CASAC AAMM
Comments Submitted by Jay R. Turner (July 21, 2008)
Consultation: Options for the Development of a Low Volume Lead in Total Suspended Particulate (Pb-TSP) Sampler

My response to the following charge questions is based on the presumption that Pb-TSP (or a similar metric) is the desired NAAQS indicator. If the primary route of exposure is ingestion, then perhaps a more relevant indicator would be a measurement of Pb deposition. Furthermore, any method which includes coarse particles (air volume sampling or deposition monitoring) could have significant contributions from resuspended dust from historical deposition which again confounds the relationship between "source-oriented atmospheric burdens" and soil/surface loading. These introductory comments aside, I offer the following responses to the charge questions.

Charge Questions

1. *Would a low-volume Pb-TSP sampler be an improvement over the existing high-volume Pb-TSP sampler? What advantages and disadvantages do you see associated with a low-volume Pb-TSP sampler?* A low-volume TSP sampler would be an improvement of the existing high-volume TSP sampler if it is well characterized. Slide 14 of the Cavender and Rice presentation[1] clearly articulates the operational advantages of a low-volume TSP sampler, especially if the sampler is based on the existing $PM_{2.5}$ and PM_{10} sampler platforms. These advantages are indeed real and important.
2. *What inlet designs would be best suited for a low volume Pb-TSP sampler? What designs are not appropriate for a low-volume Pb-TSP sampler?* The crux is the inlet design characterization. One suggestion in the Cavender and Rice presentation is to use the existing PM_{10} inlet without the PM_{10} size fractionator. This might be a viable option, but a detailed characterization of this precise configuration would be important.
3. *What is your preferred approach to the development of a low-volume Pb-TSP sampler and why?* If the facilities and resources are available, a detailed characterization is desired before designation as an FRM. While a performance based approach would be preferred to allow for various inlet designs, this might not be feasible given the testing requirements for characterizing a coarse particle sampler.
4. *If the EPA were to develop a low-volume Pb-TSP FRM, how important is it that the sampling capture efficiency be characterized for varying particle sizes?* It is very important that the collection efficiency be characterized as a function of particle size.
5. *If the EPA were to develop a low-volume Pb-TSP FRM, should the new FRM replace the existing high-volume Pb-TSP FRM, or should the EPA maintain the existing FRM?* I see no reason to maintain the existing Pb-TSP FRM if a low-volume design is developed. While this change would likely disrupt the trends analysis by introducing a discontinuity in the time series for long-term monitoring sites, the advantages of a low-volume Pb-TSP FRM outweigh the disadvantages.

[1] "Overview and Status of Lead NAAQS Review and overview of Agency Technical Documents on Lead NAAQS Monitoring Issues", K. Cavender and J. Rice, presented to the Clean Air Scientific Advisory Committee's Ambient Air Monitoring and Methods subcommittee, Public Teleconference, July 14, 2008.

6. *Is it appropriate to accept alternative sampler and inlet designs as the FEM?* In principle it is appropriate to accept alternative designs, but the equivalency testing criteria should include a detailed characterization of the inlet performance and not just rely on modest field comparisons (see below).
7. *Are the proposed FEM testing criteria for Pb methods adequate to ensure equivalence of alternative sampler and inlet designs? If not, what additional testing requirements should be considered?* I am concerned that modest field measurement campaigns will be insufficient to demonstrate equivalency under a range of operating conditions if there are differences in inlet designs. Differences in the remaining components of the sampler might be adequately tested through field sampling, but alternative inlet designs should be subjected to detailed performance characterization (size-dependent collection efficiencies)..