



S U P E R F U N D   B A S I C   R E S E A R C H   P R O G R A M

# Stakeholder Input

Responses from  
US Environmental  
Protection Agency

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## Introduction

As stakeholders in the panel proceedings, four EPA offices were requested to provide their input to the External Advisory Panel (EAP). These four offices, the Office of Research and Development (ORD), the Office of Superfund Remediation and Technology Innovation (OSRTI), the Office of Solid Waste and Emergency Response (OSWER) and the regional EPA offices, have been identified as end-users of research results.

The Office of Research and Development (ORD) is the scientific research arm of the EPA. Its mission is to conduct research to support EPA statutes to reduce environmental threats, provide technical support to the EPA program offices and regions, integrate the work of various scientific partners, and provide leadership in addressing emerging environmental issues and advancing the science of risk assessment and risk management. ORD conducts its research through its seven research laboratories and centers, with facilities located all over the U.S., as well as through its extramural grant program. ORD's research in support of the EPA Superfund program is conducted at several of these facilities.

Office of Superfund Remediation and Technology Innovation (OSRTI), located within the Office of Solid Waste and Emergency Response, manages the EPA Superfund program. It is responsible for providing the national guidance and oversight of the EPA Superfund program. OSRTI has issued and updated guidance in a wide range of fields such as site assessment, risk assessment, community involvement, and site remediation. The guidances are intended to promote consistent, cost-effective, and protective site cleanups nation-wide. OSRTI works closely to support and oversee the progress of the EPA regional office superfund programs.

In addition to overseeing the Superfund program via the OSRTI, the Office of Solid Waste and Emergency Response (OSWER) provides guidance on the land disposal of hazardous waste, the management of underground storage tanks, and the administration of the Brownfields program, which supports the remediation and reuse of potentially contaminated sites

The ten EPA regional offices, divided geographically, are charged with implementing EPA statutes and programs within their respective areas. These offices have the responsibility of implementing the national environmental programs and working with State and tribal governments to achieve the EPA's environmental goals. Superfund is one of the critical programs the regions are charged with implementing. To date, SBRP programs have reached out to establish collaborative relationships with five of the regional offices where they are located.

Each office was provided with four questions, designed to identify areas where SBRP and the EPA can collaborate more closely in the future as well as provide ideas regarding future potential needs of the EPA. The questions posed to the groups are as follows:

1. What are the key, fundamental scientific issues EPA faces regarding hazardous waste that should frame the SBRP research enterprise?
2. What are the emerging health/risk and remediation issues that the SBRP should anticipate and incorporate into future initiatives?
3. How can the SBRP best support the communication of research findings that may have direct and immediate application in EPA's Superfund program?
  - a. What program structures and strategies would best support this at the grantee level?
  - b. What can SBRP program managers do to facilitate this process?
4. What activities and relationships would suit the primary objectives stated above?
  - a. In consideration of the SBRP legislative mandates, what types (basic vs. applied) and mix (basic/applied) of research best meets the needs of EPA's Superfund program?
  - b. Are structures needed to encourage data sharing and coordination with EPA ORD/OSRTI/the regions?
  - c. Are SBRP conferences/workshops helpful for sharing research findings and exploring vital research issues? What other mechanisms should the SBRP employ?
  - d. Is it important for the SBRP to continue with Community Outreach? How could it be better used to serve the nation's Superfund program?

# **EPA ORD Input to SBRP's External Advisory Panel**

**Submitted by: Randall S. Wentsel, Ph. D., National Program Director, Land Research Program, ORD**

## **1. What are the key, fundamental scientific issues EPA faces regarding hazardous waste that should frame the SBRP research enterprise?**

- Reducing the uncertainty of risk assessment and research on emerging technologies for site remediation are important topics.
- Linking biomedical research on effects with exposure scenarios
- Linking epidemiological studies with effects from site exposure and informing risk assessments
- Using mechanistic toxicology to understand susceptibility, low-dose effects, and biomarkers
- Developing methods to assess the effects of chemical mixtures
- Using computational toxicity/genomics methods to address mixtures and streamline site assessment
- Creating research centers on issues such as mining, applied computational toxicity/genomics, contaminated sediments and ground water.

