

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

Minutes of the Public Teleconference on April 3, 2014

Date and Time: Thursday, April 3, 2014 – 11:30 a.m. to 3:15 p.m. Eastern Time

Location: Teleconference only.

Purpose: The purpose of the April 3, 2014 public teleconference was for the AMMS Subcommittee to conduct a review and provide advice regarding the scientific and technical aspects of a draft EPA document that supports a recommendation to adopt the Nitric Oxide-Chemiluminescence (NO-CL) method as a second Federal Reference Method (FRM) for measuring Ozone (O₃).

Participants:

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

Mr. George A. Allen
Dr. David T. Allen
Dr. Linda J. Bonanno
Dr. Doug Burns
Dr. Judith C. 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

Drs. David Allen, Doug Burns, Judith Chow, Daniel Jacob and James Schauer could not participate during the April 3, 2014 public teleconference.

EPA SAB Staff:

Mr. Edward Hanlon, Designated Federal Officer

Other Attendees:

A list of persons who requested information on accessing the public teleconference line or live audio webcast, or who noted that they participated on the live audio webcast, is provided in Attachment B.

Materials Available: The agenda and other meeting materials are available on the SAB website (www.epa.gov/sab) at the following CASAC AMMS April 3, 2014 public teleconference webpage:

<http://yosemite.epa.gov/sab/sabproduct.nsf/bf498bd32a1c7fd85257242006dd6cb/cf242b410033450885257c5b004f008d!OpenDocument&Date=2014-04-03>

Public Teleconference Summary

The public teleconference was announced in the Federal Register¹ on March 13, 2014 and was conducted according to the public teleconference agenda². A summary of the public teleconference follows.

Opening Statement

Mr. Edward Hanlon, the Designated Federal Officer (DFO), opened the public teleconference, and made a brief opening statement noting that the CASAC Air Monitoring and Methods Subcommittee operates under the Federal Advisory Committee Act (FACA). He noted the teleconference was open to the public and that meeting materials were posted on the CASAC website. He noted that AMMS members were appointed as Special Government Employees to provide individual expertise and advice, not to represent any organization. He noted that no members of the public had requested to present an oral statement during the April 3, 2014 public teleconference. He stated that the public could listen in to the teleconference via an audio webcast. He noted that the SAB Staff Office had identified no financial conflicts of interest or appearance of a loss of impartiality for any Panel members for this teleconference. He also noted that minutes of the public teleconference were being taken to summarize discussions and action items in accordance with the requirements of FACA.

Introductory Remarks, Panel Introductions, Review Agenda

Mr. George Allen, Chair of AMMS, then welcomed everyone. Mr. Allen noted that teleconference materials were posted on the EPA CASAC AMMS website. He noted the goals, purpose and objectives for the teleconference, and stated that during discussions on each charge question, the AMMS members would try to articulate a reflection of the AMMS's viewpoints, and that areas of consensus and differing viewpoints would be identified. Mr. Allen noted there were two separate sessions for oral public comments during the teleconference (one near the beginning of the teleconference after discussion on the charge questions, and one near the end of the teleconference intended for clarifying comments from the public). He also noted that the AMMS members would listen to and consider public comments, each other on the AMMS, and EPA staff. He noted that the CASAC AMMS draft report would undergo a quality review process by the chartered CASAC, and that after the approval of the report, the final report would be transmitted to the EPA Administrator. Mr. Allen then welcomed Dr. Russell Long, EPA Office of Research and Development (ORD), for his opening remarks.

EPA Presentation on NO-CL Method as a Second FRM for Measuring Ozone

Dr. Russell Long, EPA ORD, made a brief opening statement and presented and discussed his PowerPoint slides³ that were provided on the teleconference website. Dr. Long noted that EPA ORD and EPA has responsibility for developing appropriate performance specifications for FRMs that supported the National Ambient Air Quality Standards (NAAQS) program.

Regarding slide 8, he noted that ORD's intent was to show that the proposed specifications meet the 40 CFR Part 53 requirements, and that ORD would be updating this chart in the future. Regarding slide 9, he noted that the NO-CL method met all current and proposed ORD specifications for 40 CFR Part 53. Regarding slide 12, he noted that the Ultraviolet-Scrubberless Measurement Method (UV-SL) method without the dryer did not meet all current and proposed ORD specifications for 40 CFR Part 53. He noted that since the presence of water can cause problems with accurate measurement, ORD would include language in the reference method for drying the sample stream.

