

**Summary Minutes of the
U.S. Environmental Protection Agency (EPA)
Clean Air Scientific Advisory Committee
Air Monitoring and Methods Subcommittee (AMMS) Review of EPA's Photochemical
Assessment Monitoring Stations (PAMS) Program
Public Teleconference**

Dates and Times: Monday, May 16, 2011, 12:30 P.M. – 4:25 P.M. ET, and Tuesday, May 17, 2011, 12:30 P.M. – 4:25 P.M. ET

Location: Teleconference Only

Purpose: The purpose of the May 16-17, 2011 teleconference calls was for the EPA Clean Air Scientific Advisory Committee Air Monitoring and Methods Subcommittee (AMMS) to review and provide advice and ideas on how to improve EPA's Photochemical Assessment Monitoring Stations (PAMS) Network Re-engineering project and program.

Participants:

AMMS: CASAC Air Monitoring and Methods Subcommittee (See Roster, Attachment A):

Mr. George A. Allen, Chair
Dr. David T. Allen
Dr. Linda Bonanno
Dr. Doug Burns
Dr. Judith Chow
Dr. Kenneth Demerjian
Mr. Eric Edgerton
Mr. Henry (Dirk) Felton
Dr. Philip Fine
Dr. Philip Hopke
Dr. Rudolf Husar
Dr. Daniel Jacob
Dr. Peter H. McMurry
Dr. Allen Robinson
Dr. Armistead (Ted) Russell
Dr. James Jay Schauer
Dr. Jay Turner
Dr. Yousheng Zeng

Dr. Daniel Jacob could not participate during May 16-17, 2011 teleconference calls.

EPA SAB Staff: Mr. Edward Hanlon, Designated Federal Officer

EPA Staff: Mr. Kevin Cavender, EPA Office of Air Quality Planning and Standards
Mr. Jim Szykman, EPA Office of Research and Development

Other Participants: Dr. Rich Scheffe, EPA Office of Air Quality Planning and Standards
Mr. David Shelow, EPA Office of Air Quality Planning and Standards

Other Attendees: A list of members of the public who participated or requested information for calling into the teleconferences is provided in Attachment B, Public Attendance.

Materials Available: The agenda and teleconference materials were circulated to the AMMS in advance of the teleconferences, and were made available to the public via the CASAC website (www.epa.gov/casac) on the following CASAC AMMS PAMS May 16 and 17, 2011 teleconference webpages:

<http://yosemite.epa.gov/sab/sabproduct.nsf/bf498bd32a1c7fdf85257242006dd6cb/6a62b0219d19df358525785c0064e71b!OpenDocument&Date=2011-05-16>

and

[http://yosemite.epa.gov/sab/sabproduct.nsf/bf498bd32a1c7fdf85257242006dd6cb/6abbc18d956a2b768525785c00663487!OpenDocument&Date=2011-05-17.](http://yosemite.epa.gov/sab/sabproduct.nsf/bf498bd32a1c7fdf85257242006dd6cb/6abbc18d956a2b768525785c00663487!OpenDocument&Date=2011-05-17)

Teleconference Summary

The teleconferences were announced in the Federal Register¹ and proceeded according to the teleconference agendas². A summary of the teleconferences follows.

May 16, 2011

Opening Statements and Welcome

Mr. Ed Hanlon, the Designated Federal Officer (DFO), opened the teleconference, and made a brief opening statement noting that the AMMS is a Federal Advisory Committee under the Federal Advisory Committee Act (FACA). He noted the teleconference was open to the public and that Agency-provided briefing materials were posted onto the teleconference websites. He stated that one member of the public had requested to present an oral statement during the 5/16/11 teleconference, and that a few sets of written public comments were received and were posted onto the teleconference websites. He noted that the SAB Staff Office has determined that there are no conflict-of-interest or appearance of a lack of impartiality issues for any of the AMMS advisory committee members for this review. Mr. Hanlon also noted that minutes were being taken to summarize discussions and action items in accordance with requirements under FACA. He then turned the teleconference call over to the Chair, Mr. George Allen.

Mr. Allen welcomed everyone and noted that this is an Advisory effort where a report seeking consensus would be prepared. He stated that lead discussants would summarize the responses to each charge question, and that the AMMS letter report will include the consensus position of the Panel and separate individual comments associated with this review. Mr. Allen further noted that preliminary Panel member comments were provided on the teleconference websites, and that the preliminary comments were intended to serve as 'discussion starters'. He also noted that public comments submitted directly to Ed Hanlon are provided on the teleconference websites. He also noted that the AMMS Panel would begin discussing charge questions in order until time expired on the May 16 teleconference, and that the teleconference would continue on May 17 at

the point where discussion stopped on May 16. Mr. Allen reviewed the agenda, and then requested that EPA commence with their presentations.

EPA Presentations

Mr. Kevin Cavender, EPA Office of Air Quality Planning and Standards, made a brief opening statement and presented and discussed his PowerPoint slides³ that were provided on the teleconference website. One Panel member asked for more detail on PAMS funding that was discussed in slide 18, which notes that 25% of PAMS allocation is targeted for data analysis. Mr. Cavender responded that \$14 million is available nationally, which is divided by a number of states. Another Panel member asked whether a small amount of funding was held back for targeted data analysis. Mr. Cavender responded yes. A Panel member asked how upper air meteorological measurements have been used to date, and whether they are used to model ozone. Dr. Scheffe responded that profilers for PAMS network provide data on the upper atmosphere through the troposphere, and thus information is provided on various atmospheric air zones. Another Panel member asked whether data would be lost if inexpensive ceilometers were used. Dr. Scheffe responded that a significant amount of this data would be lost under certain conditions.