## **2. What are the emerging health/risk and remediation issues that the SBRP should anticipate and incorporate into future initiatives?**

- Green remediation
- Reuse of remediated sites
- Energy conservation in operation and maintenance of sites
- Asbestos fiber effects and exposure
- Bioavailability issues
- Revised risk assessment methods
- In-situ remediation technologies for all media
- Nanotechnology as a remediation tool

**3. How can the SBRP best support the communication of research findings that may have direct and immediate application in EPA's Superfund program?**

*a. What program structures and strategies would best support this at the grantee level?*

- I encourage the External Review Panel to examine whether the core requirement of “translating” the research results from the SBRP to the users of this research is meeting program goals.
- Direct application in the Superfund program can be defined as use at a site, incorporation into a risk assessment, use of science in guidance or in criteria, and technical support. Is this a role that the basic research program wants to embrace? In joint presentations between NIEHS SBRP and the ORD Superfund Research Program, SBRP emphasized basic research whereas EPA has emphasized applied research. I would suggest strengthening this relationship through collaborative research with ORD, linking of SBRP grantees to ORD scientists and technical support centers, and building EPA Regional relationships using ORD Superfund Technical Liaisons, which are located in each of EPA's ten Regions, as initial contacts for collaboration with Regional site managers and scientists.

*b. What can SBRP program managers do to facilitate this process?*

- Workshops with federal scientists on a given technical issue, e.g., ground water remediation, can build research partnerships and focus research areas.
- Site demonstration of technologies can build interaction with EPA site managers.
- Meeting with risk assessors to review current chemical or site-specific risk assessments could build greater understanding by grantees of the issues facing the Agency.
- Consider if NIEHS grantees and EPA/ORD researchers can team to address a given research topic.
- Continue core emphasis on graduate student education and students' peer-reviewed publications, which are important products of the SBRP.

ORD has spent a considerable amount of time to show the value of our research programs, and we would be happy to share our activities with the panel (<http://www.epa.gov/ord/lrp>). It is difficult for research outputs to lead to an immediate outcome. Often replacing a current technology or chemical level is an incremental process.

**4. What activities and relationships would suit the primary objectives stated above?**

- a. In consideration of the SBRP legislative mandates, what types (basic vs. applied) and mix (basic/applied) of research best meets the needs of EPA's Superfund program?*

An applied research program with research centers focused on specific issues of interest to the Superfund Program is a step that the SBRP program could consider. Stressing the link between biomedical research and risk-assessment parameters is another important area to consider.

- b. Are structures needed to encourage data sharing and coordination with EPA ORD/OSRTI/the regions?*

More can be done, e.g., via workshops, to encourage data sharing and technology transfer. ORD budgets \$2M per year to fund research topics, selected by the EPA Regions, in which Regional scientists work in collaboration with ORD scientists to conduct the research. The SBRP program could consider a similar program to enhance working with the EPA Regions on focused research topics.

- c. Are SBRP conferences/workshops helpful for sharing research findings and exploring vital research issues? What other mechanisms should the SBRP employ?*

ORD scientists have found the SBRP workshops and annual meeting to be valuable activities to communicate research and build coordination between agencies.

- d. Is it important for the SBRP to continue with Community Outreach? How could it be better used to serve the nation's Superfund program?*

The community outreach activities, from our point of view, appear to be productive and a valuable component of the SBRP. However, a response from the various community groups served by outreach activities would be a better indicator of its success.

If you have any questions or require any further information, please contact Dr. Randy Wentzel, the National Program Director for ORD's Land Research Program ([wentzel.randy@epa.gov](mailto:wentzel.randy@epa.gov), 202-564-3214).

## **EPA OSRTI Input to SBRP's External Advisory Panel**

Submitted by: Jayne Michaud, Office of Superfund Remediation and Technology Innovation

### **1. What are the key, fundamental scientific issues EPA faces regarding hazardous waste that should frame the SBRP research enterprise?**

For human health-related research, EPA needs improved accuracy of exposure assessments and demonstration of health risk reduction as a result of remediation. Other issues include: health effects studies at low dose exposures; tools to assess children's health risks, tools for improving environmental sampling and analysis of multiple media with multiple contaminants, and nanotechnology-related exposures and health effects.

