

**Summary Minutes of the Clean Air Scientific Advisory Committee (CASAC)
Carbon Monoxide NAAQS Review Panel Public Meeting
November 16-17, 2009
The Carolina Inn, Chapel Hill, NC**

Panel Members: Dr. Joseph Brain, Chair
Dr. Paul Blanc
Dr. Thomas Dahms
Dr. Russell Dickerson
Dr. Laurence Fechter
Dr. H. Christopher Frey
Dr. Milan Hazucha
Dr. Joel Kaufman
Dr. Michael Kleinman
Dr. Francine Laden
Dr. Arthur Penn
Dr. Beate Ritz
Dr. Paul Roberts
Dr. Armistead (Ted) Russell
Dr. Anne Sweeney
Dr. Stephen Thom (November 16th only)

SAB Staff: Ms. Kyndall Barry
Dr. Anthony Maciorowski

EPA Staff: Tim Benner, Souad Benromdhane, Barbara Buckley, Steven Dutton, Stephen Graham, Erin Hines, Doug Johns, Dennis Kotchmar, Meredith Lassiter, Tom Long, Tom Luben, David McKee, Karen Martin, Deirdre Murphy, David Orlin, Beth Osterling-Owens, Ines Pagan, Harvey Richmond, Jean Richmond-Bryant, Pradeep Rojan, Mary Ross, Jason Sacks, Geneé Smith, Joseph Somers, John Vandenberg, Debra Walsh, Lydia Wegman, Lewis Weinstock

Public Participants: Jon Heuss and George Wolfe, Air Improvement Resource, Inc.

Purpose: The CO Panel was convened to review the Agency's *Integrated Science Assessment (ISA) for Carbon Monoxide: Second External Review Draft* and the *Risk & Exposure Assessment (REA) to Support the Review of the Carbon Monoxide Primary NAAQS: First External Review Draft*.

Attachments: The meeting agenda, charge questions, presentations, public comments and preliminary review comments from the panel members may be found on the meeting website: <http://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCal/A3D5E9B3516F7D02852575F50064BD12?OpenDocument>

Meeting Summary

The discussion followed the issues and general timing as presented in the agenda, with a few modifications.

Monday, 16 November 2009

Ms. Kyndall Barry, Designated Federal Officer (DFO), opened the meeting with a statement that the CASAC CO NAAQS Review Panel will operate under the Federal Advisory Committee Act, whose meetings and deliberations take place in public with advance notice and opportunities for public participation. The DFO noted that a representative from the Alliance of Automobile Manufacturers would be presenting comments during the morning public comment period. Dr. Anthony Maciorowski, Deputy Director of the SAB Staff Office, welcomed all attendees to the meeting and thanked the Panel for their individual comments on both review documents. Dr. Joe Brain, the Panel Chair, moderated the introduction of the Panel: all members of the Panel were in attendance. Dr. Brain then explained the purpose of the Panel's meeting and reviewed the agenda.

An overview of the Agency's NAAQS review process was then presented by Ms. Lydia Wegman ("Process and Schedule for Review" posted at the above-stated URL). Her presentation included the following, court-ordered review schedule: the final Integrated Science Assessment by 29 January 2010; final Risk/Exposure Assessment by 28 May 2010; final Policy Assessment in Summer 2010; Notice of Proposed Rulemaking by 28 October 2010; and final rule by 13 May 2011. Dr. Vandenberg then introduced the team members from EPA's Office of Research and Development. Dr. Tom Long then walked the Panel through the presentation entitled, "ISA for CO (2nd External Review Draft): Briefing for CASAC CO Review Panel" and summarized the major revisions to the ISA following the Panel's review of the first draft ISA in May 2009. Specific changes in direct response to the Panel's advice included: using hot links for ISA references and expanded discussions of EPA's process for evaluating relevant studies and making causal determinations, climate forcing, monitoring network and detection limits, analysis of epidemiologic studies to name a few. Ms. Debra Walsh then discussed the Agency's new database, the Health and Environmental Research On-Line system (HERO). EPA developed HERO to support the linking of research citations and references throughout the ISA (via hotlinks). Following EPA's presentation, the Panel engaged EPA staff in discussions of the inconsistencies in terminology used throughout the document. Specifically, in describing the at-risk population the Panel deemed the use of terms "sensitive, susceptible, and vulnerable" subjective and inconsistent across review documents (e.g., ISA and REA) and across criteria pollutants. The Panel also took issue with the process EPA used to evaluate and weight evidence, and the subjective terms used to describe causality, "likely causal, suggestive, inadequate, not likely causal." Panel member Dr. Beate Ritz pointed EPA to the introductory chapter of the National Academy of Science Gulf War 8 report for improved language on causality.

During the public comment period, Dr. George Wolff presented comments on both the ISA and REA on behalf of the Alliance of Automobile Manufacturers.

