MEMORANDUM

SUBJECT: Consultation on Coarse Particle Speciation

FROM: Lewis Weinstock, Group Leader
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TO: Kyndall Barry, Designated Federal Officer
Ambient Air Monitoring & Methods Subcommittee
Clean Air Scientific Advisory Committee
EPA Science Advisory Board Staff Office

In October 2006, EPA issued the final rule to revise both the primary and secondary NAAQS for PM (71 FR 61144). The Agency decided to retain PM_{10} as the indicator for thoracic coarse particles as promulgated in July 1997 (62 FR 38652). The final rule establishes ambient air monitoring requirements for a $PM_{10-2.5}$ indicator of thoracic coarse particles to support research on particle distribution, sources, and health effects. A new Federal Reference Method (FRM) was also promulgated in the rule for measuring the mass concentration of $PM_{10-2.5}$ in ambient air. As part of the revisions to the Ambient Air Monitoring Regulations, $PM_{10-2.5}$ speciation monitoring will be required at National Core (NCore) multi-pollutant monitoring stations by January 1, 2011. EPA OAR requested AAMMS consultative advice on the issues related to $PM_{10-2.5}$ speciation and monitoring.

Attached is the review document in which the speciation and monitoring issues related to coarse particles are discussed. This document has been prepared by staff from the Ambient Air monitoring Group in the Office of Air Quality Planning and Standards which will be the focus of a consultation by the CASAC AAMMS on February 11, 2009. Please forward this memo and the attached file to the Subcommittee to prepare for the meeting. We look forward to the upcoming discussions with AAMMS. Do not hesitate to contact me if you have any questions regarding the documents or if I may be of further assistance.

Charge to the CASAC AAMMS

Within each of the sections of the document, we ask the Subcommittee to address the following:

$PM_{10-2.5}$ Speciation Measurement

1. Table 1 provides a list of proposed $PM_{10-2.5}$ species and analysis methods. Are there additional $PM_{10-2.5}$ target species or methods that can be used to help identify the source of unidentified mass in order to obtain better mass closure?

2. Various sampling devices, including dichotomous samplers, MetOne SASS speciation monitors, PM_{10} and $PM_{2.5}$ FRMs are potential sampling devices (with the appropriate filter types) for $PM_{10-2.5}$ speciation. Among these sampler types, which should be included or excluded from the pilot network design? Are there other sampling devices not listed here that should be considered?

3. What are the $PM_{10-2.5}$ speciation sampling artifacts that may be encountered using the samplers

mentioned above and how should they be addressed? Is speciation by the difference method problematic for $PM_{10-2.5}$ speciation and if so what specific issues make it problematic?

4. The current and most widely used $PM_{2.5}$ speciation sampler is the MetOne SASS and it has a flow rate of 6.7 Liters per minute (Lpm) which is significantly lower than either the FRM for $PM_{10-2.5}$ mass or the dichotomous sampler (16.7 Lpm). If this sampler was configured for $PM_{10-2.5}$ by difference, would the 6.7 Lpm flow rate be problematic, especially with the need to compare reconstructed mass to the mass collected by the $PM_{10-2.5}$ FRM?

5. Is the amount of particle mass collected on the dichotomous filters (especially the minor flow) sufficient for speciation chemical analysis?

$PM_{10-2.5}$ Species or Components

1. Table 1 provides a list of proposed $PM_{10-2.5}$ species and analysis methods. Among these species, which are most important? Are there important $PM_{10-2.5}$ species or components missing from this list? Are there important analysis methods missing from this list?

2. In the consideration of potential ion measurements for $PM_{10-2.5}$ species, what ions should be on the target list? Are nitrate or ammonium ions important? If so, is an acid gas denuder and nylon filter required for the proper collection of these species in $PM_{10-2.5}$?

3. The 2004 CD included a list of important $PM_{10-2.5}$ components which included biological materials and fly ashes. If these species are important to characterize, what specific types of biological materials and fly ashes should be included? Is scanning electron microscopy (SEM) on Teflon filters sufficient to quantify and identify these species? Is the proposed total protein assay technique important to obtain a quantitative indicator of the total biological material present?

4. Can the complication of particle size and absorption effects in XRF be resolved using absorption correction factors? If not, what other method(s) should be considered?

5. Are metal oxides a significant source of interference in thermal-optical analysis (TOA) of $PM_{10-2.5}$ for OC and EC given the large expected soil component? If so, how should this interference be addressed?

Network Design

1. Are sites with high PM_{10} and low $PM_{2.5}$ good candidate sites for $PM_{10-2.5}$ speciation? Given that there will be some urban and rural NCore monitoring sites with $PM_{10-2.5}$ speciation, what other factors should be considered in selecting the pilot monitoring and long-term sites or locations?

2. If there is an opportunity to modify the NCore $PM_{10-2.5}$ speciation monitoring requirements during a future rulemaking, should changes to the network design be considered? For example, changing the total number of required monitors and/or the required locations?