In the field of ecological risk the issue of extrapolation of toxicity test results to impact to field populations has been a challenge. Cooperation research between population biologists and toxicologists would certainly be of an advantage to the government. We need to be working at the population level. The "individual" level discussions about the endangered Species Act and other ARARs tend to confuse the research. We do not evaluate risks to individuals.

### **2. What are the emerging health/risk and remediation issues that the SBRP should anticipate and incorporate into future initiatives?**

Superfund program needs health research on early life exposures and low level exposures to Superfund contaminants. Remediation issues include nanotechnology and SBRP should work to complement existing research on the human and ecological toxicity of nanomaterials.

### **3. How can the SBRP best support the communication of research findings that may have direct and immediate application in EPA's Superfund program?**

We recommend communication of findings pertaining to the priority issues OSWER has provided to NIEHS SBRP over the past two decades. SBRP could provide a useful service to EPA by synthesizing the research conducted for PCBs, arsenic, and other common Superfund contaminants studied by the SBRP grantees. Ecological research findings could be disseminated in an abstract newsletter where every 6 months or so an abstract of researchers progress can be reviewed by the general risk and remediation community. This could be placed on a web site. It will take on-going, proactive outreach by the NIEHS SBRP to the EPA Superfund end users to translate and disseminate useful, applicable research findings.

- a. *What program structures and strategies would best support this at the grantee level?*

Presentations to OSRTI at the HQ level-by the researchers.

- b. *What can SBRP program managers do to facilitate this process?*

Presentations to OSRTI at the HQ level by the researchers, not only NIEHS staff.

#### **4. What activities and relationships would suit the primary objectives stated above?**

- a. *In consideration of the SBRP legislative mandates, what types (basic vs. applied) and mix (basic/applied) of research best meets the needs of EPA's Superfund program?*

Basic seems to be the mandate, but NIEHS should be more consistent in how it demonstrates the value of the research to Superfund. Applied research is ORD's function but SBRP should stay informed of Superfund's applied research needs and activities. Overall, OSRTI recommends SBRP keep the focus on basic research but make sure there are opportunities to engage the researchers into discussions with practitioners on field applications.

- b. *Are structures needed to encourage data sharing and coordination with EPA ORD/OSRTI/the regions?*

To the extent possible, NIEHS and its contractors for the SBRP should communicate consistently with OSRTI and keep OSRTI abreast of the various SBRP outreach efforts to ORD, EPA programs and Regional offices. Cooperative meetings should be held where discussions can be held where there is the potential for the EPA practitioners to engage with the researchers to explore field applications. Field applications are a double edged sword. There is a real potential for advancing the site, but there is also the potential for the research to not work as predicted and a potential spurious result will then need to be explained. We do not withhold information from the public and we do not wish to unduly concern the public with research which may not be ready for field application.

- c. *Are SBRP conferences/workshops helpful for sharing research findings and exploring vital research issues? What other mechanisms should the SBRP employ?*

It is an advantage to bring the researchers to EPA meetings where the government personnel are already present. With the travel fund tight it is more productive to co-locate meetings with EPA practitioners; for example, Readiness

(National On-Scenes Coordinator meeting), NRPM (National Remedial Project Managers), or National Risk Assessors Meeting. The Ecological Risk Assessment Forum had a good interaction with the Toxicity testing group at the National Risk Assessors meeting in Seattle. The group was impressed with the work being conducted and was very interested in assisting where possible. Health-related workshops, such as bioavailability, are more beneficial and relevant to Superfund when program staff is involved. Therefore, SBRP is encouraged to leverage the Superfund program staff and existing EPA meetings and conferences rather than create new meetings. International Superfund meetings should be limited to those that have a direct benefit to the Superfund program. In particular, the NIEHS should reconsider holding annual international PCB SBRP meetings in locations where very few Superfund program staff can participate and benefit from interactions with invited scientists and speakers.

