

MEETING MINUTES
US Environmental Protection Agency (EPA)
Science Advisory Board (SAB)
Board Meeting
December 14, 2005
Ronald Reagan Building
1300 Pennsylvania Ave., NW
Washington, DC 20004

Board Members: See Roster – Attachment A.

Date and Time: Wednesday, December 14, 2005, 1:00 P.M. – 4:00 P.M.

Location: US EPA Headquarters, Ronald Reagan Building, 1300 Pennsylvania Ave., NW, Washington, DC

Purpose: The purpose of the meeting was to: a) discuss EPA's priority science issues; b) review one draft SAB panel report; c) and to discuss the SAB FY 2006 Operating Plan (see Attachment B for the meeting agenda and Attachment C for the Federal Register notice for the meeting).

Attendees:

Chair: Dr. Granger Morgan

Board Members:

Dr. Greg Biddinger
Dr. James Bus
Dr. Trudy Cameron
Dr. Maureen Cropper (phone)
Dr. Myrick Freeman
Dr. James Galloway
Dr. Rogene Henderson
Dr. Phillip Hopke
Dr. James Johnson
Dr. Jana Milford
Dr. Michael McFarland
Mr. David Rejeski
Dr. Kathleen Segerson
Dr. Robert Stavins (phone)
Dr. Thomas Theis
Dr. Valerie Thomas
Dr. Buzz Thompson
Dr. Robert Twiss

Others attending: See Sign in Sheets (Attachment D)

Meeting Summary

The discussion generally followed the issues and general timing as presented in the meeting Agenda unless noted otherwise in these Minutes (Attachment C).

Wednesday, December 14, 2005

1. Introductory Remarks and Welcome: Mr. Thomas Miller, Designated Federal Officer (DFO) for the Board opened the meeting and noted that the meeting was being conducted pursuant to the Federal Advisory Committee Act, and other relevant statutory and policy requirements. Dr. Vanessa Vu welcomed the members and noted the importance of the topics to be discussed. Dr. Morgan welcomed and thanked the members for coming. He briefly reviewed the agenda.

2. Advice on EPA's Future Science Priorities: Dr. Morgan suggested that the committee advance the discussion of other topics prior to the Superfund Benefits Analysis draft report discussion so as to accommodate member's schedules. The Board discussed its intentions regarding its annual advisory on EPA's science budget request. Past years' activities have allowed the Board to gain a broad knowledge of EPA's science programs (i.e., EPA research, development, and assessment activities). See Attachment E1, E2, and E3.

Because the Board now has a base of knowledge of EPA science programs, it could, as an alternative to its usual "zero-based" approach to looking at the budget, consider the incremental changes to the budget that are planned for FY 2007. With that information, the Board could provide advice to the Administrator that could effectively influence EPA's science planning (and budgeting) for FY 2008 and beyond. If the need arises, the Board could also prepare a short advisory on EPA's science budget changes for FY 2007 and this could be made available to the Administrator and the Congress.

Board Members agreed that the activity, though complex and not always simple to do, was important and should continue to be on the SAB's calendar. Thus, the Board will proceed to conduct an activity again this year.

Some suggestions from Members that will be considered as Staff interacts with the Agency to plan the effort include:

a) the possibility of having a subgroup of Board members do the analysis and any report drafting in lieu of the full Board conducting the review as in the past. A Subgroup report, if needed, would be developed for full Board consideration and approval;

b) the possibility of asking the Agency to provide information on the impact of past SAB reports on the EPA science budget;

c) asking EPA for additional details on their “leveraging” science/research efforts with other agencies and institutions; and

d) the intent to focus on changes at the “margin” (i.e., the deltas in the program from science/research conducted in 2005 and that underway in 2006.

ACTION: Staff will discuss this approach with EPA and present a plan to the SAB Chair. A face-to-face meeting is contemplated for the first week of March, 2006. Preparatory meetings might be needed via telephone conference.

3. FY 2006 SAB Operating Plan--Discussion of Future SAB *De Novo* Study

Candidates - Members discussed several projects that the Board identified as possible activities for 2006.

a) Exploration of Jointly Funded Environmental Research: - as noted in its last two reports on EPA’s science budget (2005 and 2006 budgets) finding a solution to this problem is important, particularly in light of EPA’s stagnant to declining science budgets, the growing complexity of the issues the agency faces, and its growing research needs. It is also critical because of the speed with which advances in the commercial sector (namely, chemical synthesis, nanotechnology, genomics, and biotechnology) are occurring. EPA must keep pace with these changes or be without needed knowledge for implementing its legislative mandates in the face of a rapidly changing “risk” picture. An example of this working in Florida was mentioned. More needs to be learned. At some point, the SAB might wish to write a Commentary to the Administrator on this topic.

ACTION: Drs. Twiss, Bus, and Lambert will continue to work with staff to define this project further and will revise its “project proposal” to reflect the needs of EPA. Staff will assist these members in learning of successful joint funding efforts in other organizations and bring those lessons to this project as appropriate (i.e., email examples to Members)

NOTE: The events in 3b), 3c), and 3d) are presented here for continuity; however, they occurred later in the meeting as the Board returned to the schedule reflected in the agenda for the remainder of the meeting.

b) Possible SAB Project on Preparing for Environmental Disasters. This project proposal follows up on discussions that the SAB Chair had with the Administrator following the EPA and SAB Katrina interactions. It reflects the need for EPA to be prepared to take on an important and evolving role in the nation’s response to disasters. Though EPA has only a small part in these responses on paper, it is the case that when a response is underway the public expects EPA to be able to help significantly in tracking and resolving safety issues associated with the event. The SAB could begin this with a series of briefings to be held in its next several Board

meetings to learn more of what EPA has been called on to do in the aftermath of several disasters and identify lessons that might be drawn from recent experience.

Members believe this is an important project for the Board to move forward with additional “fact-finding” and then identify what the SAB could do to help the agency. There should be an effort to bring in a diverse group of people to brief the SAB (regions, states, municipalities, EPA research and program offices, relevant NGOs, industry and other parties who can shed light on the issues and needs. The SAB would not be doing the planning for EPA responses as a result of this project, but would work with EPA to help them identify ways to move forward to plan and prepare for events that are likely in the future, given their legal mandates and need to work with other agencies and organizations. The SAB should help EPA focus on the big picture context of the issue within which its own actions seem to fit and seem to grow as an event plays out.

ACTION: Staff will work with EPA to identify and arrange for briefings on EPA’s past activities in disaster response events. Staff will work with Drs. Morgan, Fischhoff, and Hopke to determine what topics to request briefing on in the next Board meeting.

c) **EPA 2020: A Roadmap for Shifting Environmental Policy:** Dr. Theis presented a project that builds on EPA’s stated strategic objective from its current Strategy document stating that it will move from a waste-oriented to a life cycle management way of thinking about materials.” The project would focus on helping EPA to attain this strategic and visionary goal. The first step would be to learn of EPA’s progress toward this goal to date.

ACTION: Drs. Theis, Thomas and Rejeski will work with staff to identify EPA staff who could begin to inform the Board of agency progress on this effort. The intent would be to have such a briefing at the next Board meeting, in essence, ask for a status report on the extent to which the “life cycle way of thinking” has taken hold within EPA.

d) **Inventory of Research on the Environmental, Health and Safety Implications of Nanotechnology:** There was no discussion of this topic; however, in response to a request from members during the last Board meeting, David Rejeski obtained and provided this information for the Board. It will be used in the future to develop a discussion proposal for a self-initiated project. See Attachments I1 and I2.

4. Review and Approval of the Superfund Benefits Analysis Draft Report: Members then reviewed the draft report *SAB Advisory on Superfund Benefits Analysis* that was drafted by the SAB Superfund Benefits Analysis Advisory Panel.

Dr. Myrick Freeman, Chair of the Panel gave an overview of the review and noted the major points of advice contained in the report (see Attachment J2). Drs. Cameron, Kling, McFarland, and Stavins who served as Lead Reviewers for the draft report then

summarized their comments (see Attachment J3 for details). Member comments arriving too late for inclusion in the “compilation” are added to Attachment J3. Other Members summarizing their comments included Drs. Valerie Thomas, and Granger Morgan.

Issues indicated as important in the discussions included: a) double counting across health and ecological benefits, b) Greenstreet and Gallagher’s study on housing values after a clean-up action, c) Federal facilities, d) subjective vs. objective characterizations, e)conduct of case studies vs. full analyses, and f) the clarity of the opinion to EPA on how and when it should go forward with further development of the analytical techniques.