Mr. Jim Szykman, EPA Office of Research and Development, also made a brief opening statement and presented and discussed his PowerPoint slides⁴ that were provided on the teleconference website. One Panel member asked for more detail on PAMS funding requirements to equip airplanes for monitoring, as discussed in slide 11. Mr. Szykman responded that an estimated \$100,000 per airplane was needed to conduct this monitoring. Another Panel member asked whether EPA would be incorporating/assimilating vertical air monitoring observations into the Community Multi-scale Air Quality (CMAQ) model estimates of atmospheric and deposition species. Mr. Szykman responded that EPA may not be assimilating such observations into CMAQ, since the National Oceanic and Atmospheric Administration (NOAA) was already doing that.

One Panel member asked if EPA's needs for systematic PAMS data in certain locations would be interrupted if airlines needed to service airplanes that were slated for PAMS monitoring. The Panel member asked if the airline needed to service airplanes, whether the airline have the ability to reassign monitoring locations. Mr. Szykman responded that the airline would have the ability to reassign monitoring locations, and noted that EPA would be in discussion with the airlines on this issue.

Public Comment

Mr. Jeff Underhill of the New Hampshire Department of Environmental Services provided an oral statement. He noted that many states with ozone problems have installed controls for volatile organic contaminant (VOC) emissions. He commented that due to data complexities, Mr. Underhill's region is analyzing VOC data to identify better and more cost effective ways to assess and control VOC emissions. He further noted that EPA's efforts to target PAMS monitoring may be an oversimplification.

Discussion of Charge Questions

Mr. Allen requested that discussion commence on the AMMS responses to charge questions. He requested that lead discussants on the AMMS Panel summarize key points and consensus points

after discussions occurred on each charge question.

Charge Question 1 – Prioritization of Current PAMS Objectives

The Panel discussed various aspects of current PAMS objectives, and agreed that the existing objectives are important and policy-relevant. The Panel noted that gathering information on background concentrations and precursors for priority pollutants were important priorities, and that while gathering information on toxics may be lower priority, it is helpful to gather such information if such efforts can be supported with limited resources.

A Panel member noted there were several key objectives for PAMS monitoring, including providing a speciated ambient database for evaluation of sources and emission inventories, providing data for trends analyses, and also providing data for additional measures of criteria and non criteria measurements. The Panel member also noted there are a number of secondary objectives, including measurement of precursors, and toxic measurements. The Panel member found it difficult to prioritize these objectives since all of these objectives are important, but commented that one objective (source emission characterization) deserved particular attention. The Panel member also commented that the composition of the largest sources (gasoline or liquid fuel) was likely to change over the next several years, and that data on these emissions should be gathered correctly while the nation reformulates its fuel systems.

Several Panel members had comments for improving the PAMS network. One Panel member noted that national objectives ignore regional and local differences, and that EPA should consider regional and local scale (where attainment decisions are made) since a significant amount of modeling is conducted at that scale. Another Panel member commented that characterizing trends is as important as characterizing source emissions. A Panel member commented that EPA should consider the linkages between program objectives and emission inventory. Another Panel member commented that EPA should consider updating the PAMS database and website to make them more user-friendly and provide a better example of the PAMS structure, and asked whether EPA had plans to update the website. Mr. Cavender responded that EPA did have plans to improve the PAMS website to more clearly identify site locations and how to access data.

The Panel discussed and had differing views on whether ozone nonattainment should be prioritized over other issues. One Panel member commented that PAMS should focus on ozone and deemphasize air toxics since ozone nonattainment is the most significant issue across the country. Another Panel member disagreed that the priority should be on ozone, since that would result in zero resources being directed to address other issues such as gathering information from background sites and winter season data.

Charge Question 2 – Additional PAMS Objectives

The Panel discussed whether EPA should add additional PAMS objectives to the current objectives. The panel generally agreed there was limited opportunity for EPA to add additional objectives at this time, and that due to limited resources it would be appropriate for EPA to focus on existing, current objectives. The panel recommended that EPA separate natural versus anthropogenic VOCs to understand upwind parameters and precursor data. The panel agreed that there may be limited value in focusing on air toxics since such data was very localized. The Panel recommended that EPA consider the list of contaminants being monitored to identify which contaminant species should be focused on, and noted that EPA could potentially use

modeling to identify functional groups that should be focused on.

One Panel member noted that the PAMS program should have standardized quality assurance/quality control (QA/QC) procedures for instrumentation to provide an improved comparison between regions and states.

Charge Question 3 - Advantages and Disadvantages of Current PAMS Design with Multiple Sites per PAMS Area

The Panel discussed various advantages and disadvantages of the current PAMS network design. Several Panel members compared the current design to a design having fewer PAMS sites, and noted that EPA should assess the PAMS network design in a broader context relative to local and model predictions. The Panel agreed that EPA should provide a better definition of the type of sites that are needed, and an improved understanding of the sensitivities that apply to transport issues. The Panel also believed that the current PAMS network design has created an abundance of Type-2 sites (i.e., maximum precursor emissions impact sites), and that large scale and regional sites were needed.

