

**U.S. Environmental Protection Agency
Clean Air Scientific Advisory Committee (CASAC)
CASAC Ambient Air Monitoring & Methods (AAMM) Subcommittee
Summary Meeting Minutes of CASAC Subcommittee Public Advisory Tele-
conference Meeting**

Monday, July 14, 2008 – 1:00 to 5:00 p.m. Eastern Time

SAB Staff Office, Washington DC

Advisory Meeting to Conduct a: *Peer Review of the Draft Federal Reference Method (FRM) for Lead in Pb-PM₁₀*; and a *Consultation on Approaches for the Development of a Low-Volume Ambient Air Monitor for Pb in Total Suspended Particulate (TSP) FRM or Federal Equivalent Method (FEM)*

Panel Members: See CASAC AAMM Subcommittee Roster – Appendix A

Agenda: See Meeting Agenda – Appendix B

Purpose: The purpose of this public teleconference meeting was for the CASAC Ambient Air Monitoring & Methods (AAMM) Subcommittee (CASAC Subcommittee) to conduct a: (1) peer review of the proposed Federal Reference Method (FRM) for the measurement of lead (Pb) in particulate matter less than 10 micrometers in diameter (PM₁₀) in ambient air; and (2) a consultation concerning the need and approaches for the development of a low-volume ambient air monitor for Pb in total suspended particulate (TSP) FRM or Federal Equivalent Method (FEM). This consultation is being held at the request of the Agency's Office of Air Quality Planning and Standards (OAQPS), within the Office of Air and Radiation (OAR).

Attendees:

Chair:	Dr. Armistead (Ted) Russell
CASAC Members:	Dr. Ellis Cowling Dr. Douglas Crawford-Brown Dr. Donna Kenski
Panel Members:	Mr. George Allen Dr. Judith Chow Mr. Bart Croes Dr. Kenneth Demerjian Dr. Delbert Eatough Mr. Eric Edgerton Mr. Henry (Dirk) Felton Dr. Philip Hopke Dr. Rudolf Husar

Dr. Kazuhiko Ito
Dr. Peter McMurry
Mr. Rich Poirot
Dr. Jay Turner
Dr. Warren White
Dr. Yousheng Zeng
Dr. Barbara Zielinska

EPA SAB Staff: Mr. Fred Butterfield, CASAC Designated Federal Officer (DFO)

Other EPA Staff: Mr. Kevin Cavender, OAR, OAQPS
Mr. Tim Hanley, OAR, OAQPS
Dr. Deirdre Murphy, OAR, OAQPS
Ms. Joann Rice, OAR, OAQPS
Mr. Lewis Weinstock, OAR, OAQPS
Dr. Robert Vanderpool, ORD, NERL

Meeting Summary

The discussion followed the issues and general timing as presented in the meeting agenda (Appendix B).

Convene Meeting, Call Attendance, Introduction and Administration

Mr. Fred Butterfield, Designated Federal Officer (DFO) for the Clean Air Scientific Advisory Committee, opened the teleconference meeting, called attendance, and welcomed all attendees. He noted the CASAC is a Federal Advisory Committee chartered under the Federal Advisory Committee Act (FACA) to provide advice and recommendations to the EPA Administrator, and that the Ambient Air Monitoring & Methods (AAMM) Subcommittee is a standing subcommittee of the Committee that provides its formal advice and recommendations to the Administrator via the CASAC. Consistent with FACA regulations, the deliberations of CASAC are held as public meetings and teleconferences for which advance notice is given in the *Federal Register*. The DFO is present at all such meetings to assure compliance with FACA requirements. He mentioned that there were no individuals who had registered with him in advance to provide oral public comments during today's teleconference. Mr. Butterfield said a transcript of this teleconference is not being taken. However, summary minutes were taken (by the DFO) for this teleconference meeting. These minutes will be certified by the CASAC AAMM Subcommittee Chair and posted on the SAB Web Site (<http://www.epa.gov/casac>) within 90 days after this meeting. Mr. Butterfield noted that all participating Subcommittee members had submitted documentation with respect to possible financial conflicts-of-interest or appearances of a lack of impartiality, which was reviewed by the SAB staff prior to the teleconference meeting and found to be satisfactory.