It was moved and seconded that the report be approved conditional on the Panel Chair, Dr. Freeman’s edits being done relative to the Members’ comments that have been provided. There will be no need to return the revised document to the SAB for further review and it can go to the Administrator once the edits are completed. A vote was taken and all SAB Members participating in the call approved the motion.

ACTION: The SBAAP Chair and DFO will edit the document and then it can be delivered to the Administrator.

5. Discussion on Request for a Consultation on Risk Assessment: See Attachments K1 through K6. Dr. William Sette, EPA OSA, briefed the Board members on the EPA follow up activities since the release of its Risk Assessment Principles and Practices staff paper (March 2004-see Attachment K5). This paper was the subject of an interaction between EPA staff and the SAB during 2004 and led to the Board sending a commentary to the EPA Administrator on the subject – see Attachment K6). Dr. Sette presented information on the history, purpose and recommendations of the original Staff Paper. He also noted current EPA activities related to some major risk assessment issues. He mentioned EPA’s outreach activities within EPA, outside EPA, and with the interested public noting 21 overarching themes that were raised as a result of these interactions (see Attachment K3). Dr. Sette stated that EPA is interested in further engaging the SAB in a dialogue on the next steps that need to be taken to enhance the risk assessment practice. Specifically, EPA is interested in whether the SAB has any concerns to raise over the areas that EPA is currently emphasizing and whether there are issues that are being missed.

Members applauded the great outreach efforts of EPA on this topic. Dr. Henderson was a part of this outreach. Dr. Vu volunteered the assistance of SAB Staff to work further with EPA to flesh out the details of a future SAB interaction on this topic.

ACTION: The SAB Staff Office will meet with Dr. William Farland and other EPA staff to work out the details on how the agency would like the SAB to interact on this topic.

6. Additional Items: Several additional items were made available to the Board members during the meeting. These included:

a) Update of the FIFRA SAP activities during FY 2005 (see Attachment L). Mr. Miller provided the update from the FIFRA SAP to members and noted the changes in membership to the SAP. Dr. Johnson mentioned several BOSC activities.

b) SAB Calendar for CY 2006: Members discussed the tentative timing for the SAB meetings during Calendar Year 2006. Proposed meetings will be firmly scheduled by the DFO after soliciting input from Board Members. The selected intervals for holding the Board's meetings in 2006 include:

- i) Meeting 1: March 1, 2, or 3
- ii) Meeting 2: June 5-9, June 13-16, or June 20-23
- iii) Meeting 3: September 21-22
- iv) Meeting 4: December 4-8 or December 11-14

The Designated Federal Officer adjourned the meeting

Respectfully Submitted

/ Signed /

Thomas O. Miller
Designated Federal Officer
US EPA Science Advisory Board

Certified as True:

/Signed /

Dr. M. Granger Morgan
Chair, EPA Science Advisory Board

Attachments

- A SAB Roster
- B Meeting Agenda
- C *Federal Register* 70 (see in physical file)
- D Sign-in sheets (see in physical file)
- E1 FY 2007 to 2008 Science Priorities
- E2 National Program Director Alignments with MYPs
- E3 EPA-SAB-ADV-05-002 (available at www.epa.gov/sab/)

- F Exploration of jointly funded environmental research
- G Possible SAB Project on Preparing for Environmental Disasters
- H EPA 2020: A Roadmap for Shifting Environmental Policy
- I1 Inventory of Research on Environmental, Health and Safety Implications of Nanotechnology (see in physical file)
- I2 Website Printout on Emerging Nanotechnologies (see in physical file)
- J1 Charge to the SAB for Review Draft SAB Panel Reports (9-21-2005) (see in physical file)
- J2 SAB Advisory on Superfund Benefits Analysis 11-3-05 draft report (www.epa.gov/sab)
- J3 Compilation of Comments from SAB Members (Nov 30, 2005 updated)
- K1 William Sette Overheads, Risk Assessment Task Force Staff Paper – Follow Up Activities Request for SAB Consultation (see in physical file)
- K2 Article – R. Henderson, et al. *EPA Risk Assessment Principles and Practices*, EPA ORD BOSC Workshop, February 2-3, 2005, Washington, DC. *Envir. Sci & Pollut Res.* 12(6):388-390, 2005. (see in the cited journal or the physical file)
- K3 List – OSA Staff Paper – List of 21 Overarching Issues/Themes (see in physical file)
- K4 Symposium Abstract, Dec 6, 2005 (see in physical file)
- K5 *Risk Assessment Principles & Practices*, Office of the Science Advisor, Staff Paper, EPA/100/B-04/001, March 2004 (<http://www.epa.gov/osainter/pdfs/ratf-final.pdf>)
- K6 EPA SAB COM 05-001; Letter to Administrator Leavitt, US EPA, October 26, 2004 (see EPA SAB Website)
- L Update of the FIFRA SAP activities

Attachment A

U.S. Environmental Protection Agency Science Advisory Board

December 1, 2005

CHAIR

Dr. M. Granger Morgan, Carnegie Mellon University, Pittsburgh, PA

SAB MEMBERS

Dr. Gregory Biddinger, ExxonMobil Biomedical Sciences, Inc, Houston, TX, 77005

Dr. James Bus, The Dow Chemical Company, Midland, MI

Dr. Trudy Ann Cameron, University of Oregon, Eugene, OR

Dr. Deborah Cory-Slechta, Robert Wood Johnson Medical School, University of Medicine and Dentistry of New Jersey and Rutgers State University, Piscataway, NJ

Dr. Maureen L. Cropper, University of Maryland and The World Bank, College Park, MD

Dr. Virginia Dale, Oak Ridge National Laboratory, Oak Ridge, TN

Dr. Kenneth Dickson, University of North Texas, Denton, TX

Dr. Baruch Fischhoff, Carnegie Mellon University, Pittsburgh, PA

Dr. A. Myrick Freeman, Bowdoin College, Brunswick, ME

Dr. James Galloway, University of Virginia, Charlottesville, VA

Dr. Lawrence Goulder, Stanford University, Stanford, CA

Dr. Rogene Henderson, Lovelace Respiratory Research Institute, Albuquerque, NM

Dr. Philip Hopke, Clarkson University, Potsdam, NY

Dr. James H. Johnson, Howard University, Washington, DC

Dr. Meryl Karol, University of Pittsburgh, Pittsburgh, PA

Dr. Catherine Kling, Iowa State University, Ames, IA

Dr. George Lambert, Robert Wood Johnson Medical School/ University of Medicine and Dentistry of New Jersey, Piscataway, NJ

Dr. Jill Lipoti, Director, New Jersey Department of Environmental Protection, Trenton, NJ

Dr. Genevieve Matanoski, The Johns Hopkins University, Baltimore, MD

Dr. Michael J. McFarland, Utah State University, River Heights, UT

Dr. Jana Milford, University of Colorado at Boulder and Environmental Defense, Boulder, CO

Dr. Rebecca Parkin, The George Washington University, Washington, DC

Mr. David Rejeski, Woodrow Wilson International Center for Scholars, Washington, DC

Dr. Joan B. Rose, Michigan State University, E. Lansing, MI

Dr. Kathleen Segerson, University of Connecticut, Storrs, CT

Dr. Kristin Shrader-Frechette, University of Notre Dame, Notre Dame, IN

Dr. Robert Stavins, Harvard University, Cambridge, MA

Dr. Deborah Swackhamer, University of Minnesota, Minneapolis, MN

Dr. Thomas L. Theis, University of Illinois at Chicago, Chicago, IL

Dr. Valerie Thomas, Georgia Institute of Technology, Atlanta, GA

Dr. Barton H. (Buzz) Thompson, Jr., Stanford University, Stanford, CA

Dr. Robert Twiss, University of California-Berkeley, Ross, CA

Dr. Terry F. Young, Environmental Defense, Oakland, CA

Dr. Lauren Zeise, California Environmental Protection Agency, Oakland, CA

LIAISONS TO THE SAB

a) Children's Health Protection Advisory Committee CHPAC

Dr. Melanie Marty, California Environmental Protection Agency, Oakland, CA

Dr. Henry Anderson, Wisconsin Division of Public Health, Madison, WI [CHPAC Alternate]

b) FIFRA Scientific Advisory Panel (FIFRA SAP)

Dr. Stephen M. Roberts, University of Florida, Gainesville, FL

Dr. Steven Heeringa, University of Michigan, Ann Arbor, MI [FIFRA SAP Alternate]

SCIENCE ADVISORY BOARD STAFF

Mr. Thomas Miller, Designated Federal Officer, 1200 Pennsylvania Avenue, NW
1400F, Washington, DC, 20460, Phone: 202-343-9982, Fax: 202-233-0643, (miller.tom@epa.gov)

Attachment B

MEETING AGENDA
US Environmental Protection Agency (EPA)
Science Advisory Board (SAB)
Board Meeting
December 14, 2005
Ronald Reagan International Trade Center
1300 Pennsylvania Ave., NW
Washington, DC

Purpose of the Meeting: The Board will meet to: a) review one draft SAB panel report; b) discuss possible follow up activities between the Board and EPA on the EPA risk assessment staff paper; and c) to discuss the SAB FY 2006 operating plan.

