CASAC’s Role in Air Monitoring*

George Allen
NESCAUM, Boston MA

MARAMA Monitoring Meeting
RTP, NC    April 12, 2011

Disclaimer: One person’s perspective only...
• EPA Science Advisory Board (SAB):
  Chartered SAB and SAB Standing Committees
  Advisory Council on Clean Air Compliance Analysis
  Clean Air Science Advisory Committee (CASAC)

• CASAC home page:
  http://epa.gov/casac/
  Start here to find anything...

• Chartered CASAC: 7 member panel; approves/submits letters to EPA:
  http://yosemite.epa.gov/sab/sabpeople.nsf/WebCommittees/CASAC
  Focus is review of NAAQS development material (ISA, PAD, ...)
  All CASAC Panel reports are reviewed by this committee

• 6-year maximum term
  1 S/L member required by CAA
  was Rich Poirot, then Donna Kenski, now George Allen
  EPA CASAC Home Page
Use the blue column links!

EPA Clean Air Scientific Advisory Committee (CASAC)

The Clean Air Scientific Advisory Committee (CASAC) provides independent advice to the EPA Administrator on the technical bases for EPA's national ambient air quality standards. Established in 1977 under the Clean Air Act (CAA) Amendments of 1977 (see 42 U.S.C. § 7409(d)(2)), CASAC also addresses research related to air quality, sources of air pollution, and the strategies to attain and maintain air quality standards and to prevent significant deterioration of air quality. The Chair of the CASAC also serves as a member of the chartered Science Advisory Board.

This website provides information on:

- the seven members of CASAC,
- CASAC advisory activities and reports (both activities and reports can be viewed by CASAC topic),
- how you can participate in the science advisory process, including the use of EPA's Web-based process for public nomination of experts,
- how to contact the CASAC's Designated Federal Officer to obtain additional information about the CASAC, and
- CASAC input on EPA's revised NAAQS review process

Our recent additions page provides information on recent draft reports, Federal Register notices, upcoming meetings, recently announced advisory activities, and recently finalized reports.

Designated Federal Officer: Holly Stallworth
202-564-2073
stallworth.holly@epa.gov
CASAC Panels and Subcommittees
This is where the action is. Panel Chairs are chartered CASAC members
*Air Monitoring and Methods Subcommittee (AMMS) - Active
*Lead Review Panel (2010-2013) - Active
Particulate Matter Review Panel
Oxides of Nitrogen Primary NAAQS Review Panel
*NOx and SOx Secondary Review Panel - Active
*Ozone Review Panel (2013) - Active
*Ozone -- Reconsideration of 2008 primary NAAQS - Active
Sulfur Oxides Primary NAAQS Review Panel

[* - G. Allen is current member of panel]

All Final CASAC advisory reports:
CASAC Monitoring Activities

AAMMS reformulated as AMMS Jan. 2011
   G. Allen incoming chair
   Changes in panel makeup; MARAMA rep: Linda Bonanno, NJ DEP

Recent A(A)MMS topics: NearRoad, Pb FRM, 2ndary NOx-SOx
   http://yosemite.epa.gov/sab/sabproduct.nsf/WebReportsbyTopicCASAC!OpenView&Start=1&Count=1000&Expand=2.1.1#2.1.1

Constraints on Public Discussion of current and upcoming topics:
   All CASAC discussions are public (FACA); Thus:
   Members can not discuss active topics in a “public” manner

All CASAC meetings are public by telephone or in person
   Anyone can call in -- must make request in advance to panel DFO
   Anyone can comment (3-5 minutes) - advance request to panel DFO
Current and Upcoming AMMS topics [2011]:

