

## AN OVERVIEW OF PM<sub>2.5</sub> CHEMICAL SPECIATION NATIONWIDE NETWORK PROGRAM IN THE UNITED STATES

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On July 18, 1997, the U.S. Environmental Protection Agency (EPA) promulgated the new National Ambient Air Quality Standards (NAAQS) for particulate matter (PM). The NAAQS apply to the mass concentration of particles with aerodynamic diameters lower than 2.5  $\mu\text{m}$  (PM<sub>2.5</sub>) and 10  $\mu\text{m}$  (PM<sub>10</sub>). The deployment of a new PM<sub>2.5</sub> monitoring network by EPA is a critical component in the national implementation of the PM<sub>2.5</sub> NAAQS. The compliance (mass) monitoring portion of the network was established first. Data from the compliance network are used to determine attainment with the NAAQS. EPA soon supplemented this network with a chemical speciation monitoring program to provide complementary data on the chemical composition of PM<sub>2.5</sub> for the purposes of identifying PM sources, developing implementation plans, and supporting ongoing health effects research. Research Triangle Institute (RTI) International has been given the responsibility of assisting State and local agencies in the operation of PM<sub>2.5</sub> chemical speciation monitoring network by providing filter media and analytical support for the analysis of air filters for gravimetric mass, elemental concentrations (sodium through lead), organic and elemental carbon, cations (ammonium, sodium, and potassium) and anions (sulfate and nitrate), and analysis of semivolatile organics and microscopic analysis of selected filters. The program has grown significantly over the last four years and currently, RTI is providing chemical speciation support to over 235 PM<sub>2.5</sub> monitoring sites established throughout the United States and Puerto Rico.

Several challenges encountered in the operation of this program include handling large numbers of samples, high blank levels for gravimetric mass on Teflon filters, high background levels for quartz and nylon filters, data validation issues, and reporting to the national database. For example, RTI demonstrated that outgassing from the white Delrin® rings originally used in the MetOne sampler was a cause of high blank levels for the gravimetric mass on Teflon® filters. Other challenges and their solutions implemented in the nationwide network will be presented. The different fractions of chemical analytes (ions, crustal minerals, and carbon) will be compared to the total gravimetric mass, and the distributions of the different fractions will be displayed by year and by geographical area. Time series plots for major analytes (e.g., total mass, sulfate, organic and elemental carbon) over the past four years of network operation will also be presented and discussed.