

Summary Minutes of the  
U.S. Environmental Protection Agency  
Clean Air Scientific Advisory Committee (CASAC)  
Carbon Monoxide Public Meeting  
May 12-13, 2009

Committee Members: (See Roster – Attachment A)

Scheduled Date and Time: From May 12, 2009 at 9:00 a.m. (Eastern Time) to May 13, 2009 2:00 p.m (Eastern Time). (See Federal Register Notice, Attachment B)

Location: The Carolina Inn  
211 Pittsboro Street  
Chapel Hill, NC 27516

Purpose: The purpose of this meeting was to review the *Integrated Science Assessment for Carbon Monoxide - First External Review Draft, (March 2009) and the CO NAAQS: Scope and Methods Plan for Health Risk and Exposure Assessment (April 2009)* developed for the CO National Ambient Air Quality Standards (NAAQS) review.

Participants:

Members of the CASAC CO Panel:

- Dr. Joseph Brain, **Chair**
- Dr. Thomas Dahms
- Dr. Russell R. Dickerson
- Dr. Laurence Fechter
- Dr. H. Christopher Frey
- Dr. Milan Hazucha
- Dr. Michael T. Kleinman
- Dr. Arthur Penn
- Dr. Beate Ritz
- Dr. Paul Roberts
- Dr. Armistead (Ted) Russell
- Dr. Stephen R. Thom

SAB Staff Office:

- Dr. Ellen Rubin (DFO)
- Dr. Vanessa Vu (Director SAB)

EPA Representatives: Ms. Lydia Wegman

Dr. John Vandenberg  
Dr. Mary Ross  
Dr. Tom Long  
Dr. Karen Martin  
Mr. Harvey Richmond  
Mr. John Langstaff

### Summary for May 12, 2009

Dr. Ellen Rubin, Designated Federal Officer (DFO), opened the meeting with a statement that the CASAC Carbon Monoxide Review Panel is a federal advisory committee whose meetings and deliberations meet the requirements of the Federal Advisory Committee Act. Dr. Vanessa Vu, Director of the Environmental Protection Agency (EPA) Science Advisory Board (SAB) welcomed the committee. Dr. Joe Brain, the Chair of the CO Panel welcomed the group and the members introduced themselves.

Ms. Lydia Wegman, Director of the EPA Office of Air and Quality Planning Standards presented slides on the National Ambient Air Quality Standards (NAAQS) review process and the schedule for the current review of the CO NAAQS. (Presentation is posted at <http://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCal/2EA677E2E5004CAB8525754E0063F2E8?OpenDocument>)

EPA personnel from the National Center for Environmental Assessment (Dr. John Vandenberg, Dr. Mary Ross, and Dr. Tom Long) presented highlights of the Draft Integrated Science Assessment (ISA) and the charge questions directed to the panel. (Presentation URL is <http://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCal/2EA677E2E5004CAB8525754E0063F2E8?OpenDocument>)

In the public comment period, Mr. Jon M. Heuss presented comments on behalf of the Alliance of Automobile Manufacturers. Written statement is posted at <http://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCal/2EA677E2E5004CAB8525754E0063F2E8?OpenDocument>)

The rest of the day the Panel discussed the charge questions directed to them by the EPA.

### ***Discussion and Comments from the CO Panel of Charge Question 1 – Background and Causality Framework***

The Panel described Chapter 1 as a well written, organized and useful document and recommended that this ISA should be consistent with other ISA documents (i.e. PM). Specifically, the Panel noted that the chapter was not CO specific and that the framework in

Chapter 2 could refer to the criteria pollutants in general. Also, the chapter could use clarification of the terms susceptible and vulnerable.

During the discussion it was mentioned that Table 1.2 studies are not explained explicitly and the document seems to not adequately include epidemiological studies. The EPA pointed out that epidemiological studies were considered and that EPA would clarify language to include the epidemiological studies.

### ***Discussion and Comments from the CO Panel of Charge Question 2 – Integrative Summary***

By and large, the Panel expressed support for Chapter 2's summary. There was discussion that this chapter should be consistent with the other ISA documents (i.e. PM).

Some panel members thought the summary could be more substantial in atmospheric science and could include dialogue on: health effects at current levels, exposure near traffic, exercise near traffic, and policy relevance. Also mentioned were that health effects did not provide evidence that the spikes in CO resulted in significant health outcomes. Language was recommended to include CO vs. co-pollutant, growing evidence that CO can be therapeutic in some disease states, and that there is more evidence about stroke than cardio vascular disease.

