



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460



OFFICE OF  
RESEARCH AND DEVELOPMENT

**MEMORANDUM**

**SUBJECT:** Charge Questions for the SAB/BOSC Meeting July 24-25, 2014

**FROM:** Robert J. Kavlock /signed by/  
Deputy Assistant Administrator

**TO:** Angela Nugent, Designated Federal Official  
Science Advisory Board

Thomas Tracy, Designated Federal Official  
Board of Scientific Counselors

The Office of Research and Development (ORD) is now beginning the year of updating our six Strategic Research Action Plans for 2016-2019. We are genuinely looking forward to the joint meeting of the SAB and BOSC on July 24-25, 2014 to discuss these strategic directions. The recommendations from the SAB and BOSC have been very influential in the development of ORD's six research programs and I believe we will greatly benefit from the Boards' early input, perspectives and advice at this stage of planning. I am attaching a set of ORD's charge questions which convey the issues on which we seek advice from the Boards.

To prepare the Boards for our discussions, we will provide background presentations about ORD and the six programs during a series of teleconferences in advance of the July 24-25, 2014 meeting. In addition, we will provide very early drafts of the 2016-2019 Strategic Research Action Plans and drafts of Roadmaps that address the cross-cutting issues of Children's Environmental Health, Global Climate Change, Nitrogen and Co-pollutants, and Environmental Justice.

If you have any questions or additional suggestions about the Charge Questions, please contact Gail Robarge ([robarge.gail@epa.gov](mailto:robarge.gail@epa.gov)) or Stacey Katz ([katz.stacey@epa.gov](mailto:katz.stacey@epa.gov)).

Thank you.

Attachment

## **SAB/BOSC Charge Questions**

### **1. ORD's Strategic Directions**

In 2011, a joint SAB/BOSC committee provided advice to ORD on strategic directions as ORD realigned its research into six integrated programs. The initial research plans guided ORD for 2012-2016. ORD is now beginning the development of Strategic Research Action Plans (StRAPs) to cover the period 2016 – 2019 for the six programs:

- Air, Climate and Energy
- Safe and Sustainable Water Resources
- Chemical Safety for Sustainability
- Sustainable and Healthy Communities
- Human Health Risk Assessment
- Homeland Security

The update of these plans is in the formative stages, providing an opportunity to receive early input and insights from the Chartered SAB and the BOSC Executive Committee. ORD is preparing plans that aim to provide the science needed to meet EPA's priorities, as described in the new EPA Strategic Plan (2014-2018). Also, the ORD plans need to anticipate the science that will be needed for environmental protection for 2020 and beyond.

#### **Charge Questions**

**1a.** Considering the proposed research directions and focus, how well is ORD as a whole poised to support EPA in meeting the goals of the EPA Strategic Plan?

**1b.** What are the SAB/BOSC perspectives overall on the proposed research directions providing research to address environmental issues of 2020 and beyond?

### **2. Program Specific Charge Questions**

In the first Charge questions above, ORD is asking the for SAB/BOSC's view on the ORD research program as a whole. Additionally, ORD asks for the SAB/BOSC's advice on strategic directions for each of the six research programs.

#### **Charge Questions**

**2a.** How well will the research directions in each Early Draft StRAP (2016-2019) support EPA in achieving the relevant Agency objectives and cross-cutting strategies, as described in the EPA Strategic Plan (2014 – 2018)?

**2b.** What are the SAB/BOSC perspectives on the proposed research directions in each StRAP providing research to address environmental issues of 2020 and beyond?

**2c.** For each program, do the presentations and plans indicate that ORD is designing for integration, where appropriate, on topics that are relevant to other research programs?