Several AMMS members asked questions regarding the drying requirements for the UV-SL method that ORD used during its sampling effort, the use of hand held sensors in the field, and the apparent noisier data from the UV dryer instrument. Dr. Long responded to these questions. A Panel member asked whether the UV-SL method had interference issues due to aromatics. Dr. Long responded that the UV-SL system accounted for these issues, and that the UV-SL method removes nothing but ozone from the reference air and thus can account for the interference from hydrocarbons and other contaminants.

An AMMS member noted that Slide 4 should be corrected to note that the reaction described on the slide occurs at much lower concentrations than indicated on the slide. Dr. Long noted he would revise the slide. Another AMMS member asked whether the wavelength measured in the NO-CL instrument used in ORD's research was similar to that currently used in FRM NO/NO₂ analyzers. Dr. Long responded that he believed the wavelength was probably similar but did not know for sure.

Regarding Slide 9's design requirements for the NO-CL method, an AMMS member recommended that ORD include requirements for adding an oxides of nitrogen (NO_x) scrubber, in order to ensure that releases are well managed at the exhaust of the instrument. The member also commented that for the data included within Slide 6, it would be helpful if daily results were presented and humidity data were provided. The member also noted it would be helpful if Slide 11 were further broken down to provide more information on what data were collected.

An AMMS member asked whether ORD could explain the units for interference in Slide 9. Dr. Long responded that interference was presented in parts per billion (ppb), with the exception of carbon dioxide. Another AMMS member noted that Table B-3 of 40 CFR Part 53 specifies test concentrations, and that such concentrations are in parts per million. The AMMS member asked whether ORD planned to change the requirements for interference testing in Table B-3. Dr. Long responded that ORD would change these Table B-3 requirements.

One AMMS member commented that while EPA's laboratory evaluation shows very good results and little interference, EPA's field data does not compare as well as EPA's laboratory evaluation, and for that reason, it was unclear whether the NO-CL method was the best available method for FRM status at this point.

Several AMMS members raised the topic of retaining the existing FRM for Ozone (Ethylene-Chemiluminescence Method, or ET-CL FRM). Dr. Long responded that EPA and ORD would consider whether to retain the ET-CL FRM, and that EPA's desire is to not disqualify any methods that are in the network. Dr. Long also noted that EPA may decide that the ET-CL FRM should be retained in order to allow for comparability of test results. An AMMS member asked if the ET-CL FRM were not retained, whether instruments based on the ET-CL FRM would lose Federal Equivalent Methods (FEM) status. Dr. Long responded that EPA could grandfather

existing FEMs, so that removing the current ET-CL FRM would not cause FEMs to lose that designation. Dr. Long also noted that EPA is currently discussing this topic within the EPA reference method committee.

An AMMS member asked which FRMs were included in state/local monitoring networks. Dr. Long responded that there are no working reference methods in state/local monitoring networks at present, and that the networks were comprised of FEMs with the strong majority being UV methods.

Several AMMS members discussed ultraviolet (UV) methods, noting that UV methods have significant interferences (e.g., due to water). Dr. Long responded that EPA's goals included having the best methods as FRMs, with FRMs considered the gold standard. Dr. Long noted that there are known interferences with UV methods, and that the UV methods could be adjusted to improve performance.

An AMMS member commented that the FRM procedure for measuring Ozone presented by EPA was applicable regardless of which particular Ozone monitoring method would be used. Dr. Long responded that 40 CFR Part 53 Appendix D states that the reaction for measuring Ozone is based on ethylene. The AMMS member noted that EPA could change the name of the FRM from ethylene to nitric oxide, or note the FRM could be either for ET-CL or NO-CL. Dr. Long responded that EPA would consider that option.

Discussion of Charge Questions

Mr. Allen noted there were four charge questions, and asked whether any members of the AMMS subcommittee had any questions or concerns regarding any of the charge questions or had any clarifying questions regarding EPA's draft report that is undergoing review. No questions or concerns were raised by AMMS members.