Wednesday, December 14, 2005

1:00 p.m.	Convene the Meeting Meeting Administration	Mr. Thomas Miller <i>Designated Federal Officer, SAB Staff Office</i>
	Introductory Remarks	Dr. M. Granger Morgan <i>Chair, Science Advisory Board</i>
	Welcome	Dr. Vanessa Vu <i>Director, SAB Staff Office</i>
1:30 p.m.	Review and Approval of Draft SAB Panel Report: <i>SAB Advisory on Superfund Benefits Analysis</i>	Dr. M. Granger Morgan The Board Dr. A. Myrick Freeman, <i>Panel Chair</i> Dr. Holly Stallworth, <i>Panel DFO</i>
2:15 p.m.	Overview of EPA's Request to the SAB to Conduct a Consultation on EPA's Risk Assessment Principles and Practices Follow-up Activities/Priorities	Dr. William Sette <i>Office of the Science Advisor</i>
3:00 p.m.	FY 2006 SAB Activities a) SAB <i>De Novo</i> Studies	Dr. M. Granger Morgan The Board Dr. Vanessa Vu
	b) Advice on EPA's Future Science Priorities	
4:00 pm	Adjourn the Meeting	

Attachment E1

FY 2007 to 2008 Science Priorities – Discussion Draft 12/14/2005

1. Background

The SAB has reviewed the EPA Science Budget for over 20 years. The Board has enhanced its process for this activity over the last several years and continues to modify its approach so that its advice to the Administrator (and to Congress) has added value. Below, is a suggestion for how the Board might interact with EPA on this topic during calendar year 2006.

There are actually several “budget years” that EPA staff works with at any given point in time. For example, today (assume its December 1, 2005), EPA is pursuing its science activities under the FY 2006 Appropriation, wrapping up their accountability actions for FY 2005 activities, preparing their FY 2007 Budget Request, and planning the activities that might be in their FY 2008 request.

Activities in two of these areas might potentially be influenced by SAB advice – FY 2007 budget request and the FY 2008 planning. Historically, the SAB has focused on the area represented by the FY 2007 budget request (i.e., the next budget that will go to the Congress). This focus seems to make the Board’s advice moot because it happens after the budget has gone forward. In reality the advice might still influence the Congress as it considers what to appropriate for EPA science and influence EPA as it plans its next year’s budget.

2. The Suggested Approach for FY 2007-2008:

The suggestion for SAB-EPA interaction on the FY 2007 request is to explicitly consider the FY 2007 request, along with the SAB’s existing knowledge of EPA science programs based on its recent reviews of EPA science budgets, as background knowledge and to use that knowledge to provide advice to EPA that will enhance its FY 2008 planning that leads to EPA’s FY 2008 budget request.

a) SAB – EPA Meeting (Probably mid-February 2006)

After the FY 2007 President’s Budget is released, we would meet with EPA and be briefed on their ongoing research programs by EPA ORD’s National Program Directors (NPDs). NPDs would “summarize” their science/research “plans” for each “program” at a useful level of activity aggregation and discuss future trends for these programs with a clear description of how they are impacted by the FY 2007 budget request (what might be increasing and what might be decreasing). Also, we must find an effective way to include Regional Office and Program Office science needs and activities.

b) SAB Deliberation

The SAB will discuss the issues, questioning the Agency as necessary to ensure that the message is clear. The baseline of SAB knowledge on these programs has already been built through the background materials provided during the last several years “budget interactions.”

c) SAB Advice

The Board could provide feedback on the future directions of the EPA science programs, noting what is on track, off track, missing, etc. The advice would be given a prospective focus so that it could be used in helping EPA plan its FY 2008 program (and likely fine tune its FY 2007 operations). However, if desired, the advice could be written in a way that would also allow an interested reader to decide whether the FY 2007 science budget meshes with the agency’s strategic priorities.

To be effective we must ensure that the discussions that occur during the SAB deliberations, and the feedback to EPA, be at an appropriate level – neither too aggregated nor too detailed. The Board should take a “strategic” view.

Attachment E2

NATIONAL PROGRAM DIRECTOR (NPD) ALIGNMENTS WITH MULTI-YEAR PLANS (MYPs)

NPD	MYPs
Air	Particulate Matter & Ozone Air Toxics
Drinking Water	Drinking Water
Water Quality	Water Quality
Waste	RCRA & Contaminated Sites Pollution Prevention & Sustainability Economics and Decision Sciences
Pesticides & Toxics	Safe Pesticides and Products Endocrine Disrupting Chemicals
Human Health	Human Health Human Health Risk Assessment
Ecology	Ecological Research
Global Impacts	Global Climate Change Mercury

Attachment F

Draft – Do Not Quote or Cite – November 30, 2005

Proposed Project: Exploration of jointly funded environmental research

The intent of the project would be to consider how research might be jointly funded and/or conducted by EPA and industry. The purpose of such partnerships is to seek opportunities for EPA to leverage limited research resources so that the overall quality and productivity of its research investments are enhanced. The project intent would be to identify mechanisms to assure the appropriateness, transparency and oversight of project planning, implementation, and analysis and communication.

Approach:

1. Form a sub-committee of the SAB to initiate work and elaborate the proposal
2. Consider the level of work, staff support, etc.
3. Contact other institutions that have faced this same issue (University associations, Smithsonian, NRC)
4. Compile the measures taken by others (oversight committees, pre-stated criteria for acceptance of funds, etc.)
5. Based upon the results of this survey; convene a workshop to review the issue with the agency and stakeholders.
6. Propose a structure for oversight of projects so funded. As a direct follow-on to the activities in objectives 4 and 5, the SAB could provide EPA and potential collaborating partners with a list of criteria (or the process by which to establish them) that should be followed in establishing partnership agreements involving joint research funding. The SAB also could define and/or provide required oversight responsibilities to assure that the desired criteria and actual project conduct were indeed appropriately implemented.
7. If a process is adopted, track and review the process for some period of time, and report back to the SAB and the Agency.

Attachment G

Discussion Draft Do Not Quote or Cite -- 2005 November 23

Possible SAB Project on Preparing for Environmental Disasters

Even with improved preparation and prevention, occasional environmental disasters are inevitable. They will definitely include ones arising from the intersection of natural events and human development (e.g., storms, earthquakes, tsunamis, and volcanic eruptions). They may also include man-made events, such as the terrorist attacks on the World Trade Center and the anthrax letters. When such disasters happen, the EPA will once again be called upon to characterize environmental impacts, asked for advice and guidance, and, in some cases, be called oversee some or all aspects of clean-up activities.

In crisis situations, large organizations are rarely capable of rapid innovation¹. Rather, they respond with previously developed "standard operating procedures." As a result, if future performance is to be better, EPA must put such procedures in place before environmental disasters occur. Such procedures must coordinate responses across multiple media (air, water, sediment, etc.) in both the short term (acute risks) and over the longer term (chronic risks). Given the variety of possible challenges, EPA needs a set of basic response plans that can be readily adapted to specific circumstances, and whose elements have been sufficiently practiced that key participants can execute them effectively.

Managers throughout EPA face many more demands than they can address with their available economic and human resources. Responding to emergencies like Hurricanes Katrina and Rita, puts the Agency further behind, in dealing with its routine responsibilities. As a result, the back-log that built up during the recent experiences may make them an impediment to learning, rather than an opportunity.

This proposal for an SAB self-initiated study is designed to help the Agency to develop improved plans for responding to future environmental disasters.

Clearly the SAB is *not* the right organization to develop detailed operational plans. However, we could help the Agency lay the ground work for developing such plans and examining the impediments to coordinated efforts across the Agency. Then, once the Agency had developed detailed plan, the SAB could provide thoughtful expert review and advice on the technical and behavioral dimensions of those plans.

We propose to proceed as follows:

1. Arrange for a briefing to the SAB from EPA senior legal and administrative staff (and perhaps similar staff from one or two other Federal agencies) to clarify the EPA's role and responsibilities in environmental emergencies.