It was noted that HEI came to different conclusions on how you distinguish CO effects from other pollutants. It was recommended that Chapter 2 address: 1.) what one can take away from epidemiological vs. clinical studies, 2.) how the information can be interpreted, and 3.) how we can be insured that the results are strong.

### ***Discussion and Comments from the CO Panel of Charge Question 3 – Atmospheric Science and Air Quality Analyses***

A large part of the discussion for this charge question was about CO monitors and monitoring data. Specifically discussed were detection limits ( below ambient levels), a need for a new generation of CO monitors, analysis of monitoring sites near roadways, co-pollutants, and that we do not have enough monitoring information. There was a discussion about the need for monitoring data to have precision, accuracy, and statistical analysis.

The global effects of CO were discussed. It was mentioned that the emissions from cars have been reduced but the amount of miles a car is driven has increased; and, there is still a reduction in CO emissions in the US, but globally CO has not been reduced due to economic growth in developing countries. There was a short discussion about transporter issues from Mexico.

It was recommended to rewrite the engines section including more information on CO spark plugs, catalytic converters, cold start, fuel enrichment, and the effects of oxygenated fuels.

EPA reiterated that the scope of the ISA is the identification of science and not setting standards and measurements.

#### ***Discussion and Comments from the CO Panel of Charge Question 4 – Ambient CO exposure***

During the discussion on charge question four, the Panel noted that health effects are characterized better close to the monitor and that spatial and temporal components of ambient concentration over populations is not reflected with the current way monitors are deployed. Also mentioned is that CO in atmospheric science is well characterized and with adequate measurement and models they could have high quality CO modeling information. It was also pointed out that it is important to have variability in street canyons and a need to vary wind speed. EPA stated they plan to go back and look at models.

#### ***Discussion and Comments from the CO Panel of Charge Question 5 – Dosimetry and Pharmacokinetics***

The Panel member's acknowledged that this chapter contains a comprehensive list of models including older and newer models. However, it was noted that the optimum model was not identified. EPA staff asked the Panel to make a recommendation on which model they thought was the best one to use. The Panel said they would include a list of the top models in the letter to the Administrator.

The Panel spoke about the effects of different exposure durations on COHb formation that was evaluated by the mathematical model with integrated nonlinear CFK as enhanced by Smith et al., 1994. They stated that the approach and the parameters selected, however, was not described in sufficient detail nor were the limitations discussed. The Panel pointed out that this may lead to incorrect estimation of COHb particularly over longer time periods (8h-24h) e.g., if the endogenous CO (COHb) value exceeds certain limits.

Also among the discussion, the panel thought it would be helpful to give a range of endogenous CO values for a population at-risk, such as asthmatics or people with metabolic syndrome. There was a note that smokers and passive smokers should be mentioned in this section. And, that the physical characterization section was liked, but it was recommended to have its own paragraph.

#### ***Discussion and Comments from the CO Panel of Charge Question 6 – Mode of Action***

The Panel acknowledged that this is a well-written complete write-up of the nonhypoxic mechanisms and their mode of action. A majority of the discussion involved how we draw links between emissions and mortality; and what information we need to make these links.

The Panel recommended more discussion in regard to how exogenous and endogenous CO interactions might produce health effects either via COHb as well as direct biologic activities (non hypoxic mechanism). Specifically, the Panel noted that health effects of susceptible

population should be mentioned. And, the Panel discussed how it might be helpful to mention that we still have a poor understanding of local, intracellular CO concentrations.

### ***Discussion and Comments from the CO Panel of Charge Question 7 – Integrative Health Effects***

It was discussed that this chapter included much of the new information on health effects. However, the information had a lack of organization. It was recommended to describe the main studies first and then go into the detail of the outcomes. Also, it was recommended to include language on why articles in the text were highlighted from all the articles in the index. It was mentioned that this chapter spent more time in areas with minimal data and less time on data rich areas. Also, it was mentioned that it would be helpful to include group summary assessment tables by population. It was pointed out that spatial and temporal variations need to be assessed and there needs to be a word of caution about the auditory studies; the rearing of the animals in these studies is not indicative of normal animals.

