

US EPA ARCHIVE DOCUMENT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
Office of Air Quality Planning and Standards  
Research Triangle Park, North Carolina 27711

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MEMORANDUM

SUBJECT: Clarification of Prevention of Significant  
Deterioration (PSD) Guidance for Modeling Class I  
Area Impacts

FROM: John S. Seitz, Director  
Office of Air Quality Planning and Standards (MD-10)

TO: See Addressees

A question has arisen concerning the appropriate modeling range for completing the required Class I area analysis under the prevention of significant deterioration (PSD) permit program. Specifically, the issue is whether the Class I area analysis should be limited to the impacts of sources that are located within 100 kilometers of a Class I area. As described in detail below, the Agency's position is that generally a 100 kilometer range is an acceptable modeling domain. However, impacts from large sources located at distances greater than 100 kilometers need to be considered when such impacts reasonably could affect the outcome of the Class I analysis.

In order to implement the PSD program, some States have adopted a policy which limits long-range transport modeling to a fixed distance such as 100 kilometers. Several recently-issued PSD permits have been challenged in part because of the imposition of a 100-kilometer modeling limitation which allegedly has resulted in certain major source impacts being excluded from Class I area air quality analyses. Petitioners have argued that had such impacts been considered, the Class I analysis could have had different results.

Historically, the Environmental Protection Agency (EPA) guidance for modeling air quality impacts under the PSD program has

tended to focus more on the requirements for a Class II modeling analysis. Such guidance has provided that applicants need not model beyond the point of significant impact of the source or 50 kilometers (the normal useful range of EPA-approved Gaussian plume models). PSD policy guidance has been less specific for Class I area analyses, although the importance of modeling beyond the accepted range of a Class II analysis has been stated.

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In a 1979 EPA memo<sup>1</sup>, Regional Offices were advised to provide notice to the Federal Land Manager of any proposed PSD sources that would locate within 100 kilometers of a Class I area. The memo further indicated that certain sources (i. e. , very large sources) located at distances greater than 100 kilometers could affect air quality related values and, therefore, should be included in the notification process on a case-by-case basis. Other EPA guidance concerning the evaluation of source impacts on Class I areas, while nonspecific, generally indicated that the special protection afforded to Class I areas under the Clean Air Act warranted the consideration of any "reasonably expected impacts" regardless of the 50 kilometers limitation applied to Class II area analyses<sup>2</sup>.

Trajectory-based long-range transport models are available for estimating air pollutant concentrations beyond the 50-kilometer range typically associated with Gaussian plume models used in Class II area analyses. Representative model evaluations of long-range transport models<sup>3</sup> have generally shown that, while the models tend to overestimate the maximum values, most values are within a factor of two of measured concentrations. Also, long-range transport model performance is strongly coupled to the quality of the meteorological data, and the best performance is obtained when the application of the model is tailored to the location of the analysis.

<sup>1</sup>March 19, 1979 memorandum from David G. Hawkins, Assistant Administrator for Air, Noise, and Radiation, to Regional Administrators.

<sup>2</sup>See the following references: 43 FR 26380, June 19, 1978, p. 26398.

U.S. Environmental Protection Agency, (1980): "Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD) , " EPA-450/4-80-012. Office of Air Quality Planning and Standards, Research Triangle Park, NC, p. A-7.

U.S. Environmental Protection Agency, (1986): "Guideline on Air Quality Models (Revised)." EPA-450/2-78-027R. Office of Air Quality Planning and Standards, Research Triangle Park, NC, p. 7-8.

3See the following references: U.S. Environmental Protection Agency, (1986): "Evaluation of Short-Term Long-Range Transport Models. Volume I. Analysis Procedures and Results." EPA-450/4-86-016a. Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina.

U.S. Environmental Protection Agency, (1989): "Evaluation and Sensitivity Analyses Results of the MESOPUFF II Model with CAPTEX Measurements." EPA-600/3-89-056. Office of Research and Development, Research Triangle Park, North Carolina.

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These and similar studies suggest there are no technical constraints on the use of long-range transport air quality models to evaluate impacts for transport distances in the 100-200 kilometer range. However, until a sufficient reservoir of expertise and experience develops, long-range transport models will require expert assistance in order to provide useful information for assessing impacts. Also, for these transport distances, the selection of sources for PSD modeling involves a judgement of whether these distant sources are germane to the assessment of Class I area impacts. Thus, the selection of sources and the adaptation of the long-range transport modeling to accommodate these sources for a specific situation are interconnected and must be done on a case-by-case basis.

There are acceptable examples of situations where States have used long-range transport models on a case-by-case basis to carry out Class I air quality analyses. The State of North Dakota has used MSPUFF (an adaptation of the original MESOPUFF model) for analyses involving sources located at distances of 70 to 140 kilometers from a Class I area. The State of Maryland used LONGZ and VALLEY (Gaussian plume dispersion models) to perform a screening analysis involving sources up to 130 kilometers from a Class I area in West Virginia. Also, the State of Florida recently used MESOPUFF II to assess the impact of sources up to 110 kilometers from a Class I area.

In conclusion, the use of long-range transport models is recommended for PSD Class I area modeling situations so long as a case-by-case analysis is done. Routinely, major source emissions within 100 kilometers of a Class I area should be considered when assessing pollutant impacts on that Class I area. However, circumstances may warrant consideration of other sources (initially using various screening techniques) which are located more than 100 kilometers from a Class I area if there is reason to believe that such sources could affect the air quality in the Class I area. If a long-range transport model is going to be used for a Class I area, the source inventory, modeling procedures and long-range model selected for use should be determined on a case-by-case basis in consultation with the appropriate EPA Regional Office and Federal Land Manager.

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