¹ Graham T. Allison and Philip Zelikow, *Essence of Decision* Second Edition, Longman - Addison Wesley Longman, 1999, 416 pp.

Clearly, any recommendations that the SAB develops should be consistent with legal mandates, the agency's missions, and the established division of
Discussion Draft Do Not Quote or Cite -- 2005 November 23

responsibilities between federal agencies, state and local governments, and NGOs and the private sector, while also recognizing that public expectations may not always conform to those mandates.

2. Arrange for a few members of the SAB to conduct a series of interviews with EPA staff who have been intimately involved in the response to recent environmental disasters (Sep 11, anthrax, hurricanes) – focusing on what went well, where problems were encountered, and what lessons could be incorporated in future plans.
3. In parallel with the activities outlined in Step 2, arrange for a few members of the SAB to conduct a series of interviews with other organizations (nuclear, public health, etc.) that have experience in responding to environmental disasters.
4. Have a small working group, drawing on these inputs, develop a draft proposal which builds a taxonomy of emergency response needs and outlines what should be in emergency response plans. Distribute this to all SAB members and selected agency staff.
5. Run a workshop for the SAB and selected agency staff. Begin with presentations on and discussion of lessons from tasks 2 and 3. Then move to a presentation on and discussion of on the draft taxonomy of emergency response needs and the outline of what should be in emergency response plans. Use break-out sessions to revise and refine the draft, to begin to develop an Advisory to the Administrator.
6. Finalize the Advisory in a subsequent meeting of the working group and then in a meeting of the full SAB, and communicate it to the Administrator.
7. Stand ready to respond to requests from the Administrator for future activities in this area (either by the full SAB or the Homeland Security subcommittee) and to review and offer advice on more detailed agency response plans as they become available.

Attachment H

Project Title/Subject: EPA 2020: A Roadmap for Shifting Environmental Policy

Requesting Organization/Office. SAB-Nominated Project

Background. It is proposed to form a new SAB subcommittee (nominally called the “Roadmap” Committee) whose purpose is to investigate new models of environmental policy based on “life cycle management” approaches, and lay out a series of recommended actions that, if followed, would assist the Agency as it evolves in this direction. The basis of this project follows from the 2003-2008 EPA Strategic Plan in which the Resource Conservation Challenge (RCC) is put forward. RCC is a voluntary program that urges all citizens, firms, and institutions to make environmentally conscious decisions that are consistent with the life cycle approach, specifically “...[the Agency’s] ultimate goal is to move the Nation from a waste-oriented to a life cycle management way of thinking about materials” (Strategic Plan, p. 60).

Such a vision is consistent with past thinking about environmental management. PPA, RCRA, and CERCLA (and subsequent amendments), and other legislation made clear that the preferred course of action for environmental regulation should follow the sequence: prevention, recycling, treatment, disposal/release. The goals were and remain the protection of the environment through risk management, the regulation of material flows within the US economy, and encouragement of wise conservation choices.

In practice little of the resources of the Agency have been devoted to these ends, with so-called “legacy” needs (hazardous and toxic materials regulation, cleanup of waste sites, monitoring), assuming priority roles. Even so the regulatory underpinnings of hazardous waste regulation are embodied in a “cradle-to-grave” mentality, a form of tracking of at least some substances around perceived material cycles.

Remarkably, many industries and other institutions have elected to adopt environmental policies and practices that are consistent with the RCC’s vision. This is due to several factors: the higher costs of environmental treatment and control, the promulgation of more stringent legislation in the EU that requires more extensive tracking of materials (for example packaging, and even materials in products themselves), more precise knowledge of the environmental effects of contaminants on humans and ecosystems, advances in the sophistication of environmental control technologies, and a better understanding of the value of ecosystem services in our economy. For the most part these changes have been led by larger, multinational companies, since their products tend to compete in global markets. It might be said that in some ways the Agency’s approach to environmental policy has lagged other nations, and even certain sectors of the US economy.

Why Should the SAB Undertake This Project. This is of the nature of a “visionary” project in which the combined intellectual resources of the environmental community, led by the SAB, are gathered to explore the environmental policy of the US, the Agency’s role in both influencing policy and carrying it out, the implications of shifting US environmental policy in the direction espoused by the Strategic Plan, and the steps that

will need to be taken in order to effect such a shift. This project has the potential to impact the future of US, and by implication global, environmental management far into the future. The SAB is uniquely constituted to carry out this project: it is composed of many of the nation's leading environmental scientists and thinkers and its management allows it to engage experts from across the globe, it has familiarity with the Agency's structure. As such it represents an opportunity for the SAB to further fulfill the strategic part of its mission: to advising the Agency on broad scientific matters in science, technology, social, and economic issues.

Tentative Charge. To plan and conduct a series of activities designed to accomplish the following:

1. To explore the basis and evolution of the environmental policy of the US, its relation to other policy issues (e.g. energy, commerce, defense), and to compare it with alternative models from other regions, nations, and states.
2. To define the basis of the RCC, and the role of voluntary actions, in implementing US environmental policy.
3. To examine the role of science, technology, economics, and other disciplines on the functioning of the Agency, and their relative importance in supporting policy decisions
4. To understand the Agency's role in the formation and carrying out of US policy.
5. To examine how interactions between the US and other nations affect and are affected by different environmental policies and regulations
6. To examine "life cycle based" approaches to environmental policy, the material basis of the economy, and the social, economic, and regulatory implications of such approaches.
7. To identify research needs and priorities that would be needed to support a shift in US environmental policy.
8. To identify Agency regulatory changes that would be likely to accelerate the shift toward the strategic goal.
9. To make recommendations on a series of actions needed in order to achieve the Agency's strategic goal (a roadmap).

Activities of the Roadmap Subcommittee. Given the scope of the charge, and the magnitude and potential significance of the subcommittee's work, this project will require significant time and resources to complete. The subcommittee will require a broad range of expansive thinkers, yet individuals well-grounded in their respective disciplines. It is suggested that a series of workshops (approximately 4) be initiated that address various aspects of the charge with representation from EPA, but also other sectors such as industry, municipalities, the states, and other private organizations (the "stakeholders"). The subcommittee will require approximately four face-to-face meetings, appropriately coordinated with workshops, and several teleconference meetings. The project is estimated to require two years to complete.

Tentative Commencement. 1st quarter FY 07 - Planning meeting of SAB Subcommittee, finalization of charge, first cast for membership, schedule and topical themes of workshops, and tentative schedule of other activities.

Attachment J3

COMPILATION OF COMMENTS FROM SAB MEMBERS *SAB Advisory on Superfund Benefits Analysis* (November 30, 2005 Revised Jan 4, 2006)

1. Dr. Robert Stavins (Lead Reviewer)

I have read the *SAB Advisory on Superfund Benefits Analysis*, a draft report dated November 3, 2005. In accordance with the Board's revised quality review procedure, I am pleased to state that:

- (1) the original charge questions to the Superfund Benefits Analysis Advisory Panel are adequately — indeed much more than adequately — addressed in the draft report;
- (2) the draft report is clear and logical — it is exceptionally well written and organized; and
- (3) the conclusions drawn in the report and the recommendations made by the Panel are supported by the information and arguments offered in the body of the draft report.

Furthermore, the panel — well constituted with an array of first-rate experts in relevant disciplines and domains — has gone well beyond any reasonable expectations by providing EPA with a superb assessment of EPA's own initial attempt at analyzing the cumulative, aggregate benefits of the Superfund program plus a set of very useful recommendations of how EPA can move forward with the challenges it faces.

I have three notes to add to this, the first two of which are minor typographical errors:

- (a) In the first line of the fourth paragraph on page 4, there is an apparent typo. I believe the word “a” should be inserted between “there is” and “substantive body.”
- (b) In the fifth line of the final paragraph on page 6, I believe that there is another typo. I believe the word “latter” should be replaced by the word “last.”
- (c) In the first paragraph on page 16, as parts of its response to charge question #1, the Panel notes that much of Chapter 1 appears to follow EPA's *Guidelines for Preparing Economic Analyses* (2000). I cannot comment on the accuracy of this statement, since I do not have access to the EPA report, but I am concerned by the comments by the Panel in this section, which could be taken by EPA to be a rebuke for its attempt to follow its *Guidelines*. This concerns me, because it has been an important mission for the Administrator to make sure the various program offices follow the *Guidelines* when carrying out economic analyses, and it would be unfortunate if EPA were to interpret this as a message that it should ignore the *Guidelines*. I believe the Panel can make its substantive points without sending this potentially problematic message.

All in all, this is a superb document, and the Panel and its Chair, Dr. Freeman, should be commended for the job they have done. The Science Advisory Board can be proud of this work.