For charge question 7 b, there was discussion that the conclusions were good but the text needed to be more explicit and include overview sentences to allow reader to understand how they came to conclusions. Also mentioned was a desire for EPA to list the most important areas for future work, include a summary, and a grading system like Chapter 2.

### ***Discussion and Comments from the CO Panel of Charge Question 8 – Public Health Considerations***

Discussion on this charge question included a recommendation of defining susceptibility vs. vulnerability, including a list of how CO modifies health risk in susceptible populations, include language about exercising in polluted areas, and that gender should not be included in Table 5.18 and 5.19.

The day concluded with panelists working in subgroups to draft consensus responses to charge questions.

### **Summary for May 13, 2009**

On the second day of the meeting, the Panel reviewed the draft letter to the Administrator composed by the subgroups assigned to the ISA charge questions. Dr. Brain reviewed the format of the letter. He noted that the letter will consist of a short (up to two page) summary of major findings with an enclosure for response to charge questions and an enclosure for individual comments. Dr. Brain requested specific editorial revisions on the letter from various members and promised to revise and edit as needed.

EPA personnel from the Office of Air Quality Planning Standards, Dr. Karen Martin, Mr. Harvey Richmond, and Mr. John Langstaff, presented the highlights of CO NAAQS: Scope and Methods Plan for Health Risk and Exposure Assessment. (Presentation is posted at

<http://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCal/2EA677E2E5004CAB8525754E0063F2E8?OpenDocument>)

There were no public comments either oral or written on the CO NAAQS: Scope and Methods Plan for Health Risk and Exposure Assessment (REA).

The rest of the day the panel discussed the CO NAAQS: Scope and Methods Plan for Health Risk and Exposure Assessment and the charge questions directed to them by the EPA.

The panel discussed dose –response relationships, modeling information, adding additional benchmarks and health outcomes, and the NAAQS process. The EPA mentioned that they will not be using the estimated values in Table 3-2 or the model for indoor sources that was mentioned in the scope and methods plan. These items will be updated in the upcoming REA.

There was a discussion about estimating CO near roadway concentrations including new studies from USC where they looked at the ratio of carbon dioxide to carbon monoxide as a marker for proximity to roadways. Also discussed were sensitivity analysis methods including range of variables, the need to keep variability in the model, and the importance of documenting assumptions in the model. There was discussion about EPA choices to study LA and Denver and talk about considering areas with difficult geographies, tunnel scenarios (i.e. Boston’s big dig), or other cities such as New York or Alaska. Also, stated was a need for more personnel CO monitoring data.

Generally, the Panel supported the approach in the scope and methods plan and looked forward to seeing the REA.

At 2:00 pm the meeting adjourned.

Respectfully Submitted:

/signed/

Ellen Rubin, Ph.D.  
Designated Federal Officer

Certified as True:

Sincerely,

/signed/

Dr. Joseph D. Brain, CO Chair  
Clean Air Scientific Advisory Committee

**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, letters, or reports prepared and transmitted to the EPA Administrator following the public meetings.

## Attachments

Attachment A	Roster
Attachment B	Federal Register Notice
Attachment C	Meeting Agenda
Attachment D	Public Comment

## **Attachment A: Roster**

### **U.S. Environmental Protection Agency Clean Air Scientific Advisory Committee Carbon Monoxide Review Panel**

#### **CHAIR**

**Dr. Joseph Brain**, Philip Drinker Professor of Environmental Physiology, Department of Environmental Health, Harvard School of Public Health, Harvard University, Boston, MA

#### **MEMBERS**

**Dr. Thomas Dahms**, Professor and Director, Anesthesiology Research, School of Medicine, St. Louis University, St. Louis, MO

**Dr. Russell R. Dickerson**, Professor and Chair, Department of Meteorology, The University of Maryland, College Park, MD

**Dr. Laurence Fechter**, Senior Career Research Scientist, Department of Veterans Affairs , Research Service (151), Loma Linda VA Medical Center, Loma Linda , CA

**Dr. H. Christopher Frey**, Professor, Department of Civil, Construction and Environmental Engineering, College of Engineering, North Carolina State University, Raleigh, NC

**Dr. Milan Hazucha**, Professor, Department of Medicine, Center for Environmental Medicine, Asthma and Lung Biology, University of North Carolina - Chapel Hill, Chapel Hill, NC