Mr. Allen noted that during discussion of each charge question, Lead Discussants would provide initial comments on each question, and that after Lead Discussants provide their comments, comments from the entire AMMS Subcommittee will be encouraged. He also noted that towards the end of discussion on each charge question, he would provide time for AMMS members to summarize major comments and responses. He noted that Lead Discussants were also serving as Lead Writers for the CASAC report to be drafted for this review. He also noted that while the agenda was structured to allow the AMMS members to complete review and deliberations on all four charge questions on the April 3rd teleconference call, if needed, AMMS member discussion on charge questions would continue on April 8th if AMMS members could not complete discussions during the April 3rd teleconference call. He also noted that to accommodate member availability, the sequence for discussion of charge questions would be charge question 1, followed by charge question 3, then charge question 2 and finally charge question 4.

Public Comments

Mr. Allen noted that no members of the public had requested to present oral comments during the teleconference. He noted that it was important for the AMMS subcommittee to consider public comments, and that one set of written public comments were submitted.

Responses to Charge Question 1: Overall View on Adding an Additional O₃ FRM

Several AMMS members noted that since the ET-CL FRM for Ozone was out of date, ORD should add another FRM for Ozone.

An AMMS member commented that ORD should identify when and how to use another FRM for Ozone. Another member commented that there is uncertainty on whether ORD should eliminate the current ET-CL FRM, noting that ET-CL methodology was robust.

One AMMS member suggested that EPA consider not limiting a new FRM to use of any particular method, but rather develop a set of parameters that any monitoring method would need to meet in order to be considered acceptable. An AMMS member responded that EPA traditionally selected a more specific FRM. The member noted that EPA has previously selected more than one FRM for the measurement of NAAQS pollutants (i.e., for particulate matter), and suggested that EPA consider other methods such as those that utilize UV absorbents once interference issues associated with those methods have been addressed.

Another AMMS member recommended that EPA update the 40 CFR Part 53 Table B-1 requirements for a new Ozone FRM, noting that the current 40 CFR Part 53 requirements for ozone monitoring were outdated and had a wide tolerance level. The AMMS member commented that such an update was particularly important because a large number of geographic areas were currently close to non-attainment status with the Ozone NAAQS.

An AMMS member commented that if a UV method were assessed, mercury and hydrocarbon interferences should be accounted for during the assessment of the method. The member also noted that it may not be appropriate to develop a set of parameters that any monitoring method must meet in order to be considered acceptable, since such an approach may not result in appropriate assessment of susceptibilities associated with each method.

One AMMS member noted there are many instruments listed as SO₂ FEMs that have not been commercially available for more than 30 years. The member noted that an instrument that was not commercially available should not necessarily be taken off the FEM list.

An AMMS member summarized the discussion to note that AMMS members agreed that EPA should develop a new Ozone FRM, and that there was some disagreement among AMMS members regarding whether the new FRM should be broad or specific. Also, AMMS members expressed concerns about interferences with any new FRM, and susceptibility to interferences should be described in the FRM regulation. In addition, calibration issues should be addressed as new FRMs are developed. Also, it would be acceptable if EPA did not remove the ET-CL method from FRM status. An AMMS member commented that the summary should also note that EPA should update the 40 CFR Part 53 Table B-1 requirements for a new Ozone FRM.

Responses to Charge Question 3: Other O₃ Measurement Methods for Consideration as a New Additional O₃ FRM

To accommodate member availability, the discussion of charge question 3 followed the discussion of charge question 1, after which discussion on charge question 2 and finally charge question 4 occurred.

An AMMS member described various Ozone measurement methods that were commercially

available, including methods that used light absorption with gas phase scrubbers, dual beam lightpaths, and whole and ozone-scrubbed air. The AMMS member noted that such instruments assessed measurement differences between scrubbed and whole air, and identified which chemicals may react with Ozone. The AMMS member noted that EPA should give serious consideration to light absorption method as an FRM along with the NO-CL method.

An AMMS member noted that electrochemical sensors have porous membranes that involve reactions that produce an electrical signal. The member noted such sensors have good reproducibility, quick response times, accurate measurements at high concentrations, some interferences with humidity, some storage problems, and inaccurate measurements at lower concentrations below 100 ppb. For those reasons, the AMMS member suggested that such sensors should be ruled out from most monitoring situations as a potential FEM or FRM.

