



Project Summary

Inhalable Particulate Network Report: Data Summary (Mass Concentrations Only), Vol. III, January 1983 - December 1984

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This report is the third in a series of **Inhalable Particulate (IP) Network** reports covering 88 of the 157 sites within the United States. PM_{10} (10 μm) particulate mass data and data summaries for the 88 active sampling sites are highlighted. Field operations and quality assurance procedures are referenced to preceding reports. Results of field operations and quality control audits are given.

This Project Summary was developed by EPA's Environmental Monitoring Systems 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

To meet the 1977 Clean Air Act requirement for a reappraisal of the National Ambient Air Quality Standard for particulate matter, EMSL-RTP, in conjunction with EPA's Office of Air Quality Planning and Standards, designed and implemented a nationwide monitoring network to obtain the necessary data on which to base a proposed revision of the particulate matter standard and to obtain data on inhalable particulates.

The network was designed to obtain data on airborne particles with a mean aerodynamic diameter equal to or less than 15 μm . In 1981, as a result of public comment, recommendations by the International Standards Organization Task Group, and recommendations by the EPA

Clean Air Science Advisory Committee, emphasis was shifted from 0 to 15 μm (PM_{15}) to 0 to 10 μm (PM_{10}) aerodynamic diameter size fraction. Publications EPA/600/4-84/088a and EPA/600/4-84/088b (November 1984) address both PM_{15} and PM_{10} data from 1979 through 1982. This report emphasizes PM_{10} data collected at the 88 active sites from January 1983 through December 1984. The equipment and sampling responsibilities were transferred to the respective EPA Regional Offices after the 1984 sampling was completed.

Procedure

In 1978, it was anticipated that the data from the Inhalable Particulate Network would be used to revise the existing total suspended particulate (TSP) standard to a standard based on the specific particle size range of 15 μm mean aerodynamic diameter and below, and to a lesser degree to provide information on the possible sources of the particles for subsequent control strategy implementation. To accomplish this, establishment of a nationwide network of 200 air-monitoring sites over a three-year period was planned. However, because of resource constraints, only 157 sites were placed on line. By 1983, sampling had been completed at 77 sites. Eighty regular and eight collocated sites were still in operation during 1983 and 1984.

There were two original requirements for the IP Network. The first requirement was to collect PM_{15} data at all sites. The

second was to collect a sample-year of comparison data for both TSP and PM₁₅ to investigate IP/TSP relationships. Later, the PM₁₅ requirement was extended to include PM₁₀; therefore, equipment modifications were made and sampling dates were extended. In early 1978, when the IP Network was being planned, a recently developed dichotomous sampler was available and was incorporated into the network. This PM₁₅ sampler provided two particle size fractions. The smaller size fraction (fine) included particles below 2.5 μ m. The larger size fraction (course) included particles from the 2.5 to 15 μ m range (PM₁₅). This sampler was later modified to provide PM₁₀ size particles. A modified high-volume (Hi-Vol) sampler was also used for PM₁₅ data, providing a single fraction of 15 μ m and smaller particles. This instrument, called a size selective sampler (SSS), offered ease of operation, single sample, large sample size, and cost savings.

Results and Discussion

Data in this report include 2984 TSP, 352 SSS, 1747 dichotomous sampler (Dichot) PM₁₅ and 2614 Dichot PM₁₀ samples. These data increased the overall IP data base total of 15369 TSP Hi-Vol, 7715 SSS Hi-Vol, and 15147 Dichot values over the 1979-1984 period. Because of staggered sampler set-up schedules and sampler downtime, TSP, SSS, and Dichot were not always operated simultaneously. Therefore, means of different sampler types must be compared carefully. The number of samples, means, standard deviation, minimum, maximum, start dates, and stop dates, are given in the full report.

Only data from the last two years of the EMSL-RTP IP Network are described in the report. Individual values for TSP Hi-Vol; PM₁₅ Dichot coarse, fine, and total; and PM₁₅ SSS mass are presented. The ratios Dichot total to TSP Hi-Vol, and SSS to TSP Hi-Vol are summarized for PM₁₅ mass. Similar data are presented for PM₁₀.

Quality assurance and quality control audit results are presented in the report and used to estimate sampling accuracy by examining sample flow rate.

Conclusions

Mass data from the two years (1983 and 1984), from the EMSL-RTP IP Network are presented in the full report including individual values for TSP Hi-Vol; PM₁₅ and PM₁₀ Dichot coarse and total; and PM₁₅ SSS. Ratios of Dichot total to TSP Hi-Vol based on audit results are presented and used to estimate sampling accuracy by ex-

amining sample flow rate. Audit results show that the flow rate accuracy within 90% is both reasonable and attainable.

The relationship of IP to TSP was investigated. Using paired data, means were calculated for Dichot total PM₁₀, Dichot total PM₁₅ and TSP. The ratio of the PM₁₅ mean to TSP mean varied from 0.36 in Nashville, TN, to 0.81 in Ft. Collins, CO. The similar ratio for PM₁₀ to TSP varied from 0.34 in Boston, MA, to 0.68 in Research Triangle Park, NC. The general consensus that suspended particulate matter is a complex mixture of large and small particles, both naturally occurring and man-made, is supported by the absence of a simple, consistent ratio of IP to TSP. The range of IP to TSP ratios in this small data set, however, emphasizes the requirement for careful, statistical analysis of IP data before using the data for decision-making.

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The complete report, entitled "Inhalable Particulate Network Report: Data Summary (Mass Concentrations Only), Volume III. January 1983 - December 1984," (Order No. PB 86-184 546/AS; Cost: \$22.95, subject to change) will be available only from:

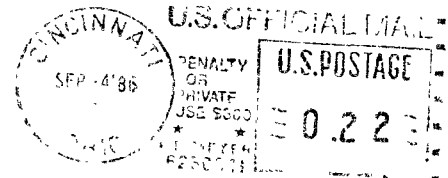
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