**Dr. Michael T. Kleinman**, Professor, Department of Medicine, Division of Occupational and Environmental Medicine, University of California, Irvine, Irvine, CA

**Dr. Arthur Penn**, Professor LSU School of Veterinary Medicine, Department of Comparative Biomedical Sciences, LSU SVM - Room 2425, Louisiana State University, Baton Rouge, LA

**Dr. Beate Ritz**, Associate Professor, Epidemiology, School of Public Health, University of California at Los Angeles, Los Angeles, CA

**Dr. Paul Roberts**, Executive Vice President, Sonoma Technology, Inc., Petaluma, CA

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

**Dr. Stephen R. Thom**, Professor, Institute for Environmental Medicine, 1 John Morgan Building, University of Pennsylvania, Philadelphia, PA

#### **SCIENCE ADVISORY BOARD STAFF**

**Dr. Ellen Rubin**, Designated Federal Officer, 1200 Pennsylvania Avenue, NW, Washington, DC, Phone: 202-343-9975, Fax: 202-233-0643, (rubin.ellen@epa.gov)

## Attachment B: Federal Register Notice

Federal Register: April 3, 2009 (Volume 74, Number 63)]

[Notices]

[Page 15265-15266]

From the Federal Register Online via GPO Access [wais.access.gpo.gov]

[DOCID:fr03ap09-27]

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ENVIRONMENTAL PROTECTION AGENCY

[FRL-8789-3]

Science Advisory Board Staff Office; Notification of a Public Meeting of the Clean Air Scientific Advisory Committee (CASAC) Carbon Monoxide Review Panel

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

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SUMMARY: The Environmental Protection Agency (EPA) Science Advisory Board (SAB) Staff Office announces a public meeting of the Clean Air Scientific Advisory Committee Carbon Monoxide Review Panel to peer review EPA's Integrated Science Assessment for Carbon Monoxide: First External Review Draft and conduct a consultation on EPA's planning document entitled Carbon Monoxide National Ambient Air Quality Standards: Scope and Methods Plan for Risk and Exposure Assessment.

DATES: The public meeting will be held on Tuesday, May 12, 2009 from 9 a.m. to 5 p.m. (Eastern Time) and Wednesday, May 13, 2009 from 8 a.m. to 2 p.m. (Eastern Time).

ADDRESSES: The meeting will be held at the Carolina Inn, 211 Pittsboro Street, Chapel Hill, North Carolina 27516.

FOR FURTHER INFORMATION CONTACT: Any member of the public who wants further information concerning the CASAC public meeting may contact Dr. Ellen Rubin, Designated Federal Officer (DFO), EPA Science Advisory Board (1400F), U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue, NW., Washington, DC 20460; via telephone/voice mail (202) 343-9975; fax (202) 233-0643; or e-mail at [rubin.ellen@epa.gov](mailto:rubin.ellen@epa.gov). General information concerning the CASAC can be found on the EPA Web site at <http://www.epa.gov/casac>.

### SUPPLEMENTARY INFORMATION:

Background: The Clean Air Scientific Advisory Committee (CASAC) was established under section 109(d)(2) of the Clean Air Act (CAA or Act) (42 U.S.C. 7409) as an independent scientific advisory committee. CASAC provides advice, information and recommendations on the scientific and technical aspects of air quality criteria and National Ambient Air Quality Standards (NAAQS) under sections 108 and 109 of the Act. The CASAC is a Federal advisory committee chartered under the Federal Advisory Committee Act (FACA), as amended, 5 U.S.C., App. The Panel will comply with the provisions of FACA and all appropriate SAB Staff Office procedural policies.

Section 109(d)(1) of the CAA requires that the Agency periodically

review and revise, as appropriate, the air quality criteria and the National Ambient Air Quality Standards (NAAQS) for the six ``criteria'' air pollutants, including carbon monoxide (CO). EPA is conducting scientific assessments to review the primary (health-based) NAAQS of CO. As part of this review, EPA's Office of Research and Development (ORD) has completed a draft document, Integrated Science Assessment for Carbon Monoxide (First External Review Draft, March 2009) and requested that CASAC peer review the document. EPA's Office of Air and Radiation (OAR) will also release a planning document entitled Carbon Monoxide National Ambient Air Quality Standards: Scope and Methods Plan for Risk and Exposure Assessment (April 2009). OAR has requested that the CASAC provide consultative advice on this plan.

