APPENDIX D

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL VEHICLE AND FUEL EMISSIONS LABORATORY
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ANN ARBOR, MICHIGAN 48105

AUG 11 1997

MEMORANDUM

OFFICE OF
AIR AND RADIATION

SUBJECT: Summary of Comments on and Guidance for Use of MOBILE5b

FROM: Philip A. Lorang, Director, Assessment and Modeling Division
Office of Mobile Sources

TO: EPA Regional Office Air Directors

Introduction and Background

In October 1996, the Office of Mobile Sources (OMS) released an interim update to the highway vehicle emission factor model, currently MOBILE5a (26 March 93). This interim update, MOBILE5b, was sent to all EPA Regional Office Air Directors, with copies to the Federal Highway Administration (FHWA) and the Office of Air Quality Planning and Standards (OAQPS). OMS solicited comment on the use of MOBILE5b, with particular attention to whether its use should be required and on the impact of its use on other related analyses, most importantly State Implementation Plan (SIP) activities and transportation conformity determinations. For additional information the reader is referred to the memo that accompanied the release of MOBILE5b; a copy is attached to this document for reference.

Summary of Comments

Relatively few substantive comments were received after the release of MOBILE5b. Of the Regional Offices, comments were provided by Regions 2 and 4. FHWA commented informally to AMD staff. Comments were also received from one consulting firm, from the State of Virginia, and several individuals. These comments are briefly summarized below:

- Region 2 raised the issue that, if an area recalculates its 15% VOC reductions using MOBILE5b but conformity determinations are not allowed to be based on MOBILE5b (both of which are stated in the 10/16/96 release memo), then how is that area supposed to demonstrate conformity the next time that is required?

- Region 4 raised several issues: (1) There is a need for improved clarity of instructions for the inspection/maintenance (I/M) program credit matrix file, IMDATA4.D; (2) The fix to the HDDV NOx basic emission rates for 1998 and later model years results in an increase in NOx emission factors relative to those calculated for MOBILE5a for future years, and though this difference is not large, it may make the difference between attainment and nonattainment, on paper, for some areas; and (3) Comparisons between results based on MOBILE5a and MOBILE5b should not be allowed, meaning that many States and locals

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everything using MOBILE5b. The Region does not state their preference as to whether or not this should occur, but notes that it is a significant issue that must be taken into account in determining where to go next with respect to the various model versions.

- The State of Virginia provided their results of comparing MOBILE5a and MOBILE5b outputs for various scenarios. Beyond posing questions on the modeling of I/M programs that are not specific to MOBILE5a/b, they noted that the onboard refueling vapor recovery (ORVR) rules do not appear to have any impact on the emission factors calculated for 1996 through 2000.

- A commenter from the Texas Natural Resources Conservation Commission (TNRCC) indicated that he "finds MOBILE5b to be a much improved product over previous model versions, and appreciates EPA's efforts to issue this model. Please let us know the developing policy regarding the use of MOBILE5b in SIPs, UAM demonstrations, and conformity, and if there are any special considerations for each."

- FHWA indicated that their primary concern was the impact of MOBILE5b on conformity determinations. They indicated that so long as consistency between SIPs and conformity analyses was maintained, that the use of MOBILE5b or MOBILE5a appeared acceptable.

Several other comments that were not deemed to be "substantive," in that they did not address the questions posed in the release memo nor state any position relative to the issues raised by the release of MOBILE5b, were also provided. These comments fell in two categories, those simply posing questions (e.g., "Is there a document available that provides more detail on the changes in the model?"), and one that indicated that, whatever OMS decides to do (e.g., require use of MOBILE5b, prohibit use of MOBILE5b except in certain narrowly defined situations, allow its use at the option of the State/local), they would like to see the decision made and publicized as soon as possible. FHWA also had a contractor (Sierra Research) prepare an analysis illustrating differences between MOBILE5a and MOBILE5b emission factors under a range of conditions, and OMS has been supplied with a copy of that report ("Comparison of EPA's MOBILE5a and MOBILE5b Emission Factors Models," November 25, 1996, Report No. SR96-11-01).

After the comment period was over, additional comments were made that also have been taken into consideration in developing this proposal for guidance on the use of MOBILE5b. Region 2 brought to the attention of OMS the fact that the emission factors for carbon monoxide (CO) display only minimal differences (i.e., MOBILE5a vs. MOBILE5b for the same input specifications), regardless of the year of evaluation. Thus, while the Region agreed with OMS that "mixing and matching" of MOBILE5a and MOBILE5b results (for example, in the use of emission factors for SIP inventories and for conformity determinations) would in general not be appropriate, they also indicated that the differences in CO emission factors were so small that requiring recalculation of base year CO inventories and SIP resubmittals would not be necessary even if a State chose to use MOBILE5b for current and future modeling.