Another AMMS member noted that while UV methods had interferences, if those issues were addressed, UV methods would be useful. The member indicated that slides presented by EPA at the beginning of the teleconference indicated impressive results for the UV methods, but that interferences noted on the slides indicated that UV methods need further work in order to be considered potentially viable for FRM status.

One AMMS member suggested that EPA consider quantum cascade system instruments, noting these instruments were accurate and commercially available. The member also noted that spectroscopic methods may also be useful to consider, and that while such methods were not specific to Ozone measurement, they could measure NO₂.

An AMMS member noted that a chemiluminescence method that used a catalytic bed was commercially available and is a promising FEM but not a potential FRM at this time. Another member noted that the National Oceanic and Atmospheric Administration (NOAA) has used the cavity ring-down instrument and that results looked promising.

An AMMS member noted that a Scrubberless UV method could be another alternative that EPA should investigate. Another AMMS member noted that the commercially available GPT Scrubberless Module had addressed interference issues, and suggested that EPA consider this instrument. Dr. Long noted that EPA would consider this instrument as it moved forward, and that modifications associated with this method would likely be needed.

One AMMS member commented that an FRM needs to be as accurate as possible, and perform well in both the laboratory and in the field. The member noted that if one or two methods are considered the best, most accurate methods, those should be FRMs. The member recommended that ORD identify preferred FRM and FEM methods, and that ORD should not recommend a variety of technologies for FRM status if they all measure Ozone accurately. Dr. Long responded that EPA was seeking the best, practical methods for FRMs.

An AMMS member asked whether EPA would promulgate a new Ozone FRM as part of an Ozone NAAQS promulgation. Dr. Long responded in the affirmative. The AMMS member noted that if the final Ozone NAAQS revisions are issued at the end of 2015, there were practical concerns regarding assessing FRM status issues for new possible methods, and noted that EPA could do a separate rulemaking to address these concerns.

One AMMS member commented that it was preferable if EPA developed performance-based FRMs. Another AMMS member noted that EPA was inconsistent in how it sets up its FRMs,

since the Particulate Matter 2.5 FRM is a design-based FRM

An AMMS member asked whether EPA could consider FRM and FEM status at the time data is being used. An AMMS member responded that when data is entered into EPA's repository of ambient air quality data (i.e., Air Quality System, or AQS), data is assumed to be equivalent. Another member noted that when data is entered into AQS, the method code is designated and thus it is known which method was used to collect the data.

A few AMMS members recommended that EPA propose the UV Scrubberless method for FRM status. Several AMMS members recommended that it would be appropriate for EPA to do this if EPA conducted necessary tests to determine the appropriateness of that proposal. An AMMS member suggested that if EPA is already conducting another set of such tests elsewhere, that EPA should test the UV Scrubberless method while conducting these other tests. Another AMMS member asked what timeframe was required for FRM approval if EPA considered the UV Scrubberless method for FRM status. Dr. Long responded that ORD has been working for four years in considering the NO-CL method for FRM status. Dr. Long noted he would consider this recommendation and conduct more testing on the UV Scrubberless method in the field and in the laboratory.

Another AMMS member asked whether CASAC AMMS was recommending a change to the 40 CFR Part 53 Appendix D specifications to address UV Scrubberless method requirements. An AMMS member responded that EPA would need to follow a process for adding an FRM, and that process requires more than an adjustment to 40 CFR Part 53 Appendix D specifications. An AMMS member asked whether 40 CFR Part 53 Appendix D specifications were applicable only to certain methods. Another AMMS member confirmed that Sections 1 and 2 of 40 CFR Part 53 Appendix D specifications were method-specific.

An AMMS member asked whether the CASAC AMMS should add more detailed requirements in 40 CFR Part 53 Appendix D specifications associated with FRM methods. Mr. Allen noted that CASAC AMMS could provide comments on whether 40 CFR Part 53 Appendix D specifications should be more detailed.

One AMMS member commented that Slide 6 of ORD's presentation indicated significant scatter associated with the NO-CL method that ORD was proposing, and that such scatter results in a less precise method.

An AMMS member summarized the discussion to note that AMMS members agreed that EPA should consider the Scrubberless UV method for FRM status, and that other methods such as cavity ringdown methods and other methods were not practical to be considered as FRM or FEMs given their complexity or price.

