

**Office of Solid Waste and Emergency Response (OSWER) Office of Superfund
Remediation and Technology Innovation (OSRTI) Science Integration for Decision Making
Fact-Finding Interviews
November 24, 2009
Washington, DC**

Four members of the SAB Committee on Science Integration for Decision Making interviewed the Deputy Director of the OSWER's OSRTI: Drs. James Bus and James Johnson in person and Drs. Catherine Kling and Thomas Theis by telephone. Following that meeting, the SAB committee members interviewed the Associate Director of OSRTI's Technology Innovation and Field Services Division. For each interview, Dr. Angela Nugent, Designated Federal Office for the committee, provided a brief introduction to the purpose of the interview. She also took notes to develop a summary of the conversation. All interviewees were provided a copy of the committee's Preliminary Study Plan in advance.

Dr. Nugent noted in each interview that the purpose of the interview was to help SAB Committee members learn about OSRTI's current and recent experience with science integration supporting EPA decision making so that the SAB can develop advice to support and/or strengthen Agency science integration efforts. Dr. Nugent thanked participants for taking time for the interviews.

Interview with OSRTI Deputy Director

Mr. Barnes Johnson

The committee members asked Mr. Johnson to describe how he viewed science fitting into the overall activities of his office and his decision making. Mr. Johnson responded that the Superfund Remedial Program made use of the most complex science for the most complex environmental problems. The Superfund Removal Program was more "surgical" - EPA "gets in and gets out."

The remedial program, also referred to as the "abandoned waste site program," focuses on longer-term clean-up of hazardous waste. Science and technical issues touch all aspects of the program. There is a long "purposeful process" involving the following steps:

- site assessment, which involves taking samples, laboratory analyses to determine the nature and extent of contamination, and monitoring. EPA must choose sampling strategies, deal with uncertainties, develop chemical methods, and summarize information in ways people can understand
- if EPA determines sites are worthy of cleanup, EPA conducts more intensive assessment that involves development of conceptual site models, modeling addressing multiple factors (e.g., geotechnical, hydraulics, subsurface water analysis) and using very detailed information.
- EPA then considers alternatives. The Superfund program employs nine criteria; nearly all (seven of the nine) involves social science. Evaluation of alternatives by criteria involves intensive consideration of scientific and technical issues. EPA conducts feasibility studies using the nine criteria to select among alternatives
- EPA designs chosen options

- The option is implemented

SAB members followed up with several questions. A member asked how staff stay informed about the huge body of external scientific activity relevant to remediation. Mr. Johnson responded that his office contained a division focused on technology innovation. Personnel identify and evaluate emerging technologies for addressing contaminants. The division has kept informed as technologies have evolved. The division looks at a wide range of innovative technologies, e.g., soil vapor extraction process, zero valent ion, subsurface walling systems, redox chemistry to mitigate contamination, bio remediation, in situ chemical oxidation. The division has a technology trends newsletter (sent to 25,000 people monthly), which receives a high level of user community feedback. The division maintains a Web site devoted to technological innovation forums (www.cluin.org) and provides "pretty elaborate training programs" in which EPA trains "thousands and thousands" of individuals in innovative technologies every year. EPA sponsors and participates in conferences. Staff are involved in "all sorts of networking" and participates in a federal facilities technology roundtable.

The division funds innovative technologies through a program that encourage people to take risks and try promising new technologies whose efficacy and speed are uncertain. His office asks regions to identify sites where innovative technologies could be considered. OSWER underwrites the clean-up. If the innovative remedy goes wrong, remedial clean-up is guaranteed and backed up by conventional approaches. The office publishes an annual report on new and emerging science. The reports provide a perspective on how previously innovative technologies become accepted.

In response to an SAB question, Mr. Barnes stated site clean-up involves evaluation of economics and community acceptance, in addition to efficacy of technology.

Mr. Johnson then discussed the sources of science used in the Superfund program. The office interacts with the National Institute of Environmental Health Science (NIEHS) on biology and health science issues through the Superfund Basic Research Program. The Superfund Science Policy Branch chief provides a liaison with NIEHS.

Mr. Johnson commented on impediments to introducing new science. One barrier for his program is shared across all EPA and involves evaluating latest toxicology information for high profile contaminants important to certain constituency groups where there are big financial implications. Examples are trichloroethylene, dioxin, and perchlorethylene. In such cases, the "science review is used to create long-term do-loops that keep us from getting the latest information implemented in the field." This dynamic delays the Integrated Risk Information System (IRIS) review process. Office of Management and Budget review and inter-agency review can present real obstacles. Peer review *per se* is not the obstacle -- some of these chemicals "couldn't be more peer-reviewed." Strong stakeholder opposition is really the issue. Arguments about how to interpret the available science are perpetuated to keep new science from being implemented.

