

## Memorandum

To: John Koupal, EPA/OTAQ  
From: Becky Battye, EC/R Incorporated  
Subject: Comments from MOVES July 31, 2012 workgroup meeting  
Date: September 22, 2012

At the conclusion of the July 31, 2012 MOVES workgroup meeting, John Koupal asked the members to submit any comments on EPAs approach to the development of MOVES 2013. EC/R has received three sets of comments from Chris Frey (NC State University); Tim French (EMA); and Steve Potter (State of CT). All three sets of comments are summarized below and the full comments are attached to this memorandum.

Chris Frey submitted his comments prior to the July 31, 2012.

- Has there been an evaluation of MOVES emission rates versus temperature for LDGV, HDDV, etc?
- Concerning the accuracy of cold start data. Have the cold start estimates been evaluated? If not, is there a plan to evaluate them?

Tim French raised a concern regarding the schedule for future MOVES 2013 meetings. The proposed schedule has NONROAD updates being presented and discussed in March 2013 which will not allow for any meaningful review before MOVES 2013 is finalized. EMA requests that EPA not withhold the NONROAD presentations and updates until the last workshop, but rather, that the Agency release the NONROAD materials during the earlier workshops.

Steve Potter provided comments to be addressed during the next meeting September 25, 2012 on Heavy-duty Updates and New Features. In summary he would like more transparency in the inputs that impact the apportionment of emissions factors.

- The MOBILE6 to MOVES VMT convertors produce a VMT based ramp fraction input rather than a VHT based ramp fraction. He provides a sensitivity analyses on ramp fraction inputs for Fairfield and New Haven Counties in CT.
- The SourceBinDistribution Generator is complex and likely based on outdated fleet distribution data.

## **Attachment 1 – Comments from Chris Frey**

William and John:

I don't think I can make the call today.

A question I'd like to raise is regarding the sensitivity of MOVES to ambient temperature. We have done sensitivity analysis on MOVES vs. temperature and the trends seem inconsistent or in some cases counter-intuitive. I think others may have similar findings. Has there been evaluation of MOVES emission rates versus temperature for LDGV, HDDV, etc.? I recommend some discussion of this.

Also, it would be good to review the accuracy of cold start data for gasoline vehicles. As hot running tailpipe emissions come down, cold start seems to be of increasing importance. MOVES estimates of cold start emissions are very sensitive to factors such as soak duration. Have the cold start estimates been evaluated? If not, is there a plan to evaluate them?

I have been trying to measure some cold start data but given funding constraints, have not gotten very far with it. However, my impression is that MOVES may be leading to overestimates of the contribution of cold start to total trip emissions for some analyses we did based on seven vehicles for which we did cold start measurements. This is not a large enough sample on our part to say much with certainty, but I think this topic merits a closer look.

Thanks,

Chris Frey

## Attachment 2 – Comments from Timothy French



333 West Wacker Drive, Suite 810  
Chicago, Illinois 60606  
Tel: (312) 929-1970 | Fax: (312) 929-1975  
www.truckandenginemanufacturers.org

September 7, 2012

John Koupal  
Director, Air Quality and Modeling Center  
Assessment and Standards Division  
U.S. EPA Office of Transportation and Air Quality  
2000 Traverwood Drive  
Ann Arbor, MI 48105

**RE: EMA Comments on MOVES2013 - July 31, 2012 Workshop**

Dear John:

At EPA's July 31, 2012, MOVES2013 workshop, the Agency presented its schedule for future MOVES 2013 meetings as follows:

- September 25, 2012 (Heavy-duty updates and new features)
- November 27, 2012 (Evaporative emission updates)
- January 29, 2013 (Fuel updates)
- March 26, 2013 (NONROAD updates)

Under the foregoing schedule, the NONROAD updates will not be presented or discussed until the last workshop in March. As a result, this schedule will provide inadequate time for any meaningful review of the NONROAD updates, since EPA has stated its intent to finalize MOVES2013 by the middle of 2013. If the industry has significant comments and concerns relating to the NONROAD materials (which is likely), it will be difficult, if not impossible, for the industry to develop its comments in a timely manner if all of the NONROAD updates and related modeling materials are withheld until the last minute. Just as important, it will be similarly difficult, if not impossible, for the Agency to review and consider industry's comments in any meaningful way.

Accordingly, EMA requests that EPA not withhold the NONROAD presentations and updates until the last workshop, but rather, that the Agency release the NONROAD materials during the earlier workshops. This would facilitate EMA's timely review of the NONROAD materials, as well as EPA's timely consideration and response to EMA's comments.

If you have questions regarding this matter, please do not hesitate to contact me.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Timothy A. French'. The signature is stylized and somewhat cursive.

Timothy A. French

cc: Tom Darlington  
Kevin Kokrda  
Mike Pankonin

### Attachment 3 – Comments from Steven Potter

The issues (questions and observations) provided below may be of use in discussing Heavy Duty Truck emissions in the next FACA meeting.

EPA has put a great deal of effort in verifying and validating underlying emission factors. The inputs that impact the apportionment of the underlying emission factors would appear to be an important piece to obtaining accurate emission estimates. There are cases where very little transparency is provided in the MOVES model to the point where we cannot even see what is being assumed/applied within the model, there are a lack of sensitivity evaluations to help steer decisions on developing inputs and there are some minor corrections that could improve guidance consistency and clarity.