One Panel member commented that a key advantage of the current network is that it offers multiple monitoring sites, and a disadvantage is that because there is a broader chemical footprint, the current network may not be capturing a full suite of relevant parameters. The Panel member commented that EPA should identify whether precursors, biogenics, background, or other data is needed, and suggested that terrain effects to model sensitivities should be considered. Another Panel member commented that EPA should find a region where VOCs and other contaminants need to be collected, and tailor data collection for that region. One Panel member suggested that EPA consider moving a PAMS measurement site from an area where high ozone exists to another location to collect other data for PAMS analysis.

Several Panel members noted that EPA should keep urban PAMS sites, but spread out upwind and downwind sites so that EPA could assess these for potential background determinations. A few other Panel members commented that EPA should equip certain sites with different equipment to allow flexibility for reconfiguration of monitoring as needed. These Panel members noted that monitoring site configuration can be different for western, mountain, and eastern states.

Charge Question 4 – Consideration of PAMS Measurements in Other Areas

The Panel discussed whether PAMS measurements should occur in other locations, and agreed that EPA should consider partnering its PAMS monitoring activities with other existing monitoring networks in order to provide a wider amount of measurements scattered over a wider geographic area. The Panel agreed that adding VOC instruments to existing non-PAMS sites would be useful but possibly cost prohibitive. The Panel also agreed that PAMS monitoring should better inform regional control strategies, and that a substantial redistribution of sites potentially would be needed to assess regional controls.

One Panel member suggested using the CMAQ model to determine if additional monitors are needed to identify sources for nonattainment. Another Panel member suggested that EPA assess the entire PAMS network to determine whether additional sites were needed or whether existing sites should be augmented with additional instruments. One Panel member suggested placing

ozone monitors in moderate attainment areas, and another suggested that EPA identify the percentage of biogenic vs. anthropogenic sources in monitored areas.

Charge Question 5 – Consideration of A New Subset of Ozone Sites

The Panel discussed whether additional monitoring sites should be provided, and agreed that existing regional PAMS sites can be tailored to allow additional selected measurements in certain regions or areas. The Panel recommended that EPA use multiple criteria to more effectively characterize regions, and noted that EPA could consider mapping current PAMS sites to identify areas between existing sites for potential future monitoring.

One Panel member suggested that EPA save money by considering use of existing EPA-supported monitoring infrastructure to conduct additional PAMS monitoring (e.g., use rural or urban NCore sites). Another Panel member commented that EPA should identify a new or improved multiple column automatic gas chromatograph (GC) detector to assess multiple pollutants.

Charge Question 6 – Role of Mobile or Temporary Sites

The Panel discussed the role of mobile and temporary monitoring sites, and agreed that the IAGOS airplane monitoring program could potentially provide good information from different atmospheric elevations. Panel members also commented that it would be helpful if data on different species of NO_x and oxidants could be gathered. The Panel noted that use of truly mobile systems that could be stationed temporarily for a few days and then moved could provide useful data, and that it might be helpful for EPA to consider maximizing available PAMS monitoring funds by conducting data collection in one year and data analysis the following year. Several Panel members commented that it would be helpful to have PAMS instruments sited on transportable platforms to allow the instruments to be periodically moved to different locations (e.g., to accommodate seasonal changes of wind patterns).

A few Panel members noted it would be beneficial to use airplanes for data gathering, but expressed some concern that airline management of the system and use of single aircrafts would limit EPA control of the monitoring. A Panel member noted that siting PAMS instruments on transportable platforms could present access or power difficulties when parking a trailer for a month or more in a preferred monitoring location.

Charge Question 7 – Merits of Revising PAMS to be Very Flexible vs. Highly Specified

The Panel discussed whether and how to revise PAMS to be flexible and specific. The Panel agreed to support a more flexible PAMS monitoring program, as long as was consistent with existing analytical and sampling methodology, measurement documentation occurred, and that a minimum basic framework for the program was developed. The Panel also supported continuation of EPA's activities on trend analysis and data gathering. The Panel noted that Regional EPA offices can coordinate regional needs for PAMS monitoring, and commented that some regions are more capable than others in such coordination.

Several Panel members commented that EPA should develop a 'toolbox' for data collection and monitoring that would help states and regions identify PAMS monitoring needs. The toolbox would provide consistent methods, a structure for determining how to conduct targeted data collection, and flexibility for measuring different parameters in different regions. Another Panel

member commented that states will have difficulties applying any PAMS requirements for monitoring beyond state or national boundaries (e.g., to gather upwind data).

Charge Question 8 – Retain or Revise Current PAMS Monitoring Season Framework

The Panel discussed and reached general agreement that the PAMS ozone monitoring season framework should be determined on a case by case and region by region basis. The Panel discussed tradeoffs on monitoring that would not increase monitoring costs, and suggested that EPA consider monitoring for an entire year and either monitor at fewer sites or reducing the temporal resolution of sampling and analysis. The Panel noted that year-round monitoring would provide data on ozone chemistry differences in winter vs. summer, and also generate comprehensive air toxics data.