An SAB member asked about how EPA could address the problem of using uncertainties in the science to delay environmental clean ups. Mr. Johnson responded that EPA has received

advice from the SAB and other groups about how to reflect uncertainties in risk assessments. EPA still struggles in general to bring uncertainty into risk assessments. Often EPA does not have the luxury of analyzing five or more studies that meet all the guideline criteria so there can be a collective characterization of uncertainties. More often, EPA has a couple of studies and one seems clearly superior. His office relies on other parts of EPA to provide toxicity assessments. Where that information is not available, his office evaluates assessments from the State of California's toxicology program or from the Agency for Toxic Substances and Disease Registry. His program scientists "look across the literature and pick what they think is the most appropriate characterization of evidence and go with that. They typically pick a driving study, using a weight of evidence approach and describe the confidence qualitatively." They usually use a model that generates a single number.

An SAB member asked whether Mr. Johnson has reviewed recommendations in the NRC *Science and Decisions* report and considered whether OSWER's approach could be improved with the report's recommendations. Mr. Johnson noted that he had not considered those recommendations.

Mr. Johnson noted that his technical staff is able to conduct many highly complex analyses, integrating detailed geological, hydrological, and toxicity data. In some cases, however, where a Principal Responsible Party might hire a modeler to perform a complex assessment, OSRTI might hire a contractor to evaluate that assessment

SAB members asked Mr. Johnson to comment on how his office works with communities and presents scientific information. They asked how OSRTI communicates alternatives and whether community input feeds into targets and options. They asked whether such activities involve behavioral and social scientists. Mr. Johnson responded that OSWER's new leadership is very committed to community engagement and involvement and very interested in risk communication. In OSRTI, there is a "whole area of practice" involving a national group of community involvement coordinators, whose precepts are to talk with communities as early as you can, as much as you can, and to be as open as you can. The group has been successful to various degrees.

Superfund authorizes OSRTI to award Technical Assistance Grants (TAG) so that technical experts can help communities digest the avalanche of technical information generated at every step of the Superfund process. He noted that it was very important to select TAG recipients that can really translate information and noted that "some of them do it well and some don't." SAB members asked how OSRTI evaluates the effectiveness of TAG activities. Mr. Johnson responded that OSRTI staff Bruce Englebert recently published an article in the *Journal of Environmental Management* evaluating the effectiveness of community involvement programs. The article summarized the results of a formal survey, approved by OMB, of five or six clean-up sites. The survey format and sampling strategy reflected rigorous and systematic work. It would be too resource intensive to conduct such surveys for every community involvement effort, but the study is a guidepost for future evaluation efforts. OSRTI is considering the use of social media tools to provide more real-time feedback in a less costly manner. He noted that OSRTI has used a wide range of community involvement mechanisms,

including hearings and workshops with booths staffed by experts so people could talk with specialists about different technical aspects of site clean up.

SAB members asked how OSRTI staff kept current with changing technology. Mr. Johnson responded that, in addition to attending professional meetings, workshops, and conferences, each OSRTI expert has an "elaborate network of practice." One example is the TRIAD, a monitoring network that has a web presence that welcomes all comers. New information is posted frequently, with information about conferences, internet sources, webinars, and remote training. He noted that OSRTI has been "ahead of the curve" regarding technology transfer. It has sustained a high level of performance and is now exploring social media and new technologies for information sharing.

Interview with the Assistant Director of the Technology Innovation and Field Services Division, Science Policy Branch Chief and Staff

Participants:

Dr. Helen Dawson, Chief, Science Policy Branch

Mr. Jeff Heimerman, Assistant Director, Technology Innovation and Field Services Division

Mr. Matthew Chawry, Science Policy Branch

Mr. Steven Chang, Science Policy Branch

The conversation began with a discussion of the work of the Technology Innovation and Field Services Division. The challenge for the division is to support OSTRI's need for "distributed decision making for land clean-up." Management decisions must continually rely on available science, where there is uncertainty because of the current state of scientific tools, knowledge, and science integration. The division has 70 people. It provides site-specific technical assistance in many ways. It manages a contract that analyzes 145,000 samples per year that are blind to the site, which meet Quality Assurance requirements, and feed analytical information to decision makers at the regional level. The division is responsible for the statements of work that set analytical standards for these analyses and conducts an audit program that guarantees the quality of the program. The division also has responsibility for training and knowledge transfer related to advanced technology, policy, and procedures for emergency response.