1) While the impact to emissions is apparently relatively small in magnitude, I would point out that a minor correction to the MOBILE6 to MOVES VMT converters and associated instructions could improve clarity and consistency. The converters and associated instructions produce a VMT based ramp fraction input rather than a VHT based ramp fraction. Guidance and converters should provide consistent and correct inputs, even if the MOVES importer automatically gives a green checkbox without overriding the default 8% ramp fraction value. The attached email provides a MOVES2010a sensitivity analyses on ramp fraction inputs for Fairfield and New Haven Counties in Connecticut. The sensitivity results are either relatively small in magnitude or relatively small in percentage increase (<1%). Still it would be wise to consistently present VHT based instructions and guidance for this input. If average ramp speed were 34.6 mph and highway speed were 65 mph, %VHT would be almost twice the value of %VMT. Using these speed assumptions a 4% VMT based ramp fraction would correspond to close to an 8% VHT based ramp fraction that would increase emissions. For example, gasoline vehicles NOx emissions would increase by 83 tons (i.e. 4 % VHT ramp fraction x 20.77 ton/% VHT ramp fraction), which corresponds to a 2.8% increase in gasoline vehicles NOx emissions.

2) The SourceBinDistributionGenerator appears to play a significant role in emission calculations, it appears to be fairly complex, it is likely based on outdated fleet distribution data, it is not transparent to the point where the distribution may not even be visible in input or output databases, it does not appear that users can modify this distribution and the sensitivity of the calculated emissions to changes to the distribution does not appear to be available.

Item 2 is difficult to understand and likely even more difficult to address. I have summarized questions in the following paragraphs and then tried to explain where and why the questions were raised in hopes that some improvements can be obtained.

EPA has performed validations of emission factors within MOVES but what has been done with respect to the applied distribution of these emission factors? Is it even possible to adjust, view source type to Source Bin mappings or understand the impact of the assumptions invoked by the SourceBinDistributionGenerator on calculated emissions? What are the emission estimate sensitivities to mal-alignment of Source Type to Source Bin mapping distributions when compared to actual fleet distributions? Are there any checks or correlations between what is generated as a SourceBinDistributionGenerator mapping and an SCC output estimate?

We have noted significant differences between the EPA projected fleet composition and the fleet composition of the registered fleet. I recall hearing that EPA fleet data associated with the distributions used internally within the

MOVES model are from the 1990's and the census survey's that supported gathering the fleet data are no longer collected in more recent census surveys.

The Ann Arbor conference raised issues with the vintage of the fleet data and I would like to further bring an element of the issue into focus by providing the following observations.

- 1) We have noted that our population of Light Duty Vehicles that are not Light Duty Trucks is higher than what EPA projected nationally.
- 2) LDT4 was projected to be relatively low by EPA, but LDT3 and LDT4 vehicles appear to be lower than projected, with some vehicles like the Hummer (HDV2b/HDV3/HDV4), the Lincoln Navigator (LDT4/HDV2B/HDV3) and the Ford Expedition (LDT4/HDV2b/HDV3) appearing to take the place of these projected LDT3 and LDT4 vehicles.
- 3) Adjustments to localize the data (HPMS, etc.) result in a reduction in the Source Type 31 and 32 VMT and populations, because of a reduction in Light Duty Trucks (i.e. Cars increased and light truck VMT/populations decreased). Use of EPA percentage mappings of source types to regulatory classes provided in Technical Guidance documents for the purpose of converting from vehicle regulatory classes (i.e. MOBILE62 classifications) results in more of the fleet going to source type 32 due to the heavier distribution of the trucks.
- 4) A partial driver of the push to either smaller fuel efficient cars or larger trucks could be IRS tax code restrictions on smaller trucks (see attached MS Word Documents). There are caps on the depreciation allowed for a smaller vehicle, but full depreciation of a larger truck is allowed in a single year, thus providing a tax benefit for the purchase of a larger truck.

The latest available Software Development Reference Manual (link provided after this sentence) does not provide enough information for me to evaluate what is internally implemented within the MOVES model. The manual <http://www.epa.gov/otag/models/moves/420b09007.pdf> Section 9.3 describes some of the complexity associated with mapping the MOVES source types and to the regulatory classes in the Source Bins. Apparently, Source Type 31 differs from Source Type 32 in not only the size distribution (i.e. regulatory class distribution) of the vehicles, but also mileage accumulation, drive profile and drive schedule.

An example of this issue at the Project Level would be an analysis that was comparing the use of Honda CRV's versus Hummer H1's for a large service fleet. How could one adjust the SourceBinDistribution to generate the appropriate mappings? Can this even be done?

This is not a simple issue, MOVES is more of a macro scale model than a model that targets specific vehicle type emissions and it may be that the only available alternative to calculating emissions accurately may be to use a consistent methodology that provides a consistent approximation of emissions.

The SourceBinDistributionGenerator appears to play a significant role in emission calculations, making it important to address these questions regarding SourceBinDistributionGenerator emission sensitivity and whether MOVES users can change, or even see the SourceBinDistributionGenerator mappings.

Thanks for considering this concern.

Steven Potter

Technical Services Group  
Bureau of Air Management  
Connecticut Department of Energy and Environmental Protection  
79 Elm Street, Hartford, CT 06106-5127  
P: 860-424-3385 | F: 860 424-4063 | E: [Steven.Potter@ct.gov](mailto:Steven.Potter@ct.gov)