Purpose of Meeting and Welcome

Dr. Armistead (Ted) Russell, CASAC AAMM Subcommittee Chair, welcomed Subcommittee Panel members and briefly stated the purpose of the meeting (see above). Dr. Russell remarked that the CASAC, in its letter dated January 2008, had recommended transitioning the sampling indicator for lead from TSP to a low-volume ambient air monitor for Pb-PM₁₀. Another member of the Subcommittee noted that the CASAC clarified this recommendation in a recent (July 2008) letter by stating that, if the level of the revised Lead NAAQS approaches the upper end of the range that the Agency is considering with its Notice of Proposed Rulemaking (NPR) (May 2008) — *i.e.*, up to 0.5 µg/m³ — then the current TSP indicator should *not* be changed.

Overview Presentation on Lead NAAQS Monitoring Issues from OAQPS

Mr. Kevin Cavender and Ms. Joann Rice of OAQPS gave a detailed overview presentation on the topic of the CASAC Subcommittee's peer review and consultation, entitled, "Overview and Status of Lead National Ambient Air Quality Standards (NAAQS) Review and Overview of Agency Technical Documents on Lead NAAQS Monitoring Issues." The presentation materials from the EPA program office are posted on the "CASAC" page of the Agency's Technology Transfer Network (TTN) Web site at URL: <http://www.epa.gov/ttn/amtic/casacinf.html>, and are also found in hard-copy in the associated FACA file for this teleconference. AAMM Subcommittee members asked follow-up questions of the Agency staff both during and after their overview presentation.

Public Comment Period

(There were no public commenters during this teleconference.)

Summary of the CASAC AAMM Subcommittee Peer-Review Discussion Concerning the Draft FRM for Lead in Pb-PM₁₀

The CASAC AAMM Subcommittee then discussed the Agency document that was the basis for the peer review — *i.e.*, EPA's "Draft Federal Reference Method (FRM) Lead in PM₁₀ (Pb-PM₁₀)," dated June 15, 2008. Key points raised during this discussion include the following:

- Subcommittee members noted that, if the Agency chooses to transition from a Pb-TSP to a Pb-PM₁₀ sampling indicator, then they are generally supportive of using the PM_{10c} FRM sampler. Members felt that the rationale for selecting the PM_{10c} FRM sampler were well laid-out in the draft FRM peer review document. However, as discussed earlier on the teleconference, the CASAC has previously advised the Agency that the choice of Pb-PM₁₀ as a sampling indicator should be conditional on a considerable tightening of the final Lead standard.
- Subcommittee members noted that the question concerning the selection of x-ray fluorescence (XRF) as the Pb-PM₁₀ FRM analysis method was difficult to answer without knowing the level of the revised NAAQS for Lead. In addition, the Subcommittee is presently unsure what the analytical requirements are for this method, since the Agency has not completed its analysis of the data quality objectives (DQOs), which is being done in the

face of uncertainty concerning both the level and the averaging time of the revised Lead NAAQS.