Responses to Charge Question 2: Views on Establishing the NO-CL Method as the New, Additional O₃ FRM

An AMMS member commented that the technology supporting the NO-CL method was not yet field proven for consideration of FRM status. The member noted that there may be better methods for measuring Ozone than the NO-CL method, and that this method has not reached the level of performance that is associated with FRM status.

Another AMMS member commented that there is a need for a new Ozone FRM, and that

perhaps the NO-CL method for measuring Ozone was the best available method. The member noted that interference issues needed to be addressed for the Scrubberless UV method. The member also recommended that ORD assess another method over the NO-CL method for measuring Ozone if there was time for such assessment, but was concerned that there was insufficient time available. The member also noted that it was not favorable to have more than one FRM, since having multiple FRMs raised questions on which FRM was preferable.

One AMMS member responded that the preferable FRM would be the one that performed practically and at lower cost. The member suggested that CASAC AMMS could recommend that EPA assess whether the Scrubberless UV method was preferred over the NO-CL method. Another AMMS member noted that an advantage of the Scrubberless UV method was that it was regularly used for monitoring Ozone.

An AMMS member expressed concern that a new FRM was needed since FRMs must be available for developing a new FEM. One AMMS member recommended that CASAC AMMS be very clear on what its recommendations were to EPA regarding the NO-CL method. Another AMMS member stated that AMMS should identify the best available method for measuring Ozone.

Several AMMS members recommended that EPA first assess the spread of the NO-CL data that were presented by ORD, and that such assessment might address the data issues associated with the NI-CL method. Several AMMS members recommended that ORD has a good data set associated with the NI-CL method from which to assess sources of interferences, and that ORD should assess such data. One AMMS member recommended that ORD assess whether there were significant differences in residence times in the monitoring instrument, as well as any issues with downstream effects past the bulkhead of the instrument. Another AMMS member suggested that EPA conduct further data analysis of the existing data and the additional data from Denver that ORD was gathering.

An AMMS member recommended that ORD provide more data and assessment on the performance of the Scrubberless UV method. Another AMMS member noted that Slides 7 and 11 of ORD's presentation provided useful information and data on the performance of the Scrubberless UV method. One AMMS member commented that the Scrubberless UV method was not ready for FRM status since it has only been available one year in the market. The member also noted that performance based approaches were preferred since multiple methods could be used if they met the specifications.

One AMMS member noted that larger data sets were needed for ORD's assessment. An AMMS member recommended that EPA consider using 8-hour average data rather than 1-hour data in its FRM method assessments. Another AMMS member suggested that if ORD's assessment included 8-hour average data there would be more confidence in the analysis. Dr. Long noted that 40 CFR Part 53 required use of 1-hour data when assessing FRMs.

One AMMS member recommended that ORD compare the Scrubberless UV method to the NO-CL method, and another AMMS member suggested that ORD consider a variety of factors/variables when comparing the methods (e.g., humidity). Dr. Long noted that humidity, NO_x data, and other information was available. One AMMS member asked whether data on olefins and isoprenes were available, and Dr. Long noted that while such data were not collected for the NO/CL method analysis, such data may have been collected from nearby Photochemical Assessment Monitoring Stations (PAMS) sites (e.g., near the Houston NO/CL testing location).

Another AMMS member recommended that the AMMS members identify what additional data were needed for ORD to conduct its assessment, and that AMMS were available to review and consider that additional data if EPA requested such a review.

Responses to Charge Question 4: Guidance/Opinion on Emerging Measurement Methodologies

One AMMS member recommended that ORD characterize sensor performance, since low cost sensors can be used for exposure assessment applications. The member also noted that low cost monitors near a NO_x source would provide very useful information. A few AMMS members noted that low cost monitors provide particularly useful data at ground level near sources such as refineries or other facilities which do not have tall stacks. Another member recommended that the AMMS express support for further development of sensors and that EPA should address issues that prevented their use.

One AMMS member expressed concern that data collected from low cost monitors may not be considered acceptable by EPA. Several AMMS members stated that data collected from low cost monitors could supplement other monitoring data that EPA would accept, and that such supplemental data collected from inexpensive monitors could be used to fill in gaps, better understand spatial gradients (e.g., in rural areas and in western United States), and help in the assessment of human health protection in vast areas where no Ozone data has been collected.

