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Comments on DRAFT 2009 MOVES Model to be relayed to OTAQ/EPA

Maryland Dept. of the Environment has the following initial set of observations, comments and suggestions to offer on the working of the Draft 2009 MOVES model. As the model is still being tested, more can be expected. These comments relate to 'county-based' runs with user-defined inputs wherever possible.

1) General:

MOVES model expects the annual VMT as input, aggregated by six HPMS vehicle types. This means the Highway Performance Monitoring System (HPMS) VMT or the link-based transportation demand modeling based VMT, defined with several hundreds links, has to be aggregated to six HPMS-vehicle types.

Input of VMT at link level is not implemented yet. In the absence of this implementation and technical guidance on data conversion schemes, the testing of MOVES model was limited to HPMS-based VMT.

Along the same lines we do not have the know-how to produce Vehicle Population by HPMS vehicle types, VMT-Mixes, etc. data matrices accurately to feed into the MOVES model. All our test runs used MOVES defaults for these inputs.

2) Multiple Computer Configuration and Batch Processing:

EPA recommends MOVES model to be run in a multiple computer configuration so that several computers work together to execute the model simulation runs saving considerable time. Our IT department has expressed concern that it may not work with MDE's existing network environment.

A detailed guidance with examples is needed for re-examine the running the model in the recommended Master-Slave setup with a shared work folder.

Similarly additional clear guidance with examples is needed for running the MOVES model in batch processing which is essential in developing periodic emission inventories and conducting more frequent transportation conformity analyses.

3) Emission Reporting Facility:

The emission reporting facility definitely needs enhancements. The post-processing menu must contain options for reporting standard summaries as well as detailed activity and emissions by county, by roadway type, by vehicle type, etc., on the go and be able to save results in one single report.

4) House Keeping:

a) Databases: During the testing phase or even in a normal setup there arises a need for house keeping of input and output databases to avoid cluttering. It is observed that the normal delete actions (DOS delete or delete command from the Windows Explorer) do not work always throwing 'access denied' messages. One has to reset the attributes of databases, close all programs, before the delete command works. Is there an easy way out?

b) MOVES Run #s: Over a period of testing, MOVES run numbers clog the 'Specify Parameters for Summary Report' screen from the Post-Processing/Summary Report menu option. The new run hides down completely. Need system capable of allowing the modelers to delete the unwanted older run numbers so the real ones stay visible at the top? Also the windows can be made larger.

5) County Domain:

County Domain option seems a good option to produce emissions for a non-attainment area with homogeneous characteristics. It is less time intensive compared to individual the model runs for each of the constituent counties. The disadvantage is that the State/County identity is completely lost and the domain emissions cannot be divvied up into its county emissions.

Can MOVES model be modified to yield county domain results while retaining the county-wise information for any future referencing? OR can a feature be added in the 'County' domain to model a group of counties?

6) Age Distribution Convertor:

Tim Omolewa's narrative goes here.

7) Pollutant/Process Window:

a) While pollutant and process selection are being made if the 'pollutant/process requirements' are not fully met the system does not issue a green check mark and the modeler will be wondering what is wrong.

It is suggested that the user be cautioned by a flashing message on top of screen to ensure that there are no pending messages in the message box which are hidden by default. One does not know until scrolls down.

b) To satisfy this 'pollutant/process requirement' if scrolled right, the left most column with 'Pollutants' hides out making it difficult for the user to navigate and make the intended selection. If moved down to look for any Pollutant/Process requirement messages, the top most row with 'Process' hide out creating the same problem..

It is suggested to freeze the top row and left-most columns respectively showing the Emission type (running exhaust, start exhaust, etc.) and Pollutant type (THC, NMHC, etc.) all the time providing a user-friendly screen.

c) If VOC (SIP required) are modeled then MOVES forces the user to check boxes for THC, NMHC and CH4 through this pollutant/process requirement. In the current setup screen needs to be scrolled back and forth several times to fix this. Is it possible for the system to handle this internally, once VOC box is checked for modeling?

8) Post-Processing Summary Report Window:

The 'Run Number (s)' Window within the 'Specify Parameters for Summary Report' is small. Most of space is taken by Run Number, Date and Time so the space for the actual name specified in the 'mrs' file is very much restricted. If the name is kept long for easier identification, it cannot be fully seen making it impossible to make the right choice of run number.

It is suggested to make the main window larger to address this problem.

9) Category Tables:

MOBILE6 User's Guide has several category tables, in the very beginning, between pages 14 and 16. This serves as a good reference. MOVES model features many more tables. It is strongly suggested that similar information is included in MOVES guidance documents to serve as a ready reference.

10) Where is GASPM?

MOBILE6 Pollutant Categories can be found in Table 1.2.6 on page 16. Numbers 7-10 refer to pollutants SO4, OCARBON, ECARBON, and GASPM (Total Carbon portion of gasoline exhaust particulates).

Draft MOVES 2009 User Guide exhibits Pollutants/Process Panel on page 29. Both PM categories (PM2.5 and PM10) list their constituents as OC, EC, and SO4.

The question is what happened to GASPM? Is it merged with one of remaining three?

11) Project Level Modeling:

If the Calculation Type is selected as Emission Rates, Project Domain/Scale cannot be chosen (See page 16 of the Draft MOVES 2009 User Guide). But a vast majority of highway projects include the Hot Spot Analyses for CO dispersion modeling of signalized roadway intersections requiring emission factors. What is the resolution of this issue?

The sample example shown is for a parking lot. Need detailed guidance with examples covering a wide variety of roadway projects.

12) Appendix A. Table of Acronyms:

HPMS = Highway Performance Monitoring System.

The Draft MOVES 2009 Software Design and Reference Manual exhibit mistakenly HPMS as Highway Performance Management System, on page 262.

13) Regulatory Class of Vehicles:

Table 9-2a, on page 34 exhibits MOVES Source Bin Definitions for Fuel Type, Engine Technology, Loaded Weight, Engine Size and Regulatory Class. It will be a good idea if all the vehicles under Regulatory Class are defined along with their acronyms.

14) Error Handling with empty County Databases:

A summer-day run spec for a valid MD County was created. The run was accidentally executed without populating the County databases (empty). MOVES started executing without any warning. After about 13 minutes, it announces of run completion without any warning. Post Processing can be performed without any error except that the report will be empty.

It is suggested the system should check for presence of data in critical databases before starting the run. It should abort with cryptic messages.

15) Refueling Emissions:

In Maryland 14 out of 24 counties have Stage II Refueling Controls. How do we model Stage II Program in MOVES? There is no mention of this control anywhere in the User's Manual and the Software Design & Reference Manual.

16) I/M Table in County Data Manager:

It is suggested to make the handling of I/M Table similar to the other exportable/importable tables for vehicle population, VMT, etc., instead of the current capability available thru a line by line editor. Most comprehensive table can be prepared outside of MOVES like other tables and imported for use in MOVES execution. This will ensure that all pollutants/processes are covered for all applicable vehicle types and made available in the form of I/M Table. MOVES will use only what is required for the run.

In the current system if the first run is made for all pollutants with pre-processing completely done followed by a minimal pollutant/process combination, the I/M Table reduces to a bear minimum dynamically. Any further run with more pollutant/processed require repeating of pre-processing for I/M again.

This can be avoided by rendering the I/M Table importable like other tables.