OMS concurs with this position, and agrees that, *in the case of CO only,* "mixing and matching" of MOBILE5a and MOBILE5b emission factors raises no problems with respect to consistency

of modeling for air quality and transportation purposes. This conclusion is reflected in the guidance for future use of MOBILE5b, as summarized below, under paragraph 3 (vi) and (vii).

Response to Comments

With work underway on the development of MOBILE6, AMD does not plan to spend significant resources supporting MOBILE5b. The substantive comments described above are addressed by the guidance summarized below for use of MOBILE5b until such time as MOBILE6 is available.

Guidance for Use of MOBILE5b

1. No one is required to use MOBILE5b at any time or for any reason. The continued use of MOBILE5a is acceptable for all highway vehicle emission factor modeling until such time as MOBILE6 becomes available. This includes SIP inventories and modeling, conformity determinations, and the quantification of emission reductions for open market trading (OMT) programs.

2. Any party that finds the use of MOBILE5b to be preferable (due to the ability of MOBILE5b to more easily and accurately model certain types of inspection/maintenance programs, or for any other reason) is permitted to use MOBILE5b, subject to paragraph 3 below.

3. Generally, a State or local agency wanting to use MOBILE5b should switch to it for all new analyses and submissions to EPA, except where comparisons to earlier analyses and submissions have practical consequences for program stringency or approvability. In such cases, either MOBILE5a should continue to be used for the new analysis or submission to EPA, or, the previous related analysis or submission should be redone using MOBILE5b and resubmitted.

   Specifically:

   (i) The use of MOBILE5b in a new SIP revision or submission does not trigger any requirement to recalculate and resubmit the 1990 actual inventory under Section 182 using MOBILE5b.

   (ii) A 15% VOC submission, and any post-1996 rate of progress (ROP) submissions, must use only MOBILE5a or only MOBILE5b for all emission inventories calculated for 1996, 1999, 2002, etc. In particular, if after submitting a MOBILE5a-based revision to EPA, the control strategy or modeling assumptions change and require a resubmission in which the State chooses to use MOBILE5b, then the "baseline emissions" must be recalculated using MOBILE5b as well.

   (iii) The use of MOBILE5b for a post-1996 ROP submission does not require resubmittal of a 15% SIP revision, whether or not EPA has approved the 15% SIP yet.

(iv) The submission of an attainment or maintenance demonstration using MOBILE5b does not require resubmission of any ROP revisions done using MOBILE5a.

(v) The use of MOBILE5b in an "offsetting emissions increases due to growth in vehicle miles traveled (VMT)" SIP does not require that any earlier SIP revision done using MOBILE5a be redone or resubmitted.

(vi) The use of MOBILE5b in CO "hot spot" conformity analyses does not create a requirement to use MOBILE5b in all subsequent regional (emissions budget) analyses, and does not invalidate any regional modeling already performed using MOBILE5a.

(vii) For VOC and NOx emissions, the use of MOBILE5b in an emissions budget analysis under conformity is allowed only if the emissions budget being tested was created with MOBILE5b. (As noted previously, this restriction does not apply for CO emissions.) The 1990 emission level that defines a ceiling on future emissions may be recalculated within the conformity determination, and does not require resubmission of the 1990 emission inventory required by Section 182 of the Act. Future year emission budgets must be submitted as SIP revisions.

(viii) Once a MOBILE5b-based SIP revision which establishes or revises an emissions budget applicable to conformity determinations is submitted to EPA, subsequent conformity determinations under that SIP revision must also use MOBILE5b for regional emissions estimates.

(ix) For OMT purposes, the same version of the model (whether MOBILE5a or MOBILE5b) must be used for the calculation of both baseline and controlled emissions.

The overall intent of this guidance is to provide the States and other users with maximum flexibility, avoiding unnecessary reworking of past analyses while also avoiding situations in which MOBILE5a-based and MOBILE5b-based analyses are inappropriately combined in ways that substantively impact program stringency or the approvability of submissions to EPA. AMD has tried to address the specific situations that we can foresee in the paragraphs above, and encourages the Regions to make their own determinations on other specific situations that may arise following this philosophy.

