UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Research Triangle Park, NC 27711

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

TO: Regional Office Modeling Contacts

FROM: Tyler Fox, Leader
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DATE: December 11, 2007

RE: Clarification on Regulatory Status of Proprietary Versions of AERMOD

Several questions have been raised recently within the modeling community regarding the regulatory status of commercial software packages based on the AERMOD dispersion model. These commercial products are being marketed by third-party vendors as optimized versions of AERMOD that can provide the benefit of reduced model runtimes from "parallel" processing utilizing multiple processors. The purpose of this memorandum is to clarify the regulatory status of these third-party proprietary software packages based on the guidance presented in the *Guideline on Air Quality Models* (Appendix W to 40 CFR Part 51). While these recent questions have arisen in the context of "parallelized" versions of AERMOD, the guidance presented in this memorandum applies generically to any proprietary software based on an EPA preferred model that is being used for regulatory modeling purposes.

The proposed use of proprietary software based on an EPA preferred model for regulatory modeling applications raises two issues: 1) whether proprietary software can be considered as a preferred model; and 2) the status of the preferred model in cases where changes have been made to the code. The guidance in Appendix W regarding both of these issues is summarized below.

The general issue of whether proprietary software can be considered as a preferred model is addressed in Section 3.1 of Appendix W, "Preferred Modeling Techniques." This section clearly states in paragraph 3.1.1.b.vi that a preferred "model and its code cannot be proprietary." Thus, any proprietary software code based on the AERMOD model cannot be considered as a preferred model under Appendix W. While the definition of "proprietary software" may vary depending on the context beyond Appendix W, the key requirements for the preferred model stated in this section are that "the model and source code" be "available to users" at "reasonable cost" or through "public access." Any software package that does not meet these basic requirements cannot be considered as a preferred model.

Section 3.1 of Appendix W also addresses the second issue regarding the status of the preferred model in situations where "changes are made to the preferred model without affecting the concentration estimates." Examples of such modifications cited in paragraph 3.1.2.b of Appendix W are changes that "enable the use" of the model "on a different computer platform", or changes that "affect only the format or averaging time of the model results." In these situations, Appendix W stipulates that "when any changes are made, the Regional Administrator should require a test case example to demonstrate that the concentration estimates are not affected."

Since Section 3.1 refers specifically to preferred models, it cannot be applied to proprietary software based on the AERMOD model. However, applicable guidance in the case of proprietary software is provided in Section 3.2 under "Use of Alternative Models." The first condition for approval of an alternative model cited under this section in paragraph 3.2.2.b allows for the model to be approved for use "if a demonstration can be made that the model produces concentration estimates equivalent to the estimates obtained using a preferred model." Paragraph 3.2.2.c establishes the following criterion for equivalency in order to satisfy this condition: "demonstrating that the maximum or highest, second highest concentrations are within 2 percent of the estimates obtained from the preferred model." This paragraph further states that "the option to show equivalency is intended as a simple demonstration of acceptability for an alternative model that is so nearly identical to a preferred model . . . that it can be treated for practical purposes as the preferred model." This description of an alternative model that is "nearly identical to a preferred model" is considered to be an appropriate characterization of the types of proprietary software based on the AERMOD model code that are the main impetus for this memorandum.

As with the case of changes to the preferred model code that do not affect concentration estimates addressed in Section 3.1, the determination of acceptability of an alternative model under Section 3.2 is a Regional Office responsibility. The scope of the equivalency demonstration, whether in the case of non-proprietary changes to the AERMOD code or proprietary code based on the AERMOD model, is at the discretion of the Regional Office. In the case of proprietary software packages based on AERMOD, knowledge of the nature and extent of code changes, while protecting confidential business information, may be necessary for establishing the scope of such equivalency demonstrations. While a sufficiently broad generic demonstration of equivalency may be adequate in many cases, some applications may require additional case-specific demonstrations based on the use of a particular set of model inputs or options. The standard test cases packaged with the AERMOD model on the SCRAM website provide a reasonable starting point for equivalency demonstrations, with additional tests to be determined as needed on a case-by-case basis.

In order to apply this guidance, a distinction should be made between peripheral software, such as a proprietary graphical user interface (GUI) designed to facilitate setting up the inputs for the AERMOD model and/or analyzing the model results, and the dispersion model kernel that is utilized by or embedded within the GUI. Appendix W does not specifically address the status of proprietary GUIs or other peripheral software related to the AERMOD model, and we recognize the advantages that such software can offer to setting up the complex model inputs that may be required for some applications. The focus of the guidance cited above is on the dispersion model

kernel and any changes that may have been made to the AERMOD model code to develop that kernel.

While the determination of acceptability of a model is a Regional Office responsibility, the burden of proof is on the applicant to provide an adequate demonstration of equivalency, subject to Regional Office acceptance, before these proprietary codes based on AERMOD can be used as the basis for regulatory modeling demonstrations. The Model Clearinghouse process may also be utilized by the Regional Office for highly sensitive or unusual cases and where an issue of national consistency is involved.

The provisions in Appendix W regarding proprietary software are intended to preserve the openness and transparency required for regulatory modeling applications. In order to maintain this transparency, EPA expects that developers of proprietary software packages based on the AERMOD model (or other EPA-preferred models) will clearly identify outputs from these proprietary products as distinguishable from the outputs generated by the standard EPA version of the code. We further expect that Regional Offices will notify OAQPS through the Model Clearinghouse of cases where proprietary software packages based on AERMOD have been approved for regulatory applications. Such notification will also contribute to the openness and transparency of the regulatory modeling process and to fostering national consistency in the application of the guidance in Appendix W relevant to these cases.

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