2. Dr. Trudy Cameron (Lead Reviewer)

I have read this draft report, distributed for SAB review on November 14, 2005. The charge to the reviewers includes a determination of whether:

- a) the original charge questions to the SAB Panel were adequately addressed in the draft report – (Yes);
- b) the draft report is clear and logical – (Yes); and
- c) conclusions drawn and/or recommendations made are supported by information in the body of the draft report – (Yes).

This draft report is also well-written and thoughtful. The challenges that the Agency faces in assessing the benefits of the Superfund program are substantial, and this report is unambiguous about the blind alleys and about its suggestions for improvement.

Nevertheless, I have a number of requests for clarifications or elaborations, and a few literature suggestions that the Panel may wish to consider in finalizing its report. I will itemize a few substantive points first, followed by a list of miscellaneous line-edit suggestions.

p. ii. “..(unless individual site-specific panel data were collected)..” Here, and elsewhere in the document, do you mean repeat-sales data? It is not made clear how panel data would solve the problem of unobservables and yield credible benefits at the national level. If repeat-sales data is implied, there is still the problem of controlling for unobserved factors which are not constant across time (such as the remodeling efforts discussed in conjunction with another point, concerning page 24, below). If houses closer to Superfund sites are systematically remodeled (or even just redecorated or re-landscaped) less frequently than houses farther from Superfund sites, then even repeat-sales data may be somewhat misleading. (The same point is mentioned on page 3 of the report, third line from bottom.)

p. 7: In the discussion of prices recovering after EPA remediation, some of the work I have been doing over the last couple of years is relevant. In “Evidence of Environmental Migration,” (Cameron and McConnaha), forthcoming in *Land Economics*, we examine the changing spatial patterns in sociodemographic and economic variables, over three decades, for a set of four significant Superfund sites as they are identified, listed, and as cleanup is undertaken. There is surprisingly little evidence of housing prices doing what one would expect, *ceteris paribus*. There is a lot more evidence of changes in neighborhood composition. This is pertinent to the discussion about “redevelopment” on page 19 of the report, as well. The redevelopment process need not be formalized and government-sponsored in order for it to occur. Some changes in neighborhood composition are endogenous, not merely omitted exogenous variables that might be correlated with included variables.

p. 8: “...with the added assumption that those changes are due solely to Superfund activities.” Again, my work with McConnaha suggests that there is a lot more going on

around Superfund sites that just the ebb and flow of concern about the risks of the site among a fixed set of neighbors. Neighborhoods change as people respond differentially to information about the site. Over the time frame relevant to Superfund cleanups, even just the natural rate of turnover in housing occupancy can make a considerable difference in the composition of neighborhoods.

p. 9: "...the variable of interest is a "neighborhood" measure, so identification comes from even fewer observations (and thus the standard errors are biased upwards)." Are we sure about the identification and bias statements? If a neighborhood characteristic is the relevant explanatory variable, there is not necessarily any errors-in-variables attenuation in the slopes. On the other hand, if the dependent variable is a neighborhood average, instead of the true individual variable, use of this average as though it was an individual value will overstate the precision (since it ignores the variation within the neighborhood). Overstating the precision will tend to understate, rather than overstate, the standard errors.

p. 10: "...to demonstrate the significance that people apparently place on the presence of Superfund sites near their homes and changes in the information about Superfund sites." There may be some value in the findings of Finucane et al. (2000) about ethnic and gender differences in risk perceptions and sensitivity to potential stigmatization of communities from hazards.

p. 11: Hamilton and Viscusi build objective measures of risk, whereas housing prices in the vicinity of Superfund sites are presumably dictated by the varying subjective perceptions of risk from Superfund sites. In a normative sense, we should probably not make policy based on the risks people think they are avoiding, only upon the best scientific estimates of the actual risks. However, it is debatable whether people are better off if they believe they are better off, or only if they actually are better off. For example, I know at least one sixteen-year-old whose subjective welfare level is drastically adversely affected by a policy that provides what is good for her. This will remain a thorny normative issue, I suppose.

p. 14: "...how much cleanup has happened in three dimensions." This is a little confusing. Does it refer specifically to literal three-dimensional space, with depth being the third dimension, or to a figurative third dimension? The confusion stems from the segue from the previous paragraph, where the report talks about second and third "channels" (a term that might also have a literal and figurative meaning, when talking about water). At the end of the paragraph that talks about the three dimensions, reference is made again to "the second and third channels above." This passage could be rendered a little less confusing.

p. 16: (top paragraph) It might be judicious to be somewhat less dismissive of the Agency's "Guidelines for Preparing Economic Analyses" (2000). Rather than advising that the report eliminate discussion of the guidance, it would be more helpful to advise that the report should acknowledge the existence of the Guidelines and explain why some of its recommendations are relevant to the present analysis and why some of its recommendations are not intended for this type of application. It is certainly not necessary for the report to proceed, lock-step, through every chapter of the Guidelines. It should cherry-pick the relevant sections only, after explaining why the Guidelines are not relevant in their entirety.

p. 22: “Many studies estimate a price gradient, but don’t assess the distance at which price effects go to zero. As a result, many studies arbitrarily assume a distance [at] which the price effect goes to zero, ...” Isn’t it more likely that the price effect becomes asymptotic to zero? Reciprocal forms for the price gradient may be the most appropriate. This is an “extent of the market” issue, in a way. The best we can hope for is to identify a rough distance at which there is no remaining statistical evidence of a price effect, assuming perfectly functioning markets and perfect information.

p. 22: “...or they choose a distance based on the data they have.” In a paper forthcoming in JEEM (Cameron, 2006), I draw attention to the potential pitfalls of using hedonic property value data where the observed distances covary with directional effects in site impacts.

p. 23: (Omitted-variable bias) “The Greenstone and Gallagher paper provides a research design that could potentially address this problem.” This paper is a very important addition to the literature. Even though it cannot do everything, the statistical regularities it identifies are worthy of attention. They find that “We cannot reject that the clean-ups had no effect on local housing price growth, nearly two decades after these sites became eligible for them.” Considering that I spent several years beating on tens of thousands of individual housing value data points at four major Superfund sites over time periods spanning up to a couple of decades, looking for the anticipated price effects, the Greenstone and Gallagher results are not surprising. I gave up trying to find the “right” sorts of price effects and passed a 65 page report (and about 100 pages of appendices) back to my collaborators, who dredged through all of my results and used some of them to support the Messer et al. (2006) paper.

However, that unsatisfying experience pushed me to consider just why I was failing to find the price effects I expected to see. This led to the Cameron (2006) paper concerning directional heterogeneity (illustrated with individual housing price data around the Industri-Plex site in Woburn, MA). It also spawned the Cameron and McConnaha (2006) paper that considers census tract-level data for a set of four significant, previously studied, or notorious sites. This concern also led to a third paper, Cameron, Crawford and McConnaha (2005), that examines a smaller list of neighborhood attributes for a set of seven sites that overlap with the Cameron and McConnaha study in only one case. (This paper is currently under review).

We have been looking for reasons why you might not expect to see housing prices rise obediently when a Superfund site is cleaned up. There can be substantial neighborhood changes occurring near these various Superfund sites that are not happening farther away from them in the same area. This leads me to believe, based on my own research, that there is a lot more going on than just Superfund clean-up. And it is not exogenous (or even constant over time, so that it can be controlled-for by including initial-period levels of neighborhood characteristics or by employing panel-data methods for repeat-sales data).

p. 24: “...only two studies in the sample of nine use panel data, in spite of the accepted notion that cross-sectional studies are inadequate in this type of analysis.” If by “panel data,” you mean “repeat-sales” data, it should be acknowledged that repeat-sales data is not necessarily a panacea for statistical problems either. Panel methods allow you to net out the effects (typically just on the intercept) of any unobserved heterogeneity that is constant over time. The trouble is that most extant examples are still forced to assume

that way too many things are constant over time. Neighborhoods change (we are sure of that, from the work mentioned in this review), distances to the nearest examples of important amenities/disamenities are changed as new shopping areas are developed, as roads are widened, as transit schedules change, and as congestion changes. If houses are not redecorated or remodeled at the same rate as houses elsewhere, there can be change in the quality of the house itself or in other nearby houses if they are not redecorated or remodeled and instead allowed to become out-dated or run-down, relative to houses in the wider community. *Ceteris paribus* is an awfully difficult assumption to maintain.

