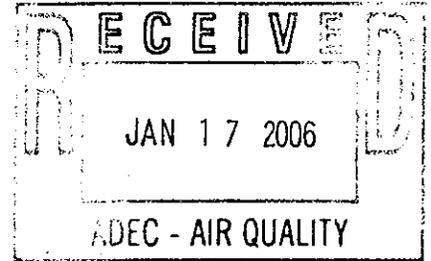




UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 10  
1200 Sixth Avenue  
Seattle, WA 98101

13 JAN 2006



Reply To  
Attn Of: OEA-095

Mr. Alan E. Schuler  
Alaska Department of Environmental Conservation  
Division of Air Quality, Air Permits Program  
410 Willoughby Avenue, Suite 303  
Juneau, AK 99801-1795

Dear Alan,

EPA Region 10 has reviewed the State of Alaska, 20 October 2004, letter request and the two technical documents prepared by MACTEC for the State of Alaska to determine if the Plume Volume Molar Ratio Method (PVMRM) should be designated as a refined technique and acceptable for use in quantifying ambient air nitrogen dioxide concentration impacts as well as for credits on a case-by-case basis, i.e., a non-guideline technique. In making the demonstration, PVMRM was coded into the AERMOD dispersion program as a non-default regulatory option and evaluated for performance against two data sets. The two documents are:

Sensitivity Analysis of PVMRM and OLM in AERMOD dated September 2004

Evaluation of Bias In AERMOD-PVMRM dated June 2005

The first report describes a sensitivity analysis of the PVMRM and Ozone Limiting Method (OLM) options embedded in the AERMOD dispersion code. The objective of the analysis is to determine how well nitrogen dioxide concentrations predicted by PVMRM compared to nitrogen dioxide estimates predicted by OLM Tier 1 and Tier 3, and the Ambient Ratio Method (ARM) under a range of dispersion cases, meteorological conditions, source characteristics, source types and source groupings. The report concludes that "...the PVMRM option appears to provide a more realistic treatment of the conversion of  $\text{NO}_x$  to  $\text{NO}_2$  as a function of downwind distance from the source than OLM or the other  $\text{NO}_2$  screen options."

The second report describes a performance evaluation of the PVMRM option embedded in the AERMOD dispersion code to determine the bias in model predictions. Bias is determined by utilizing two aircraft measurement studies of power plant plumes and two long term field studies. To judge bias or performance, a factor of two agreement between model predictions and observations was employed in the study. In addition, the power plant in-stack  $\text{NO}_2/\text{NO}_x$  ratio of 0.05 was used in the evaluations. The report concludes that "...the AERMOD-PVMRM algorithm is judged to provide unbiased estimates of the  $\text{NO}_2/\text{NO}_x$  ratio based on criteria that are comparable to, or more rigorous than, evaluations performed for other dispersion models that are judged to be refined, implying unbiased performance."

Based on the results and conclusions contained in the reports, it is my judgement that:

1. The first study adequately supports a Region 10 determination that the non-default PVMRM option as coded in the AERMOD dispersion program is an acceptable non-

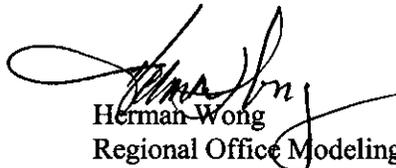
guideline technique to quantify ambient nitrogen dioxide concentration impacts from combustion sources emitting oxides of nitrogen through a stack.

2. The second study sufficiently supports a Region 10 determination that the non-default PVMRM option as coded in the AERMOD dispersion program results in unbiased concentration impacts and is acceptable for quantifying emission credits.
3. The use of the PVMRM option in the AERMOD dispersion code is limited to ambient air quality analyses prepared for the State of Alaska.
4. The use of the PVMRM option in the AERMOD dispersion code requires Regional Office Modeling Contact approval prior to its use in air quality analyses.

In a separate correspondence, Region 10 will request that the Office of Air Quality Planning and Standards (OAQPS) consider elevating PVMRM to a refined guideline technique in the Guideline on Air Quality Models. In 70FR68218, dated 09 November 2005, the Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions; Final Rule, the PVMRM option in the AERMOD Modeling System (version 04300) is identified as a non-regulatory, non-default option in the preamble and in Appendix A to Appendix W, Section A.1.1, and currently being tested as a refined technique in Section 5.1.j. If and when OAQPS makes the elevation to a refined guideline technique, Region 10 approval for the use of PVMRM will no longer be required.

Should you have any questions, please don't hesitate to call me at 206.553.4858

Sincerely,



Herman Wong  
Regional Office Modeling Contact

cc: Tyler Fox, OAQPS, Air Quality Modeling Group  
Warren Peters, OAQPS, Model Clearinghouse.