• Secondary NAAQS NOx-SOx Network Design
  Draft initial letter:
  http://yosemite.epa.gov/sab/sabproduct.nsf/bf498bd32a1c7fd1f85257242006dd6ceb/1076645a85d7fa4d852578540055fbe0!OpenDocument&Date=2011-03-29
  CASAC call to approve final letter 5/12; draft will be posted ~4/20:
  http://yosemite.epa.gov/sab/sabproduct.nsf/bf498bd32a1c7fd1f85257242006dd6ceb/448cec2e9f4ceba485257853004989e11!OpenDocument%26Date=2011-05-12
  Court deadline to issue NPRM: July 12 (final March 20, 2012)

• PAMS Network Re-engineering:
  May 16-17 teleconference meeting; charge questions at:
  http://yosemite.epa.gov/sab/SABPRODUCT.NSF/81e39f4c09954fcb85256ead006be86e/6f01491f8a48811885257781005d0e26!OpenDocument

• Near-road Monitoring -- Network Design Guidance Development:
  not yet scheduled; Nov. 2010 final CASAC letter on this topic:

• Air Toxics Monitoring Methods Improvements:
  including Methods for VOCs
  not yet scheduled
Current Members of CASAC AMMS (* = S/L affiliation)

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>City</th>
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<tbody>
<tr>
<td>Allen, David</td>
<td>University of Texas</td>
<td>Austin</td>
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<td>*Allen, George</td>
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<td>*Bonanno, Linda</td>
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<td>State University of New York</td>
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<td>Atmospheric Research &amp; Analysis</td>
<td>Cary</td>
<td>NC</td>
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<td>Zeng, Yousheng</td>
<td>Providence Eng. &amp; Environ.</td>
<td>Baton Rouge</td>
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With respect to the factors EPA is considering for siting monitors, we note that the primary focus of the monitor site selection process is on annual average daily traffic (AADT). However, the approach may place too much weight on these data. Other factors to be considered include the physical characteristics and the patterns of vehicle use at the site (e.g., fleet mix, roadway design, congestion patterns, terrain, etc.), modeling information, and preliminary monitoring studies (e.g., results of multiscale/saturation studies). CASAC suggests that EPA should allow states and local agencies to bring as much information to bear on the site selection process as is appropriate, with prioritization of installation of sites based on review of all relevant data in discussions between monitoring agencies and EPA offices.
We encourage evaluation of the use of a “true” NO2 monitor and inclusion of this instrument in the near-road monitoring program. We endorse the views expressed in the letter of August 19, 2010 from the National Association of Clean Air Agencies to Assistant Administrator Paul Anastas encouraging ORD “to increase its focus on the development and advancement of ambient air monitoring reference, equivalent and other sampling and analytical methods.” Measurement methods germane to near-road monitoring mentioned in that letter include those for PM2.5, PM10-2.5, and ultrafine particles. We also urge EPA to address known biases in measurements made with the NO2 FRM.