If census block or census tract data are used, it is possible to construct decennial panels of spatially aggregated data. Perhaps these pseudo-panels are what is intended in the discussion. However, even then, it is difficult to argue that all of the relevant unobserved heterogeneity is captured adequately by a set of implicit fixed effects (or random effects, for that matter).

p. 25: In the “per-square-foot” argument, if you use the square footage of the dwelling, doesn’t this assume that dwelling area is proportional to lot size? In the case of air contaminants, the concentration of contaminants is presumed to be physically associated with the air column above the property. One wants benefits of contaminant removal to be measured on a per-square-foot basis, rather than on a per-lot basis, since the latter would mean that the way to increase benefits would be to sub-divide lots, which is silly. I don’t recall any literature that claims that benefits should be measured on a per-square-foot of dwelling-size basis. Couldn’t we then amplify benefits by building bigger houses on the same-sized lots, even if no more people occupy them?

p. 25: “The Panel has some problems with the inferences, and questions using full reversals of negative price effects as a basis for the benefits estimate.” I heartily concur. Given the amount of movement we see in everything BUT prices around the sites we consider in Cameron and McConnaha (2006), I’m very suspicious of using simply a “price effects” criterion to measure the benefits of Superfund remediation. I’m not sure how we should measure it, unfortunately, but spatial sorting, and the locational equilibrium question, are going to be important in this debate.

p. 27: “Charge Question 4b. Are there other feasible methods for monetizing the value of avoided morbidity besides Cost of Illness?” I would be remiss not to mention our work on “Valuing Health-Risk Reductions: Sick-years, Lost Life-Years, and Latency” (Cameron and DeShazo, 2005). Using a large representative national sample, we estimate WTP for health risk reductions using a model that seamlessly combines non-fatal health effects, sudden death, and (most importantly) pre-mortality morbidity. This main paper, and two others (one addressing age effects and the other tackling the question of co-morbidity) are poised to enter the review process within the next month. (Or bust?)

p. 28: It may be worth reminding readers that the LECR formula is only a linear approximation, since it assumes that each of the parameters involved is a single scalar value, rather than a function of many other things. I presume that ED is exposure duration *per episode*, since EF is exposure (episode) frequency. IR must be ingestion rate *per exposure episode*? Having introduced the formula and begun the explanation, some of us are unsatisfied if we cannot see how the various units will cancel to yield LECR (whatever its units might be).

p. 28-29: How does the Panel recommend handling uncertainty analysis when the formula is a product of terms? At least we can probably assume that averaging time and body weight are not likely to be zero, so that the divide-by-zero “infinity” problem is not going to be a big deal. Is a bootstrapping process envisioned for the development of a possible distribution for LECR, given the uncertainty about its component terms?

p. 31: “But one must also consider the possibility of negative “psychological” effects of the program.” This brings to mind the case of the Hudson River clean-up, where (I understand) the PRP went to great lengths to convince the local populace that the cure would be worse than the disease (dredging up the PCBs, or whatever they are). Dredging was portrayed as being noisy, invasive, and likely to stir up more contaminants than were leaching from the sediments anyway.

As far as the stigma associated with Superfund, the discussion in Messer et al. is provocative. Even if a site is pronounced “clean” after remediation, prior subjective perceptions may not be restored. Kind of like the turkey-roasting pan I once had to use as an emergency litter-box...I could never bring myself to use it for roasting another turkey, no matter how much I cleaned it.

p. 34: “Empowerment” is one of those over-used words that can be enough to make a reader gag. I agree with the panel that the concept has to be made concrete. “For example, the discussion suggesting that community empowerment might reduce declines in property values does not appear grounded in any research.” Some relevant research might include Pastor et al. (2001). I seem to recall that this is one of the papers where the ethnic mix of a neighborhood affects the odds that a toxic facility will be located there. Homogeneous neighborhoods, of any kind, succeed better in resisting such location decisions than factionalized neighborhoods without a critical mass among any one ethnic community. Community activism may be predicated upon community homogeneity, at least to a certain extent.

Miscellaneous:

p. 3: “...using a more representative set of Superfund sites, and using an innovat[ive] research design.”

p. 4: “..beneficial effects of remediation and restoration on ecological system[s] are not well understood [or] documented.

p. 4: “Finally, [there is no well-established method for] connecting estimated interim lost use values [first] with NRD settlements or awards, and then to actual application of the settlement fund toward restoration activities[.]”

p. 5: (bottom) {I’m still allergic to the use of “critiques” as a verb. Could you change to “offers a critique of”?

p. 6: (middle) Perhaps: “The concept of benefits includes impacts on people that stem either from the flow of services provided by the environment [(if we take a teleological philosophical perspective)] or from the intrinsic value of the environment and its components [(if we take a deontological philosophical perspective)]. {Economists reading this passage will be placated by an acknowledgement that the relevance of intrinsic values is predicated on a non-economic viewpoint.}

- p. 10: (top) "...a different and possibl[y] larger set of studies;"
- p. 11: "...the risk factors are 95% upper confidence levels rather than [expected] values." {Maximum likelihood is an estimation method, rather than a sample statistic.}
- p. 12: "The Panel suggest[s] that the Agency present a sensitivity analysis..." {Unless, of course, you are being British, where Panel would be plural, rather than singular.}
- p. 14: There is a rogue line-space in footnote 1.
- p. 15: (second-last paragraph) "The introduction could provide a clearer statement of [the] purpose of the report..."
- p. 16: {While I do not have the report itself to evaluate, only this review, it is sometimes appropriate to relegate case studies to an appendix, if they contribute anything of value to the report itself.}
- p. 17: The titles for items 1 and 2 should be capitalized (as for item 3 on page 18), and there should be a period at the end of item 2.
- p. 17: "...and compares them to the first seven [of X] selection criteria."
- p. 18: The parenthetical passage does not make sense in the sentence beginning "The Panel strongly recommends taking proposed NPL sites out of the statistics..."
- p. 20: Rather than "most of the exposed U.S. population lives near a small fraction of the sites" perhaps it would be better to use "Only a small fraction of sites accounts for most of the hazard exposure experienced by the U.S. population."
- p. 20: "can be added to the text of the report [by] describing how population is concentrated around a limited subset of sites."
- p. 20, footnote 2. Just as you define the abbreviation HPM, you should also define the abbreviation TIF.
- p. 21. "...study of benefits should include on the sites [at] which remediation is completed..."
- p. 21. "...a lower percentage of federal sites has CC complete..." What does this mean?
- p. 21. Hamilton and Viscusi should be "H&V", rather than "H & V", perhaps?
- p. 21. There is a confusing (straggling?) sentence in the form of "The hedonic property method (HPM) sites probably looked at complex sites."
- p. 21: "The average size of NPL sites..." {measured how?}
- p. 21: "Federal sites are very large and [the sites considered in most HPV studies] tend to be smaller." Unless you mean H&V, rather than HV, HPV, or HPM. The abbreviations are causing the confusion here. Perhaps it is not too difficult just to spell out Hamilton

and Viscusi, throughout the review, to avoid ambiguity.

p. 22: I would recommend "...find some evidence [that] property values in rural areas are not responsive to distance to a landfill. Similarly, the [sites examined in the] studies used in the meta-analysis take longer to clean up..."

p. 22: "This chapter should provide more information [upon/with] which to assess whether the sites from the hedonic studies..."

p. 22: "...so the uncertainty [about whether cleanups will happen] and the [discounting of benefits due to] the delay would reduce the estimate of retrospective benefits of Superfund."

p. 26: "The Panel's answer to this charge question sounds [themes that are common to those expressed in the response to] charge question 3c.

p. 26: {In reading through this, I was surprised at this point by the reference to "the concern of the earlier SAB Panel." Perhaps I missed it, but I hadn't realized there was a prior panel. Perhaps the existence of this previous panel can be mentioned up front in the document.}

p. 26: "... was whether [] the hedonic price function (HPF) would shift as a result of a change in the vector of characteristics." {the "or not" part is usually superfluous}

p. 26: {perhaps a typo in the original charge question} "...a proposed analysis for captur[ing] health effects of Superfund."

p. 27: "In view of the limited exposure data, the lack of [any] ability to address additive or synergistic..."

p. 27: "A modeling approach to evaluate [blood lead] levels was initiated..."

p. 28: (bottom of page) This instance of the abbreviation CC is probably not the same as the instance on page 21.

p. 29: "...lifetime excess cancer risk (LECR) can vary [by] several orders of magnitude.

p. 29: In the two paragraphs at the top of page 29, I lost track of who "they" are. It would be helpful to refer again to Hamilton and Viscusi.

p. 29: "These adjustments could surpass those of the uncertainty in the {constants factors?} {please clarify}.

p. 29: "...adopt more widely a probability[-]based risk assessment approach."

p. 33: "...Superfund program also uses [?] community outreach mechanisms to create..."

p. 33: "...and to the individual[s] conducting these activities."

p. 33: "The Superfund program has several [affiliated?/sub-?] programs intended to

provide information to communities.”

p. 33: In addition to the TAG program {no parentheses around “TAG” here, since it was defined in the previous paragraph}.

p. 34: “...opportunities for deterrence are limited to containment.” The term “containment” would seem to imply that toxics have already been released, at least within a limited area. The term “deterrence” should probably be reserved for prevention of release in the first place. This passage was bothersome.

p. 39: The Landrigan reference has “et al.” embedded in it for no apparent reason, just before the journal name.

