

## Highlights from Supersites PI Meeting in Las Vegas, Nevada: February 25-26, 2004

[note,,,the following are really just a sample of many emerging findings from the SS program that happened to dominate last week's meeting]

1. ***Near roadway exposures:*** Very compelling evidence continues to emerge from the Los Angeles (and other cities) study indicating very elevated exposure near major roadways. This effect is associated with findings indicating an abundance of ultrafine particles near roadways, that fall off (i.e, size distribution shifts toward larger particle diameters) as one moves away. Associated with the ultrafine particles is a dominant fraction of organic carbon, relative to larger size fractions where inorganics (e.g., nitrates and sulfates) dominate. The emerging health hypotheses suggest ultrafines in near roadway environments present a dual effect related to efficient cell penetration (actually sub cellular bodies such as mitochondria) by UF particles and the associated organic carbon appears to impact (negatively) cellular oxidation processes (ATP cycles, etc.). Regardless of the actual biological/cell effects, the scientific community is making the case for UF particles near roadways. The SS have provided a wealth of data (e.g., size fractionated particles chemically speciated at various distances from major roadways) that tends to support certain health effects hypotheses.

**[From a policy perspective, we should think about our role in the near roadway environment....how do the various mobile source rules impact?...is there any benefit associated with IAQR...etc....and..are there other policy opportunities to be probed to address the proximity issues associated with roadway environments. This also is interesting as we have finally evolved toward taking a more regional perspective on many issues (supported by science) that hint at expanding beyond the confined demographic boundaries of attainment/nonattainment designations; and now we may need to look at the other end of the spatial scale spectrum. Note that there are additional roadway exposure issues....entrained brake lining/tire dust; elevated diesel PM, gaseous BTEX compounds as well. Should OAQPS orchestrate an inter agency (e.g., OTAQ, OAQPS, DOT, DHHS (urban housing and development) effort tackling this emerging issue?]**

2. ***Measurement findings relative to national networks.***

*Continuous speciation monitors.* After several years of testing a variety of near continuously operating chemical speciation samplers with relatively mixed performance, the SS PI's recommend that these monitors be collocated with more standard filter based instruments operating in the IMPROVE and speciation networks. During program start up we had anticipated further progress in this area and had expected to start replacing filter based instruments with continuous monitors. While we have been articulating this recommendation over the last three years, it is a welcome message from the expert measurement community. [note, this may impact some of the progress on our commitment to the NAS on establishing a 10 site continuous speciation network, especially from a timing perspective]

*Continuous PM<sub>2.5</sub> mass.* General consensus was voiced regarding relatively good

performance of the newer TEOMs (which are able to estimate semi-volatile losses and provide corrected output). Given all the candidate measurement approaches, the TEOM appears to offer the most desirable approach to characterize "true mass". There remain certain engineering/water management issues that the vendor is attending to. [*We may want to consider viewing the new TEOM as a national anchor to provide decent interstate comparability of continuous PM2.5 mass*]

### **3. Secondary organic carbon.**

The new breed of single particle analyzers and aerosol mass spectrometers combined with specific organic compound and carbohydrate analyses have progressed secondary carbon characterization. Some preliminary findings suggest significantly greater secondary organic carbon (e.g., approaching 70% in Pittsburgh during late summer/early Fall). This is very preliminary but raises interesting questions regarding carbon mitigation. Also of note were findings from Houston that indicated that aromatic derived secondary carbon was relatively insignificant compared to biogenic derived...an interesting finding given the aromatic rich environment in Houston. Also, more evidence indicates similarity between secondary carbon and sulfate profiles in the East, indicating transport influence of both components (expected). [On a related note, field measurements from the Pittsburgh SS appears to not support earlier hypotheses that acid catalyzed polymerization exacerbated secondary carbon formation (the implication being that reduction of NOx/SOx could also lead to reductions of aerosol carbon) more information should be coming regarding organic C polymerization and related effects associated with inorganic aerosols]

### **4. Particle nucleation (initial particle formation processes).**

The aerosol mass spectrometers have been combined with continuous particle size distribution measurements to shed more light into nucleation growth. New findings include distinct differences in urban roadway settings in Los Angeles (hot carbon exhaust gases involved in initial particle formation) relative to more regionalized formation in the East dominated by sulfate (actually sulfuric acid) and associated with clean conditions with onset generally occurring after sunrise. [It's hard at this point to relate these phenomena directly to programmatic issues; however, it's hard to imagine that uncovering the basics underlying particle initiation will not play a role in particle management...at a minimum ...another strong evaluation test of modeled processes.]

### **5. Supersites synthesis/communications.**

Paul Solomon is developing a series of workshops with the Supersite PI's that address a series of policy relevant questions with the objective to synthesize the body of work produced by the Supersites and other key programs. This is a major effort targeted for OAQPS and the RPO's. The initial set of questions are attached. During last week's meeting responsibilities were divided among the PI's. The outcome will take form in a document based on the questions that will be somewhat analogous to previous Southern Oxidant Study and NARSTO assessment reports. In addition a major final SS conference is scheduled for February of 2005. ORD has

asked OAQPS to jointly fund this effort, a reasonable request given the policy focus of the intended product. Both EMAD and AQSSD as well as the front Office should be considered important clients. An office wide support level of 100K would be appropriate; ORD has committed ~220K. Typically, I would not advocate sharing project funds with ORD. However, the SS program started as a joint OAQPS-ORD funded project and it makes sense to conclude it in that manner. The funds are used to support the PI's for a series of meetings (workshops) and writing efforts to operate together as a unit to produce an integrated synthesis of key findings.