Sidebar: NO2 Method issues.
- Current FRM [chemiluminescent] has positive bias / interference
- Measures “some” NOz
- Can read high by more than 20% in some cases
- Goal is 1 FEM box with “true” photolytic NO2 and robust NOy
- Get “good” data for NO2 and NOz (API is working on this)
As a general matter, **CASAC is deeply concerned about the timing proposed for the current network deployment, as well as for the Pilot Study.** The revised NO2 NAAQS, issued on 2/9/10, mandates that state and local air monitoring agencies deploy the near-road network by January 1, 2013. This ambitious schedule may make it difficult to absorb lessons learned from EPA’s Pilot Study to evaluate and improve the siting and monitoring process. If possible, given this mandated date of deployment, **EPA might consider deploying the network in stages over time, e.g., 10-20 sites the first year, 20-40 the next and the rest in the final year.** As part of this staged approach, EPA should consider using near-road sites appropriately paired with sites from the National Core (NCore) monitoring network...  **Consideration should be given to areas with larger populations.** Such a staged approach would be consistent with the recommendations from the CASAC Oxides of Nitrogen Primary NAAQS Review Panel. In this way, **the network can evolve based on lessons learned from the Pilot Study as well as from the operation of the initial sites.**
Just as we recommended a staged approach to the deployment of the near-road monitoring network, **CASAC also recommends a tiered approach to the design of the near-road monitoring sites.** A few sites should be comprehensively equipped such that they can provide comprehensive information about the composition of mobile source emissions and how pollutant concentrations and mixtures change over time with changes in sources and control measures. The bulk of the sites could be more modestly equipped. For example, **the modestly equipped sites would [also] include optical black carbon (as a surrogate for elemental carbon), carbon monoxide (CO), meteorology and ultra-fine particulate matter (PM) monitoring capabilities** responsive to the needs for assessing attainment with the applicable standards and the extent of near-road pollution exposure, as well as for use in health studies. We provide more detail in our responses to the associated charge questions.
State and local resource constraints are another cause for concern, particularly in view of this schedule. For all of the criteria pollutants as well as for NO2 specifically, CASAC encourages EPA to commit the resources necessary to focus on the development and advancement of ambient air monitoring methods, with specific attention paid to assessment and possible modification of the Federal Reference and Equivalent Methods. We are concerned that the current time frame for the NO2 near-road network may not allow adequate time to appropriately plan and execute the Pilot Study and then to interpret and use the resulting findings in designing the near-road network. The decisions that will be made have broad implications related not only to NO2, but to other criteria pollutants and the characterization of multiple-pollutant exposures from roadway sources.
AAMMS Priorities for NR monitoring (Nov. 2010 letter):
(all methods are “on-line” with 1-hour or better resolution)

<table>
<thead>
<tr>
<th>Pollutant group</th>
<th>Rationale and comments</th>
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<tbody>
<tr>
<td>#1: NO(_2), NO, Nox [y]</td>
<td>•• Same instrument</td>
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<tr>
<td>#2: Black carbon</td>
<td>•• Diesel tracer&lt;br&gt;•• Potential health relevance&lt;br&gt;•• Continuous methods available&lt;br&gt;•• Not a direct measure of carbon</td>
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<td>#3: CO</td>
<td>•• Gasoline vehicle tracer&lt;br&gt;•• Dilution factors&lt;br&gt;•• Potential health relevance&lt;br&gt;•• Continuous methods available&lt;br&gt;•• Pending new NAAQS</td>
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<tr>
<td>#4: Ultra-fine particles / particle number concentration</td>
<td>•• Strong roadside gradient&lt;br&gt;•• Potential health relevance&lt;br&gt;•• Continuous methods available</td>
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| Particle-size distribution | • For a limited number of sites  
|                           | • Potential health relevance  
|                           | • More comprehensive health relevance than just particle number |
| $\text{PM}_{10-2.5}$     | • Potential health relevance  
|                           | • Re-suspended roadside particles  
|                           | • Speciation for metals  
|                           | • Important in future PM NAAQS reviews |
| $\text{PM}_{2.5}$        | • Continuous methods available  
|                           | • Potential health relevance  
|                           | • Speciation for metals, and organic marker compounds  
|                           | • Possibly FDMS to include semi-volatiles |
| EC/OC (Sunset Labs method) | • Potential health relevance  
<p>| CO$_2$               | • Normalization of pollutants to CO$_2$ |</p>
<table>
<thead>
<tr>
<th>Substance</th>
<th>Notes</th>
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| Ozone     | • To understand photo-chemical processes  
|           | • Not to be used for health effects analysis |
| NOy       | • Total nitrogen oxides and mass closure |
| SO\textsubscript{2} | • To verify fuel content compliance  
|           | • Pending new NAAQS |
| BTEX (benzene, toluene, ethylbenzene, and xylenes) and 1,3 butadiene | •• Potential health relevance  
•• Continuous methods available  
•• Provides unique information as to how changing fuel characteristics and control systems are impacting emissions  
•• Can provide additional info on which class of vehicle is impacting monitor |
Final thoughts...

• Current CASAC activities: substantial monitoring network implications
  NR CO and NO2, secondary NOx-SOx, O3 [old and new]
  Just finished, NPRM not yet issued: PM
  Recently finished: SO2, Pb

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