Preliminary Comments from Members of the Clean Air Scientific Advisory Committee CASAC Air Monitoring and Methods Subcommittee (AMMS)

Preliminary Comments received on 2/16/11

Purpose: To review and provide advice on the scientific adequacy and appropriateness of EPA draft documents on monitoring and methods for Oxides of Nitrogen (NOx) and Sulfur (SOx).

Additional Preliminary Comments from Dr. Doug Burns

General Comments

Many of the charge questions focus on leveraging CASTNET (and to an extent rural NCORE) measurements to address this new secondary standard. I support leveraging these existing networks where possible if the measurements and methods are rigorous and would lend themselves to FRM/FEM designation. The total NOy measurement seems like it needs lots of testing and may not be ready to deploy in a monitoring network for a couple of years at best. I also feel that passive collectors can be valuable. Though these devices may be less accurate and precise than other measurements, they are relatively inexpensive and can provide an opportunity to greatly expand the spatial intensity of measurements. This is important for aspects of model checking. It would seem that NH3 and and NO2 should be priorities for passive collection.

Though this subcommittee was tasked with questions that focused solely on atmospheric chemical measurements, I note that surface water chemistry measurements in sensitive ecosystems are essential to promulgation of this new NOX-SOx standard. Some sensitive regions of the US have good and recent surface water chemistry measurements, but some regions have few or none. I would think that an attempt needs to be made to evaluate existing water quality data that could be used to promulgate this standard. This would help to identify gaps and limitations in implementing this potential new rule.

Charge Question 10 – Use of CASTNET filter pack to measure total nitrate

Measurement of total nitrate is currently done at all CASTNET sites using the filter pack. These measurements are generally viewed as providing accurate data on total nitrate concentrations in ambient air (see CASTNET QA reports on line), though the speciation between particulate nitrate and nitric acid may not be accurate. Precision is in the range of +/- 3-5%. Currently, data on total dry nitrate combined with particulate ammonium from CASTNET is “the” measurement to calculate dry N deposition for those working in remote/rural ecosystems sensitive to acidification. Clearly, these species from CASTNET do not represent all dry deposited N species and therefore, the CASTNET measurements provide an underestimate of deposition. The key question to answer then becomes: Does total nitrate from CASTNET vary in a predictable manner relative to the other key dry N species such as NH3, NO2, and PAN? If the answer is yes or close enough to yes, then CASTNET total nitrate from the filter pack would be a good surrogate for the secondary NOy standard. Data shared with this subcommittee from two sites in Canada (measured by CAPMON), as well as work by Jed Sparks and others suggest that key N species such as NH3, NO2, and PAN vary significantly both spatially and temporally and not necessarily synchronously with total nitrate. This would

indicate that total nitrate is not a good surrogate for NOy. However, this could be explored in greater detail using existing data and/or model results (such as CMAQ) for NO2, NO, and PAN.

Charge Question 5 – Use of the AMoN ammonia monitoring network

This is a question that gets to the issue of being able to make lots of measurements inexpensively (passive samplers) vs. being able to make fewer measurements (denuder), but more expensively. I have observed the development of the AMoN network first hand. It is clear based on comparisons done among three passive NH3 devices that the Radiello were the most accurate of the passive samplers available at that time. The tests performed with the Radiello samplers indicate good precision (< 10%) and a low bias compared to side-by-side denuder measurements. The low bias appears to be on the order of 0.3 to 0.6 ug/m3 based on the comparisons I have seen. This obviously becomes more of a problem at sites with low NH3 concentrations where the deviations are greatest in absolute and relative terms. My recommendation would be to deploy as many denuder samplers as budgets allow, including some sites that have both a denuder and a passive sampler. The passive samplers could then be used to create a denser network of sites in areas of particular interest such as the Adirondacks and Shenandoah Park.

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