Attachment

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ATTACHMENT
OCT 11 1996

MEMORANDUM

SUBJECT: Release of MOBILE5b

FROM: Philip A. Lorang, Director /s/
Assessment and Modeling Division

TO: Regional Air Directors

Introduction

This memorandum announces the release of an interim update to the current highway vehicle emission factor model, MOBILE5a (March 26, 1993). This interim update to the model is MOBILE5b (September 14, 1996). A copy of the program and related files on diskette, and a paper copy of the revised Chapter 2 for the User's Guide to MOBILE5, is attached for your use and information. The program and all related files are also available through the Technology Transfer Network (TTN) computer bulletin board system (BBS); detailed information on the file names, contents, and location appear later in this memo.

The remainder of this memo explains what changes have been made in MOBILE5b, relative to MOBILE5a; discusses the reasons why this interim model update is being released at this time; and discusses the situations in which use of MOBILE5b is allowed. The use of MOBILE5b is not being required at this time. As part of this process, the Office of Mobile Sources (OMS) is seeking input from model users (including, but not limited to, EPA Regional Offices, State and local air quality agencies, and State and regional/local transportation and planning agencies) as to when and under what conditions use of MOBILE5b should be required.

Changes Made in MOBILE5b

The changes that have been made in this interim update to the model fall into two broad categories: Programming the effects of regulations that have been finalized since the release of MOBILE5a, and improving the modeling of various innovative inspection and maintenance (I/M) program designs and options. Most of the improved I/M program modeling features were made available previously in MOBILE5a_H; however, that version of the model was very complicated to use and did not provide the flexibility that is included in MOBILE5b. Details of the specific changes in MOBILE5b follow:

Final Regulations. The Final Rule for onboard refueling vapor recovery (ORVR) systems is reflected in MOBILE5b. While ORVR system requirements could be modeled by the user in MOBILE5a, a number of inputs were required, and no provisions were made for phase-in of the requirements. In MOBILE5b, ORVR system requirements are built-in, do not require additional user input, and the nine-year phase-in period before all light-duty gas vehicles and

light-duty gas trucks are required to have onboard VRS is modeled. The Final Rule for detergent gasoline additives has also been finalized. The effects of this rule on emissions is accounted for by MOBILE5b with no user input requirements. Finally, the revised Final Rule for reformulated gasoline (RFG) is reflected in MOBILE5b. The impact of the RFG rule is that, starting in calendar year 2000, a reduction in NOx emissions of about 6.8% for some vehicles (i.e., gasoline-fueled vehicles equipped with three-way catalysts), under summer conditions, is modeled as resulting from the new requirements.

Inspection and Maintenance (I/M) Program Options. There are a number of ways in which MOBILE5b allows modelers to more readily estimate the impacts of various I/M program options. As noted, many of these were available through use of the MOBILE5a_H version of the program; however, MOBILE5b makes these options easier to model, with less likelihood of error, and further expands the flexibility provided to the model user. Retest-based hybrid I/M programs, pressure checks, and purge checks can be easily modeled using MOBILE5b. Technician training and certification (TTC) credits are also readily obtained using MOBILE5b. The Acceleration Simulation Mode (ASM1 and ASM2) tests are now options for test type. Specific test-and-repair program effectiveness values can now be supplied by the modeler, replacing the 50% credit reduction that was coded into MOBILE5a. The phase-in of benefits for I/M programs during their first cycle of operation (first year for annual programs, first two years for biennial programs) is correctly modeled in MOBILE5b, where MOBILE5a and 5a_H did not provide correct credits under those circumstances. The credit files for estimating the benefits of all types of I/M programs have been streamlined and modified ("smart" credits) in such a way as to minimize the complexity of the input files and thus leading to reduction in the number of errors that are likely.

Miscellaneous Changes. Two other changes have been included in MOBILE5b that will benefit many model users. One of these is the reactivation of idle emission factor calculations. This is based on the "MOBILE5 Information Sheet #2" algorithm, in which exhaust emission factors at an average speed of 2.5 mph (the minimum speed for which emission factors can be calculated) are converted to grams/hour and used as estimated idle emissions. Post-processing will no longer be required to develop these values, as setting the correct flag to request idle emissions will produce those numbers as part of the program output. The other is an expansion in the range of calendar years (CY) for which emission factors can be estimated, from CY 2020 in MOBILE5a to CY 2050 in MOBILE5b. This is particularly useful in examining the full benefits of regulations being implemented in the 1990s and beyond, as the previous limit of CY 2020 was not sufficient to model complete fleet turnover for regulations taking effect in 1995 and later model years.