The purpose of the May 12-13, 2009 meeting is to review these two documents. Background information about the formation of the CASAC Carbon Monoxide Review Panel was published in the Federal Register on October 12, 2007 ([72 FR 58078-58080](http://www.federalregister.gov)). The CASAC Panel previously held a public teleconference on April 8, 2008 (announced in [73 FR 12998](http://www.federalregister.gov)) to provide consultative advice on EPA's Plan for Review of the National Ambient Air Quality Standards for Carbon Monoxide, the first document in this review of the CO NAAQS. The CASAC panel report was made available at [http://yosemite.epa.gov/sab/sabproduct.nsf/AB0ED61CDF9F37DF8525746A005C12EC/\\$file/EPA-CASAC-08-013-unsigned.pdf](http://yosemite.epa.gov/sab/sabproduct.nsf/AB0ED61CDF9F37DF8525746A005C12EC/$file/EPA-CASAC-08-013-unsigned.pdf).

Technical Contacts: Any questions concerning EPA's Integrated Science Assessment for Carbon Monoxide should be directed to Dr. Tom Long at [long.tom@epa.gov](mailto:long.tom@epa.gov) at (919) 541-1880. Any questions concerning EPA's Carbon Monoxide National Ambient Air Quality Standard: Scope and Methods Plan for Risk and Exposure Assessment should be directed to Dr. Dave McKee at [mckee.dave@epa.gov](mailto:mckee.dave@epa.gov) at (919) 541-5288.

Availability of Meeting Materials: A meeting agenda, charge questions and other materials for the meeting will be placed on the CASAC Web site at <http://www.epa.gov/casac>. Select the calendar link on the left and click on May 12-13. The Integrated Science Assessment for Carbon Monoxide: First External Review Draft (March 2009) is available at <http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=203935>. The CO NAAQS Scope and Methods Plans (April 2009) will be available at [http://www.epa.gov/ttn/naaqs/standards/co/s\\_co\\_cr\\_pd.html](http://www.epa.gov/ttn/naaqs/standards/co/s_co_cr_pd.html).

Procedures for Providing Public Input: Interested members of the public may submit relevant written or oral information for consideration on the topics included in this advisory activity. Oral Statements: To be placed on the public speaker list for the May 12-13, 2009 meeting, interested parties should notify Dr. Ellen Rubin, DFO, by e-mail no later than April 27, 2009. Individuals making oral statements will be limited to three minutes per speaker. Written Statements: Written statements for the May 12-13, 2009 meeting should be received in the SAB Staff Office by April 27, 2009, so that the information may be made available to the CASAC Panel for its consideration prior to this meeting. Written statements should be supplied to the DFO in the following formats: one hard copy with original signature and one electronic copy via e-mail (acceptable file format: Adobe Acrobat PDF, MS Word, WordPerfect, MS PowerPoint, or Rich Text files in IBM-PC/Windows 98/2000/XP format). Submitters are asked to provide versions of each document submitted with and without signatures, because the SAB Staff Office does not publish documents with signatures on its Web sites.

Accessibility: For information on access or services for individuals with disabilities, please contact Dr. Rubin at the phone number or e-mail address noted above, preferably at least ten days prior to the teleconference, to give EPA as much time as possible to process your request.

Dated: March 27, 2009.  
Anthony F. Maciorowski,  
Deputy Director, Science Advisory Board Staff Office.  
[FR Doc. E9-7434 Filed 4-2-09; 8:45 am]  
BILLING CODE 6560-50-P

## Attachment C: Agenda

**AGENDA**  
**U.S. Environmental Protection Agency**  
**Science Advisory Board Staff Office**  
**Clean Air Scientific Advisory Committee (CASAC)**  
**Carbon Monoxide Review Panel Public Meeting**  
**May 12-13, 2009**  
**The Carolina Inn, 211 Pittsboro Street, Chapel Hill, NC 27516**

**Purpose: To review the *Integrated Science Assessment for Carbon Monoxide (First External Review Draft, March 2009)* and to provide consultation on a planning document: *Carbon Monoxide National Ambient Air Quality Standards: Scope and Methods Plan for Risk and Exposure Assessment***