- The CASAC Subcommittee considers XRF as possessing a number of potential benefits over competing approaches (while noting several weaknesses as well). Overall, Subcommittee members expressed positive view on XRF, citing various advantages, including the fact that this method: is reasonably cost-effective; is currently being used for analysis of the Speciation Trends Network (STN) filters; provides concentrations of elements other than lead; involves less analytical preparation than other methods such as inductively coupled plasma–mass spectroscopy (ICP-MS) and atomic-absorption (AA) spectroscopy; and is non-destructive. However, members commented that XRF does not have either the same lower detection limits or the potential accuracy as ICP-MS, and is not well-suited for analysis of high-volume TSP or PM₁₀ sample filters. ICP-MS also allows more direct calibration against NIST-traceable references. There are also concerns about possible non-uniform deposits of sample material across the face of low-volume PM_{10c} filters which would need to be more carefully investigated prior to selection of an XRF FRM.
- CASAC Subcommittee members engaged in a lengthy discussion on this topic, concluding that, while XRF appears to have sufficient accuracy and detection limits if the level of the standard approaches the *upper* end of the range that Agency staff and the CASAC have recommended (*i.e.*, 0.2 µg/m³), ICP-MS would be appropriate over the entire range of levels under consideration for the final Lead standard. Therefore, members of the Subcommittee were leaning toward a recommendation that the Agency consider selecting ICP-MS as the FRM and use XRF as an FEM.
- With respect to the Subcommittee's comments on the specific analysis details of the XRF analysis method contained in the proposed Pb-PM₁₀ FRM analysis method description, members noted that, whether XRF is used as the FRM or as an FEM, there are a number of technical sampling-related issues that need to be addressed more thoroughly than currently appears in the EPA's draft FRM for Pb-PM₁₀.
- As to the adequacy of the precision, bias and MDL of the XRF method for the proposed Pb range, the members of the Subcommittee again commented that it was hard to answer this question without knowing what the form and the level of the revised Lead NAAQS will be, particularly in the absence of approved DQOs. Overall, members thought that ICP-MS would be superior if the level of the final Lead NAAQS was established at the lower end of the range being considered by EPA, and would also be suitable at the upper end of the range — and a number of individual Subcommittee members specifically recommended that ICP-MS be selected as the analysis method for the FRM. Finally, in the opinion of the Subcommittee, the Agency has adequately identified any potential method interferences with XRF.

Summary of the CASAC AAMM Subcommittee Consultative Discussion Concerning the Development of a Low-Volume Pb-TSP Sampler (FEM or FEM)

The CASAC AAMM Subcommittee then discussed the Agency document that was the basis for the consultation — *i.e.*, the EPA memorandum entitled, “Approaches for the Development of a Low Volume Lead in Total Suspended Particulate (Pb-TSP) Sampler” (undated, but issued for distribution to the CASAC Subcommittee on June 20, 2008). Key points raised during this discussion include the following:

- One Subcommittee member again noted how difficult it is to accurately specify a measurement system when the level for the final Lead NAAQS is not yet known. He added that, in general, the proposed FRM sampler for Pb in PM₁₀ is quite reasonable if one believes the appropriate indicator is PM₁₀, noting the PM_{10c} sampler is well understood in terms of its sampling characteristics and would already be deployed in the network. However, this member added that “ease of implementation” should not be the basis for making this decision on sampler; rather, protection of the health of children who are particularly sensitive to lead must be the driving consideration. In terms of the analytical methods, this member also suggested that ICP-MS would be superior to XRF as the FRM analytical method, since that eliminates all of the issues of sample non-homogeneities on the filter.
- Another member of the CASAC Subcommittee expressed his disappointment with the quality of the existing scientific evidence to justify the development of a new low-volume TSP sampler and basing the standard on the use of that instrument — adding that, in his opinion, the crux of the matter is how important is lead in particles greater than 10 microns. He listed several concerns with the consultative document, including: the fact that the study does not carry the weight of a peer reviewed publication, technical sampling issues, and absence of detailed information on the filter media on which samples were collected, the methods of data analysis, blank corrections, *etc.* On this basis, this member strongly supported moving to a Pb-PM₁₀ protocol — commenting that a new low-volume sampler for the FRM measurement of TSP Pb should not be deployed until it has been well characterized. He added that, while such samplers are currently available from manufactures, they have not been scientifically validated.
- A third Subcommittee member thought that a low-volume Pb-TSP sampler that is properly characterized would be an improvement over the existing high-volume TSP sampler, indicating that there are few or no relative disadvantages to a low-volume TSP sampler for lead. As to the question of what inlet designs would be best-suited for a low-volume Pb-TSP sampler, this member felt that there are, effectively, only two choices, given that they are limited to existing low-volume designs and designs that are practical for wide deployment in state and local agency monitoring networks. He noted that his preferred approach for the development of a low-volume Pb-TSP sampler was to first evaluate the performance of the inlets noted above by collocation with high-volume TSP and PM₁₀ under a range of wind conditions and Pb levels, and then evaluate the inlet performance in an appropriate wind tunnel. The Subcommittee member judged that the new FRM should replace the existing high-volume Pb-TSP FRM, although he did not recommend

using the existing high-volume TSP FRM as the sole reference method for evaluation of an FEM TSP sampler.