An AMMS member recommended that EPA clarify the applications of a monitoring network that would function for various purposes (e.g., modeling, source characterization). Another AMMS member recommended that EPA determine the purposes and uses of sensors, and demonstrate performance of available sensors before they are deployed.

An AMMS member summarized the discussion to note that AMMS members agreed that EPA should minimize restrictions against use of low cost sensors that would supplement methods accepted by EPA, and delineate the purposes for the use of low cost sensors.

Clarifying Public Comments

Mr. Will Ollison of the American Petroleum Institute provided clarifying public comments. Mr. Ollison noted that the methods described in his written public comments³ have NO_x scrubbers, and that the two instruments discussed during this meeting have NO_x scrubbers on their exhaust. He recommended that EPA consider network issues when assessing Ozone FRMs, noting for example that the gradient of ozone sampling results is 3 or 4 ppb depending on the height of the sample inlet. He stated that monitoring measurements are providing data on mixing ratio and effects associated with exposure at higher elevations. He also noted that the use of dry ozone calibration is not a very strong marker in the field for assessing bias and precision.

One AMMS member asked whether altitude effects on Ozone concentration was an issue for the CASAC Ozone NAAQS panel to consider rather than the CASAC AMMS panel. Mr. Ollison stated that such effects were relevant for setting the Ozone NAAQS. Mr. Allen responded that this question may be beyond the scope of the CASAC AMMS, and noted there is opportunity for public comment during the CASAC Ozone NAAQS panel teleconference in late May, 2014.

Wrap Up and Remaining Issues, Action Items and Next Steps

Mr. Allen noted that he and DFO Ed Hanlon will work on developing minutes for the teleconference, which would be posted onto the CASAC teleconference website when they are final. Mr. Allen also noted that the Federal Register Notice that was published on March 13, 2014 notified the public that an April 8, 2014 AAMS would be held only if the AMMS subcommittee did not complete its deliberations on the topic being considered during the April 3, 2014 AMMS teleconference. He noted that since the AMMS member completed discussions on all four charge questions on the April 3, 2014 AMMS teleconference, the April 8, 2014 AAMS teleconference was cancelled.

Mr. Allen stated that by April 10, 2014, AMMS members should send the DFO any revisions to their preliminary individual AMMS member written comments associated with this review, and noted that these individual AMMS member written comments will be included in the CASAC report to the EPA Administrator as an Appendix to the report.

Mr. Allen also stated that the DFO would soon send AMMS members an email detailing anticipated next steps and instructions for the CASAC Report preparation, which would include the following anticipated next steps:

- By April 22nd, Lead Discussants/Writers should send Mr. Allen and the DFO written text responding to each charge question, noting areas of consensus, reasoning, and key points associated with the response.
- By May 6th, Mr. Allen and the DFO would send AMMS members a draft CASAC Report with a request for AMMS member redline-strike/shade comments. Mr. Allen noted that this draft CASAC report would be posted on the June 12th AMMS teleconference website for public review.
- By May 20th, AMMS Panel members should send Mr. Allen and the DFO their individual suggested redline changes to the draft CASAC report.
- By May 27th, the DFO would compile the individual AMMS member comments into one document and send this document to the AMMS Panel for review. Mr. Allen noted that this compilation of strike/shade comments would be posted on the June 12th AMMS teleconference website for public review.
- On June 12th, the AMMS Subcommittee would hold a follow-up teleconference call to review the draft CASAC report. Mr. Allen noted that the goals for this teleconference were to identify and resolve issues with the draft CASAC report, reach AMMS Subcommittee agreement on the final language for the draft report, and receive AMMS member concurrence to send the draft report as revised to the chartered CASAC for quality review.
- Assuming there was AMMS Subcommittee concurrence in sending the draft CASAC report to the chartered CASAC for quality review, Mr. Allen and the DFO would incorporate changes discussed on the June 12th teleconference call into a revised final draft CASAC report and send the revised draft CASAC report to the chartered CASAC designated federal officer for posting on the charter CASAC teleconference website for quality review.

Mr. Allen thanked the AMMS members for their efforts, the public commenters, and all those in attendance for their interest in the work of the AMMS. With the meeting business concluded, the DFO Mr. Hanlon adjourned the public teleconference at 3:15 pm ET.