It would be helpful to provide complete author references in the References list, rather than “et al.” notations. If the references have been prepared in EndNote, for example, perhaps the settings for the Bibliography merely need to be expanded.

The date (1990?) is missing on the McClelland et al. paper in the references.

The OMB Circular A-94 reference has some over-typing at the end.

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3. Dr. Maureen Cropper (Lead Reviewer)

I have read the *SAB Advisory on Superfund Benefits Analysis*. The report is clear and logical and answers the charge questions posed to the Panel; however, I believe that

some of the Panel's recommendations could be stated more clearly both in the Executive Summary and in the report itself.

Definition of Benefits from the Superfund Program

The Panel states that “the Agency should develop a more coherent framework for enumerating the many possible benefits of the Superfund program.” It seems to me, however, that the Panel could help the Agency in this task by addressing the following questions more straightforwardly in its review. (The questions are answered implicitly, but buried in a very long report so that the answers are lost.)

1. *What benefits (if any) can be measured by examining housing prices, under ideal conditions (i.e., with ideal data)?*

There should be a more straightforward discussion of this question (a) assuming that individuals correctly perceive the health and ecological risks from Superfund sites; and (b) assuming that they do not.

Under assumption (a) housing prices could capture certain use values associated with Superfund cleanups (health benefits, ecological benefits as perceived by residents, some groundwater benefits, aesthetic benefits), but they could not capture non-use benefits. So they would be a lower bound to total benefits.

Under assumption (b) one might not want to call the change in prices of houses near a site before and after cleanup (compared to an appropriate set of controls) a measure of benefits because they reflect subjective beliefs; however, one might be interested in examining this as an *impact*. I personally feel that the Panel cannot argue how difficult it is for epidemiologists to estimate health risks in one section of their report and then subscribe to the view that individuals correctly perceive health risks when discussing hedonic price analysis.

2. *Should the benefits measured using housing prices be added to benefits measured using the other three approaches outlined in the *Superfund Benefits Analysis*?*

Clearly not. This would constitute double counting under assumption (a), and wouldn't make any sense under assumption (b). This is important to state.

3. *If one abandons the property value approach as a measure of benefits, should the benefit estimates measured by the other three approaches be added together?*

As Cathy Kling has noted, adding together ecological and groundwater benefits could entail double counting. The same is true of health and groundwater benefits, to the extent that groundwater is viewed as a route of exposure for health effects.

What Can Be Inferred from Property Values?

The report should state up front (and explain more clearly to the reader) that to measure the impact of Superfund cleanups on housing prices requires before and

after cleanup data on “treatment” houses (those near the site) and “controls” (comparable houses not affected by the cleanup). The average treatment effect associated with cleanup is given by:

$$(\text{Average price}_{T,A} - \text{Average price}_{C,A}) - (\text{Average price}_{T,B} - \text{Average price}_{C,B})$$

Where “A” refers to after cleanup, “B” to before (e.g., after the RIFS is conducted, or whatever the correct baseline is), and “T” and “C” refer to treatments and controls.

An implication of this statement is that the impact of Superfund cleanups on housing prices cannot be measured using a single cross section of data. This implies that the estimates in the *Superfund Benefits Analysis* are not valid (since most studies used are based on a single cross-section of data), and would not be valid even the study had used 100 cross-sectional studies on a representative sample of sites. Instead of estimating the first term in parentheses, the authors of *Superfund Benefits Analysis* assume that it is zero!

A further problem with their approach (noted on p. 32 of the report) is that estimating the second term in parentheses using an hedonic price study conducted after the RIFS (or whatever the correct baseline date is) is likely to overstate $|\text{Average price}_{T,B} - \text{Average price}_{C,B}|$ that is due to toxic contamination from the Superfund site. This is because houses near the Superfund site are likely to have sold for less than “control” houses due to visual disamenities even before the site was listed on the NPL.

I know that the Panel recognizes these points, but they do not come through clearly. If one reads the Executive Summary, it appears that the main problem with the property value analysis is lack of studies covering enough sites. This is a data problem, not a methodological flaw.

4. Dr. Michael McFarland (Lead Reviewer)

SAB Superfund Benefits Analysis Advisory Report – McFarland Comments

The SAB Panel’s review of the Agency’s Superfund Benefits Analysis was clear, logical and provided a number of valuable recommendations that, if adopted, will ensure a more balanced and scientifically defensible retrospective evaluation of the Superfund program. The Panel’s review of this document was clearly challenging as much of the information adduced by the Agency in drafting its analysis framework was found to be, in many cases, insufficient, inappropriate or, in some cases, missing.

Charge Questions to the Quality Review Committee

Were the original charge questions to the SAB Panel adequately addressed in the draft report?

On the whole, the Panel addressed each of the multifaceted charge questions and provided clear and comprehensive responses. The one charge question for which the Panel’s written response seemed unclear was Charge Question 3g. In Charge Question 3g, the Agency posed the following: “Should federal sites be included in this analysis or not? If so, how?”. In reviewing the Panel’s response to this charge question, it was not entirely obvious whether the Panel actually supported or rejected the notion of including

federal facilities in the Superfund benefits analysis.

Moreover, fully recognizing that it is not the role of the QRC to rewrite the Panel's report, I am, nevertheless, compelled to mention that, under the US Department of Defense's (DoD) Base Realignment and Closure (BRAC) program, many federal lands that once housed military facilities are now scheduled to transfer to private, commercial or local government ownership. Many of these properties have had contaminated soil and/or groundwater whose remediation was managed under the Superfund program. Although, on the one hand, it would seem that consideration of these data by the Agency in their Superfund Benefits Analysis is appropriate, the Panel may have more cogent reasons for recommending exclusion of this information. To the Panel's credit, I would also hasten to add that it is also not immediately apparent whether inclusion or exclusion of federal facilities data would effectively change any of the Panel's findings.

Is the report clear and logical?

Yes, the report was clear and logical and provided a series of valuable recommendations.

Where the conclusions drawn and/or recommendations made supported by information in the body of the draft report?

Yes, the Panel furnished clear and detailed information supporting each of its conclusions and recommendations.

Additional Comments:

1. In reading the Panel's report, it was not obvious to whom the Agency's Superfund Benefits Analysis report was being directed. This omission is mentioned primarily because knowledge of the report's target audience may explain, to some degree, the Agency's rationale in formulating the technical basis of its Superfund Benefits Analysis framework.
2. On Page 18, the Panel's report makes the following statement: "When states do carry out (CERCLA) actions, all decision-making powers still are with EPA and not the states". In principle, this statement may be correct, particularly where CERCLA actions involving privately owned facilities are concerned. However, it is not immediately apparent that this statement is accurate (at least in practice) where federal facilities are identified as the principal responsible parties (PRPs). CERCLA actions at federal facilities normally involve consensus decisions reached by a remediation advisory board (RAB) whose members consists of federal, state and local government officials as well as members of the public. In my limited experience with RABs, states (as well as other stakeholders) do not automatically assume a subordinate decision-making role to the EPA. In fact, in practice, the reverse is often true (i.e., states are often the final arbiters of remedial decisions). My discomfort with this statement would be eased if there was some consideration to modifying the word "all".

5. Dr. Cathy Kling:

I read the report and think it is quite well done. My single comment/question for the panel was whether they considered the question of the separability of water protection benefits from ecological and/or health benefits. Specifically, might there be a double counting concern if there is overlap between the benefits that come from protecting water and the ecosystem or health benefits?

6. Dr. Rebecca Parkin:

AB Advisory on Superfund Benefits Analysis

To answer the questions explicitly:

1. Are the original questions adequately addressed? Yes
2. Is the report clear and logical? Yes
3. Are the conclusions and recommendations made supported by information in the body of the report? Yes

Additional comments:

Overall, the draft report was clearly written with a logical flow. The components of the draft report are repetitive but consistent in content. The Executive Summary and section 3.0 Overview are very similar; I would have used only one of these.