*d. Is it important for the SBRP to continue with Community Outreach?  
How could it be better used to serve the nation's Superfund program?*

SBRP should more clearly define "Community Outreach" and which stakeholders are included (Federal, State, Tribal, the general public). It is important that the researchers work with EPA to identify outreach needs before conducting research in a community. The SBRP could be improved by making sure grantees consult with EPA before designing a research agenda for a particular Superfund community.

## **EPA OSWER Input to SBRP's External Advisory Panel**

**Submitted by: Bill Sette, Ph. D., OSWER Senior Science Advisor**

Below please find my own thoughts regarding the questions that you posed to your External Advisory Panel and for which you also asked for EPA input. I have read the comments provided by ORD, EPA Region 3, and by OSRTI, and my comments, in large part, are meant to emphasize and reflect those recommendations that I found most promising. I have one additional general suggestion to pass along.

At SBRP's 20th Anniversary meeting, Dr. Bernie Goldstein made a suggestion that NIEHS consider reviving meetings between ATSDR, EPA, and NIEHS to consider their mutual interests and how to facilitate their interaction. This could take a number of forms. For example, the results of ATSDR health investigations at Superfund sites do define research needs, and could be directly useful to the SBRP. It might also be useful to collectively discuss research needs for specific chemicals across agencies, particularly for non-cancer assessments where both ATSDR and EPA (IRIS) have programs.

### **1. What are the key, fundamental scientific issues EPA faces regarding hazardous waste that should frame the SBRP research enterprise?**

Beyond the simple but broad and challenging, if not impossible, need to have up-to-date hazard assessment information on the major contaminants that are encountered in hazardous wastes, I would highlight a few key issues.

- Understanding hazards of materials in the exposure conditions in which they are encountered, i.e. in a multi-chemical, often low-dose environment to populations with varying susceptibility as a result of their life stage, genetic polymorphisms, other chemical and non chemical stressors, etc.
- Developing better methods for predicting and assessing exposures, including bioavailability, use of sensor technologies, and modeling.
- Utilizing emerging technologies in computational toxicology and high throughput testing to better understand hazards of multiple chemical exposures, often at low exposure levels, and to complex populations, basically to inform any step along the source-to-effect continuum.
- Developing better methods for remediation and its evaluation.

**2. What are the emerging health/risk and remediation issues that the SBRP should anticipate and incorporate into future initiatives?**

In addition to the example provided, nanotechnology as a remediation tool and nanoparticles as potential toxic contaminants at sites, I would suggest:

- the impact of the use of alternative fuels;
- the adaptation to the effects of climate change on cleanups;
- the use of green remediation as a means to reduce GHG emissions, to produce energy, or to store CO<sub>2</sub>, and
- sustainable materials management to reduce waste entering the environment.

**3. How can the SBRP best support the communication of research findings that may have direct and immediate application in EPA's Superfund program?**

- a. *What program structures and strategies would best support this at the grantee level? Example: the current research translation core requirement vs. other models*
- b. *What can SBRP program managers do to facilitate this process?*

I would echo and support the comments provided by OSRTI, ORD, and the regions, and noting in particular the potential for collaborative research between NIEHS grantees and ORD technical support centers, and with regional ORD Superfund Technical Liaisons. I also think that issue or topic area workshops or compiled information, e.g. websites can be quite useful.

**4. What activities and relationships would suit the primary objectives stated above?**

- a. *In consideration of the SBRP legislative mandates, what types (basic vs. applied) and mix (basic/applied) of research best meets the needs of EPA's Superfund program?*

While the program can be served by both types of research, the more specific needs of the Superfund program ought to lead to research aimed towards its specific applied needs. As an illustration, Bernie Goldstein in his SBRP 20th Anniversary remarks also noted that biomarkers need to be usable by regulatory agencies. In this context then, while the development of biomarkers of exposure and effect might be basic research, focus on the characteristics of markers that could support applied purposes, e.g. specificity to a contaminant and/or to toxic outcome, should be examined as an essential part of the research plan.