Respectfully Submitted:

/signed/

Mr. Edward Hanlon
Designated Federal Officer
Science Advisory Board

Certified as Accurate:

/signed/

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

NOTE AND DISCLAIMER: The minutes of this public teleconference reflect diverse ideas and suggestions offered by AMMS members during the course of deliberations within the public teleconference. Such ideas, suggestions and deliberations do not necessarily reflect consensus advice from the AMMS members. In addition, any mention of trade names or commercial products does not constitute a recommendation for use. 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 meetings or teleconferences.

Materials Cited

The following meeting materials are available on the SAB website (www.epa.gov/sab) at the following CASAC AMMS April 3, 2014 public teleconference webpage:

<http://yosemite.epa.gov/sab/sabproduct.nsf/bf498bd32a1c7fdf85257242006dd6cb/cf242b410033450885257c5b004f008d!OpenDocument&Date=2014-04-03>

¹ March 13, 2014 Federal Register Notice announcing the public teleconference (79 FR 14245 – 14246)

² Agenda for April 3, 2014 public teleconference

³ Public comments submitted by Ollison, Will, 3-27-14

ATTACHMENT A – ROSTER
U.S. Environmental Protection Agency
Clean Air Scientific Advisory Committee
CASAC Air Monitoring and Methods Subcommittee (AMMS)
Review of Federal Reference Method for Ozone: Nitric Oxide-Chemiluminescence

CHAIR

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

MEMBERS OF AMMS

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

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

***Dr. Doug Burns**, Research Hydrologist, New York Water Science Center, U.S. Geological Survey, Troy, NY

Dr. Judith C. Chow, Nazir and Mary Ansari Chair in Entrepreneurialism and Science, Research Professor, Division of Atmospheric Sciences, Desert Research Institute, Nevada System of Higher Education, Reno, NV

Dr. Kenneth Demerjian, Emeritus 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, Assistant Deputy Executive Officer, South Coast Air Quality Management District, Diamond Bar, CA

Dr. Philip Hopke, Director, Institute for a Sustainable Environment and Bayard D. Clarkson Distinguished Professor, Clarkson University, Potsdam, NY

Dr. Rudolf Husar, Professor of Energy, Environmental and Chemical Engineering, 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, Raymond J. Lane Distinguished Professor and Head, Department of Mechanical Engineering, and 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, Board Member, Providence Holding Company, Baton Rouge, LA

SCIENCE ADVISORY BOARD STAFF

Mr. Edward Hanlon, Designated Federal Officer, U.S. Environmental Protection Agency, Science Advisory Board Staff, Washington, DC

*Did not participate in this Review.

ATTACHMENT B – Other Attendees

List of Members of the Public Who Requested Information on Accessing the April 3, 2014 Teleconference line or Live Audio Webcast, or Who Noted That They Participated On the Live Audio Webcast: April 3, 2014

Name	Affiliation
Asay, Danna**	No Affiliation Given
Beaven, Lara**	No Affiliation Given
Birks, John**	No Affiliation Given
Carrasco, Eduardo**	City of San Antonio
Copeland, Weslee**	No Affiliation Given
Duvall, Rachelle**	No Affiliation Given
Farrington, Linda*	Eli Lilly and Company
Gouze, Steve**	California Air Resources Board
Hall, Eric*	EPA
Hu, Yongtao**	No Affiliation Given
Jansen, John*	No Affiliation Given
Jansen, John J. **	Southern Company
Jones, Lindsey**	No Affiliation Given
King, Patrick*	Teledyne Advanced Pollution Instrumentation
Klein, Sally**	No Affiliation Given
Laredo-Zepeda, Connie*	City of San Antonio
Leston, Alan R. **	No Affiliation Given
Long, Jamie**	No Affiliation Given
Long, Russell*	EPA
Ollison, Will*	American Petroleum Institute
Sharac, Timothy**	No Affiliation Given
Sweigert, Gayle**	No Affiliation Given
Turnipseed, Andrew**	No Affiliation Given
Weinstock, Lewis**	EPA
Williford, Craig**	No Affiliation Given
Yeow, Aaron**	EPA

* Member of public who participated or requested information for calling into the public teleconference.

**Member of public who indicated that they participated via the Audio Webcast, or requested information for participating via the Audio Webcast.