What is Not Included in MOBILE5b. In my November 10, 1994 memo "Planned Release of MOBILE5b," I noted several developments that had taken place that affected in-use emission estimates. Of these, most were based on implementation of new regulations (ORVR, RFG, and detergent gasoline, as described above), and are included in MOBILE5b as it is being released now. One change that was discussed in the November 10, 1994 memo is not included in MOBILE5b, however. This is the inclusion of driving patterns (e.g., high speeds, steep accelerations and decelerations) that are not part of the Federal Test Procedure (FTP). These

non-FTP ("off-cycle") driving patterns and the emissions increases associated with such driving behaviors are a subject of continuing work. As requested by the Modeling Work Group (part of the Mobile Source Technical Advisory Subcommittee of the Clean Air Act Advisory Committee, established under provisions of the Federal Advisory Committee Act), we have decided not to include our first approximation of these effects in MOBILE5b. They will be included in MOBILE6, which will undergo a more thorough peer/outside review process than has been characteristic of earlier versions of the model. The Modeling Work Group recognized the need to supply States and other model users with an interim model update containing the features detailed above, and so agreed that OMS could and should release MOBILE5b without the "non-FTP effects," which will likely be the subject of much comment and revision before their inclusion in a later model update (MOBILE6).

Why is MOBILE5b Being Released Now?

In light of the recent passage of the National Highway Bill, and the need for many States to recalculate their 15% VOC Reduction Requirements, OMS believes that this interim update to the MOBILE model will be useful for many parties in their modeling efforts. OMS would like to stress that the use of MOBILE5b is optional -- it is not required. It is being provided as a tool that may be useful in specific situations. OMS recommends that MOBILE5b be used by those areas required to recalculate their 15% VOC reductions. Additional guidance on modeling the 15% VOC Reduction Requirement for 1999 is being released under separate cover. Based on the changes included in MOBILE5b, as described above, the following guidance is offered as to who should use MOBILE5b now:

The use of MOBILE5b is not currently approved for any State Implementation Plan (SIP) submissions (other than the 15% recalculations as discussed above), nor for any transportation conformity findings, at this time. OMS wants to understand the implications of approving such uses of MOBILE5b, and wants to be able to provide comprehensive guidance on issues that arise with respect to consistency between SIPs prepared using one version of the model and conformity determinations made using another version, among other issues, before approving more widespread use of MOBILE5b. This is discussed below.

Seeking Comment on When and Whether Use of MOBILE5b Should be Required and/or Allowed

The release of a new version of the MOBILE model unavoidably raises a number of issues and questions. OMS has determined, for the reasons outlined above, that release of this interim update to the MOBILE model is warranted by the need on the part of a number of States to recalculate their 15% VOC reduction plans and the complexity of modeling a number of I/M programs (e.g., those that have not yet completed a full testing cycle before the emission factor evaluation date, those with various types of hybrid programs) using the earlier MOBILE5a and 5a_H versions of the model. However, as discussed above, OMS also wants to understand the implications of approving the use of MOBILE5b for SIP submittals and conformity findings, and to provide comprehensive guidance on issues that arise with respect to consistency between SIPs prepared using one version of the model and conformity determinations made using another

version, among other issues, before approving more widespread use of MOBILE5b.

Thus, we are seeking comment for the next sixty (60) days from all affected parties (EPA Regional Offices, State and local/regional air quality and transportation planning agencies, Department of Transportation) on how additional guidance on the need for and use of this version of the model should be handled.

For example, we would appreciate input from affected parties on how the release of MOBILE5b will impact the State Implementation Plan (SIP) process, what complications may arise from use of this version of the model, and how the release of this version of the model will impact conformity evaluations. We want this release to be a beneficial tool for those who need it, or who choose to use it for other reasons, while not unnecessarily disrupting other ongoing related work. We want users of the model to inform us of when and under what conditions it will be advantageous for them to use MOBILE5b, and when and under what conditions it will not be advantageous.

Reaction and comment from model users over the next 60 days will assist OMS in developing and providing additional guidance on the use of MOBILE5b between now and the scheduled release of a completely new version of the model, MOBILE6, in the summer of 1998. Please provide any comments addressing the issues raised in this section of this memo to our office. Comments may be submitted by mail, phone, or E-mail.

Attachments

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