Summary and Next Steps

Dr. Russell thanked the members of the Subcommittee for their participation and requested that everyone — but particularly those of members who served as co-lead discussants for the Pb-PM₁₀ peer review portion of today's conference call — to furnish any technical inputs they might have for the Subcommittee's draft letter to the EPA Administrator concerning this peer review to him and Mr. Butterfield, DFO, as soon as practicable, but by no later than close of business this Friday, July 18.

In addition, by the same date, all members of the Subcommittee, are requested to provide their initial or revised/updated individual written comments for both the peer review of the Pb-PM₁₀ FRM and the consultation on a Pb-TSP FEM to both the Chair and the DFO for attachment in the enclosures to both the consensus letter (peer review) and the *pro forma* letter (consultation), as appropriate. In addition, Dr. Russell asked Subcommittee members to specifically address the charge questions found in the June 15 background and charge questions memo from OAQPS' Ambient Air monitoring Group for this peer-review and consultation in their individual written comments.

The Chair and the DFO will work to develop both of these draft letters in order to circulate these to all by next Wednesday, July 23, requesting Subcommittee members' review and comments by later that following week (July 31). The goal is to have all members of the Subcommittee panel concur on an "approval draft" letter concerning the Subcommittee's peer review of the Pb-PM₁₀ FRM that the DFO will have posted on the associated "advisory activity" and "meeting" pages of the CASAC Web site for the public's review by no later than four (4) weeks from today — *i.e.*, Monday, August 11, which is five (5) business days prior to the CASAC's follow-on teleconference scheduled for Monday, August 18 beginning at 1:00 PM EDT. The purpose of the August 18 /18 conference call is for the chartered Clean Air Scientific Advisory Committee to publicly review and approve the draft letter to the Administrator concerning the peer review.

Mr. Butterfield also thanked everyone on the conference call for their participation, and the DFO adjourned the meeting at approximately 3:57 p.m.

Respectfully Submitted:

Certified as True:

/s/

/s/

Fred A. Butterfield, III

Armistead (Ted) Russell, Ph.D.

Fred A. Butterfield, III
CASAC DFO

Armistead (Ted) Russell, Ph.D., Chair
CASAC AAMM Subcommittee Chair

Date: August 4, 2008

Appendix A – Roster of the CASAC AAMM Subcommittee

U.S. Environmental Protection Agency Clean Air Scientific Advisory Committee (CASAC) CASAC Ambient Air Monitoring & Methods (AAMM) Subcommittee

CASAC MEMBERS

Dr. Armistead (Ted) Russell (Chair), Georgia Power Distinguished Professor of Environmental Engineering, Environmental Engineering Group, School of Civil and Environmental Engineering, Georgia Institute of Technology, Atlanta, GA

Dr. Ellis Cowling, University Distinguished Professor At-Large, Emeritus, Colleges of Natural Resources and Agriculture and Life Sciences, North Carolina State University, Raleigh, NC

Dr. Donna Kenski, Director of Data Analysis, Lake Michigan Air Directors Consortium (LADCO), Rosemont, IL

SUBCOMMITTEE MEMBERS

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

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

Mr. Bart Croes, Chief, Research Division, California Air Resources Board, Sacramento, CA

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

Dr. Delbert Eatough, Professor of Chemistry, Emeritus, Chemistry and Biochemistry Department, Brigham Young University, Provo, UT

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 Hopke, Bayard D. Clarkson Distinguished Professor, Department of Chemical Engineering, Clarkson University, Potsdam, NY