Dr. Brain led the Panel through a discussion of the ISA charge questions. Individual review assignments and lead assignments for each chapter were divvied up amongst the Panel; however members were given opportunity to comment on all chapters of the ISA. The following issues recurred in the Panel's morning discussions: the need for improved language and terminology in the assessment and characterization of uncertainty; a universal glossary for all criteria pollutants; and strengthening the assessment through careful meta analyses of relevant studies (controlled human exposure and epidemiologic). In discussions of climate, monitoring, spatial variability, and exposure; the Panel found the ISA's treatment to be adequate, but asked the Agency to expand discussions of CO's confounding effect as a co-pollutant and for a better explanation of the apparent lack of treatment of ecological effects. There was strong agreement among the Panel on the inadequacy of current, ambient air data (i.e. monitoring networks, detection levels, etc.). The Panel also felt the in-vehicle exposure estimates to be highly uncertain due to the non-existent near roadway monitoring data. Discussions then turned to concern with EPA's use of APEX model with standard Coburn-Foster-Kane equation to predict exposure vs. enhanced models which may perform better in COHb predictions and new studies on the therapeutic application of CO.

Following the lunch break, the Panel resumed discussion of ISA charge questions. The Panel expressed a strong preference to use the more general term cardiovascular disease (CVD) rather than coronary artery disease (CAD) for the at-risk population. By Panel vote, there was agreement to designate "insufficient evidence" for effects on respiratory system due to long-term CO exposure; there was no consensus view on acute effects due primarily to issues with data quality and monitor siting. Turning to susceptible populations, there was overwhelming agreement that including fetuses and persons with anemia would strengthen the Agency's CO review, although the Panel noted there was merit for sickle cell anemia to have its own, separate discussion. Panel members also pointed out new studies of CO effects on maternal and paternal reproductive outcomes and diabetes and metabolic syndrome.

A short break preceded the Agency's presentation entitled, "Risk and Exposure Assessment to Support the Review of the CO Primary NAAQS – First External Review Draft", which provided a historical perspective of the previous CO reviews and highlighted the current REA document. The most recent CO review commenced in 1997, but was never completed. Congress halted that review and called for the National Research Council (NRC) to study of topography and air quality issues related to CO emissions in Fairbanks, Alaska. The NRC report was published in 2002. The assessment focused on adults with ischemic heart disease (coronary artery disease) as the population of concern and COHb levels from 1.5 to 6 percent as the dose metric. Using monitoring data from sites in Denver and LA, exposures were modeled for two microenvironments. Three years' worth of data were plugged into the nonlinear CFK equation in APEX to estimate COHb levels at "as is" and "just meeting" the current 1-hr and 8-hr stands. Following the Agency's presentation, the Panel engaged staff in discussions of the model's ability to handle activity patterns, the Agency's judgment that epidemiological evidence was not adequate for a quantitative risk assessment, EPA's plan to qualitatively include the epidemiological data in the policy assessment, EPA plans to include epidemiology in exposure and policy assessments, and the utility of the current REA.

Tuesday, 17 November 2009

Ms. Barry reconvened the meeting of the CASAC CO NAAQS Review Panel. On the second day of the meeting, the Panel addressed the *Risk & Exposure Assessment (REA) to Support the Review of the Carbon Monoxide Primary NAAQS: First External Review Draft*. The Panel focused on the discussion and development of draft responses to the charge questions. There was overwhelming agreement among the Panel that there was room for improvement in the first draft REA. Paralleling the Panel's concerns in the ISA review, several issues dominated the REA discussion like the quality and quantity of CO monitors (and monitoring data) and the recommendation to expand the at-risk population to include persons with cardiovascular disease, anemias, sickle cell disease, fetuses and pregnant women.

One suggestion to better address the CO data-quality issue in estimating exposure in the REA was to use a combination of measurements and models, especially land regression models. The Panel urged the Agency to regard measurements and models as complementary tools, especially in microenvironments, for better COHb estimate and for its potential to reduce uncertainty in the REA.

Prior to the lunch break, the Panel discussed the draft letter on the second draft ISA. The Chair and the DFO compiled the language submitted from the workgroups into a single letter. The letter was projected onto the screen and discussed by the Panel. The Panel reached consensus on the major points as required by FACA and approved the intent of the letter. Editorial changes to the letter would be handled by the Chair and the workgroup leads. The DFO noted that draft letter with final review comments will be posted on the meeting website prior to the final review and approval by the statutory CASAC on December 22nd. Following the break, the Panel completed its review of the REA and discussed the main review comments.

Panelists voiced concern that the paucity of ambient air data would continue to be a limitation of exposure assessment and offered several suggestions to strengthen the second draft. Panelists also expressed displeasure with the use and application of APEX. One member pondered the utility of a standard, exposure model the Agency could use across criteria pollutants. Transparency in the case study selection process; better characterization and quantification of areas of uncertainty; and an improved summary chapter were other recommendations to improve the REA.

Respectfully Submitted:

/s/

Ms. Kyndall Barry
Designated Federal Officer

Certified as True:

/s/

Dr. Joseph Brain, Chair
CASAC Carbon Monoxide
NAAQS Review Panel

NOTE AND DISCLAIMER: The minutes of this public meeting reflect diverse ideas and suggestions offered by committee members during the course of deliberations within the meeting. Such ideas, suggestions, and deliberations do not necessarily reflect definitive 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.