### **3. Air, Climate and Energy Charge Questions**

The ACE Research Program includes a focus on the environmental impacts of energy production and use, including decisions regarding energy choices. Initially, ACE work addressed impacts of biofuels, as well as the development of models and decision tools that evaluate the outcomes of energy choices. The support to the biofuels program has diminished substantially. As we look to the future, we face a continually changing energy landscape, and an urgent need to anticipate the likely environmental impacts of an evolving mix of energy sources. The ACE Program wants to effectively target its resources to produce models and decision tools that illuminate environmental impacts and that will aid individuals, communities and governments in understanding the consequences of energy choices.

#### **Charge Question**

**3a.** Does the SAB/BOSC have suggestions regarding how ACE should target its efforts to understand, model, and convey the potential environmental impacts of possible energy choices?

### **4. Sustainable and Healthy Communities**

SHC has committed to integrating ecological and human health to better address issues of human and community well-being.

#### **Charge Question**

**4a.** Does the research program contain the elements necessary to integrate these two critical elements of EPA's mission?

SHC's research and development on indicators and indices, ecosystem goods and services, and the EnviroAtlas make reference to specific health conditions such as asthma, but are largely oriented toward protection and promotion of more broadly-defined individual and community well-being.

#### **Charge Question**

**4b.** Is increased well-being the appropriate outcome to aim for, rather than amelioration of specific health conditions? If so, does the SAB/BOSC have recommendations for shaping the Community Public Health research project more toward broader well-being impacts?

As EPA moves to implement a sustainability paradigm, ORD's role is to conduct research that supports this paradigm. SHC's plan is to conduct research on sustainability using a systems-based approach and by using case studies to illustrate community-level sustainability.

#### **Charge Question**

**4c.** SHC is interested in thoughts and suggestions from the SAB/BOSC on ways to conduct research on the science of sustainability.

## **5. Safe and Sustainable Water Resources**

In many parts of the country, the quality and availability of fresh water is a serious concern, and one that will become even more challenging as the climate changes. Simultaneously, energy consumption continues to rise. To meet the increasing energy demand, domestic energy consumption is increasing, and contributing to the increasing demand for water. Water is used to cool power plants, grow feedstock for and produce biofuels, and to extract oil and gas. Additionally, large amounts of energy are used to transport and treat water for human use. This “water energy nexus” is a significant challenge as we strive for more sustainable energy and water use. Many government agencies have roles to play in energy and water development and management in the US – including the Department of Energy, Department of the Interior, Department of Agriculture, US Geological Survey and others. EPA is particularly interested in moving toward a future in which communities could have “net zero” input and output of energy, water, nutrients, and other resources reclaimable from wastewater.

### **Charge Question**

**5a.** Where can EPA make a significant research contribution in moving toward a sustainable water-energy future, with consideration of energy, water, nutrients, and other resources?

## **6. Chemical Safety for Sustainability and Human Health Risk Assessment Charge Questions:**

CSS research is conducted to provide the fundamental knowledge infrastructure and complex systems understanding required to predict potential impacts from use of manufactured chemicals and products, as well as to develop tools for rapid chemical evaluation and sustainable decisions. The CSS research program integrates advances in information technology, computational chemistry, and molecular biology to improve Agency prioritization of data requirements and science-based assessment of chemicals through signature research in Computational Toxicology. EPA investments in advanced chemical evaluation and sustainability analytics are providing decision support tools for high-throughput screening and efficient risk-based decisions. In addition, CSS research results are translated to provide solutions and technical support to our Agency partners and external stakeholders.

The HHRA program is focused on development of assessments to support Agency program decisions (i.e., Integrated Science Assessments, Integrated Risk Information System assessments, Provisional Peer Reviewed Toxicity Value assessments) and on development and application of new methods to improve risk assessments. The focus of the 2014 SAB/BOSC review is on the development and application of new methods for risk assessment, rather than on the assessment products (which are reviewed by SAB and other peer review panels).