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

Dr. Kazuhiko Ito, Assistant Professor, Environmental Medicine, School of Medicine, New York University, Tuxedo, NY

Dr. Thomas Lumley, Associate Professor, Biostatistics, School of Public Health and Community Medicine, University of Washington, Seattle, WA

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

Mr. Richard L. Poirot, Environmental Analyst, Air Pollution Control Division, Department of Environmental Conservation, Vermont Agency of Natural Resources, Waterbury, VT

Dr. Kimberly Prather, Professor, Department of Chemistry and Biochemistry, University of California, San Diego, La Jolla, CA

Dr. Jay Turner, Visiting Professor, Crocker Nuclear Laboratory, University of California - Davis, Davis, CA

Dr. Warren H. White, Research Professor, Crocker Nuclear Laboratory, University of California - Davis, Davis, CA

Dr. Yousheng Zeng, Air Quality Services Director, Providence Engineering & Environmental Group LLC, Providence Engineering and Environmental Group LLC, Baton Rouge, LA

Dr. Barbara Zielinska, Research Professor, Division of Atmospheric Science, Desert Research Institute, Reno, NV

SCIENCE ADVISORY BOARD STAFF

Mr. Fred Butterfield, Designated Federal Officer, 1200 Pennsylvania Avenue, N.W., Washington, DC, 20460, Phone: 202-343-9994, Fax: 202-233-0643 (butterfield.fred@epa.gov) (Physical/Courier/FedEx Address: Fred A. Butterfield, III, EPA Science Advisory Board Staff Office (Mail Code 1400F), Woodies Building, 1025 F Street, N.W., Room 3604, Washington, DC 20004, Telephone: 202-343-9994

Appendix B – Meeting Agenda

**U.S. Environmental Protection Agency
Clean Air Scientific Advisory Committee (CASAC)
CASAC Ambient Air Monitoring & Methods (AAMM) Subcommittee**

Public Advisory Teleconference Meeting

Monday, July 14, 2008 – 1:00 to 5:00 p.m. Eastern Time

Advisory Meeting to Conduct a: *Peer Review* of the Draft Federal Reference Method (FRM) for Lead in Pb-PM₁₀; and a *Consultation* on Approaches for the Development of a Low-Volume Ambient Air Monitor for Pb in Total Suspended Particulate (TSP) FRM or Federal Equivalent Method (FEM)

Meeting Agenda

1:00 p.m.	Convene Teleconference; Call Attendance; Introductions and Administration	Mr. Fred Butterfield, CASAC DFO
1:10 p.m.	Purpose of Meeting	Dr. Armistead (Ted) Russell, CASAC AAMM Subcommittee Chair
1:15 p.m.	Public Comment Period	Mr. Butterfield (Facilitator)
1:45 p.m.	Overview of Draft FRM for Lead in Pb-PM₁₀ from EPA's Office of Air Quality Planning & Standards (OAQPS) Ambient Air Monitoring Group (AAMG)	Ms. Joann Rice & Mr. Kevin Cavender, OAQPS-AAMG
2:15 p.m.	CASAC AAMM Subcommittee Members' Discussions: <i>Peer Review</i> of Draft FRM for Lead in Pb-PM₁₀	AAMM Subcommittee Members
	<u>Lead Discussants:</u> Dr. Warren White, Dr. Judith Chow & Mr. Eric Edgerton	
3:15 p.m.	Overview of Approaches for the Development of a Low-Volume Pb-TSP Sampler (FRM or FEM) from OAQPS-AAMG	Ms. Rice & Mr. Cavender, OAQPS-AAMG
3:45 p.m.	CASAC AAMM Subcommittee Members' Discussions: <i>Consultation</i> on Development of a Low-Volume TSP Sampler (FRM or FEM)	AAMM Subcommittee Members
	<u>Lead Discussants:</u> Dr. Philip Hopke, Dr. Delbert Eatough & Mr. George Allen	
4:45 p.m.	Summary and Next Steps	Dr. Russell
5:00 p.m.	Adjourn Meeting	Mr. Butterfield