

42

---

## **Characterization of Possible Candidate $PM_{2.5}$ Equivalent Method Continuous Particulate Monitors Using Light Scatter and Beta Attenuation**

Thomas M. Merrifield, MetOne Instruments

The past ten years have indicated an association of health risks with ambient fine particulate matter concentration. Recent promulgation of national ambient air quality standards have resulted in the need for improved monitoring data for particulate and chemical speciation of ambient fine particulate;  $PM_{2.5}$ . Historically filter based techniques have been used to collect mass and some composition elements of ambient particulate. However filter based techniques are labor intensive, long time resolution due to manual method, integrate over long time periods and inaccuracies due to loss of some volatile and semi-volatile components. In an effort to circumvent the problems associated with filter-based manual techniques continuous particulate monitors for measuring mass and composition are being developed for fine particle measurement. Since the application of continuous particulate monitors is relatively new for ambient fine particulate, side-by-side inter-comparison tests have been conducted to determine accuracy and precision to act as surrogates for filter-based methods. A forward light-scatter nephelometer and beta attenuation monitors have been adapted with new fine particle inlet designs and improved mass sensitivity for low concentrations. Several inter-comparison studies have taken place in 1998 /1999 in the San Joaquin Valley and the south-eastern areas of the United States. The primary focus of these studies is to describe the principle of measurement and electro-mechanical hardware used, and to provide a data summary to evaluate the performance of these continuous particulate sampling devices by comparison to commonly accepted integrated sampling (filter-based) methods.