One Panel member noted that modeling data and data on emissions and ambient levels should be generated to properly estimate the season for monitoring. Another Panel member commented that while June through August may be good months for most regions to assess peak ozone levels, for certain regions (e.g., Baton Rouge), summer thunderstorms may reduce ozone levels. Another Panel member suggested that while the PAMS monitoring season should be at least as long as the ozone season occurs for a given area, fewer sites that are monitored for longer periods of time would be preferable than continuing with the existing PAMS approach. Another Panel member agreed that winter chemistry should be better understood.

Charge Question 9 - Criteria for Re-Evaluating PAMS Target VOC List

The Panel discussed and reached general agreement that EPA should assess the current PAMS target VOC list to identify the accuracy that a specific compound provides for marking emissions, the degree that the compound forms ozone, and the level of detection using current methods. The Panel also commented that analytical results indicate a substantial fraction of unidentified hydrocarbon and VOCs from PAMS monitoring (potentially made up of higher molecular weight compounds), and recommended that EPA conduct research to identify these fractions. The Panel also discussed and generally agreed it would be beneficial to direct some PAMS funding towards identification of GC peaks, characterization of regional differences, assessing reactivity of VOC compounds, species profiling, and urban air toxics data collection.

A Panel member stated that EPA should research the ability of new auto GC's to measure VOCs. Another Panel member commented that it was unclear whether it is necessary or cost effective to require collection of PAMS data on certain VOCs that are never detected. One Panel member noted it would be helpful to assess PAMS data results that indicate VOCs are present below detection levels. Another Panel member noted that EPA should include chemical reactivity as one criteria to determine which compounds should be targeted.

Charge Question 10 - Specific Compounds to be Added to or Subtracted from PAMS Target VOC List

The Panel discussed and reached general agreement that EPA should carefully consider the criteria for adding or subtracting compounds from the target VOC list. The Panel referred to its discussion and response to Charge Question #9. The Panel recommended that EPA capture unidentified components within analytical results, and noted that there is frequently a large slug of unidentified compounds indicated at the end of chromatograms. In addition, the Panel recommended that EPA consider including secondary VOC components to the target VOC list.

One Panel member commented that EPA should first consider how to target VOC compounds before ruling out compounds. The Panel member recommended that EPA assess and consider adding biogenic compounds to the list, and also recommended that EPA keep carbonyl compounds on the list. Another Panel member recommended that EPA add a few extra tracer chemicals to the list to help identify individual sources of releases. The Panel member also recommended that EPA add one or more biogenic compounds to the target list.

Charge Question 11 - Advantages and Disadvantages of Manual Canister Sampling vs. Field Deployed Auto-GCs

The Panel discussed and reached general agreement that a determination on the advantages and disadvantages of manual canister sampling versus field deployed auto-GCs is dependent on objectives and cost analysis of the sampling. The Panel noted that if sampling objectives require high time resolution, auto-GCs should be used. If the sampling objectives are to conduct a characterization study, then a cost analysis should be conducted to compare manual canister sampling versus field deployed auto-GCs. The Panel also noted that auto-GCs could provide quick turnaround data which may be needed. In addition, the Panel suggested that EPA consider longer term averaging of auto-GC sampling results. The Panel also cautioned that auto-GC instruments are fickle, and that EPA should carefully assess auto-GC results and emphasize the special skills that are needed for GC sampling and data analysis.

One Panel member noted that field deployed auto-GCs can help evaluate air quality models, and manual canisters can help characterize VOC levels on a day-day basis and also provide annual trend data for analysis. Another Panel member noted that while manual canisters have well published methods, they are labor-intensive, deteriorate over time in storage, do not provide all data that is needed, and have lower temporal resolution. The Panel member noted that while field GCs do not require day to day presence during sampling, they have a high capital cost, require special skills for sampling and data analysis, and do not have standard QA/QC procedures. One Panel member noted that canisters could provide useful spatial characterization of the source signature.

One Panel member commented that auto-GC data could be made available to the public within an hour of collection, with appropriate data caveats noting that QA/QC was not completed. The Panel member commented that such real time data reporting has helped communities identify options for reducing air quality impacts. Another Panel member noted that a disadvantage of auto-GC is that since deployment of the instrument is based on laboratory GCs a comparison with laboratory data validation requirements is required. A Panel member commented that to properly compare the two approaches, analytical data from canisters and auto-GCs should be provided.

The Panel discussed issues associated with gathering data on diurnal profiles, collecting wintertime measurements, using continuous measurements, and sampling in early morning hours when ozone is at minimum (e.g., 3 a.m) to identify industrial sources of contaminants that form ozone. The Panel did not agree on how these issues affected the decisions on whether to utilize manual canister sampling versus field deployed auto-GCs. Another Panel member commented that a combination of manual canister sampling and field deployed auto-GCs can be very helpful.

Charge Question 12 - Appropriateness and Suitability of New Commercially Available Auto-GCs at PAMS Sites

The Panel discussed this issue, and agreed that while the available new technology appears promising, comprehensive evaluations are needed to assess suitability of the instruments for national monitoring. The Panel discussed and noted that EPA should consider many factors when evaluating available technology.