<u>Tuesday, May 12, 2009</u>		
9:00 am	Convene Meeting and Welcome	Dr. Ellen Rubin Designated Federal Officer Dr. Vanessa Vu Director, SAB Staff Office
9:05 am	Introductions of Members, Review of Agenda	Dr. Joe Brain Chair, CO CASAC
9:15 am	Opening Remarks	Ms. Lydia Wegman Director, EPA Office of Air and Quality Planning Standards
9:30 am	Highlights of Draft <i>Integrated Science Assessment (ISA)</i> and Charge Questions	EPA National Center for Environmental Assessment Dr. John Vandenberg Dr. Mary Ross Dr. Tom Long
10:15 am	Public Comments on Integrated Science Assessment	
10:20 am	Comment on Charge Question 1 --- Background and Causality Framework	<u>Dr. Christopher Frey</u> All
10:50 am	Break	
11:00 am	Comment on Charge Question 2 --- Integrative Summary	<u>Dr. Arthur Penn</u> Dr. Christopher Frey Dr. Ted Russell
11:45 am	Comment on Charge Question 3 --- Atmospheric Science and Air Quality Analyses	<u>Dr. Russell Dickerson</u> Dr. Paul Roberts
12:15 pm	Lunch	
1:15 pm	Comment on Charge Question 4 --- Ambient CO Exposure Assessment	<u>Dr. Thomas Dahms</u> Dr. Russell Dickerson Dr. Paul Roberts
2:00 pm	Comment on Charge Question 5 --- Dosimetry and Pharmacokinetics	<u>Dr. Milan Hazucha</u>
2:45 pm	Comment on Charge Question 6 --- Mode of Action	<u>Dr. Michael Kleinman</u> Dr. Thomas Dahms
3:15 pm	Break	
3:30 pm	Comment on Charge Question 7 --- Integrated Health	<u>Dr. Beate Ritz</u>

	Effects	Dr. Stephen Thom Dr. Arthur Penn Dr. Laurence Fechter
4:15 pm	Comment on Charge Question 8 --- Public Health Considerations	<u>Dr. Stephen Thom</u> Dr. Beate Ritz Dr. Arthur Penn Dr. Laurence Fechter
4:45 pm	Adjourn	Dr. Ellen Rubin

<u>Wednesday, May 13, 2009</u>		
8:30am	Reconvene Meeting	Dr. Ellen Rubin Designated Federal Officer
8:35 am	Discussion of draft responses to charge questions on the ISA	Dr. Joe Brain Chair, CO CASAC
10:00 am	Highlights of CO NAAQS: <i>Scope and Methods Plan for Health Risk and Exposure Assessment</i>	EPA Office of Air and Quality Planning Standards Dr. Karen Martin Mr. Harvey Richmond Mr. John Langstaff
10:30 am	Public Comment	
10:35 am	Break	
10:45 am	Comment on Health Risk and Exposure Plan Chapter 2	Dr. Thomas Dahms Dr. Laurence Fechter Dr. Milan Hazucha Dr. Michael Kleinman Dr. Arthur Penn Dr. Beate Ritz Dr. Stephen Thom
11:30 am	Lunch	
12:15 pm	Comment on Health Risk and Exposure Plan Chapter 3	Dr. Russell Dickerson Dr. Laurence Fechter Dr. Christopher Frey Dr. Paul Roberts Dr. Ted Russell
2:00 pm	Adjourn	Dr. Ellen Rubin

**Attachment D: Public Comment**

**List of Public Speakers**

**U.S. Environmental Protection Agency – Science Advisory Board (SAB) Staff Office  
SAB/CASAC/Council  
Clean Air Scientific Advisory Committee  
Carbon Monoxide Review Panel  
May 12-13, 2009**

**Public Commenters**

#	Speaker's Name	Organizational Affiliation(s)	Organization(s) Represented (i.e., comments offered on behalf of)
1.	Jon M. Heuss	Air Improvement Resources, Inc	The Alliance of Automobile manufacturers
2.			

## List of Individuals Submitting Written Comments

U.S. Environmental Protection Agency – Science Advisory Board (SAB) Staff Office  
SAB/CASAC/Council  
Clean Air Scientific Advisory Committee  
Carbon Monoxide Review Panel  
May 12-13, 2009

#	Speaker's Name	Organizational Affiliation(s)	Organization(s) Represented (i.e., comments offered on behalf of)
1.	Jon M. Heuss	Air Improvement Resources, Inc	The Alliance of Automobile manufacturers
2.			