Letter to the Administrator

Add “assumptions” to item 2. Important issues about assumptions occur repeatedly in the report (pp. 2, 7-8, 9-10, 25-26 and 31) and therefore merit inclusion in the letter.

Minor edits:

P. 4, item 5: NRD is not defined before its first use. Insert in parens earlier in the paragraph.

P. 18, 2nd para.: ELI acronym needs to be inserted – before it is used in the next paragraph.

P. 32, 1st para.: Simons, 1998 was not found in the references.

7. Dr. Valerie Thomas:

Here is my comment on the Draft SAB Panel Report - Superfund Benefits.

From reading the Draft SAB Panel Report, it is not clear to me how EPA should understand when it is appropriate to use case studies and other partial, illustrative approaches, and when it is necessary to undertake a full, comprehensive analysis. A main point of the Panel Report is that a more comprehensive analysis is necessary. But within the Report, the Panel also calls for partial or illustrative analyses.

For example, on page 11, " it is possible to present some illustrative calculations of some important components of the benefits to human health."

I think it is important to understand and to clarify how EPA can distinguish the circumstances in which SAB would support illustrative analyses, and those in which SAB would argue that a full analysis is necessary. This is especially important for topics such as Superfund Benefits, in which turn-key quantitative analysis is not an option.

8. Dr. Deborah Swackhamer:

Comments on SAB Review of Advisory on Superfund Benefits Analysis – Deb Swackhamer

Overall, I found the review to be thoughtful and thorough. The charge questions were addressed (however, see below); the report is clearly written, and the conclusions drawn are supported by the content of the report.

I found it odd that the charge questions were not even listed until page 15, and not described at all (nor the responses summarized) in the Executive Summary. The report devotes the letter to the Administrator, the Exec Summary, and the first 15 pages of the report to comments and recommendations that encompass some but not all of the charge questions, and reach beyond them in most cases. This indicates to me that the panel had a lot to say about the SBA, and wanted to have their say up front, with a lesser emphasis on the specific answers to the charge questions. By organizing the report in this fashion, they essentially re-wrote the charge questions, by answering lots of things that weren't asked right up front, and then getting to EPA's specific questions later. Are we comfortable setting such a precedent for our SAB reports? My opinion is that I am, *provided* there is a bit more of a roadmap for the reader up front. I would like to see some text added to the Exec Summary that summarizes the response to the charge questions, and I would like to see a more explicit discussion in Section 3 that explains that the charge questions are answered in detail in Section 4, but that the panel felt that their overall comments were important enough to put them first. Their current introduction to the rest of Section 3 (paragraph 4 on page 2) does not set the reader up well at all – it makes it sound as if the report is heading off on just one topic (hedonic property value study), whereas the subsequent comments are much broader than that.

9. Dr. Genevieve Matanoski:

The SAB review of the Superfund Benefits Analysis fulfills the three areas that the Board requires: namely, it answers the charge questions; it is clearly and logically written; and the conclusions reached by the review are for the most part supported with documentation. In general, the review is very comprehensive and seems to give EPA some useful advice as to how to move forward with the document by either focusing on only one area or simply developing the framework that would allow them to determine where there are missing pieces and where there will be uncertainties that need to be

addressed in the future. Therefore I would be in favor of accepting the document. However, to some extent the thrust of the document is very negative. That would seem to discourage any further attempt to carry out this type of analysis of benefits of superfund remediation. Maybe that is what the SAB wishes to do that. Yet, it would seem to be useful to have an assessment of the value of the program.

In some cases the negative comments appear to need to be further justified as on Page 11. On that page in paragraph 2, the SAB has stated that “ the panel does not know whether there are cost of illness data for”certain listed effects. We should be more definite as to whether there are no measures for chronic non-cancer illnesses or there are inadequate measures or that measures of these outcomes cannot be done. (Of course, the last alternative I do not think is true). I believe there are cost estimates of the burden of some chronic non-cancer outcomes in the medical literature but they may not be adequate.

In the next paragraph on the same page, there is an indefinite statement about another study, “The Panel is skeptical of the use of the Hamilton and Viscusi (1999) study” The panel then lists its problems. What I find is a issue with the Panel’s complaint is that the study is published and has attempted to carry out the analysis of benefits. The Panel seems to offer nothing in return. For example, some of the problems they list regarding the study could be resolved perhaps by looking at the sensitivity of the analysis to animal estimates of risk versus epidemiology without simply abandoning the study altogether.

On Page 15 is another example of negative statements about the SBA approaches to evaluation of benefits without any justification as to why the Panel is more correct than the EPA authors. For example, is there any precedence that states that economics of benefits includes “community involvement” as part of a “response” or “empowerment” a means to an end rather than a “benefit”. If this is not fact nor precedence, then maybe we should ask EPA to defend why they consider these measures to be benefits. These problems and the ones noted above occur throughout the document. Maybe the Panel needs to better indicate what are the appropriate measures generally accepted by economists to determine benefits in these situations. Is it only property values?

On Page 19, the Panel has discussed separating Federal and non-Federal facilities but I was not clear as to why that recommendation was made. Is this because of the measure of property values or the population in the area or the types of pollutants or all of these outcomes?

Attachment L
FIFRA SAP ACTIVITIES

(An archive of background documents and FIFRA SAP reports or meeting minutes is available on the FIFRA SAP web page at www.epa.gov/oscp/sap)

I) FIFRA SAP - Panel Members – Changes Effective January 1, 2006

Dr. Stephen Roberts of the University of Florida will retire from the FIFRA SAP as of January 1, 2006. Dr. Roberts has served on the FIFRA SAP since July 1999 and has served as the Chair since December 2002. During Dr. Roberts’ term, he has provided valuable service to the U.S. Environmental Protection Agency (EPA) in assisting the Panel’s reviews of a wide range of highly technical and complex pesticide and pesticide-related risk assessment issues. The EPA greatly appreciates his commitment to protecting human health and the environment and the contributions he has made to ensuring that the Agency has the benefit of high quality, independent scientific advice and recommendations.

Beginning January 1, 2006, Dr. Steven Heeringa will take over as Chair of the FIFRA SAP. Dr. Heeringa has served on the Panel since December 2002 and, prior to his appointment, he participated in the reviews of a number of complex scientific issues as a member of the FQPA Science Review Board. The skills and experience he will bring to the Panel as Chair will help guide the Panel through the challenging topics ahead.

Also effective January 1, 2006, Dr. John Bucher, Deputy Director of the Environmental Toxicology Program and Chief of the Toxicology Operations Branch, Environmental Toxicology Program, National Institute of Environmental Health Sciences will become a member of the FIFRA SAP. Dr. Bucher brings to the Panel considerable expertise and experience in toxicology, especially animal studies used in human health risk assessment.

Dr. John Bucher National Institute of Environmental Health Sciences Expertise in Toxicology	Dr. Steven Heeringa (Chair Beginning January 1, 2006) University of Michigan Expertise in Biostatistics
Dr. Janice Chambers Mississippi State University Expertise in Toxicology, Animal Models, Physiology	Dr. Gary Isom Purdue University Expertise in Toxicology/Neurotoxicology
Dr. H. Christopher Frey North Carolina State University Expertise in Uncertainty Analysis, Exposure Assessment, Risk Assessment	Dr. Kenneth Portier University of Florida Expertise in Biostatistics and Experimental Design
Dr. Stuart Handwerker University of Cincinnati Expertise in Pediatric Research Developmental Endocrinology	

FIFRA Section 25(d)(1) establishes the FIFRA SAP as a permanent panel consisting of 7 members who serve staggered terms of appointment.

II) FQPA Science Review Board

The Food Quality Protection Act amended FIFRA at 25(d)(2) establishing a Science Review Board (SRB). The SRB members augment the expertise of the FIFRA SAP permanent panel through ad hoc participation in reviews conducted by the panel.

III) Recent SAP Meetings

August 23 – 26, 2005: Preliminary N-Methyl Carbamate Cumulative Risk Assessment – **Report Available**

December 6 – 8, 2005: Plant-Incorporated Protectants Based on Virus Coat Protein Genes: Science Issues Associated with Review of Proposed Rule

IV) Upcoming Meetings (Topics >6 Weeks Away Subject to Change)

Tentative Dates for Calendar Year 2006

February 14-16 – Review of Worker Exposure Assessment Methods

V) SAP Participation in Science Advisory Board (SAB) Meetings

February 22-23, 2005 – Preliminary Risk Assessment of Perfluorooctanoic Acid

September 12-13, 2005 – Review of the Health Effects Assessment of Arsenic