One Panel member noted there is significant information available on benzene, toluene, ethylbenzene, and xylene sampling instruments. Another Panel member noted that the Synspec Ozone Precursor Analyzer was a dual GC/detector system that could analyze C2-C10 compounds, and thus data on the entire list of PAMS compounds could be generated. The Panel member had no information on QA/QC requirements of this instrument, and commented that the State of Connecticut was thoroughly evaluating its field robustness. Other Panel members briefly discussed the performance of the new Perkin Elmer and EcoTech instruments. A few Panel members noted that some instruments provide data on contaminant ‘peaks’ that do not identify the contaminant, and also do not convert the data for analysis. Another Panel member suggested that EPA conduct a formal survey of states and local communities who are using these instruments to develop an understanding of implementation issues.

Charge Question 13 – Role, if any, of TNMH Monitors in PAMS program

The Panel discussed and reached general agreement that TNMH monitors can be a useful tool but EPA should assess the monitors further to identify how it can be used. The Panel noted that the monitors required care during use, and that in rural areas the monitors’ sensitivity may not be high enough to register a signal. The Panel also agreed that it would be helpful if manufacturers could convert the monitors into one instrument, and also aggregate hydrocarbons based on hydrocarbon group.

A Panel member commented that these monitors have high resolution and could be used to measure other compounds that are important for PAMS. Another Panel member commented that states need robust, field tested instruments. A Panel member noted that it would be helpful to have information on these instruments available in a toolbox (e.g., information on available methods and parameters that can be measured).

Mr. George Allen then noted that time had expired for the May 16 teleconference, and that the teleconference would continue on May 17 at 12:30 pm EST at the point where discussion stopped on May 16. With the meeting business concluded for the first day of the teleconference, at 4:25 pm ET the Designated Federal Officer noted the teleconference would continue on May 17, 2011 on the same teleconference line that the public called in on for May 16.

Tuesday, May 17, 2011

Opening Statements and Welcome

Mr. Ed Hanlon, the Designated Federal Officer (DFO), opened the second day of the teleconference, and made a brief opening statement noting that the teleconference was continuing from the May 16, 2011 teleconference. He then turned the teleconference call over to the Chair, Mr. George Allen. Mr. Allen noted that the teleconference would continue from the point where discussion stopped on May 16.

Charge Question 14 – Carbonyls at VOC Speciation Sites

The Panel discussed and reached general agreement that EPA should provide detailed information regarding which carbonyls should be measured and which methods should be used to measure carbonyls. The Panel commented that a range of sites was needed to provide data on primary and secondary sources, and noted that carbonyls are good indicators of VOC chemistry. The Panel noted that a suite of sites was required to cover a range of atmospheric conditions.

Several Panel members commented that formaldehyde, acetaldehyde, methyl-glyoxal, glyoxal, and acrolein were higher priority carbonyls that should be considered for measurement under the PAMS program. Other Panel members commented that measurement of these oxidation products will be helpful to understand ozone and mechanisms and reactions. A Panel member commented that it is important to measure carbonyls since ethanol is increasingly being used in our fuel supply. Dr. Scheffe responded that EPA was seeking to measure aldehydes, isoprene and formaldehyde to assess toxics in rural sites.

Charge Question 15 – Issues with the Current TO-11A Method for Carbonyl Sampling

The Panel discussed and reached general agreement that while precautions and measures have been taken to limit cross contamination, QA is needed to tighten the measurement platform to improve precision using the current TO-11A method for carbonyl sampling. The Panel also agreed that sampling accuracy needs improvement, and that alternative sampling methods should possibly be identified. The Panel recommended that EPA consider conducting some well designed experiments to explore these issues.

A Panel member identified three primary issues with using the current TO-11A method for carbonyl sampling: a) contamination; b) collection efficiency; and c) positive and negative reactants in gas phase. The Panel member noted that improvements in storage and handling and use of ozone scrubbers have resulted in improved precision and accuracy. The Panel member noted that benchmarks for measures of accuracy are needed.

Charge Question 16 – Alternative Methods to the manual TO-11A Method for Carbonyl Sampling

The Panel discussed and reached general agreement that in order to assess alternative methods to the current TO-11A method for carbonyl sampling, time integrated substrate techniques should be differentiated from continuous methods. The Panel agreed there is limited information available on the feasibility of time-integrated substrate techniques, and that continuous, wet chemistry approaches have mixed feedback but appeared to be more promising than time substrate techniques.

One Panel member noted that laser spectroscopy was a potentially viable alternative but that fewer carbonyls could be measured using that method. The Panel member commented that another possible option was to reevaluate the use of manual canisters and field deployed auto-GCs to determine their usefulness. Another Panel member noted that the State of Missouri used wet chemical methods, and noted that while some wet chemical methods are performing well, others were not performing well. A Panel member commented that wet chemical methods that were developed years ago may provide useful information in assessing their current utility. One Panel member commented that research was needed to identify low cost approaches.

Mr. David Shelow responded that the EPA was investigating alternative methods for carbonyl sampling including gathering feedback from industry, and was also assessing in-situ and direct measurement approaches. Several Panel members requested that EPA keep states and organizations in the loop on available alternative methods for carbonyl sampling.