The chief of the Science Policy Branch then described her branch's efforts to keep abreast of the latest science. Individual staff members go to national science meetings (not just EPA meetings) and conferences. They look for opportunities to use the information to inform decisions about site remediation and assessing risks at sites. Members of her branch lead technical work groups to address key science issues relevant to OSTRI. The work groups include regional scientists, ORD representatives, and state scientists. The Science Policy Branch sends major work products to these workgroups for feedback. One example is the action plan to address Libby amphibole asbestos. Another example is the use of risk assessment modeling for lead risk assessment, one chemical for which the Branch uses modeling of blood levels estimated from soil concentrations rather than monitoring of blood levels to determine risk assessment levels. The goal is to use the best science to address issues that have a national impact.

Work products generated by the Science Policy Branch typically receive external peer review by experts identified by an independent contractor. In some cases, work products receive SAB review. The SAB asbestos review prompted OSWER to "go back to the drawing board to reevaluate." The branch has discussed not only how to strengthen that analysis, but also how to improve the workgroup process for developing future technical documents.

An SAB member asked how the branch handled the connection between science and policy. The Science Policy Branch Chief responded that, once assessments are completed, her staff works with regions to identify acceptable, implementable policies. The Science Policy Branch then works through EPA's Action Development Process with an Agency workgroup that includes representatives of different program offices impacted by a proposed policy. The workgroup develops options, which they discuss with the lead Assistant Administrator, then other Assistant Administrators. The policy is then sent to OMB and other federal agencies for review

The process for stakeholder input primarily involves informing stakeholders about the schedule for developing a new policy (one example was internet posting of the schedule for developing a new policy on dioxin) and taking formal public comment on the policy. The Branch Chief noted that OMB doesn't like a draft document to be released for public comment until OMB review has concluded. Sometimes OMB review "trumps" the science in formation of a policy. While OMB has "stymied development of some products" and review is influenced by the political tone of the day, nevertheless, the interagency process provides input that strengthens science products

The discussion then turned to the role of science input from ORD for OSTRI decision making. The Technology Innovation and Field Services Division does not generally consider ORD as a "technology development machine" for site clean-up. Instead that division looks at a broader marketplace for ideas and technology. The division looks for opportunities to take advantage of the huge investments made by the Department of Defense, Department of Energy, National Aeronautics and Space Administration, and National Science Foundation, especially from a demonstration validation perspective. The Science Policy Branch chief noted that ORD is responsive if OSWER provides funding for a specific toxicity study; one example is OSWER funding for in vivo and in vitro asbestos toxicity studies. ORD's National Health Effects Research Laboratory "stepped up to the plate" and devoted 10 scientists to that effort. The OSTRI managers noted that their priorities often don't get attention as part of ORD's land research program. OSTRI, as a result, seeks other partners. They have cooperative agreements with Argonne National Laboratory and the Army Corps of Engineers. The Technology Innovation and Field Services Division hosts a federal remediation technology roundtable that identifies and explores cutting-edge technologies and issues (e.g., vapor intrusion). Interviewees noted that there is not always a match between OSTRI's needs and ORD's interest, enthusiasms, and activities.

Both managers spoke of the importance of staff keeping abreast of the latest science, being the "eyes and ears" of the organization, acting like "beat reporters" following scientific and technical issues. They spoke of the value of the OSTRI's "Clu-in" Web site as a "go-to source" for technical information.

In response to an interview question, managers reflected on the usefulness of recent SAB and National Academy of Sciences reports. The Science Policy Branch Chief noted that it is useful to highlight the boundaries of science investigations and be conscious about how they affect decisions. She also noted the value of a recommendation in the recent *Science and Decision* report, which "hit the key issue of revisiting default assumptions to see if they are based on inertia or best information."

The group then briefly addressed the issue of uncertainty. In particular reviews (e.g., for the lead risk assessment) Science Policy Staff can evaluate existing literature and reevaluate assumptions. It is more difficult to address the issues of default parameters for risk assessment generally. One scientist spoke of the many uncertainties associated with groundwater, despite surveying the available information from Technology Innovation and Field Services Division, Office of Water, and Association of State and Territorial Solid Waste Management Officials. In some cases, OSTRI staff "don't know how to clean up some of this stuff" and can only manage to "stop it from spreading. Other staff noted that Clu-in and the efforts of the Technology Innovation and Field Services Division gave them confidence that they are using the state of the art.