- b. Are structures needed to encourage data sharing and coordination with EPA ORD/OSRTI/the regions?*
- c. Are SBRP conferences/workshops helpful for sharing research findings and exploring vital research issues? What other mechanisms should the SBRP employ?*

Yes to both questions. See the remarks above under 3b.

- d. Is it important for the SBRP to continue with Community Outreach? How could it be better used to serve the nation's Superfund program?*

Yes. I would echo the comments of OSRTI seeking early input from EPA prior to outreach, and to seek community feedback after outreach to evaluate its effectiveness. Websites and available information in colloquial language can also be useful; here too, coordination with EPA is important in my view.

## EPA Regions Input to SBRP's External Advisory Panel

Submitted by: Wendy Hopkins Lubbe, Superfund Lead Region Coordinator, EPA Region 7

### 1. What are the key, fundamental scientific issues EPA faces regarding hazardous waste that should frame the SBRP research enterprise?

- Reducing the uncertainty of risk assessment and research on emerging technologies for site remediation should continue to be supported.
- More work on emerging contaminants like perchlorate, PFOA/PFOS.
- More work on older, problematic contaminants like dioxins, TCE, etc., to aid the Agency in decision making.
- Develop site characterization and analytical tools for contaminated ground water sites. For sites where facilitated transport is suspected, what are practical techniques and methods for evaluating whether the facilitated transport is due to co-solvency, colloidal transport, and transport with emulsions? How would this tool be used for both migration to groundwater and also migration within a groundwater flowpath?
- Conducting original research to determine the comparability of the various methods that have been used to analyze toxaphene (8081A and the modified 8081A "total area under the curve" approach) with the new GC-NIMS congener-specific data. The purpose of the study would be to determine if the historical data that has been collected to date can still be of some value to the Region in its decision making.
- Research on emerging characterization technologies, and their in-the-field effectiveness, that can define the location of subsurface source zones. Typically these will involve geophysical techniques and other sensors such as lasers that can be emplaced on subsurface probes.
- Field research on the effectiveness of DNAPL source zone remediation technologies. This should include nanotechnology evaluation.
- Economic analysis of remediation technologies.
- Support ongoing efforts to establish/update toxicity information for contaminants under review (i.e., TCE).
- Research to support development of toxicological info on emerging contaminants.
- Developing innovative methods for remediating mining-influenced waters, e.g., in-situ methods for remediating metals; remediation methods and technologies specific to high-altitude sites.
- Assessing mineral fiber (asbestiform) health effects and exposures.
- Understanding human health and ecological effects due to nanoparticle exposures.

- Developing methods for measuring long-term exposure concentrations at sites, e.g., vapor concentrations in indoor air.
- Developing low-cost, low-detection-limit site monitoring systems.
- Pharmaceuticals in the water.
- Risk-based asbestos.

**2. What are the emerging health/risk and remediation issues that the SBRP should anticipate and incorporate into future initiatives?**

- Green remediation and/or reuse of remediated sites.
- How to handle sites with asbestos fiber effects and exposure.
- More chemical specific bioavailability values for site specific risk assessments.
- Nanomaterials, of all chemical compositions, should be evaluated for both health and environmental effects.
- Emerging contaminants (believe HQ maintains a list).
- Green remediation.
- Alternative energy sources for remote sites.
- Metals recovery from water treatment.
- Impacts of in-situ leach mining practices on ground water resources.
- Bioavailability issues.
- Vapor intrusion has become a focus at our sites as we get more familiar with the circumstances around it. More work is needed in sampling devices and consistent protocols for how to determine risk.
- Arsenic uptake. For arsenic uptake, the topic is trying to determine an appropriate clean-up level for arsenic that was deposited in soils as a consequence of arsenical pesticide application in old, now redeveloped orchards.
- Use of genomic data in future risk assessment processes.