Charge Question 17 – Suitability of Direct Measurement NO₂ or Photolytic NO₂ Analyzers For Deployment in PAMS Network

The Panel discussed and reached general agreement that direct measurement NO₂ and photolytic NO₂ analyzers are suitable for deployment in the PAMS network. The Panel noted that these instruments are commercially available, and that additional manufacturer information is needed regarding their long-term operation. The Panel stated that these instruments would require testing for longer periods of time in order to assess their suitability. Some other available measurement methods were discussed by the Panel, and pros/cons of the various instruments were identified. The Panel recommended that EPA compare all available instruments for measuring NO₂ (i.e., do a ‘shoot-out’ on the long-term operation of currently available instruments). In addition, the Panel recommended that EPA prepare information on appropriate maintenance for these instruments for use by regulatory agencies.

A Panel member noted two significant issues with measuring NO₂: a) lack of specificity (in summer afternoons, rural NO₂ is only 20% of NO_Y, but conversion using available monitoring analyzers indicates NO₂ is 70% of NO_Y); and b) current analyzers use two channels with a single detector, and variable results have occurred. Another Panel member asked whether EPA would be requiring NO_Y sampling at PAMS sites. EPA responded that its 2006 ozone implementation rulemaking required NO_Y sampling at Type-1 (upwind) and Type-3 (maximum ozone) sites.

One Panel member commented that instruments using the photolytic technique for measuring NO₂ could be easily incorporated into existing NO_X instruments (e.g., could be added to the back of the NO_X instrument). Another Panel member noted that states or local air agencies should make the decisions on which instruments should be used for measuring NO₂. The Panel member also commented that various options for measuring NO₂ should be available.

Charge Question 18 – Observational Approaches to Gather Ozone and Nitrogen Oxide Profile Information

The Panel discussed and reached general agreement that routinely collected surface measurements from background and regional sites for ozone determination and attainment could complement vertical profile and total column observations. The Panel discussed recent applications of various different commercial instruments that were available. The Panel also agreed that aircraft platforms are well suited to provide vertical profile and total column observations. The Panel also commented that airplane observation of land cover and biogenic production provides useful information and suggested that standardization of those techniques would be helpful.

One Panel member noted that EPA is trying to advance use of multisensor approaches, which could be a great help to the PAMS program. Another Panel member noted that potential concerns about use of airlines for collecting information include cost, Federal Aviation Administration certification requirements, and limited application in large industrial areas. The Panel member noted that satellite sensors have limited accuracy and precision, and that the highest satellite accuracy is less sensitive than surface measurements. The Panel member further

noted that clouds and surface reflection and scattering affect monitoring results. Dr. Scheffe responded that EPA is considering these issues, and noted there have been large investments by NASA and other agencies in use of satellites for collection of air monitoring data. He also noted that expertise at NASA and other agencies are assessing how to apply this technology.

Charge Question 19 – Collection of Upper Air Wind Speed and Wind Direction Data at PAMS Sites

The Panel discussed and reached general agreement that decisions regarding whether to collect upper air wind speed and wind direction data at PAMS sites depend on the needs for local and regional boundary models. The Panel noted that some areas are complex and not well suited for modeling, and if meteorological fields are not prepared correctly, the models will have significant error. The Panel commented that in some areas one monitor can support several states. The Panel also noted that ceilometers could be used to gather upper meteorological data at a relatively low cost. In addition, the Panel discussed the pros and cons of various instruments that could be used to gather necessary PAMS program meteorological data.

One Panel member recommended that state and local monitoring agencies have flexibility in how they make both surface and upper-air PAMS meteorological measurements. The Panel member also noted that measurement frequency should be based on the framework or model that is being used to assess upper air.

Charge Question 20 – Incorporation of NOAA Data Into the PAMS Program

The Panel discussed and reached general agreement that NOAA data is already being incorporated into the PAMS program by air modelers. The Panel noted that EPA's profiling measurements have been useful for short term meteorology measurements, and may be useful for longer term forecasting. The Panel discussed but did not resoundingly recommend that EPA use radar profilers at PAMS sites, noting that existing profilers are not critical to meet PAMS measurement requirements. The Panel noted that it was not necessary to separately gather PAMS data using radar profilers since modeled data was already available at no cost.

One Panel member noted that local agencies regularly used radar profilers to gather data, and that these profilers have been in service for a number of years. Several Panel members noted that before NOAA data could be used, EPA should conduct QA/QC on the data to characterize its usefulness. Several Panel members noted that meteorological stations were expensive and have siting issues (e.g., access and noise issues). One other Panel member noted it would be prudent to run meso-scale data through a model such as WRF, then add NOAA data to see if that adds value to the model.

Charge Question 21 – Use and Analysis of PAMS Data

The Panel had a wide ranging discussion, and reached general agreement that EPA should refine or define PAMS monitoring objectives to determine what can be achieved. The Panel noted that PAMS data are valuable to local and state agencies, and provide insight into a particular airshed or problem area. The Panel commented that there is opportunity for using PAMS data to address fundamental problems (e.g., to identify sources and strategies for reducing ozone). The Panel also agreed that state and local monitoring agencies should have flexibility to develop a framework for use of such data.

One Panel member noted this was a very broad question, and that PAMS data could be used to perform trend analyses, characterize emissions, and conduct various other assessments. Several Panel members pointed out that there are two basis uses for PAMS data: longer term, and shorter term use. A few Panel members asked how state agencies were spending the funds they received for data analysis. One Panel member noted that PAMS funding pays salary for field staff, and is used to conduct modeling and other analyses. This Panel member suggested that feedback from modelers was needed to determine how such data could be used. One Panel member noted that since models change over time, it was difficult to do trend analyses on PAMS data over time.

