ACTION TEAM PROGRESS REPORT

PM Continuous Monitors

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Team Membership: EPA Region 5 Air Monitoring Staff, members of the LADCO data analysis workgroup (the Midwest Regional Haze Planning Organization's workgroup, which consists of air monitoring data analysts from state and local monitoring organizations within Region 5, as well as several industry representatives).

Environmental Problem:
Continuous PM2.5 monitors are used for real-time air quality reporting and, if they meet the equivalency criteria in the proposed particulate matter monitoring regulations, they may also be used for determining attainment with the National Ambient Air Quality Standards. Monitoring organizations in Region 5 have experienced varied performance from these continuous PM2.5 monitors.

Technology Challenges:
In January 2006, the US EPA published proposed revisions to the ambient air monitoring regulations in order to facilitate the wider use of continuous $PM_{2.5}$ monitors by revising performance based federal equivalent method (FEM) equivalence standards and allowing for approved regional methods (ARM) for continuous $PM_{2.5}$ mass monitors. The goal of our work was to compare data from continuous $PM_{2.5}$ monitors throughout Region 5 to determine their performance relative to the Federal Reference Method (FRM) $PM_{2.5}$ monitors, according to the FEM/ARM criteria contain in the proposed monitoring regulations.

FY'06 Accomplishments:
Data was obtained from each Region 5 monitoring site that operates the Tapered Element Oscillating Microbalance (TEOM), TEOM with the Filter Dynamics Measuring System (FDMS) revisions A or B, or the beta attenuation monitor (BAMS) with a collocated FRM monitor. We worked closely with the Region 5 monitoring organizations to document what types of continuous PM2.5 instruments had been operated at each site, how those instruments were configured, and when, if any, modifications were made. For each site, we compared continuous data with the FRM to assess the performance of each monitor. A separate analysis was run for Michigan sites to assess variability in monitor performance across seasons. We also observed the data by season and individual monitor. Finally, we evaluated a data adjustment algorithm developed by OAQPS for the TEOM FDMS B by applying it to a site located in Mayville, WI.

Our results were consistent across all six Region 5 states; however, site to site variability was noted. Overall, the data from the TEOM under-predicted the FRM, the TEOM with FDMS Version A either predicted or over-predicted the FRM and usually had positive additive bias, and the TEOM with FDMS version B was not very consistent. BAMS results were variable, corrected BAMS values both over and under-predicted the FRM, while uncorrected BAM values tended to under-predict the FRM. When continuous data was compared to the FRM by season, generally, the continuous data from the TEOM under-predicted in the winter and performed within the acceptable slope and intercept limits in the summer. Conversely, the TEOMs equipped with FDMS versions A or B performed well in the winter, but over-predicted during the summer. Additional analysis is planned to develop site specific algorithms based on temperature.

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FY'07 Objectives:

Update current analyses with additional data collected since October 2005. Additional analysis is planned to develop site specific algorithms based on temperature.

Issues: