

**MEETING MINUTES**  
**US Environmental Protection Agency Science Advisory Board**  
**December 6-7, 2007**

Meeting Location: US EPA SAB Conference Room,  
1025 F Street NW, Washington, DC 20004

**PURPOSE:** The EPA Science Advisory Board (SAB or the Board) met to continue its discussions on EPA's strategic research directions, response preparation for environmental disasters, the draft SAB HAP Hypoxia report, and several administrative matters. Attachment A is the Federal Register notice announcing the meeting (72 FR, 64217, November 15, 2007). A meeting agenda is included as Attachment B.

**LOCATION:** The meeting was held in the EPA SAB Conference Center, Room 3700, 1025 F St., NW, Washington, DC.

**DATE AND TIME:** Thursday, December 6, 2007 to Friday, December 7, 2007.

**PARTICIPANTS:** The roster of SAB members is in Attachment C and others are in the Sign in sheets in Attachment D (in physical file only).

**MEETING SUMMARY:** A summary of the meeting follows.

**Thursday, February 22, 2007 (Day One of the Meeting):**

1. Convene the Meeting: Mr. Thomas Miller, Designated Federal Officer convened the meeting and noted that the meeting was held under, and in compliance with, the requirements of the Federal Advisory Committee Act. Mr. Miller welcomed new members of the Board including: 1) Dr. David Dzombak, Chair, SAB Environmental Engineering Committee; 2) Dr. Bernd Kahn, Chair, SAB Radiation Advisory Committee; 3) Dr. James Sanders, At-Large Member; 4) Dr. Kerry Smith, At-Large Member; and Dr. Thomas Burke, At-Large Member. Mr. Miller also noted that Dr. Deborah Cory-Slechta, a Member of the Board, had agreed to serve as the Chair of the SAB Exposure and Human Health Committee.
2. Dr. Vanessa Vu welcomed members and mentioned the tasks that needed to be addressed during the meeting. She noted the recent FACA Impact Award given to the SAB and the pending visit by the Administrator as indications of the regard that EPA gives to advice from the SAB.
3. Dr. Granger Morgan, EPA Science Advisory Board Chair welcomed members and identified the main topics for the meeting in some detail so that new members would have an understanding of where each issue came from and its status.

4. **Visit by Stephen L. Johnson, US EPA Administrator:** Administrator Stephen L. Johnson visited the SAB to provide reflections on the value of SAB input to EPA and to respond to questions from Board Members.

Mr. Johnson noted that in his 27 years with EPA, he had observed first hand the environmental changes brought about by EPA activities. Environmental protection has been accelerated in recent years and he credits EPA's staff and advisory committees with making that possible. He applauded the SAB's impending 30<sup>th</sup> anniversary of advising EPA Administrators and for the important role that the SAB has played over that time. He noted that the recent FACA Impact Award for the SAB was evidence of the significance of that advice.

Mr. Johnson noted the importance of how advice is given to EPA's ability to implement that advice. He stated that it is important to be clear in SAB reports on what you want EPA to do for any specific issue that the SAB advises upon. He noted that past advice on reducing risk and looking beyond the horizon were examples of important advice that helped EPA look at environmental issues differently and that integrated environmental decision making had helped EPA to think beyond the normal "stove-piped" manner in which environmental issues tend to be considered because of the way many environmental statutes are structured. Breaking down the stovepipes and looking across media are important to our citizens. He stated that he looks forward to the SAB's soon to be given advice on things such as hypoxia in the Gulf of Mexico and on preparing to respond on natural and man-made environmental disasters.

Mr. Johnson stated that in regard to the future, a number of questions seem to be important for EPA to think about. Issues he noted were:

- a) What are the science needs for EPA in light of tomorrow's coming environmental challenges?
- b) What steps should EPA take to invest in sound science – what areas must we invest in? and
- c) What are the top science priorities that the SAB sees for me, as the current Administrator, and for future EPA Administrators, to address?

Administrator Johnson also presented plaques to three Board Members in recognition of the completion of their service as Chairs of several SAB Committees. Recognized were Drs. Jill Lipoti, outgoing Chair of the SAB Radiation Advisory Committee; Michael McFarland, outgoing Chair of the SAB Environmental Engineering Committee, and Dr. Rebecca Parking, outgoing Chair of the SAB Exposure and Human Health Committee.

SAB Members then asked Administrator Johnson a number of questions. These questions follow:

- a) Members agreed that credit was due for the work of EPA on past issues. They wondered how EPA would address the large, linked environmental issues where Agency authority is not explicitly covered by statute (e.g., urban

sprawl). They also wondered if EPA was participating in the Bali Conference. Mr. Johnson stated that the U.S. has a large team at the conference and that the EPA is represented on that team. Mr. Johnson noted that for large issues, such as climate change, EPA is an active participant in multi-agency efforts that address the issue. He stated that EPA has spent more than any other nation on science and technology efforts to address climate change (\$37 billion to date). Green-house gases and climate change will have technology-driven solutions. As an example, he noted the importance of carbon sequestration standards in providing a regulatory framework for safe ways of storing CO<sub>2</sub>. Technology can then be developed to meet those standards and attain safe storage. Even without a clear mandate, efforts in this area will be advanced by the U.S. Innovative, technology driven solutions are even more important given the relative size of EPA's budget in relation to the total need in this area.

- b) Members noted their concern that EPA still seemed to use a "single-pollutant" approach to considering chemical risk while, in reality, exposure to complex mixtures is the most common situation. How can EPA get to a better understanding of mixtures risk? Mr. Johnson agreed with the need for understanding the complex exposure situations that are the common situation. He noted that EPA has started to address this situation with a focus on things such as classes of pesticides, e.g., carbamates and organophosphates. There is a need for research in this area and the even more complex situation when we go beyond mixtures and recognize that this is further complicated by recognition of sensitive subpopulations, genetic predisposition, age, and other factors that vary in human populations that are at risk. The total issue is complex and needs much exploration and the solution will take time.
- c) The solution to many complex issues is made more difficult by the stovepipes that you noted earlier. How can we break down these stovepipes to find solutions? Mr. Johnson noted that a commonality of many complex situations is that they involve many small decisions that lead to a larger problem. Ways need to be found to influence those many decisions at all levels so that they are made in ways that minimize their leading to large problems. Administrator Johnson cited as an example of such decisions is how EPA and others have worked together to attain energy savings from shifting consumer choices from incandescent lighting to compact fluorescent bulbs. Another example that keeps mercury from being released is a program that worked in partnership with the "scrap" industry to remove mercury containing switches from automobiles that had been scrapped.
- d) How can EPA attract and retain the agile, talented workforce that it will need to meet the science and technical challenges that are emerging in the face of competition for talent from areas where support of research and may be perceived as being greater? Mr. Johnson noted that his priorities for the remaining year are to work on clean air, clean water, Homeland Security, and building a stronger EPA. In regard to getting the talent that is needed at EPA, the Agency is aggressively trying to help by developing grant opportunities that will support research efforts that develop future scientists and also provide answer to important science questions. The Agency is also doing

more to created opportunities for young scientists to work at EPA as post-docs and in other capacities.

Dr. Morgan thanked Administrator Johnson for visiting with SAB members.

5. **Environmental Disasters:** Dr. Morgan summarized the background on the SAB's involvement in this issue beginning with its consideration of early EPA monitoring plans after Hurricane Katrina and its activities since that have led to the November draft comments to the Administrator (see Attachment E). Dr. Morgan stated that the day's effort needed to consider the draft comments and to decide on what is missing and what edits need to be made.

Members discussed the following:

- a) Table 1 should have additional language explaining the nature of event examples listed in each column (e.g., "invasive species is in both, what's the difference between the two?"), that many events have mixed elements (citation for this is to be provided by Dr. Dale)
- b) The Environmental Engineering Committee report on environmental disasters should be cited in this document;
- c) The recommended small standing group of 5 to 7 experts needs other expertise, and regional office representation; it should take advantage of efforts ongoing at DHS Homeland Security Centers; should recognize the generic need for information for first responders and citizens and possibly mention SARA Title III efforts at EPA and state efforts as possible sources to help.
- d) To discuss "waiver of regulatory authorities" in the wake of an event and to encourage a prospective look at the authorities that might be waived so that this is not done in a way that makes things worse.
- e) First responder needs for information on what they might encounter – the recent California fires highlighted their continuing need for such information for their own safety and for informing citizens about necessary precautions upon their reentry to the site.
- f) Point out that one of the elements important to the communications point made on page 5 is for a trusted voice.
- g) On page 5 some explanation on how one would know that things were "not working."
- h) Clarify on page 7 the difference between the two bolded statements and what is to be prioritized.
- i) Clarification of Figure 2
- j) On page 13 clarify that a lesson is not truly learned until behavior is changed.
- k) Clarify in item 6 on page 14 that this is pre-event.
- l) Page 19 needs to note that the reinvigoration mentioned is also a 'pre-event' activity.
- m) The items in section 7 might be referred to as "action steps."

Dr. Morgan edited the document and circulated a revised version Attachment F-(see in physical file only) to members for additional discussion at the meeting. After the discussion, the Chair completed an additional revision of the draft for action as noted below (see Attachment G).

**ACTION:** The DFO is to send the draft to the EPA Office of Emergency Management (OEM) and to the SAB Homeland Security Advisory Committee (HSAC) for information and with a request for comments on the draft. After this, the document will be circulated to the Board with a synopsis of the HSAC and EPA comments and it will be revised further as the Board determines is necessary. A February time frame for delivery or additional discussion is anticipated.

6. **Strategic Research Directions:** Dr. Morgan summarized the background on the SAB's involvement in delivering strategic advice on EPA's research programs and the difficulties of doing this within the constraints of a specific year's budget for science and technology. He mentioned the October 2007 SAB meeting with ORD representatives to discuss the strategic directions of the EPA ORD research program. He noted that the current draft needs substantial work before it can be completed and sent to the Administrator.

Members agreed that for now the Board will pursue a relatively quick and focused report that identifies major cross-cutting issues and provides some level of specific response to charge questions for each of the 16 research areas. Over the coming months the SAB will work to develop more complete and balanced advice on what a more integrative and systems-oriented research portfolio might look like. Additional feedback will be provided from time to time as the Board, or its Standing Committees, continues to interact with EPA on specific research programs. This will be the baseline against which the Board will compare each year's budget increment and upon which it will base its comments on budget adequacy and focus.

A subgroup of the members present discussed and identified cross-cutting issues that should be highlighted in the advisory to the Administrator. A draft of these issues was prepared and passed out to SAB Members for discussion. However, even though there was a sense that ORD had succeeded in developing reasonable strategic directions for its 16 individual research areas, and even though they have begun efforts to link some of these specific areas' focus to that of other areas, that in thinking about 2012 and beyond a broader, more-integrated, and systems-oriented approach to research planning and implementation will be necessary if EPA is to move beyond the current approach to its mission that was characterized by Administrator Johnson earlier in the meeting, as "too stove-piped." For now, the Board will provide its early reflections on the need for EPA to continue this limited linking of programs within EPA and outside EPA to a broader and more "integrated view of the world." Within this broader view, the Board identified some cross-cutting issues in need of consideration including:

- a) Systematic consideration of water demand, supply and distribution.

- b) A shift in "land preservation" from a focus on remediation and RCRA driven regulations to a broader focus on land use, the control of sprawl and more generally to issues of sustainability.
- c) An expanded effort to link toxicology to exposures of people and ecosystems in the real-world.
- d) An expanded focus on the environmental consequences of product life cycles and international supply chains.
- e) Organizational agility in response to changing technologies and environmental challenges.

The Board agreed to address the question of human scientific resources, focusing on the problems of sustaining and renewing EPA's traditionally scientifically excellent and highly motivated research staff, and to offer comments on strategies that ORD might employ to increase its research effectiveness and efficiency, such as:

- a) Strategies by which the EPA might make greater use of results from its own research program (e.g., sustainability and nanotechnology).
- b) Strategies to engage citizens in data collection, and for computational resources for advanced modeling and analysis.
- c) Expansion and greater integration of behavior and decision science into many ORD research programs.

The document will have several sections with Part 1 focusing on a theme of broader integration and identification of a number of cross-cutting issues. Part 2 will offer brief comments on each of the cross cutting issues. Part 3 will address human scientific resources, focusing on the problems of sustaining and renewing EPA's traditionally scientifically excellent and highly motivated research staff. Part 4 will offer initial comments on strategies that ORD might employ to increase its research effectiveness and efficiency. Part 5 will address ways in which the SAB – ORD – Other EPA interactions can be improved and move forward as EPA evolves its strategic research directions in the future. Part 6 will provide specific commentary on the 16 existing ORD research areas.

Using SAB Standing Committees should be considered as a way of conducting the continuing interactions between the SAB and EPA's research and science community. The SAB can ask for briefings from selected Standing Committees during future Board meetings so that it can increase its understanding of the details of the research program. The intent would be to help EPA develop a more-integrated, systematic approach to planning its research programs.

The Board might consider having other environmental research organizations (government, academic, and non-governmental) interact with the SAB in future meetings. The intent would be to determine how they plan and conduct research relevant to EPA's needs and how academia prepares students at the PhD level to be able to participate in/support the nation's environmental decision-making.

**ACTION:** The Chair noted that the current draft sections of the compiled comments that were developed during the meeting needed a heavy-handed edit. This will be done by an Editing Committee that was identified to continue drafting of the report. The Group will include Jerry Schnoor, James Johnson, Lauren Zeise, Mike McFarland, George Lambert, and David Rejeski. The DFO will facilitate the next round of edits with this group and then circulate the resulting draft report to the Board Members for comment.

- 7. Discussion of the Draft Report Approval Process:** Dr. Vanessa Vu discussed the draft procedure, "Report Development and Approval Process of SAB Reports" (see Attachment H). She noted that the process grew from the new practice of adding key points to the standard notification letter that is sent to the Administrator to note such activities. In essence, for the future such key points will not be highlighted in the letter and thus the letter will not need to undergo a quality review by the SAB. We will use a pro forma letter indicating the identity of the consultation topic, note that panel members provided individual reflections/comments at the meeting, noting that some individual written reflections are attached (if that is the case), and pointing out the SAB's expectation that the Agency will bring the topic back to the SAB in the reasonably near future for a mid-stream review of a final peer review (i.e., when a consultation is requested, the Agency is also committing to an additional review that will generate written, consensus comments).

Several Members were concerned that on occasion a given consultation letter might need SAB quality review. Proposals were made for that decision to be made by the DFO, the Panel Chair, or others. Others noted that having a more detailed consultation letter is helpful when a standing committee does a review later so that one can determine the type of ideas individual suggested to EPA during a consultation and how the Agency might have reacted those ideas. Members decided that the letters would be passed to the SAB Chair for a quick read and reaction prior to being sent to the Administrator. If the Chair determines that there are issues that need full Board consideration that will be noted and a discussion will be scheduled prior to sending the letter to EPA.

Members pointed out that the quality of attachments to SAB reports varies greatly. Some are to the point and enjoy wide support among panelists and others are a compilation of comments that are not well focused and which do not present a cogent message. Some pointed out that this is often the cost of getting buy-in to the consensus statements in the body of the report and that constraints on what an Appendix says might delay or deny consensus. Guidance would be appropriate, nonetheless, to ensure that the Appendix does not become a dumping ground.

**ACTION:** The Board approved the proposal. Staff will edit the procedure and address the nature of things that are appropriate for inclusion within an appendix.

8. **SAB Workplan for FY 2008 and Liaison Reports**

- a) **SAB Annual Meeting and 30-Year Celebration:** Dr. Vanessa Vu noted that it was time for the SAB to agree on the nature of this activity and to agree that it was to be carried out. She suggested several alternatives that might be implemented, for example:
- i) a workshop covering several topics;
  - ii) ii) a discussion of future environmental issues, spearheaded by several notable individuals for specific areas;
  - iii) iii) a meeting to showcase several recent major SAB *ad hoc* works such as, that of the CVPESS or the Integrated Nitrogen Committee; or
  - iv) a hybrid that would incorporate a panel session with presentations by past SAB Chairs, or senior staff, discussing a number of notable SAB works (e.g., “Reducing Risk,” “Beyond the Horizon,” “Integrated Environmental Decision Making”), follow-up discussions on strategic research directions with a focus on environmental challenges that would be discussed by outside experts, and workgroup activity on specific topics.

Topics identified for possible discussion included: i) The Ash Council Report that was an important influence on EPA’s creation should be a part of the presentation because it made it clear that one of the major contributions of EPA should be integrated ways in looking at environmental issues; ii) Future challenges in Air; iii) the future of toxicology.

Members noted that possibilities for involvement were other agencies with missions and research related to the environment, persons from the international community, past AA’s from ORD (e.g., Dr. Paul Gilman).

**Meeting Focus and Framework.** Members agreed that the hybrid model would be the best to pursue. Meeting time should be divided to give one day to presentations relevant to future EPA science/research needs, and a second day to SAB discussions that would lead to specific comments to deliver to the Administrator. The meeting is to be scheduled for September 2008 with the specific dates to be determined by surveying Board Members. (Note: Dr. Vu presented a synopsis of the Meeting Framework during day 2 of this meeting – see Attachment I).

A **Steering Group** was identified to plan the Annual Meeting. The group will include: Drs. Granger Morgan, Virginia Dale, George Lambert, Jill Lipoti, Jana Milford, Rebecca Parkin, David Rejeski, Kerry Smith, and Thomas Theis.

**ACTION:** The DFO will email SAB Members asking for suggestions for speakers at the Annual Meeting. SAB Staff will engage the Steering Group in planning the meeting. The Board will be kept informed of the results of discussions and/or meetings of that group.

- b) Dr. Vu discussed the updated **FY 2008 Operating Plan for the EPA SAB**. Her comments focused on the near term activities that were now being completed and those either underway or soon to be started. See Attachment J in the physical FACA file only.
- c) **Planning for the FY 2009 EPA Research Budget Review:** Dr. Granger Morgan noted that in last year's review of the research budget, the SAB asked for EPA to emphasize how EPA's various research programs support four cross-cutting environmental issues: i) the impacts of **climate change**; ii) **sensitive populations** (both human and ecological); iii) the environmental consequences of **urban sprawl**; and iv) large-scale **natural and man-made environmental disasters**. The Board could ask for ORD to discuss the progress it has made on giving integrated consideration to these issues.

The big theme emerging in the Board's comments seems to be a push for the EPA to provide a more integrated view of its research, and that this view should also be carried into EPA's planning for science across its programs. Dr. Morgan asked if there were other cross-cutting issues to ask ORD to discuss in the February SAB meeting? Suggestions included new technology implications (e.g., omics), a "one-hydrosphere" approach for water to match the one-atmosphere approach taken for the air program; broadening the urban sprawl issue to encompass land use in general or high-impact land use as is the case with biofuels; and the impact of recent NRC reports on toxicity and soon on risk assessment itself. Members also suggested that instead of the Board suggesting its ideas for cross-cutting problems, that EPA be asked to present their own views of the research program against the backdrop of what they consider the cross-cutting issues to be.

**ACTION:** The Board will conduct its review on February 28-29, 2008. It will use the Team Assignments that are listed in Attachment K to these minutes (i.e., the assignments from the October 3-5, 2007 meeting and the December 6-7, 2007 meeting). The meeting will incorporate a big picture view from the AAAS (Dr. Koizumi if available); a snapshot of the EPA budget picture overall (EPA OCFO), a snapshot of the ORD Research budget and if possible other EPA Science budget items (EPA ORD), break-out sessions to discuss each budget area's (with some cross-linking to the 16 areas discussed in our current strategic discussions with ORD if they are not the same as used in the 2009 budget document) content and change from 2007 levels (SAB Members, ORD NPDs, other EPA if possible), and a plenary session to report out on the specific discussions and identify major points to make in the SAB report and draft Congressional testimony (SAB). The SAB will identify background materials to request from EPA and EPA ORD in a

draft letter to be prepared by the Chair (with DFO assistance) and sent to Dr. Gray for response. The letter will likely include a request for specific BOSC reports on various research areas. The SAB might also approach the BOSC with a request for participation in the SAB review by some BOSC members beyond those who are already SAB Members.

- d) **Reports from Other Advisory Committees:** Board Members who either Chair, or are members of, other EPA Advisory Committees with missions that complement that of the EPA SAB traditionally report on the status of their committee's activities at SAB meetings. This is done to ensure that the SAB is aware of other activities that are relevant to their own deliberations on specific issues, or for gaining a greater understanding of pieces of EPA's activity that are important in evaluating EPA's strategic science directions. The following summarizes the briefings received by the SAB from several Advisory Committee Chairs and Members.
- i) **Federal Insecticide, Fungicide, Rodenticide Act (FIFRA) Scientific Advisory Panel (SAP), Dr. Steve Heeringa, Chair:** Dr. Heeringa summarized the recent activities of the FIFRA SAP. He noted work in the areas of test methods for anti-microbial product efficacy, review of an ORD SHEDS-multimedia model, approaches for developing PBPK models for pyrethroid pesticides, atrazine's aquatic effects, and cancellation activity for carbofuran. Members suggested the possibility of some level of SAB-SAP interaction on the upcoming SAB toxaphene review. See Attachment L for Dr. Heeringa's updates (physical file only).
  - ii) **Children's Health Protection Advisory Committee (CHPAC), Dr. Malanie Marty:** Dr. Marty summarized recent CHPAC activities. She noted that CHPAC is a body of scientists and policy experts who advise EPA on regulations, research, and communication issues relevant to children. CHPAC has sent letters to the Administrator on: climate change, smart growth, farm worker's children, the 2005 supplemental guidance on assessing risk from early-life exposure to carcinogens, and a variety of proposals for NAAQS. Recent activities focused on the Children's Environmental Health and Disease Prevention Research Centers Program that is a joint effort funded by EPA and NIEHS. The focus was on translation of research results and the role of community participation plays in research and its translation. CHPAC reviewed the chemicals management paradigm under TSCA relative to children's exposure to toxic chemicals in the environment, CHPAC also reviewed a companion document to the supplemental guidance, the Framework for Determining a Mutagenic MOA for carcinogens, and is now preparing a letter to the Administrator on that framework. Future efforts will likely consider climate change

impacts on children and a look at the activities and impacts of the Pediatric Environmental Health Specialty Units.

- iii) **ORD Board of Scientific Counselors (BOSC):** Dr. Deborah Swackhamer and Dr. George Lambert, SAB Members who also serve on BOSC discussed recent activities of that advisory group (see Attachment M – physical file only). Members were interested in how BOSC activities differ from SAB regarding the ORD research programs. Drs. Lambert and Swackhamer stated that BOSC does have some overlap with some of the SAB efforts but that the SAB tends to focus at a 50,000 foot level and the BOSC at a 5,000 foot level in terms of details covered in the research programs. BOSC efforts focus on programs, laboratories/centers, and multi-year plans. BOSC looks at programs on a 5-year cycle but for each program, there is a mid-term review at 2.5 years to see how the research is progressing. BOSC reviews are also useful in ORD's program outcome analyses in the PART process. It is common for Dr. Gray or Dr. Teichman to be present throughout all the BOSC meetings on specific programs.

Members believe that much of the BOSC effort can be useful as information input for the SAB in its evaluation of the strategic directions for research and possibly even during the budget reviews.

**ACTION: The DFO will explore what information is available in this regard.**

- iv) **NACEPT review of the Report on the Environment:** Dr. Lambert noted that the National Advisory Committee on Environmental Policy and Technology is reviewing EPA's draft public version of the 'Report on the Environment.' The SAB ROE Panel is looking at the technical version of the report. The two groups share some common concerns with the existing report drafts.

- 9. **Quality Review for the Draft SAB HAP Hypoxia Report:** Members conducted the first quality review of this draft document during its October 3-5, 2007 meeting. The Board noted then that it would like the HAP to conduct an additional public telephone conference meeting to discuss the SAB comments as well as public comments that have been received (and those which might be received by the end of the extended comment period). This was done and the draft document was revised as appropriate and it was forwarded to the SAB for a final review. Several SAB Vectors were appointed to consider the revisions and to help the full Board decide if the revised report should receive final approval. These comments are in Attachment N.

Dr. Virginia Dale introduced the topic by discussing the activities of the HAP since the October 2007 Board meeting. The HAP revised the document to reflect the comments from the SAB's October 2007 quality review and the outcome of the follow up HAP telephone conference.

Dr. Morgan asked members if they cared to highlight any of the comments that had already been submitted in writing. Members discussed one comment from Dr. Thomas that focused on achievement of the 2015 goal for hypoxic zone decrease. The HAP agreed to clarify that the main issue is associated with the lag in time due to technology development or in developing approved management policies.

A motion was made to approve the report subject to the additional clarifications being made that are discussed in Attachment N. The motion was seconded. A vote was taken and no dissent was registered. Dr. Dzombak recused himself from voting because of his participation in, and Chairing of, a National Academy of Sciences panel that produced a recent report related to this issue.

Having no further business to transact, Mr. Miller, SAB DFO, adjourned the meeting.

Respectfully submitted

Certified as True

*/ Signed /*

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Thomas O. Miller  
Designated Federal Officer

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Dr. Granger Morgan, Chair  
EPA Science Advisory Board

Attachments:

- A Federal Register Announcement of the Meeting (72 FR 64217)
- B Meeting Agenda
- C SAB Roster
- D Sign-in Sheets
- E Pre-meeting Draft Report “Preparing for Environmental Disasters”
- F Meeting Revision of the Draft Report “Preparing for Environmental Disasters”
- G End of Meeting Draft Report “Preparing for Environmental Disasters”
- H Draft – “Report Development and Approval Process of SAB Reports”
- I Proposal: SAB Annual Meeting – 2008 (Dec 7, 2007 ver)
- J FY 2008 Operating Plan for the EPA Science Advisory Board (Dec 5, 2007 ver)
- K EPA SAB Strategic Research Direction Team Assignments (Nov 28, 2007 ver)
- L FIFRA SAP Activities (Dec 7, 2007 ver)
- M FY 2007-2008 Projects of the Board of Scientific Counselors (Dec 5, 2007 ver)
- N Compilation of Board Member Comments on the Draft Hypoxia Report Dec 7, 2007 ver)

**US Environmental Protection Agency  
Science Advisory Board Meeting  
December 6-7, 2007  
SAB Conference Center, Suite 3700  
1025 F Street NW, Washington DC  
Phone: (202) 343-9999**

**Thursday, December 6, 2007**

8:30 a.m.	<b>Convene the Meeting</b>	<b>Mr. Thomas O. Miller</b> Designated Federal Officer US EPA SAB
8:40 a.m.	<b>Welcome by the SAB Office Director</b>	<b>Dr. Vanessa Vu</b> Director, Office of the SAB
8:50 a.m.	<b>Introductory Remarks of the Science Advisory Board Chair</b>	<b>Dr. M. Granger Morgan</b> Chair, EPA Science Advisory Board
9:00 a.m.	<b>Environmental Disasters Advisory Discussion</b>	<b>Dr. M. Granger Morgan</b> <b>The Board</b>
9:30 a.m.	<b>Administrator's Remarks</b>	<b>The Honorable Stephen L. Johnson,</b> Administrator, U.S. Environmental Protection Agency
10:00 a.m.	<b>Break</b>	
10:15 a.m.	<b>Environmental Disasters Advisory Discussion (Continuation)</b>	<b>Dr. M. Granger Morgan</b> <b>The Board</b>
12:00 noon	<b>Lunch</b>	
1:00 p.m.	<b>Strategic Research Directions Advisory Discussion</b>	<b>Dr. M. Granger Morgan</b> <b>The Board</b>
3:15 p.m.	<b>Break</b>	

3:30 p.m.      **Discussion of the Board’s Work Plan for FY 2008:**  
                   ❖ EPA Research Budget Review (February 2008)  
                   ❖ Annual Meeting (September/October 2008)

**Dr. M. Granger Morgan  
 Dr. Vanessa Vu  
 The Board**

4:30 p.m.      **Discussion on the Proposed SAB Report Approval Process**

**Dr. Vanessa Vu  
 Dr. M. Granger Morgan  
 The Board**

5:30 p.m.      **Adjourn for the Day (time approximate)**

**Friday, December 7, 2007**

9:00 a.m.      **Reconvene the Meeting**

**Dr. M. Granger Morgan**

9:10 a.m.      **Updates on the FY 2008 Operating Plan for the SAB**

**Dr. Vanessa Vu  
 Dr. M. Granger Morgan  
 The Board**

**Updates from Advisory Committee**

**Liaisons:**

❖ **FIFRA Scientific Advisory Panel (SAP)**

**Dr. Steve Heeringa  
 Chair, FIFRA SAP**

❖ **Children’s Health Protection Advisory Committee (CHPAC)**

**Dr. Melanie Marty  
 Chair, CHPAC**

❖ **Board of Scientific Counselors (BOSC)**

**Drs. Deborah Swackhamer  
 and George Lambert  
 Members, SAB and BOSC**

10:30 a.m.      **Break**

11:00 a.m.      **Quality Review of the SAB Draft Report on Hypoxia in the Northern Gulf of Mexico**  
                   a) **Public Comments**  
                   b) **Board Comments**

**Dr. M. Granger Morgan  
 Dr. Virginia Dale  
 The Board**

12:00 noon      **Adjourn The Meeting**

**Mr. Thomas Miller  
 DFO  
 Science Advisory Board**

review activities and about formation of the CASAC Panel was published in the **Federal Register** on August 7, 2006 (71 FR 44695–44696).

**Technical Contact:** Any questions concerning EPA's *Integrated Science Assessment for Sulfur Oxides—Health Criteria (First External Review Draft)* should be directed to Dr. Jee Young Kim in EPA's Office of Research and Development at (919) 541–4157 or [kim.jee-young@epa.gov](mailto:kim.jee-young@epa.gov). Any questions concerning EPA's *Sulfur Oxides Health Assessment Plan: Scope and Methods for Exposure and Risk Assessment* should be directed to Dr. Stephen Graham in EPA's Office of Air and Radiation at (919) 541–4344 or [graham.stephen@epa.gov](mailto:graham.stephen@epa.gov).

**Availability of Meeting Materials:** EPA–ORD's *Integrated Science Assessment for Sulfur Oxides—Health Criteria (First External Review Draft)* can be accessed at: [http://www.epa.gov/ttn/naaqs/standards/so2/s\\_so2\\_cr\\_isa.html](http://www.epa.gov/ttn/naaqs/standards/so2/s_so2_cr_isa.html). EPA–OAR's *Sulfur Oxides Health Assessment Plan: Scope and Methods for Exposure and Risk Assessment* will be accessible at: [http://www.epa.gov/ttn/naaqs/standards/so2/s\\_so2\\_index.html](http://www.epa.gov/ttn/naaqs/standards/so2/s_so2_index.html). Agendas and materials in support of meeting will be placed on the SAB Web site at: <http://www.epa.gov/sab> in advance of the meeting.

**Procedures for Providing Public Input:** Interested members of the public may submit relevant written or oral information for the CASAC Panel to consider during the advisory process.

**Oral Statements:** In general, individuals or groups requesting an oral presentation at a public meeting will be limited to five minutes per speaker, with no more than a total of one hour for all speakers. Interested parties should contact Dr. Stallworth, DFO, in writing (preferably via e-mail) by November 30, 2007 at the contact information noted above, to be placed on the public speaker list for this meeting. **Written Statements:** Written statements should be received in the SAB Staff Office by November 30, 2007, so that the information may be made available to the Panel for their consideration prior to this meeting. Written statements should be supplied to the DFO in the following formats: one hard copy with original signature (optional), and one electronic copy via e-mail (acceptable file format: Adobe Acrobat PDF, WordPerfect, MS Word, MS PowerPoint, or Rich Text files in IBM–PC/Windows 98/2000/XP format).

**Accessibility:** For information on access or services for individuals with disabilities, please contact Dr. Stallworth at the phone number or e-mail address noted above, preferably at

least ten days prior to the meeting, to give EPA as much time as possible to process your request.

Dated: November 8, 2007.

**Anthony F. Maciorowski,**  
*Deputy Director, EPA Science Advisory Board Staff Office.*

[FR Doc. E7–22372 Filed 11–14–07; 8:45 am]

**BILLING CODE 6560–50–P**

## ENVIRONMENTAL PROTECTION AGENCY

[FRL–8494–9]

### Science Advisory Board Staff Office; Notification of a Meeting of the Science Advisory Board

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Notice.

**SUMMARY:** The EPA Science Advisory Board (SAB) Staff Office announces a public face-to-face meeting of the chartered SAB to: continue its discussions of the strategic research directions for the U.S. Environmental Protection Agency; complete its discussions of science use in disaster response programs; complete its quality review of the draft SAB report *Advisory on Hypoxia in the Gulf of Mexico*; and to continue its planning activities for future SAB meetings.

**DATES:** The meeting dates are Thursday, December 6, 2007, from 8:30 a.m. to 5 p.m. through Friday, December 7, 2007, from 8:30 a.m., no later than 12 p.m. (Eastern Time).

**ADDRESSES:** The meeting will be held in the SAB Conference Center, located at 1025 F Street, NW., Room 3705, Washington, DC 20004.

**FOR FURTHER INFORMATION CONTACT:** Members of the public who wish to obtain additional information about this meeting may contact Mr. Thomas O. Miller, Designated Federal Officer (DFO), by mail at the address given below; by telephone at (202) 343–9982; by fax at (202) 233–0643; or by e-mail at: [miller.tom@epa.gov](mailto:miller.tom@epa.gov). The SAB mailing address is: U.S. EPA, Science Advisory Board (1400F), 1200 Pennsylvania Avenue, NW., Washington, DC 20460. The messenger address is: U.S. EPA, Science Advisory Board (1400F), Room 3600, 1025 F Street, NW., Washington, DC 20004, Phone (202) 343–9999. General information about the SAB, as well as any updates concerning the meeting announced in this notice, may be found on the SAB Web site at: <http://www.epa.gov/sab>.

**SUPPLEMENTARY INFORMATION:** The SAB was established by 42 U.S.C. 4365 to provide independent scientific and technical advice, consultation, and recommendations to the EPA Administrator on the technical basis for Agency positions and regulations. The SAB is a Federal advisory committee chartered under the Federal Advisory Committee Act (FACA), as amended, 5 U.S.C., App. The SAB will comply with the provisions of FACA and all appropriate SAB Staff Office procedural policies.

**Background:** (a) SAB Quality Review of the Draft SAB Report Advisory on Hypoxia in the Gulf of Mexico. The Chartered Science Advisory Board will conduct a second quality review of the draft report of its Hypoxia Advisory Panel (HAP) which was begun at the SAB meeting on October 3, 2007 (see 72 FR 50105–50107; August 30, 2007). The draft report will be placed on the SAB Web site prior to the meeting. Specific times for this activity will be provided in the meeting agenda that will be placed on the SAB Web site prior to the meeting (see <http://www.epa.gov/sab/>). Background on the Panel and this review is available on the SAB Web site at: [http://www.epa.gov/sab/panels/hypoxia\\_adv\\_panel.htm](http://www.epa.gov/sab/panels/hypoxia_adv_panel.htm).

(b) **EPA Strategic Research Directions:** The Agency asked the Science Advisory Board for advice on the strategic directions for its research program for the next five to fifteen years. This activity complements the annual SAB review of EPA's research budget, and permits a more critical evaluation of research programs than is possible during the research budget review. The SAB will continue to discuss EPA's research program directions which were initiated at its October 3–5, 2007 meeting (see 72 FR 50105–50107; August 30, 2007). Specific information time for this discussion will be provided in the meeting agenda that will be available on the SAB Web site prior to the meeting (see <http://www.epa.gov/sab/>).

(c) **Science in Emergency Response:** The SAB is exploring the use of science in preparing for and responding to environmental disasters. The SAB previously discussed this topic at its meetings on December 12–14, 2006 (see 71 FR 67566), June 19–20, 2007 (see 72 FR 27308) and October 3–5, 2007 (see 72 FR 50105–50107; August 30, 2007). The SAB is currently drafting advisory comments to the Administrator as a result of these discussions. Final discussions of those comments will be held during the SAB meeting on December 6–7, 2007. Specific times will be provided in the meeting agenda that

will be placed on the SAB Web site prior to the meeting (see <http://www.epa.gov/sab/>). Additional information is available on the SAB Web site for the December 2007 meeting at: <http://www.epa.gov/sab/agendas.htm>.

(d) SAB meeting at: [http://www.epa.gov/sab/07agendas/sab\\_06\\_19-20\\_07\\_agenda.pdf](http://www.epa.gov/sab/07agendas/sab_06_19-20_07_agenda.pdf), and for the October 3-5, 2007 meeting at: <http://www.epa.gov/sab/mtgcal.htm>

*Availability of Meeting Materials:* Materials in support of this meeting will be placed on the SAB Web site at <http://www.epa.gov/sab> in advance of this meeting.

*Procedures for Providing Public Input:* Interested members of the public may submit relevant written or oral information for the SAB to consider during the advisory process.

*Oral Statements:* In general, individuals or groups requesting an oral presentation at a public meeting will be limited to five minutes per speaker, with no more than one hour for all speakers. Interested parties should contact Mr. Thomas Miller, DFO, at the contact information provided above, by December 3, 2007, to be placed on the public speaker list for the December 6-7, 2007 meeting. A telephone conference line will be available for those portions of the meeting during which the SAB is conducting quality reviews of draft committee reports. Information on the call in procedures and numbers can be obtained by calling the EPA SAB Staff Office at (202) 343-9999. *Written Statements:* Written statements should be received in the SAB Staff Office by December 3, 2007, so that the information may be made available to the SAB for their consideration prior to this meeting. Written statements should be supplied, at the contact information specified above, in the following formats: one hard copy with original signature, and one electronic copy via e-mail to: [miller.tom@epa.gov](mailto:miller.tom@epa.gov) (acceptable file format: Adobe Acrobat PDF, WordPerfect, MS Word, MS PowerPoint, or Rich Text files in IBM-PC/Windows 98/2000/XP format).

*Meeting Accommodations:* For information on access or services for individuals with disabilities, please contact Mr. Thomas Miller at (202) 343-9982, or via e-mail at [miller.tom@epa.gov](mailto:miller.tom@epa.gov). To request accommodation of a disability, please contact Mr. Miller, preferably at least 10 days prior to the meeting, to give EPA as much time as possible to process your request.

Dated: November 7, 2007.

**Vanessa T. Vu,**

*Director, EPA Science Advisory Board Staff Office.*

[FR Doc. E7-22371 Filed 11-14-07; 8:45 am]

**BILLING CODE 6560-50-P**

## ENVIRONMENTAL PROTECTION AGENCY

[EPA-HQ-OPPT-2004-0109; FRL-8156-9]

### Draft List of Initial Pesticide Active Ingredients and Pesticide Inerts to be Considered for Screening under the Federal Food, Drug, and Cosmetic Act; Extension of Comment Period

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Notice; second extension of comment period.

**SUMMARY:** EPA issued a notice in the **Federal Register** of June 18, 2007, concerning the draft list of the first group of chemicals that will be screened in the Agency's Endocrine Disruptor Screening Program (EDSP). The draft list was produced using the approach described in the September 2005 notice, and includes chemicals that the Agency, in its discretion, has decided should be tested first, based upon exposure potential. The June 18, 2007 **Federal Register** notice provided for a 90-day public comment period. EPA extended the comment period an additional 60 days in the **Federal Register** of September 12, 2007. This document is extending the comment period for a second time for 45 days. The new comment period extends to December 31, 2007.

**DATES:** Comments, identified by docket identification (ID) number EPA-HQ-OPPT-2004-0109 must be received on or before December 31, 2007.

**ADDRESSES:** Follow the detailed instructions as provided under **ADDRESSES** in the **Federal Register** document of June 18, 2007.

**FOR FURTHER INFORMATION CONTACT:** Linda Phillips, Office of Science Coordination and Policy (7203M), Office of Prevention, Pesticides, and Toxic Substances, Environmental Protection Agency, 1200 Pennsylvania Ave., NW., Washington, DC 20460-0001; telephone number: (202) 564-1264; e-mail address: [phillips.linda@epa.gov](mailto:phillips.linda@epa.gov).

#### SUPPLEMENTARY INFORMATION:

##### I. General Information

###### A. Does this Action Apply to Me?

The Agency included in the June 18, 2007 notice a list of those who may be potentially affected by this action. If you

have questions regarding the applicability of this action to a particular entity, consult the person listed under **FOR FURTHER INFORMATION CONTACT**.

###### B. What Should I Consider as I Prepare My Comments for EPA?

When preparing comments follow the procedures and suggestions given in Unit I.B. of the **SUPPLEMENTARY INFORMATION** of the June 18, 2007 **Federal Register** notice.

###### C. How and to Whom Do I Submit Comments?

To submit comments, or access the public docket, please follow the detailed instructions as provided in Unit I.B.3. of the **SUPPLEMENTARY INFORMATION** of the June 18, 2007 **Federal Register** notice. If you have questions, consult the person listed under **FOR FURTHER INFORMATION CONTACT**.

## II. What Action is EPA Taking?

This document extends the public comment period that was originally established in the **Federal Register** of June 18, 2007 (72 FR 33486) (FRL-8129-3) and was extended in the **Federal Register** of September 12, 2007 (72 FR 52108) (FRL-8146-3). In the **Federal Register** notice of June 18, 2007, EPA announced the draft list of the first group of chemicals that will be screened in the Agency's EDSP. The draft list was developed using the approach described in the **Federal Register** notice of September 27, 2005 (70 FR 56449) (FRL-7716-9). As required by the Federal Food, Drug, and Cosmetic Act (FFDCA), all pesticides must eventually be screened under the EDSP, and this first group is simply a starting point. Because EPA developed this draft list of chemicals based upon exposure potential, it should not be construed as a list of known or likely endocrine disruptors, and it would be inappropriate to do so. Following consideration of comments on this draft list of chemicals, EPA will issue a **Federal Register** notice containing the final list of chemicals. EPA is hereby extending the comment period, which was set to end on November 16, 2007, to December 31, 2007.

## III. What is the Agency's Authority for Taking this Action?

Section 408(p) of FFDCA requires EPA to "develop a screening program, using appropriate validated test systems and other scientifically relevant information, to determine whether certain substances may have an effect in humans that is similar to an effect produced by a naturally occurring

ATT C  
**U.S. Environmental Protection Agency  
Science Advisory Board  
BOARD**

**January 2, 2008**

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**Dr. Deborah Swackhamer**, Interim Director and Professor, Institute on the Environment, University of Minnesota, St. Paul, MN

**Dr. Thomas L. Theis**, Director, Institute for Environmental Science and Policy, University of Illinois at Chicago, Chicago, IL

**Dr. Valerie Thomas**, Anderson Interface Associate Professor, School of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, GA

**Dr. Lauren Zeise**, Chief, Reproductive and Cancer Hazard Assessment Branch, Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, Oakland, CA

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**Dr. Steven Heeringa**, (FIFRA SAP), Research Scientist and Director, Statistical Design Group, Institute for Social Research (ISR), University of Michigan, Ann Arbor, MI

**Dr. Melanie Marty**, (CHPAC Chair), Chief, Air Toxicology and Epidemiology Branch, Office of Environmental Health Hazard Assessment, California EPA, Oakland, CA

## **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)

## **Preparing for Environmental Disasters**

An Advisory Report from the  
Science Advisory Board  
of the  
U.S. Environmental Protection Agency

EDITORIAL NOTE: There is ongoing discussion of an Executive Summary or moving the summary and conclusions to the front. We are also in on-going discussion about the cover letter that will communicate this document to the Administrator.

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## **1. Background**

Even with improved preparation and careful advanced preventive actions, occasional environmental disasters are inevitable. They will arise from natural events such as storms, earthquakes, and volcanic eruptions which have significant human and environmental impacts (SAB, 1995, 1999). Unfortunately they may also result from accidental or intentional human events such as large spills, structural collapse, facility explosions or terrorist attacks.

When disasters with large environmental consequences occur, the public naturally looks to EPA to play a central role in characterizing environmental impacts, protect human health and ecosystems, and in post disaster clean-up activities. However, EPA's authority covers only a subset of the issues that may arise in an environmental disaster (See Box 1). These include protection of drinking water supplies, the cleanup of contaminated buildings, and the development of a nationwide laboratory network to support response. Other federal, state, and local agencies may have primary responsibility for other aspects, including First Response. When the scale of a disaster is large, or especially politically salient, senior political leaders also become involved. In such situations, EPA often finds itself buffeted by forces over which it has little or no control or authority, while at the same time the public does not understand, or in the face of a disaster care very much, about the intricacies of bureaucratic or political constraints.

While no one can predict the future, we believe that it should be possible to identify, at least in general terms, the range of large-scale environmental disasters that could plausibly arise from natural causes (earthquakes, hurricanes), accidents (accidental explosions, structural collapse) and terrorist events. The EPA has already done some of this, partly in response to previous SAB investigations and recommendations (SAB, 1995, 1999) However, in crisis situations large organizations are rarely capable of rapid innovation. Rather, they respond with previously developed "standard operating procedures" (Allison and Zelikow, 1999). As a result, if EPA is to improve its response to future large-scale environmental disasters it must have performed needed research and developed plans in anticipation of the range of plausible contingencies. At least as important, Agency personnel must have practiced and refined these plans in "table-top" or other exercises that address both the risks and the likely complex institutional setting in which the Agency will likely have to execute its plans. Indeed, if it has done its homework well, EPA may even be able to assist other government and private sector entities in improving their preparation and response.

The purpose of this SAB self-initiated study has been to stimulate the agency to become less reactive and more anticipatory and to think more broadly about how it identifies and assesses possible future large-scale environmental disasters and develops plans for responding to and communicating about them. Clearly the SAB is *not* the right organization to develop detailed operational plans. Rather it is our hope that by taking a fresh independent look at the problem, and building on previous SAB efforts on the topic of preparedness for environmental disasters (SAB, 1995, 1999) we can persuade the Agency to begin to adopt the kind of broader, more anticipatory, approach we believe is

DRAFT – please do not cite or quote because the final version may change - DRAFT needed. In the future, once the agency has developed a broader planning process and plans, the Science Advisory Board would be happy to provide thoughtful expert reviews and advice on the technical and behavioral dimensions of those processes and plans.

**BOX 1: Summary of EPA's authorizations and responsibilities with respect to environmental disasters.**

EPA has over 30 years experience in responding to releases of oil and hazardous materials under the National Contingency Plan (NCP) that was established and/or modified by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Clean Water Act (CWA), and the Oil Pollution Act of 1990. Most of these responses do not rise to the level of Incidents of National Significance that are the focus of the National Response Plan (NRP) and the National Incident Management System (NIMS) which are required by various Homeland Security Presidential Directives (HSPDs). Typically, EPA receives over 30,000 release notifications per year (hazardous materials account for about 66% of the total notifications and oil spills for about 34%). Under this program EPA conducts 300 responses per year and assists in about 500 others. Specific EPA responses are to: i) environmental emergencies, ii) acutely hazardous sites/inland oil spills, iii) nationally-declared disasters, iv) terrorist incidents, and v) major national security events. Response activities include, but are not limited to: i) sampling and monitoring, ii) site screening, iii) decontamination, iv) disposal, v) dust mitigation, and vi) data management.

Under EPA's national approach to responses to Incidents of National Significance, the system that the Agency uses to respond to oil and hazardous material releases, under the NCP are integrated into the NRP and NIMS structure and are used when EPA responds within that structure as a part of the total national response to such incidents.

The National Response Plan provides a comprehensive and coordinated structure to prepare for and respond to all Incidents of National Significance. The NRP, coupled with the nationwide response template of the National Incident Management System (NIMS) provides the response structure and mechanisms that enable government and nongovernmental agencies and organizations to provide an all-hazards approach to emergency response activities. The system established is able to address large-scale events needing national leadership (e.g., the Departments of Homeland Security, Justice, Defense, and Agencies such as EPA) for incident management and smaller events where localized management is more appropriate (e.g., state and local officials and organizations).

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## 2. Learning from Others

In undertaking this self-initiated study, one of the first steps the SAB took was to invite a set of briefings from a range of organizations that have extensive experience in dealing with a wide variety of environmental disasters. We did this for two reasons:

- 1) We wanted to see if there were general lessons to be drawn that might be relevant to the EPA's needs, and
- 2) We wanted to get ourselves "grounded" in examples of a number of real events so that our deliberations would not be too abstract.

People we heard from over the course of the study included:

<u>Name</u>	<u>Organization</u>
Mr. Joseph Becker	The American Red Cross
Mr. Patrick Brady	BNSF Railway
Ms. Debbie Dietrich	EPA Office of Emergency Management
Dr. Baruch Fischhoff	Carnegie Mellon University
Mr. Michael Lunsford	CSX Transportation
Ms. Suzanne Mattei	The Sierra Club
Dr. L.D. McMullen	Des Moines Water Works
Mr. Alan Nelson	Nuclear Energy Institute
Mr. Timothy Overton	Dow Chemical Company
Mr. Timothy Scott	Dow Chemical Company
Dr. Gayle Sugiyama	Lawrence Livermore National Laboratory
Ms. Dana Tulis	EPA Office of Emergency Management
Mr. William Wark	United States Chemical Safety and Hazard Investigation Board
Dr. Henry Willis	The Rand Corporation

In reviewing the most successful of the efforts we learned about, we identified a number of themes and approaches that we believe will likely be common to any effort to deal effectively with environmental disasters. These include:

- *Anticipating, assessing, planning and practicing* to deal with events that can reasonably be anticipated to occur. When this is done, previously developed operational and communication plans, trained personnel, and previously identified instrumentation and materials can all be rapidly and efficiently brought to bear on the problem.
- *Learning rapidly* about what is going on and developing a rapid and rough sense of what risks may exist to people and the environment. This means for example that field measurements made in the early stages of a disaster should probably be designed quite differently (different instruments, quality assurance, etc.) than measurements that are made for long-term monitoring and remediation. It means that one needs to have access to and prior experience with appropriate fast modeling and monitoring tools. It also means that with some prior geo-coded inventories of what materials

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(sewage, chemical stores, etc.) might be available for release in a disaster, one should be able to anticipate some aspect of likely exposures, and the consequent measurement and modeling needs.

- *Communication* with the general public and with non-technical decision makers in a meaningful way. There is clear empirical evidence that such communication will be much more effective if it is based on the prior development and iterative empirical testing of at least the kernels of key messages and disseminated by trusted organizations or individuals. There is also clear evidence that helping people figure out what numbers mean, what their choices are, and what they should do to protect themselves, their children, their employees, and the environment, are all critical.
- *Coordination* and communication with other key players. EPA has specific statutory responsibilities in terms of what it is and is not responsible for. However, in the context of an environmental emergency, "that's not my department" is not a satisfactory answer. The general public is likely to look at the Agency's name and expect it to take a wider range of responsibilities than it is likely to actually have. In order to avoid serious misunderstanding and inadequate response, there clearly needs to be coordination in both message and action. The SAB heard the briefings in December as strongly suggesting that these would almost certainly *not* happen unless there are pre-developed plans and messages that have been developed and rehearsed among relevant parties.
- *Flexibility*, including the ability to adapt procedures and make real-time decisions when previous plans are not working. It was clear that the most successful private organizations the SAB heard from have been very good at identifying strategies that are not effective and making improvement rapidly. Figuring out how to replicate this ability to adopt an iterative approach in Federal agencies clearly presents challenges that need to be addressed.
- *Delegation* to folks in the field, and the willingness of senior management to back their decisions, was another characteristic of the successful private organizations the SAB heard from. Again, figuring out how to replicate this capability in Federal agencies clearly presents challenges that need to be addressed.
- *Mobilization* of personnel and resources in a rapid and orderly way was a characteristic of the successful private organizations the SAB heard from. In the case of EPA, there is considerable expertise across the agency, including its laboratories, which might be mobilized if there were adequate prior planning, training and rehearsal. How much of this has already occurred is not clear to the SAB.

**The SAB recommends that as EPA works to improve the way in which it identifies, assesses, prepares for, and responds to possible future environmental disasters, and the way it examines and seeks to learn from the best practices of other public and private organizations.**

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### **3. Identifying a Range of Potential Environmental Disasters**

There is no way to know the future. Some enormous but imaginable environmental disasters, such as the impact of a large meteorite, or a continental scale lava flow, are of such low probability that it would make little sense for EPA, with its limited resources and large set of obligations, to spend time thinking about them (Smil, in press). Other environmental disasters will be sufficiently small or local in extent that it is unlikely that EPA would become involved. However, there are other regularly occurring environmental disasters, such as floods and hurricanes that have significant human health and environmental impacts (SAB, 1995, 1999).

When Agency staff now think about environmental disasters they tend to start with the Agency's authorities (Box 1) and go from there. The committee believes that it would be also be wise for the Agency to develop a taxonomy of plausible events, ask what would be the environmental consequences of each, and only then ask:

- what agencies would deal with the various consequences?
- what responses and coordination would be needed?
- where are the gaps in authority and expertise?
- what other parties are likely to have key roles?
- what if any short term waivers to regulations and other rules might be needed and what mechanisms are needed to achieve these in a way that balances efficiency with protection and other objectives?
- what needs to be done to facilitate good coordination within EPA, with other Federal Agencies, with state and local government, and with the private sector?
- where are there commonalties across different types of environmental disasters that could be exploited to develop more efficient and effective response plans?
- what would the public expect of the EPA?

A very simple illustration of how such a taxonomy might be developed is provided in Table 1. Other possible structures are also possible. The key point is to first develop some comprehensive way to think systematically about the full range of plausible disasters the Agency might be called upon to address.

The entries in Table 1 are still abstract. The next step, once a taxonomy of this sort has been developed, would be to select a range of specific events and think through their consequences. Suppose, for example, that there were a major volcanic event in the Pacific Northwest - essentially a larger scale version of the Mt. St. Helens eruption but with impacts that extend to a number of population centers such as Seattle, Tacoma, Olympia, or the Portland area. Clearly such an event could have a large number of consequences. In addition to wide-spread devastation of precious terrestrial and aquatic ecosystems and forest resources, there could be extensive loss of life, wide spread destruction of built property, and disruptions of critical infrastructures such as power supply, communication, roads and water. One way to explore these would be to build a set of "influence diagrams" that trace out various causal chains. Figure 1 shows a highly

DRAFT – please do not cite or quote because the final version may change - DRAFT simplified example of the impacts that such an event might have on the sustained contamination of water supply.

Figure 2 presents an illustrative time line for pre- and post-event planning and action. The main features of pre-event analysis include: identifying likely measurement needs; developing measurement tools and protocols, and risk analysis and consequence analysis tools; identifying likely communication needs and developing pre-tested communication modules that can be modified once the specifics of an event are known; identification of issues of jurisdiction/coordination; planning for longer term remediation needs; and identifying and implementing mitigating actions and strategies that could reduce or eliminate risks. Illustrations of a few post-event actions are shown on the right hand side of Figure 2.

Over the course of the past two years, the SAB has had occasion to review a number of geographical information systems being developed by different regional EPA offices. If these efforts were better coordinated, the result could be a very useful tool for pre-event analysis to identify and assess the various facilities that could result in sources of difficulty (such as chemical or other contamination). The availability of such a system or systems could also prove invaluable during the actual management of an event once it had happened.

Clearly developing such assessments will take time and care. The agency will not be able to do this for a large range of potential natural, accidental and terrorist-cause disasters all at once. Accordingly **the SAB recommends that the EPA establish a small interdisciplinary group of five to seven fulltime professionals who are charged with working across the agency to identify, prioritize and assess potential environmental disasters.** We believe that with the right people, resources, and mandate, such a group could make very substantial progress in just a few years. After developing a taxonomy of possible risk events, and perhaps working up one or two example assessment, such a group might then use these results as a basis to consult with Regional Offices, The National Homeland Security Research Center and key mission Offices across the Agency in order to set priorities across potential disaster scenarios (some of which would be generic in nature, some of which, like earthquakes or volcanic events, would be specific to geographical regions). As the work of such a small assessment team progressed, they would certainly find many situations in which the same sequences and responses apply across many different events and contingencies.

As noted in Box 1, EPA does not have a mandate to deal with all aspects of environmental disasters. Indeed, in many cases the legal mandate is limited to only a modest sub-set of all the issues that may arise. However, **the SAB recommends that the small group recommended above start by prioritizing a systematically developed list of potential disasters and then perform, or arrange for others to perform, a reasonably comprehensive assessment of each.** We make this recommendation for three reasons:

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- 1) Without such a comprehensive anticipatory approach, the EPA will regularly find itself unprepared and playing catch-up in the face of future environmental disasters.
- 2) Without such an approach, coordination with other Agencies may be spotty
- 3) Without such a systematic approach, eventualities will likely arise in which no clear preparation has been made by any Federal agency to deal with at least some aspect of an acute environmental problem and, even if EPA's mission does not encompass that contingency, the public will likely look to the Agency for leadership, or blame the Agency for an inadequate response.

Of course, there are others at EPA ORD and in regional EPA offices, in DHS research center, at DoE National Labs, in Universities, and in other research and operational entities, who have done portions of such assessments. Clearly the agency should build upon the prior work of such groups as it precedes with this effort.

Having put in place an ongoing process to perform such assessments (starting with the highest priority issues) the Agency will be in a much better position to:

- prepare and practice response plans for a range of high probability events,
- identify likely gaps in expertise and develop prior arrangements with experts and organizations who can provide the needed knowledge and skills. Develop a geo-coded list of this expertise so that these connections can be made rapidly in an emergency.
- identify short term waivers to regulations and other rules that might be needed and prearranged mechanisms to achieve these waivers in a way that balances efficiency with protection and other objectives.
- develop and pre-test public communications messages, that can be easily modified to meet the specific needs of different contexts, to deal with those events;
- engage in coordination activities with other Federal, State and private parties.
- develop measurement and quality assurance protocols that will allow rapid dissemination and use of field measurements in the early stages of a disaster.

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**Table 1:** One possible example of a structure that EPA might use to develop a taxonomy of potential environmental disasters. While many of these involve precipitating events that happen suddenly, for completeness any such taxonomy should also include events that develop more gradually (e.g. droughts, invasive species) whose consequences are never-the-less disastrous. When more than one disturbance occurs, the response may be more extreme than would occur when these disturbances occur singly. (Paine et al., 1998)

<b>Natural events</b>	<b>Events With Humans or their Systems in the Causal Chain</b>
Biologically related Disease (natural) Invasive species (natural) Geologically related Earthquake Flood plain events Volcanic eruptions Weather related Drought Flood (e.g., Tsunami, storm surge) Lightening Wild Fire Wind (e.g., hurricane, tornado)	Complex network system failures Dam, levee, dike failures Disruption of network infrastructures (e.g., power, water, sewer, highways, rail, pipelines, etc.) Large structural collapse Nuclear events  Human induced (unintentional/intentional) Biological Chemical release Explosions Fire Invasive species Radiological Water, air, food contamination

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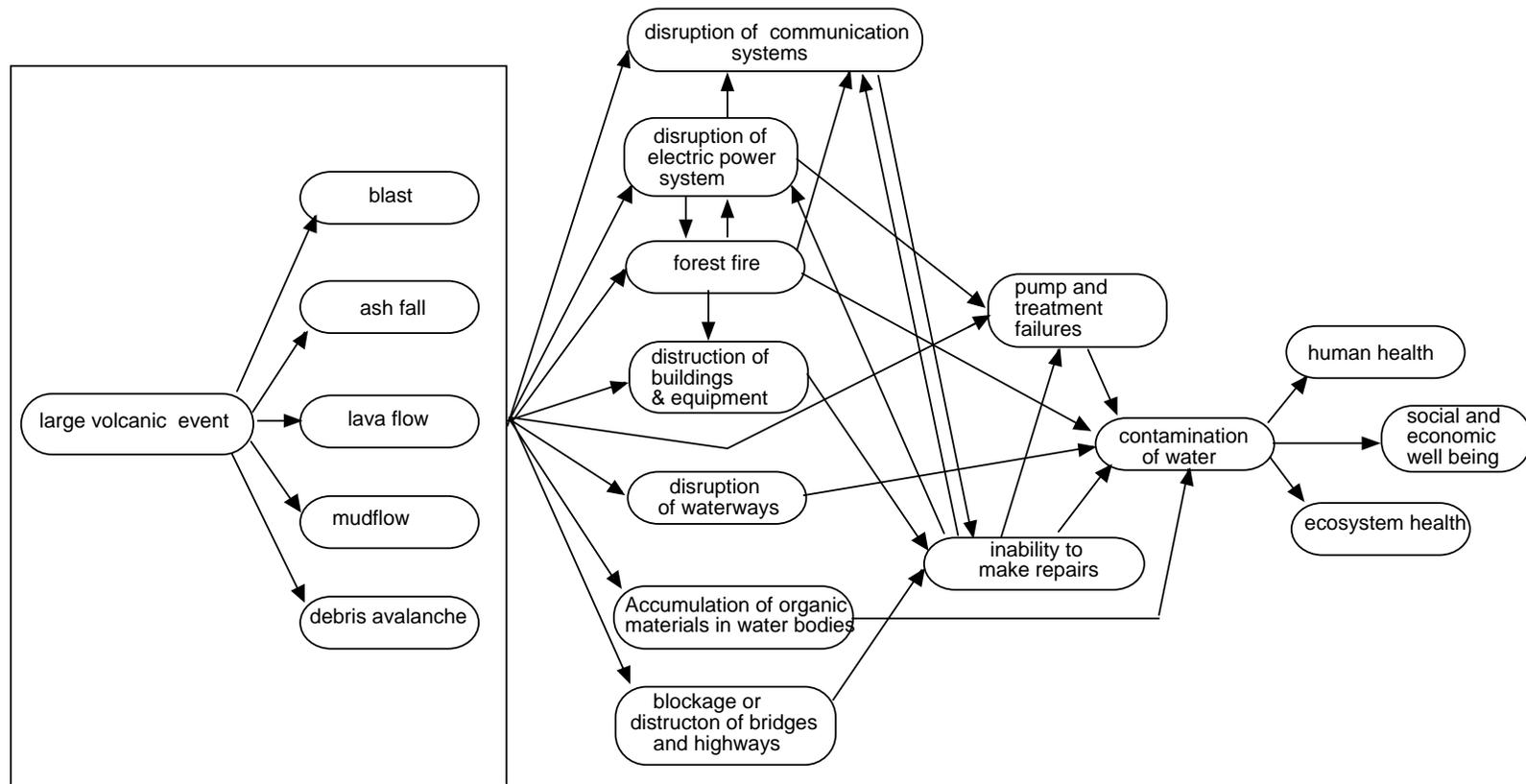


Figure 1: Simplified illustration of an influence diagram tracing some of the routes by which a volcanic event might result in sustained contamination of water supply.

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For an event of a given type:

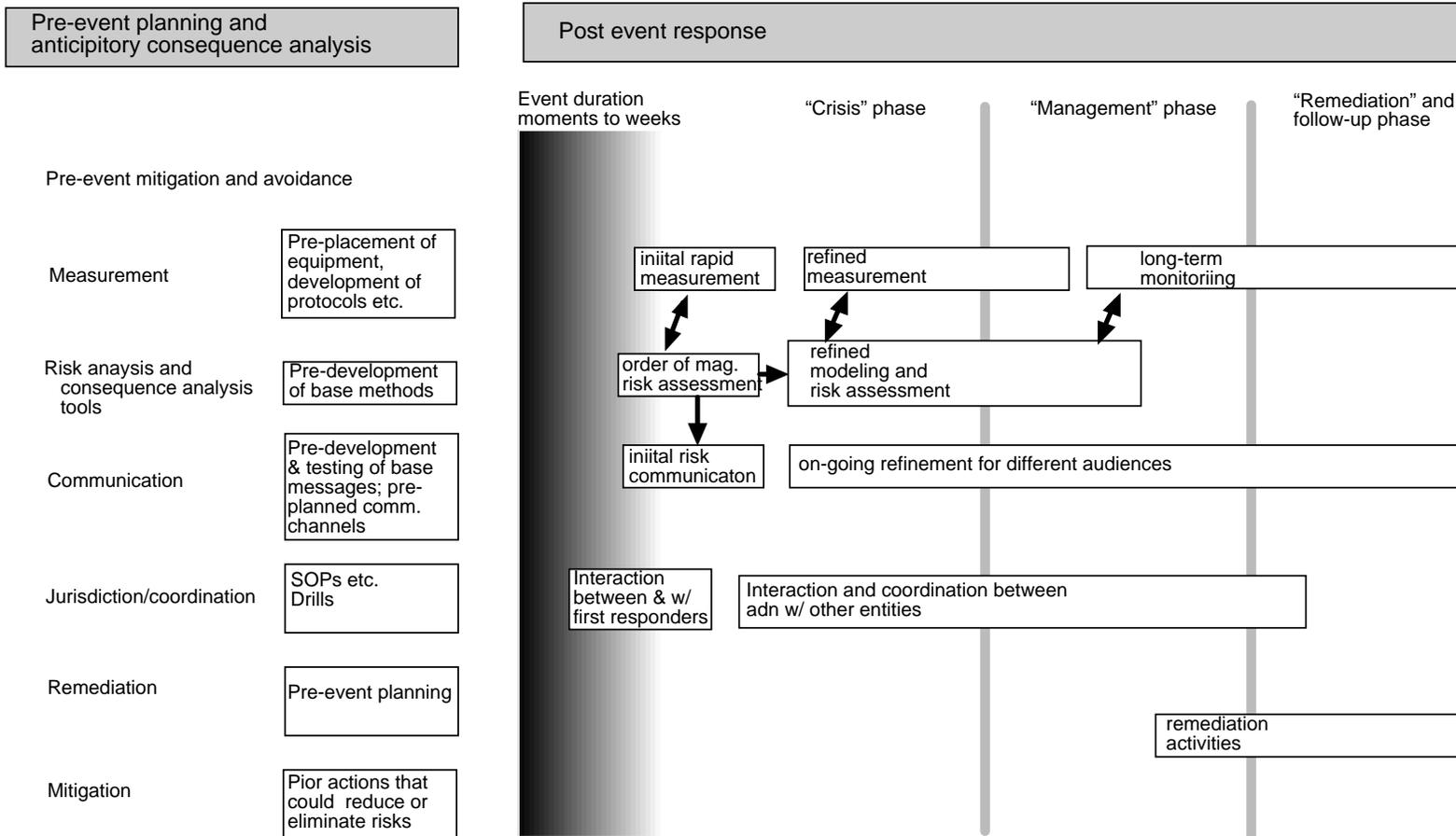


Figure 2: Pre- and post-event tasks for an environmental disaster. Many of the actions noted need to be performed at the regional level.

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#### 4. Geographically Specific Tools for Data Display and Analysis

Assessing potential future disasters, planning for response, and effective response once a disaster has occurred, all require information and modeling and analysis capabilities at a variety of scales (local, regional, and national). Local first responders such as fire, emergency services or police can respond and often immediately address needs created by a small special disaster. However, as the spatial scale of the disaster increases additional resources, information and tools are needed to respond and address the consequences of the disaster.

EPA has developed a variety of spatial analysis tools incorporating GIS and fate and transport models applicable to assist emergency responders with information helpful in identifying vulnerable populations and environmental resources at the state, regional and national scales. These tools incorporate GIS data layers such as land use, infrastructure, location of chemical storage facilities, industrial facilities, human census tract data, sensitive environmental and public health receptors and a myriad of other spatially explicit databases into decision support systems. EPA has also developed and uses transport and fate models capable of estimating the dispersion of chemicals, particles, microorganisms, and radiation released by a disaster into the air and water. These tools could be particularly valuable for disaster managers responding to incidents at the regional scale.

Models, Tools, and Resources. Maximum preparedness for short- and long-term emergency response actions requires development and maintenance and deployment of a variety of models, tools and other resources (resource systems). Consultations by EPA with SAB and HSAC have addressed specific elements of this overall system resource portfolio but have not provided the overall context for SAB and SAB's Homeland Security Advisory Committee (HSAC) consideration of these reviews.

**SAB recommends that EPA compile an inventory of existing models, tools and resources that are currently available for use in disaster response.** These "assets" should be listed (with applicable assets from other agencies) and they should be mapped against the list of disasters and their applicability to each should be established. EPA has special expertise in risk assessment of building disasters and building decontamination, water and wastewater infrastructure assessment, surface water and groundwater quality modeling, air quality modeling, emission locations and databases, municipal and industrial site locations, and ecological risk assessment. EPA tools may be especially useful in decision support for certain types of disaster response, and these applications should be identified *a priori*.

An example is the Water Sentinel Model that EPA has developed for assessing the vulnerability of water distribution systems under various contamination scenarios. Water Sentinel, built around the EPANET water quality model for distribution systems, allows water utilities to simulate the purposeful (or accidental) input of chemical or microbial agents into water distribution networks and predicts the impact of various scenarios on water consumers.

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*Identification of Gaps and Prioritization of Research Needs.* Following completion of of the inventory, **SAB recommends a comprehensive assessment and report of the gaps in the available resource systems, and a listing of needs for further research and development.** The list of gaps in the resource system inventory should be prioritized. This prioritization process should consider the environmental and human health consequences caused by missing tools or information, the impacts of related consequences (including spatial and temporal scales), and other relevant criteria. This analysis should enable optimization of the allocation of EPA resources to fill these gaps over the short-, intermediate- and long-term. **SAB recommends that the listing of research needs (identified in the gap analysis) be prioritized and conveyed across the Agency.**

Once gaps and research needs have been identified, the SAB would be pleased to review the results and offer its advice.

*Characteristics of Models, Tools and Resources.* Effective use of resource systems requires functionality and reliability under a wide variety of circumstances and conditions, including disaster response situations. These characteristics should include:

- *Portability.* To the extent possible, resource systems should be portable to allow transportation and usage in difficult field conditions. The systems should be designed to be field-ready.
- *Redundancy.* There should not be any single expert or expert-system that cannot be replaced in an emergency. Duplication of function is a necessity.
- *Interoperability.* Models and databases must be compatible with those from other agencies. Personnel with various backgrounds, and from other agencies, should be able to use them.
- *Resiliency.* These systems should be robust and have limited vulnerability. To the extent possible, resource systems should be able to operate when central power sources and direct internet access are not available, and they should not rely solely on standard communication lines to function.

*Dissemination and Maintenance of Resource Systems.* To achieve maximum effectiveness, resource systems must be disseminated to the full range of potential users, including first responders and long term-managers at the local and State level, in addition to EPA central office and regional staff and other federal agencies. Relevant databases such as the Toxics Release Inventory (TRI), which is under threat of losing essential data due to changes in thresholds of reporting, is nationally computerized and available and should be preserved. The Chemical Storage Inventory under the Clean Air Act 112r is another example of data that can be helpful in emergency disaster planning and response and should be digitized for ready access by first responders. Resource systems should be maintained to keep their contents current, reliable and easily searchable. **The SAB recommends that EPA solicit feedback from users, particularly local and State personnel including first responders, and regional EPA managers, regarding resource systems and were necessary digitized data bases to support improved**

DRAFT – please do not cite or quote because the final version may change - DRAFT **disaster response decisions.** Periodic updates of resource systems should consider comments and criticisms from users. The results of audits of response performance following actual events and trials should also be used in maintenance and updating of resource systems.

*Training and Planning Function of Resource Systems.* SAB recognizes the substantial value of resource systems developed by EPA for use by local and State managers for training and planning functions, and SAB encourages EPA to maximize this function in the future. Uses of resource systems include emergency response scenario development, use within and during training exercises, and overall assessment of system response needs and capabilities.

*Audits of Event Response Performance.* **SAB recommends that EPA perform and encourage performance audits of event responses by its staff at the local, State and regional level.** EPA should play a special role as compiler and synthesizer of performance results and characteristics. The Agency often identifies problems which are commonly referred to as “lessons learned”, but "lessons" are not really "learned" and have little value until procedures and behaviors are changed (continuous improvement) While we are aware of and have read the reports by the Agency's Auditor General on EPA's performance during several recent environmental disasters, we are not persuaded that these sufficiently meet this need.

*Sensitivity of Resource Systems.* In some cases, components of resource systems developed by EPA may be too sensitive to warrant general release to the public or to local and state entities. **SAB recommends that EPA carefully assess the content of its resource systems to evaluate the security risks associated with their release.** Criteria recommended by SAB for this evaluation include the ability of system resources to be used to implement an attack, or to optimize consequences of an attack. Examples of resource systems that have components with considerable risk associated with release include the “consequence modeling” component of the Water Sentinel program and, to a lesser extent, the incident modeling in ECAT. For example, if a calibrated Water Sentinel model for a specific utility falls into the wrong hands, it could be used against that utility by attacking them at their most vulnerable distribution system locations.