One Panel member noted that if a state has a particular need for the data, they will conduct a data analysis of some sort. The Panel member suggested that it would be helpful if the PAMS program had a data analysis option that would allow such analysis to be conducted to fulfill a particular objective.

Charge Question 22 – Implementation of Recommended Data Analyses at the State, Regional, and National Level

The Panel discussed and reached general agreement that analyses should be implemented at state, regional and national levels. The Panel members also agreed that state and local monitoring agencies should have flexibility to develop a framework for use of PAMS data. The Panel also agreed that EPA should leverage the infrastructure and success of other programs such as FED to develop a data system that allows easy access and use of PAMS data when conducting PAMS data analyses. The Panel also commented that EPA should consider sponsoring an annual or bi-annual conference that would promote data analysis and collaboration with other related programs and communities.

One Panel member noted there is a difference between a practical, local and state agency use of data vs. an academic research analysis. The Panel member commented that EPA should make PAMS data analysis tools more available, and consider gathering more information on such tools. A few Panel members noted that the lack of easy access to PAMS data is a major obstacle to its use, and commented that it would be helpful if EPA made the data available through a user-friendly website. Another Panel member noted that because PAMS data is difficult to use and the data is not available in a readily usable format, it is a significant effort to use the PAMS data. One Panel member noted that regarding use of NOAA data, most NOAA data is gathered in central United States where most PAMS locations are not located.

Several Panel members commented that EPA's national focus for use of PAMS data should be on model development, evaluation and improvement, and that model developers should be able to access data to assess local and regional situations.

Charge Question 23 - PAMS Funding Allocation towards Data Analysis

The Panel discussed and reached general agreement that it is uncertain how the PAMS funding allocation is being used. The Panel noted that if matching funds are required for use of the PAMS funding, EPA should consider the variety of possible uses of these PAMS funds. The Panel also commented that it was uncertain whether the magnitude of funds that is currently set aside for PAMS data analysis is actually necessary for doing PAMS analysis. The Panel also suggested that it would be helpful if EPA prepared case studies that would demonstrate how PAMS funding could be used for emissions inventory and other uses.

One Panel member suggested that the EPA should identify the links between the objectives and allocation of PAMS funding, since it was not clear that PAMS funding is being used to serve PAMS objectives and purposes. Another Panel member suggested that EPA consider releasing requests for proposals to receive bids from academic, local and other agencies and organizations to conduct PAMS data analysis. Another Panel member commented that agencies that allocate some of the PAMS funding towards purposes other than PAMS analysis may have reduced operations if their PAMS funding allocation for data analysis is reduced. A Panel member asked for clarification on what are EPA's expectations for 'data analysis,' since that term has widely varying interpretations (e.g., trend analysis; modeling).

Upon completion of the initial discussion of the Panel's responses to the charge questions, Mr. Allen asked whether any Panel members had any other concerns to present to EPA. Mr. Cavender stated that there are two objectives for the PAMS program: a) gather data so that local areas can resolve local problems; and b) gather data for model evaluators to improve their models. He noted that the current PAMS focus is to solve local problems, and that it is unclear how to adjust the PAMS program to gather data to improve models. He requested Panel feedback on how to improve models using the PAMS program. The Panel discussed this topic, and several Panel members had thoughts to consider when identifying and defining national needs that would assist model evaluators, including: a) need to identify how many sites are needed; b) need to identify what are the spatial and temporal requirements for the PAMS program; c) consider adjusting sampling frequencies (since EPA could save money if 8 or 24 hour sampling occurred in certain areas); and d) gather more information on what are the national needs.

Several Panel members asked whether EPA was considering redistribution of PAMS monitoring sites to assess potential impacts from hydraulic fracturing locations across the nation. Several Panel members suggested that companies with hydraulic fracturing could be tasked to put data from their sites into a national repository, and that EPA could identify model needs for use of such data.

Mr. Allen then discussed next steps and action items, and asked if the Panel members had any additional questions or comments. Hearing none, Mr. Allen thanked the Panel members and EPA staff who participated at the meeting. With the meeting business concluded, the Designated Federal Officer adjourned the meeting at 4:25 pm ET.

Respectfully Submitted:

/signed/

Mr. Edward Hanlon
Designated Federal Officer

Certified as Accurate:

/signed/

Mr. George Allen, Chair
CASAC Air Monitoring and
Methods Subcommittee

NOTE AND DISCLAIMER: The minutes of these public teleconferences reflect diverse ideas and suggestions offered by Panel members during the course of deliberations within the teleconferences. Such ideas, suggestions and deliberations do not necessarily reflect consensus advice from the Panel members. The reader is cautioned to not rely on the minutes to represent final, approved, consensus advice and recommendations offered to the Agency. Such advice and recommendations may be found in the final advisories, commentaries, letters or reports prepared and transmitted to the EPA Administrator following the public meetings or teleconferences.

Materials Cited

The following meeting materials are available on the CASAC website (www.epa.gov/casac) on or through the following CASAC AMMS PAMS May 16 and 17, 2011 teleconference webpages: <http://yosemite.epa.gov/sab/sabproduct.nsf/bf498bd32a1c7fdf85257242006dd6cb/6a62b0219d19df358525785c0064e71b!OpenDocument&Date=2011-05-16> and <http://yosemite.epa.gov/sab/sabproduct.nsf/bf498bd32a1c7fdf85257242006dd6cb/6abbc18d956a2b768525785c00663487!OpenDocument&Date=2011-05-17>

¹ Federal Register Notice announcing the teleconferences

² Agendas for May 16 and 17, 2011 public teleconferences

³ Presentation from Mr. Kevin Cavender, USEPA

⁴ Presentation from Mr. Jim Szykman, USEPA

ATTACHMENT A – ROSTER

U.S. Environmental Protection Agency Clean Air Scientific Advisory Committee CASAC Air Monitoring and Methods Subcommittee (AMMS)

CHAIR

Mr. George A. Allen, Senior Scientist, Northeast States for Coordinated Air Use Management (NESCAUM), Boston, MA

PANEL MEMBERS OF AMMS

Dr. David T. Allen, Professor, Department of Chemical Engineering, University of Texas, Austin, TX

Dr. Linda Bonanno, Research Scientist, Office of Science/Division of Air Quality, New Jersey Department of Environmental Protection, Trenton, NJ

Dr. Doug Burns, Research Hydrologist , U.S. Geological Survey

Dr. Judith Chow, Research Professor, Desert Research Institute, Air Resources Laboratory, University of Nevada, Reno, NV

Dr. Kenneth Demerjian, Professor and Director, Atmospheric Sciences Research Center, State University of New York, Albany, NY

Mr. Eric Edgerton, President, Atmospheric Research & Analysis, Inc., Cary, NC

Mr. Henry (Dirk) Felton, Research Scientist, Division of Air Resources, Bureau of Air Quality Surveillance, New York State Department of Environmental Conservation, Albany, NY

Dr. Philip Fine, Atmospheric Measurements Manager, South Coast Air Quality Management District, Diamond Bar, CA

Dr. Philip Hopke, Bayard D. Clarkson Distinguished Professor, Department of Chemical and Biomolecular Engineering, Clarkson University, Potsdam, NY

Dr. Rudolf Husar, Professor, Mechanical Engineering, Engineering and Applied Science, Washington University, St. Louis, MO

Dr. Daniel Jacob, Professor, Atmospheric Sciences, School of Engineering and Applied Sciences, Harvard University, Cambridge, MA

Dr. Peter H. McMurry, Professor, Department of Mechanical Engineering, University of Minnesota, Minneapolis, MN

Dr. Allen Robinson, Professor, Department of Engineering and Public Policy, Carnegie Mellon University, Pittsburgh, PA

Dr. Armistead (Ted) Russell, Professor, Department of Civil and Environmental Engineering, Georgia Institute of Technology, Atlanta, GA

Dr. James Jay Schauer, Professor, Department of Civil and Environmental Engineering, College of Engineering, University of Wisconsin - Madison, Madison, WI

Dr. Jay Turner, Associate Professor, Environmental & Chemical Engineering, Campus Box 1180, Washington University, St Louis, MO

Dr. Yousheng Zeng, Managing Partner, Providence Engineering & Environmental Group LLC, Baton Rouge, LA

SCIENCE ADVISORY BOARD STAFF

Mr. Edward Hanlon, Designated Federal Officer, U.S. Environmental Protection Agency, Washington, DC

ATTACHMENT B – Other Attendees

List of Members of the Public Who Requested Information for Calling into the Public Teleconferences of the EPA Clean Air Scientific Advisory Committee Air Monitoring and Methods Subcommittee (AMMS) for the Review of EPA’s Photochemical Assessment Monitoring Stations (PAMS) Program

May 16-17, 2011

Name	Affiliation
Dinh, James D.	State of Virginia Department of Environmental Quality
Doug Dickerson	Entech Instruments
Downs, Tom	Maine Department of Environmental Protection
Ferdinand, Orette	State of Georgia Department of Natural Resources
Field, Kent	Ventura County Air Pollution Control District
Holland, John C.	State of North Carolina Department of Environment and Natural Resources
Johnson, Andrew	Maine Department of Environmental Protection
Klassen, Jon	San Joaquin Valley Air Pollution Control District
Koerber, Michael	Lake Michigan Air Directors Consortium
Krask, David J.	Maryland Department of the Environment
Lacaillade, Robert	State of Vermont Department of Environmental Conservation
Lam, Janice	Sacramento Metropolitan Air Quality Management District
Mallory, Erik	The J.J. Wilbur Company, Inc./Wilbur Technical Services, LLC
Moore, Mark	Olympic Region Clean Air Agency
Mullen, Marylee T.	Maine Department of Environmental Protection
Nichols, Paul R.	Maine Department of Environmental Protection
Ollison, Will	American Petroleum Institute
Parker, Stuart	Inside Washington Publishers
Scott Reynolds	State of South Carolina Department of Health and Environmental Control
Steger, Joette	State of North Carolina Department of Environment and Natural Resources

Name	Affiliation
Stevenson, Eric	Bay Area Air Quality Management District
Torsello, Donald	State of Pennsylvania Department of Environmental Protection
Underhill, Jeffrey	New Hampshire Department of Environmental Services
Wilbur, John	The J.J. Wilbur Company, Inc./Wilbur Technical Services, LLC
Wilson, Linda M.	New York State Office of the Attorney General