Tailoring analytical assessment approaches to provide characterization of new endpoints as biotechnology advances requires development of new methods of dose-response analysis to transparently incorporate and integrate data across scientific disciplines and different experimental designs (e.g., epidemiology, controlled or clinical exposures, *in vitro* / *in vivo* / *ex vivo* toxicology). As our understanding of the key events for different diseases evolves, building bridges to systems biology

requires construction of analytical methods that can incorporate data on biomarkers from various disease dimensions (e.g., early or late-stage) in various tissues (e.g., blood or liver) of different species, and the ability to incorporate high-throughput data and adverse outcome pathways (AOP) with different

degrees of verification. To this end, the HHRA and CSS programs are collaborating to develop new science (CSS) and support and evaluate its application in various assessment products (HHRA).

### **Charge Questions**

- 6a.** Please comment on approaches the HHRA research program might target to better tailor its exposure and response assessment approaches to address fit-for-purpose characterizations (e.g., risk prioritization, risk screening, risk assessment).
- 6b.** Please comment on approaches proposed by CSS and HHRA research programs to identify and integrate novel data streams to develop innovative fit-for-purpose assessment products.
- 6c.** Are there other areas of fit-for-purpose characterizations (e.g., risk prioritization, risk screening, risk assessment) that are ripe for such collaboration/integration?

## **7. Homeland Security Charge Questions**

In past years the HSRP conducted research primarily to support the Agency's responsibilities related to the terrorism portion of Homeland Security incidents. The Agency has broadened the definition of Homeland Security to include all hazards (e.g., natural disasters, industrial accidents) and the HSRP aims to be in line with this new direction. The revised StRAP applies the research in the all hazards framework and provides new strategic directions related to all hazards research.

### **Charge Question**

- 7a.** What advice (e.g., strategic, tactical, structural) can the SAB/BOSC give to further guide the program toward this broader role?

While developing the 2016-2020 StRAP, the HSRP utilized a systems approach when constructing its research to support the Agency's responsibilities related to water security and resilience and indoor/outdoor cleanup. This systems thinking is incorporated into the research objectives, science challenges, and research topics and projects.

### **Charge Question**

- 7b** How could the research program better incorporate this systems thinking and engage its partners in this systems thinking from a strategic and tactical standpoint?

## **8. Roadmaps for Cross-cutting Issues**

ORD's six research programs are designed to focus on six key Agency priority areas. Inevitably, significant environmental issues arise that cut across these six programs. For example, climate change, while an important component of the Air, Climate and Energy research program, is highly relevant to the other research programs.

Rather than create additional research programs for every cross-cutting issue, ORD is developing Roadmaps for climate change research, children's environmental health, nitrogen and co-pollutants, and environmental justice. They "map" out the ongoing and planned research from each StRAP. ORD intends that each Roadmap include: articulation of the problem and why this is an area where ORD can play a leadership role; identification of several relevant topics for research; description of research in the StRAPs (ongoing or planned) that will address the issue; and identification of scientific gaps in these cross cutting issues that will inform the national research programs in the development of the next

StRAPs. As new, high priority, cross-cutting issues emerge, ORD expects to use this approach to integrate existing research efforts and identify needed work. ORD notes that the Environmental Justice Roadmap is still in an early stage of development.

### **Charge Question**

**8a.** How effective is each Draft Roadmap in presenting a problem statement, elucidating key research topics, capturing relevant research in each of the six programs, and identifying any important scientific gaps?

## **9. Integration Across the Programs**

In addition to cross cutting issues that are germane to most or all of the research programs, there are issues that are highly relevant to two or three of the programs. ORD is actively working to prevent research falling into six silos by strengthening ties across the programs. The alignment into six programs has been underway for two years and integration efforts between any two of the research programs are growing or are newly beginning. In some cases, integration requires formal planning while in others coordination and collaboration occurs in less formal ways as the research programs are planned and implemented. The goal is for integration across the programs to improve the science and better address environmental issues.

### **Charge Question**

**9a.** Do ORD's plans, taken collectively, indicate that integration, where appropriate, will develop the needed scientific knowledge and produce results that advance EPA's ability to address complex problems?