

## Quality Assurance and Method Development of the Connecticut PM<sub>2.5</sub> Monitoring Program

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### Abstract

The Connecticut Department of Environmental Protection (CTDEP) and The Environmental Research Institute (ERI) at UCONN have entered into a partnership to implement the USEPA PM<sub>2.5</sub> monitoring program. CTDEP conducts field operations and contracts ERI to provide analytical services to support the monitoring program. To increase the scientific rigor and quality control of the laboratory data generated, CTDEP and ERI have expanded upon existing federal regulations. ERI has implemented both procedural and infrastructural modifications over the duration of the program to meet the rigorous quality control requirements. Procedural modifications include triplicate measurements of all filters weights, laboratory blank sets consisting of 3 filters, and archive filter analysis. As part of the CTDEP program, the average of the filter triplicate masses is reported as the sample result. Initially the Standard Deviation of pre-sampling triplicate masses averaged 6.8 µg. However, method development and analyst familiarity with the program has reduced the average Standard Deviation to 0.6 µg. The laboratory blank quality assurance methodology implemented has undergone significant refinement. Initially, Laboratory Blank sets consisted of three filters that were exposed to the weighing room environment continuously. Laboratory blank performance at this stage showed post-weigh minus pre-weigh average mass accumulations of more than 15 µg. Laboratory Blank procedures were then modified to encompass a set of three filters being assigned to sample and QA filters for a period of 1 month. Laboratory blank exposure to the weighing room environment was minimized to only when associated filters were also being conditioned. The updated Laboratory Blank procedures have resulted in average Laboratory Blank mass accumulations of less than 15 µg (post minus pre-weigh). Archive Filter analysis consists of three filters selected from sites to represent urban and suburban monitoring stations and also included a set of three blank filters. Urban and suburban archive filter analysis has shown mass fluctuations over time ranging from plus 30 µg to minus 30 µg. Infrastructural modifications to equipment and facilities at ERI have contributed to the increased performance of the weighing room. An antechamber was created to reduce the intrusion of particles into the weighing room. HEPA filters positioned inside the antechamber as well as the weighing room reduce the potential for particle contamination. Humidifiers were positioned in the antechambers to provide humidification above 40% RH during the winter and a de-humidifier lowers RH to 50 - 60 % during the summer. This technique allows constant de-humidification inside the weighing room and results in a stable RH and Temperature conditions within specified limits.