*Development of Resource Clearinghouse.* **SAB strongly recommends EPA emphasize its role in development of centralized and streamlined virtual libraries of references, guidance materials and models, and other resources.** The SAB endorses efforts like those in ECAT to compile a wide breadth of information in a user-friendly form. This work should also include Internet enabled tools (with and without security-related access controls) and coordination of spatial data bases (land use, land cover, census data, chemical plants). It is presumed that all counties in the US have an inventory of all chemical facilities, power plants, water and wastewater treatment facilities, hazardous waste generators, storage facilities, hospitals, research labs, universities, etc. located within their jurisdictional boundaries, in terms of types and amounts of potential contaminants and their coordinates. These inventories, as well as Federal databases in which EPA has primary authority, need to be updated annually.

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Completion of the tasks outlined in this section should prove very valuable to the small assessment team recommended above in Part 3 of this report, and that team should be consulted in the formulation and completion of these tasks. However, this team should not be given primary responsibility for completing these tasks so as not to divert its attention from the critically important job of identifying, ranking, assessing and planning for possible future environmental disasters.

## **5. QA/QC for Data During Emergencies**

Field measurements made during the early stages of a disaster have a different purpose than field measurements made for long-term monitoring and remediation. Emergency responders and citizens need fast order-of-magnitude indications of the nature and level of hazards they may face. Accordingly instrumentation, quality assurance procedures for authorizing the release of data, and measurement priorities need to be designed to appropriately meet those needs.

Many existing EPA data protocols do not emphasize rapid response, because they have been developed to meet the needs of long-term monitoring and regulatory activities. Especially in the early stages of an emergency, the quality of data may have to be balanced against the need to get information to users on the time scale they require. This balance should be worked out in advance, so that procedures are already developed and approved before the emergency occurs, and a graceful transition can be achieved from rapid order-of-magnitude assessment to increasingly more time consuming and accurate characterizations as time goes by (See Figure 2).

**The SAB recommends that EPA develop procedures for rapid field measurement, data analysis and data release to the public during the early stages of emergencies, as well as protocols for how those procedures will be modified to assure greater precision and quality control as needed in later stages of the life cycle of an environmental disaster.**

## **6. Improved Communication and Public Consultation**

Communication needs and content are highly context dependent. Before, during and after events, the goals and methods for effective communications should be different. For example, during an event when immediate protective actions are needed, rapid one-way approaches are critical. However, before and after events, these methods are rarely appropriate. In these periods, dialogues with decision makers, stakeholders and representatives of the public are key ways for building knowledge about current contexts and information needs and preferences. Development of messages based on knowledge and empirical testing enhances the probability of effective decisions and actions during events. Without such fundamental and current knowledge, communications may create problems where few or none existed.

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Effective communication between many different parties is essential:

- in performing assessments and making plans before an environmental disaster occurs,
- in protecting human health and ecosystems during the initial stages of an environmental disaster, and
- in managing long term protection, clean-up and recovery from an environmental disaster.

Communications about environmental disaster requires two-way interactions within the US EPA, across agencies, and with partners and the public. In designing any communications program, one must ask the question: "How can information be transmitted to elicit well informed decisions and behavior by individuals, first responders, decision makers and organizations?"

Communications need to occur throughout the process of assessing, preparing for, and responding to environmental disasters. Of course the purpose and form of the communication often needs to change at different stages along the life cycle of an event (Figure 2). For example, immediate protective guidance is often necessary during the initial response phase while there is great uncertainty, while more specific guidance is provided during later stages when more information is available and uncertainties have been reduced.

No aspect of communication is more important than communication with the public – including both those directly affected by the event and the general public. Too often, communication is seen as the one-way conveyance of facts, guidance and decisions from experts and those in charge to a passive receiving public. Sometimes in a crisis situation such one-way communication is necessary ("You need to stay in your house and seal the doors and window because a cloud of toxic gas is rapidly approaching."). As elaborated below, even in such situations communications are likely to be far more effective if generic versions have been carefully developed, empirically evaluated and refined ahead of time through careful two-way interaction with individual who are typical of the intended audience.

Recent years have witnessed considerable progress in developing a scientific basis for risk communication. The key insight from this work is that it is essential to adopt an empirical approach. Unless one understands the way in which a recipient will interpret and understand a message, even as simple a message as "Take a wet cloth to cover your face in the event you find yourself being exposed," one can have no confidence that it will be properly understood.

Behavioral social scientists have developed a variety of strategies to determine, through empirical studies, the "mental models" that people adopt in thinking about risks (Fischhoff, 2005; Morgan et al, 2002). They have also developed empirical strategies for testing and refining possible messages (Fischhoff, in press). Unfortunately, with almost no behavioral social scientists on staff, EPA does not possess the expertise to make use of such methods.

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This absence of understanding and expertise also has implications for other aspects of EPA's mission. For this reason the SAB makes two related recommendations:

First, **ORD should re-establish its program in behavioral social science and risk communication research, perhaps by reinvigorating the very successful collaboration it once had with the NSF program in Decision Research and Management Science (DRMS).**

Second, in assembling the small assessment team proposed above in Part 3, **at least two of the members should have a strong working understanding of, and ability to apply, modern methods of empirical social science for developing risk communication strategies, and the design, testing and refinement of risk communication messages.**

Frequent, transparent interactions with partners (within the Agency, across agencies, and with others) in advance of events are an important part of building communication readiness. Purposes of these interactions and related research include:

- Determination of how *people form their concepts of risk* and related issues, as well as how people make decisions and what information influences their decisions.
- Development and rigorous *pre-testing of consistent messages* for a variety of scenarios and receivers. Scenarios formulation should include representatives of the public and mass media to ensure that exercises involve their perspectives and gauge the likelihood of behaviors that would have significant impacts in real events. Representatives of other partners appropriate to the scenario should also be involved both in drills as well as in debriefings after exercises. During an event, zero tolerance for false positives often works against providing the public with timely and useful protective information. The tradeoffs in risks (e.g., public health and environmental vs. organizational) are important considerations that should be clearly identified and articulated by decision makers. When uncertainty prevents a definitive decision, warnings that include protective actions and specific guidance should be issued with a caveat to “stay tuned” for more certain information. Pre-testing such messages would yield considerable insights about what will and will not work well in eliciting desirable behaviors.
- Anticipation of how *people would respond to communication initiatives* (messages and interactive engagements), especially under stressful conditions. Research is needed to identify how first responders, decision makers and the public are most likely to respond to communication initiatives.
- Empirical research involving formative and summative *evaluations* of risk communication activities is essential to ensure continuing progress.

In environmental disasters EPA should endeavor to ensure that information the Agency has developed gets to the persons or organization that are trusted by the intended receivers (in crisis conditions) or partners (in routine conditions). In various cases, another entity or person (e.g., local official or community leader) will be seen as a more

DRAFT – please do not cite or quote because the final version may change - DRAFT trusted source of information. In those circumstances, the EPA should focus on getting the best possible information to that party and helping him/her promptly interpret and use the information correctly. In preparation for an event, EPA should:

- Recognize and be in contact with trusted *social networks* within a community
- Discover the ways in which information is currently and rapidly *disseminated* (e.g., reverse 911, e-mail, instant messaging, YouTube and other networks)

There is an urgent need to improve consultation with the public on a variety of tough choices that many environmental disasters can present. An obvious example is decisions about "how clean is clean enough" when restoration to pre-disaster conditions is neither technically nor economically feasible. Effective mechanisms to perform such consultation are lacking. **The SAB recommends that the development, demonstration and evaluation of mechanisms for better including public values and preferences in clean-up decisions should be an element of the reinvigorated program of behavior research in ORD.**

The SAB understands that EPA already participates in a wide variety of multi-agency drills and exercises on disaster response, and we commend EPA for the leadership shown in certain areas. SAB also recognizes that selected employees within EPA have been assigned to red or blue response teams, and they are already recognized for their capabilities in specialized areas of disaster response. These employees are expected to stop all other duties in the event of a disaster and devote themselves solely to the response for however long it takes. Such employees have laptop computers especially dedicated for disaster response, and drills in "bunker" locations have been successfully executed. However, it is our belief that a major gap still exists is in the area of communications, and that the ability to locate and contact each person in the network during a disaster has not been given proper attention by the agency or by Homeland Security. **We recommend that a failsafe method for communication among key members of the disaster response team be designed and implemented.** Obviously, responders must be able also to communicate with critical models, databases, and decision support tools and convey the results of their analysis to responsible parties.

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**7. Summary and Conclusions [EDITOIAL NOTE: what should this be called and should it be here at the end or at the beginning or both?]**

Thinking broadly and becoming more anticipatory is the goal of every agency. EPA needs to identify and assess potential future environmental disasters and develop plans for responding and communicating information about them. In the interest of improving the way in which the EPA identifies, assesses, prepares for and responds to possible future environmental disasters that arise from natural causes, accidents or the actions of terrorists, the Science Advisory Board recommends that the EPA:

1. Establish a small interdisciplinary group of five to seven professionals who are charged with identifying, prioritizing and assessing potential environmental disasters. Develop a system to identify potential environmental disasters, prioritize them based on probability and consequence, and identify common attributes and response strategies that could improve the efficiency and effectiveness of agency responses.
2. This group should perform comprehensive assessments of the potential impacts of those disasters, beginning with those that are judged to be of the highest priority. It should then help and advise the Agency to further:
  - Identify gaps in coverage by Federal, State and Local authorities and needs for improved coverage, coordination and preplanning;
  - Develop a prior arrangements with experts and organizations who can provided the needed knowledge and skills and develop a geo-coded list of this expertise so that these connections can be made rapidly in an emergency.
  - Identify short term waivers to regulations and other rules that might be needed and prearranged mechanisms to achieve these waivers in a way that balances efficiency with protection and other objectives.
3. Compile an inventory of existing models, tools, data and resources that are currently available for use in disaster response; perform a comprehensive assessment and a report on the gaps in the available resource systems; solicit feedback from users of these tools , particularly local and state personnel and regional EPA managers, regarding resource systems; and, identify further research and development needs. Since some of these tools may involve sensitive information, their content, and associated access policies should be carefully reviewed to assure an appropriate balance between needs of local and regional responder and the public and the necessity for protection against misuse. Emphasize EPA’s role in development of centralized and streamlined virtual libraries of references, guidance materials and models, and other resources.
4. Examine and seek to learn from the best practices of other public and private organizations. In so doing it should seek strategies by which it, and other responsible parties, might better:
  - *anticipate, assess, plan for, and practice responses* to deal with major events that plausibly might occur in coming years;

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- *learn rapidly* what is going on and developing a rapid and rough sense of what risks may exist to people and the environment;
- *effectively coordinate and communicate* with other key players including first responders and the public;
- *respond with flexibility* to the specific needs and circumstances of the event at hand, including the ability to adapt procedures and make real-time decisions when previous plans are not working;
- *delegate* decision authority to responsible individual in the field; and
- *mobilize* personnel and resources in a rapid and orderly way.

4. Develop procedures for rapid field measurement, data analysis and data release during the early stages of emergencies, as well as protocols for how those procedures will be modified to assure greater precision and quality control as needed in later stages of the life cycle of an environmental disaster.

5. Conduct performance audits of event responses by EPA staff at the local and State level.

In addition to the recommendations above, the SAB recommends that EPA:

Reinvigorate its program in behavioral social science research, perhaps by reestablishing the very successful collaboration it once had with NSF-DRMS. This research should include:

- A strong program in empirically based methods of risk communication.
- Development, demonstration and evaluation of mechanisms for better including public values and preferences in clean-up decisions.

Attachment H

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## Attachment H

### EPA Science Advisory Board (SAB)

### **Report Development and Approval Process of SAB Reports**

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The EPA Science Advisory Board (SAB or Board) is a Congressionally-mandated, external group of scientists, engineers and other professionals who provide independent technical advice to the EPA Administrator on a wide range of high priority environmental issues. Subcommittees (standing committees or panels) chaired by Board members perform most of the work of the SAB. These subcommittees forward their findings and recommendations to the Board for consideration. Reports approved by the Board are transmitted to the EPA Administrator. This paper describes the process for report development and the approval process for SAB reports.

