



Project Summary

An Emission Inventory for Urban Particle Model Validation in the Philadelphia AQCR

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The goal of this research project was to prepare the necessary emission inputs for use in validation of an urban particle model in the Philadelphia area. The model, PEM-2, was developed by the Atmospheric Sciences Research Laboratory based on the Texas Episodic Model. In compiling emissions data for PEM-2, maximum use was made of the inventory generated earlier for validation of the Urban Airshed photochemical oxidant model in Philadelphia.

Hourly emission estimates were compiled for the mid-July to mid-August 1982 ambient monitoring period. Five pollutants were considered: coarse particles, fine particles, coarse sulfate, fine sulfate, and sulfur dioxide. Emission source categories were divided into major point, minor point, industrial process fugitive, highway vehicle, and area sources. Limited source testing and paved road silt load sampling were conducted.

Validating the model with these inputs will not be straightforward since the emissions do not represent real-time conditions, relatively large (2.5 by 2.5-kilometer) grids were used, and some of the monitoring sites are impacted by nearby fugitive sources.

This Project Summary was developed by EPA's Atmospheric Sciences Research Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

EPA is in the process of revising the National Ambient Air Quality Standards for total suspended particulates to account for the fact that smaller particles are responsible for adverse health effects. The new standard has not been finalized but is expected to be for PM₁₀ particulate matter with an aerodynamic diameter $\leq 10 \mu\text{m}$.

After the new standard is promulgated, the states will be required to revise their State Implementation Plans for attainment or maintenance of the standard. The development and validation of an urban particle model for the states to use is the responsibility of the Atmospheric Sciences Research Laboratory (ASRL). ASRL chose Philadelphia for a validation study because it has a good mix of industrial emissions and is the site of an EPA validation program for the Urban Airshed photochemical oxidant model.

Model Input

To assist ASRL in the validation program, emissions input for the urban particle model PEM-2 were prepared. Hourly emission estimates were developed during the monitoring period for five pollutants: fine particles ($<2.5 \mu\text{m}$), coarse particles (2.5 to $10 \mu\text{m}$), primary sulfate ($<2.5 \mu\text{m}$), primary sulfate between 2.5 and $10 \mu\text{m}$, and sulfur dioxide. The monitoring period extended from 6 p.m. on July 14 to 6 p.m. on August 13, 1982. All point sources other than 300 major point sources were com-



bined into the two hundred eighty nine 2.5 by 2.5-kilometer grid cells used for area sources and highway vehicles.

Highway vehicle emissions data were generated by the Delaware Valley Regional Planning Commission under subcontract. Limited source testing was conducted and silt loading samples were collected from selected paved roads to provide Philadelphia-specific data for model validation.

Conclusion

Model results should be interpreted by keeping in mind that the emissions data developed do not represent real-time conditions. The use of relatively large 2.5 by 2.5-kilometer grids in the study complicates model validation since impacts from paved roads very near the monitors are likely to be the most significant contributors. In addition, several of the monitoring sites used to collect ambient data exhibit microscale source influences and one is located on top of a building, which makes comparisons with model predictions more problematical.

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The complete report, entitled "An Emission Inventory for Urban Particle Model Validation in the Philadelphia AQCR," (Order No. PB 85-207 611/AS; Cost: \$43.00, subject to change) will be available only from:

National Technical Information Service

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