**3. How can the SBRP best support the communication of research findings that may have direct and immediate application in EPA's Superfund program?**

*a. What program structures and strategies would best support this at the grantee level?*

- Continuing to build relationships/communications between ORD and the Regions using ORD Superfund Technical Liaisons, which are located in each of EPA's ten Regions, as initial contacts for collaboration with Regional site managers and scientists.
- Provide easy access through EPA intranet and/or internet of past and ongoing research and/or results with contact information.
- The current research translation efforts are commendable. Where appropriate the SBRP staff should consider more workshops to bring

- More site demonstrations or joint pilot projects between Superfund sites and SBRP
- HQ TIFSD contact
- Branch Chief and Division Director Meetings
- NARPM
- Notices of available information

*b. What can SBRP program managers do to facilitate this process?*

- Provide workshops in the Regions where scientists/RPMs/OSCs etc. can get information on technical issues, e.g., ground water remediation, soil remediation, risk assessment protocols, etc.
- Provide site demonstration of technologies that have worked elsewhere
- Meet with risk assessors (Regional Risk Assessors Conference), RPMs (NARPM), and OSCs (OSC Readiness) to provide relevant information.
- Conferences as described above are useful. Ongoing/continuing coordination with the lead Regions for RCRA and Superfund should be maintained as well as with the NPD for waste, Randy Wentzel, and the Superfund Technical Liaisons and their Program Manager.
- SBRP often attends NARPM. In conjunction with the Technical Support Project, a meeting with RPMs and TSP staff as well as HQ staff at NARPM might help to refine further the research needs.
- Workshops focused on specific technical topics
- Presentations at EPA regional offices
- Development of a research center focused on mine remediation
- Conference/workshops, federal partnerships with more direct coordination and interaction with EPA

**4. What activities and relationships would suit the primary objectives stated above?**

*a. In consideration of the SBRP legislative mandates, what types (basic vs. applied) and mix (basic/applied) of research best meets the needs of EPA's Superfund program?*

- Basic research on emerging contaminants is needed. The hazardous substance list defines chemicals of most concern to the Superfund program. However, other contaminants are often co-mingled. Consideration should be given to research that examines other chemicals that are found in waste, perhaps from textile operations and the associated chemical dyes. Similarly, waste recyclers are often Superfund sites with a very mixed waste profile.
- Applied research on sensors and remediation effectiveness are an ongoing need.

- Applied research is important to the Region. Site-specific and topic-specific research is most directly useful.
- Since Superfund deals with actual issues as they occur the focus on applied research is the most beneficial. We frequently don't have time to wait for long-term research to deal with site specific contamination issues.

*b. Are structures needed to encourage data sharing and coordination with EPA ORD/OSRTI/the regions?*

- Continuing to build relationships/communications between ORD and the Regions using ORD Superfund Technical Liaisons, which are located in each of EPA's ten Regions, as initial contacts for collaboration with Regional site managers and scientists.
- Provide easy access thru EPA Intranet and/or internet of past and ongoing research and/or results with contact information.
- No, there are current structures available. The structures that come to mind are NARPM where key personnel are in attendance as well as the Technical Support Project forums (groundwater, engineering and federal facilities).
- Some structure exists, but it could be enhanced. For example, a working group of EPA and SBRP liaisons could be developed to help facilitate a greater sharing of research outcomes. A greater emphasis on and resources devoted to workshops and presentations of SBRP research would also help.
- I believe those structures exist in the national meetings and conference calls that take place throughout the year. The challenge is making sure the data is shared with all of those entities efficiently.

*c. Are SBRP conferences/workshops helpful for sharing research findings and exploring vital research issues? What other mechanisms should the SBRP employ?*

- Region 4's Superfund Division has not participated in many, if any, of these conferences/workshops in the recent past. More information is needed to adequately comment.
- They are helpful as are the internet seminars (webinars) that are currently offered. These overcome travel dollar limitations for EPA staff.
- They are helpful, however, with travel budgets continuing to constrict, SBRP should consider videoconferences and internet-based seminars.
- I'm not sure who from EPA attends these meetings. It would be helpful to see more info shared on this program throughout the Superfund Divisions around the country.

*d. Is it important for the SBRP to continue with Community Outreach?  
How could it be better used to serve the nation's Superfund program?*

- Impact from community outreach is not seen very well at the Regional level.
- Provide easy access through EPA intranet and/or internet of past and ongoing research and/or results with contact information.



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