#### **Types of Advice**

**Consultation** – At a consultation, individuals serving on the Board or SAB subcommittees provide expert advice on technical issues at a public meeting *before* the Agency begins substantive work on that topic. No group advice is sought or provided. The consultative letter documents the nature of the consultation. Written comments from individual members may be appended to the letter. By requesting a consultation, the Agency commits to seeking further advice from the SAB (*i.e.*, either an advisory or a peer review of subsequent work products) on the topic.

**Advisory or Peer Review** – In an advisory, the Board or an SAB subcommittee provides written, consensus advice on a technical topic. The advisory is designed to provide guidance on work product(s) under development or on EPA activities for which periodic or additional SAB advice is needed or required. By contrast, a peer review addresses a final draft work product. In both cases, consensus is reached through deliberation at one or more public meetings. Where consensus cannot be reached, the specific areas of agreement and disagreement are described in the report.

**Original Study** – An original SAB study evaluates the state of the science and offers recommendations on an environmental issue. An SAB study is conducted at a series of deliberative public meetings of the Board or an SAB subcommittee. The study can be requested by EPA or initiated by the SAB.

**Commentary** – The Board or an SAB subcommittee may also provide a short communication in the form of a letter to provide unsolicited advice on an important technical issue.

#### **Report Development**

The Federal Advisory Committee Act (FACA) and EPA policies require that all deliberations be conducted at public meetings (either face-to-face or via teleconference). The drafting of the report or letter may occur either during or following the public meeting. Members of the Board

or an SAB subcommittee responsible for writing various sections may communicate with each other through the Designated Federal Officer (DFO). The chair of the Board or an SAB subcommittee will assemble and integrate the draft report with the assistance of the DFO. Reports developed and approved by the Board may be transmitted to the Administrator directly. However, reports developed and approved by SAB subcommittees must undergo a quality review and be approved by the Board at a public meeting before being transmitted to the Administrator. Opportunities for public comment must be provided on the draft report at all major stages of report preparation and approval.

### **Approval Process**

1. For *consultative* letters, quality review and approval by the Board is not required. The letter to the Administrator is signed by the member of the Board who chairs the consultative meeting.
2. All other SAB reports must be approved by the Board at a public face-to-face meeting or teleconference.

### **Quality Review**

As required by FACA and EPA policies any consensus advice and recommendations by an advisory subcommittee must be approved by its parent committee. The quality review process for draft SAB reports fulfills this requirement. The Board quality review is **not intended to be a second review** of the issues discussed by the SAB subcommittee or panel responsible for the development of the draft SAB report. Rather, the Board reviews the draft SAB report to determine whether:

- (a) the original charge questions to the SAB subcommittee were adequately addressed in the draft report;
- (b) the draft report is clear and logical; and
- (c) the conclusions drawn, and/or recommendations made, are supported by reasoning or references provided in the body of the draft SAB report.

The Board may also seek external review by subject matter experts for an original study to identify any technical errors or omissions prior to the quality review of the draft SAB report.

The Board's decision on a draft SAB report is documented in the minutes of the public meeting or teleconference. The SAB subcommittee chair, with the assistance of the DFO, has full responsibility for revising the advisory report and in doing so may consult with members of the subcommittee as deemed appropriate. The chair of the Board may assign one or more reviewers from the Board to assist in the revision of the report and to confirm that revisions have been made as recommended by the Board. Final approval is conveyed by the Board chair's authorization to sign the report's transmittal letter to the Administrator.

## **Attachment I**

### **Proposal: SAB Annual Meeting - 2008**

#### **Purpose**

- To mark the 30-year anniversary of the federally chartered SAB by looking at past, present, and future environmental challenges and the role of science
- To stimulate SAB thinking about advice for addressing future challenges by
  - building on SAB current work on strategic research directions
  - inviting past SAB chairs and staff directors for their perspectives
  - inviting outside speakers to stimulate SAB discussion of future challenges

#### **Format**

- Day-long workshop followed by half-day chartered SAB meeting, both open to the public
  - Workshop would include presentations and break-out sessions
  - Outside speakers and invited participants would be invited to stimulate workshop discussion
  - Half-day chartered SAB meeting would focus on possible report to the Agency on science priorities for meeting future challenges

#### **Timing**

- Date to be set for September-October 2008

#### **Primary Audience for Workshop**

- Members of the chartered SAB, SAB Standing Committees, CASAC, and the Council
- EPA Representatives

#### **Proposed Process**

- Steering group composed of Board members would work with SAB Staff
- Members of the Board, SAB Standing Committees, CASAC, and the Council would be invited to suggest themes, issues, speakers, and invitees.
  - Invitees might include: individuals with valuable knowledge/insights about environmental research from
    - other federal agencies
    - other federal advisory committees
    - scientific advisory committees from other countries or international organizations
    - state and local governments
    - non-governmental organizations
    - professional associations
    - think-tanks
    - trade associations and corporate world

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Dr. James Johnson	Dr. Thomas Theis
Dr. Bernd Kahn	Dr. Valerie Thomas

November 28, 2007

December 7, 2007

**Compilation of Board Member Comments on the Draft Hypoxia Report  
Submitted for the December 6-7,, 2007 US EPA SAB Meeting**

**1. Dr. Thomas Theis**

I have gone through the HAP report one more time. As I said in my first critique, it provides a very comprehensive evaluation of the causes, impacts, and potential remedies for the Gulf hypoxic zone. At this point I am prepared to support its contents and major recommendations. However I do have two suggestions that I hope the committee will consider before the report is finalized. These are given below.

- a) Much is made in the report of the need for conducting meaningful and comprehensive studies on the costs and benefits, especially co-benefits, of reducing nutrient loading to the Gulf. I believe this is indeed important, yet it is surprising that this does not make it into the list of summary (most important) recommendations in section 5.4 nor in the letter to the Administrator. The closest the report comes is lines 2-3 page 228 (bullet #4 under "...implementation of management options..."), but in my judgment this doesn't carry the full weight of the needs expressed in the report. Such an assessment is a critical part of developing regulations, working with other Agencies, and establishing meaningful incentives. Without it, most of the other recommendations, while important scientifically, lack a cohesive basis for informing policy. I urge the HAP panel to place this as a high priority item in the body of the report, section 5.4, and the transmittal letter.
- b) Language and notation in the report. I well appreciate the breadth and backgrounds of those who contributed to the report, and the practical difficulties of bringing a sense of cohesion to the style and manner of expression. In my original critique I expressed surprise that, in a report in which chemical transformations play such a crucial role, not a single chemical reaction can be found. This is more a matter of clarity and completeness than pedagogical background and I urge the panel to go through the report and amplify various parts with applicable reaction sequences and stoichiometric equivalencies. If embedding these in the report is considered an unnecessary burden, then I urge that important nutrient reactions be placed in an appendix and referenced in critical places in the report.

**2. Dr. James Galloway:**

I have reviewed the revised hypoxia report and find it improved. I am grateful that my earlier comments were addressed and I applaud the report's conclusion that the hypoxia issue can not be addressed without using a systems approach to address the entire nitrogen issue.

### 3. Dr. Michael McFarland

Hypoxia in the Northern Gulf of Mexico:  
An Update by the EPA Science Advisory Board

McFarland Comments

The SAB Hypoxia Panel (Panel) is commended for providing a clear and compelling assessment of a scientifically complex and multifaceted environmental issue. The Panel has generated a well written and comprehensive report that describes the state of the science surrounding the environmental impact, causes and possible technical, economic and regulatory solutions for mitigating the expansion and impact of Hypoxia in the Northern Gulf of Mexico (NGOM). Based on the scientific quality of the report and the clarity of the Panel's responses to the Agency's charge questions, I strongly support its approval by the SAB. The following discussion summarizes my responses to the SAB quality review charge questions.

**a) Are the original charge questions to the SAB Panel adequately addressed in the draft report?**

The Panel's report provides unambiguous, explicit and comprehensive responses to each of the Agency charge questions, which, in general, focused on the characterization of Hypoxia as well as its causes and potential management approaches for reversing its expansion. In responding to these broad set of charge questions, the Panel cited extensive examples of supporting scientific literature as well as a number of nutrient best management practices from various federal and state water quality programs.

**b) Is the draft report clear and logical?**

Except for a section of the report that was inadvertently placed out of sequence in the document (pp. 198 – 238), the report is clear and logical. The Panel's report provides a compelling description of the various anthropogenic activities that have contributed to the formation of Hypoxia and highlights the potential value of an adaptive management approach in addressing the uncertainty associated with the myriad of possible approaches recommended for reversing Hypoxia expansion.

**c) Are the conclusions drawn and/or recommendations made supported by information in the body of the draft report?**

On the whole, the Panel's conclusions and recommendations are supported by information contained within the body of the report. However, in a limited number of cases, the body of the report provides information that goes well beyond what is summarized in the Panel's conclusions and recommendations. For example, while the body of the report describes various point sources of discharged nutrients that contribute to the expansion of Hypoxia in the NGOM, under Management Options (Page 7 – Executive Summary), the recommendation to control point sources of nutrients simply states that the Agency should consider "introduction of tighter N and P limits on municipal point sources". To avoid inconsistency and ambiguity with information found in the body of the report, this particular recommendation should state that the Agency should consider "introduction of tighter N and P limits on municipal and private industrial point sources".

Beyond the standard quality review questions, additional scientific clarification may be required on a limited number of the report's recommendations. In my opinion, these issues are mere trifles in relation to the totality of the Panel's report, which is broad based, comprehensive and scientifically compelling. These minor issues, which I only raise for the sake of technical completeness, are summarized as follows:

i) In the report's recommendation of the use of wetlands as an option for potentially removing and managing nutrients in the NGOM drainage area (Page 164), no mention is made of whether or not there is a need/requirement to harvest wetland vegetation. Properly designed constructed wetlands can be a cost-effective nutrient removal process provided that vegetation is periodically harvested. Over the long-term, however, if no harvesting program is implemented, nutrients removed and immobilized within plant biomass are simply reintroduced to the aqueous environment through the process of mineralization.

ii) In the report's description of possible approaches for increasing bioenergy yield from manure (Page 177), the report indicates that manure thermal oxidation is becoming more cost effective. However, the report does not distinguish between the various animal manure types under consideration and how certain types of manure can be managed differently for enhanced energy recovery and nutrient management.

#### **4. Dr. Valerie Thomas**

Letter to the Administrator

p. ii, lines 23-24. "it may no longer be possible to achieve this goal by 2015." Does this mean it is not technically possible because of time lags in the system? This should be made explicit; otherwise the statement might be interpreted to mean that this is too much change for farmers and politicians to embrace and gradual progress is more reasonable. The

statement should be changed to show that this is a scientific conclusion, not a social judgment. For example, “because of time lags in the response of the hypoxic zone, it may no longer be possible to achieve this goal by 2015.” This physical delay mechanism is not easy to find in the body of the report. On p. 91, lines 3-5, there is reference to a study showing a lagged response for N of 2-5 years for most of the N input, and 6-9 years for some additional N. Is this the basis for the conclusion that it might not be possible to reach the goal by 2015? If so, that should be said explicitly on p. 91.

#### Executive Summary

p. 2, line 9. Again, “it may no longer be possible to achieve this goal by 2015.” Same comment as above.

p. 2, lines 28-29, “most recent model runs showing a 45-55% required reduction for N in order to reduce the size of the hypoxic zone.” This statement implies that there is a threshold; that no reduction in the hypoxic zone would occur unless N is reduced by at least 45%. The body of the report (p. 132, key findings) says that > 45% reduction is needed to reduce the hypoxic zone to 5000 km<sup>2</sup>. Therefore, “to 1500 km<sup>2</sup>” should be inserted on p. 2, line 29.

p. 6, lines 33-34. “Large N and P reductions, on the order of 45% or more, are needed to reduce the size of the hypoxic zone.” Same comment as above. “to 1500 km<sup>2</sup>” should be inserted on p. 6, line 34.

p. 91, lines 3-5. “McIsaac et al. ... found that a 2-5 year lagged net N input explained the most variation in nitrate-N export...” Is this the basis for the conclusion, in the Letter to the Administrator and the Executive Summary, that reaching the goal by 2015 may not be possible? If so, this should be clarified.

p. 200, lines 12-19. Sequestration is not a NO<sub>x</sub> control strategy.