**EPA Region 2 Science Integration for Decision Making Fact-Finding Interviews**
**December 17, 2009**
**290 Broadway, New York, New York**

Three members of the SAB Committee on Science Integration for Decision Making conducted three interviews in EPA Region 2: Drs. Jill Lipoti and Wayne Landis in person and Dr. Thomas Theis by telephone. For each interview, Dr. Vanessa Vu, Director of the SAB Staff Office, provided a brief introduction to the purpose of the interview and the Designated Federal Officer, Dr. Angela Nugent, 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. Vu noted in each interview that the purpose of the interview was to help SAB Committee members learn about Region 2'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. Vu thanked participants for taking time for the interviews and thanked Drs. Marian Olsen and Roland Hemmett for serving as liaisons with the SAB Staff Office in planning the interviews. Dr. Hemmett preceded the interviews with an overview of distinctive features of Region 2.

**EPA Region 2 Manager Participants (10:15 - 11:45 a.m. Session)**

Division of Environmental Planning and Protection
- Barbara Finazzo – Director
- Doug Pabst – Leader of the Dredging Sediments and Ocean Team
- Jeff Gratz – Chief of the Clean Water Regulatory Branch
- Phil Sweeney – Chief of the New York City Water Supply Protection Team

Emergency and Remedial Response Division
- Walter Mugdan – Director
- Doug Garbarini – Chief of New York Remediation Branch
- Ray Basso – Strategic Integration Manager, Chief of the Passaic River Study
- Vince Pitruzzello – Chief of the Program Support Branch

Managers described how science is a major factor in Region 2's dredging program and how it often points to costly risk management options that conflict with economic needs. Science is definitely a focus of stakeholder attention. Region 2 managers voiced concerns about implementing EPA's peer review policy. Although it is important to comply, peer review is often costly in terms of resources and time. It is often not clear what type of peer review is needed or how to frame peer review questions appropriate at a given stage of a project. It is difficult to fit peer review into EPA's regulatory schedule. At times, peer review seems to become a science project with a life of its own. Sometimes, peer reviewers provide "an academic view" that EPA should develop more data, when an EPA manager has a timeline to make a decision based on available data.

Managers reflected on the challenges involved in managing the peer-review process. One approach used by Region 2 for peer review in the Superfund process when there are

contentious issues is to arrange for a third-party neutral to select peer reviewers from a list of experts proposed by EPA and the principal responsible party. Because the Superfund program, is adversarial, the potentially responsible party hires expert consultants who challenge EPA's science. When the process works well, robust science results from the contentious process.

The dredging program also involves "dueling science" related to contaminated sediment in the New York-New Jersey Harbor. Region 2 has a strong relationship with ORD and the U.S. Army Corps of Engineers' Waterways Development Center at Vicksburg on science relating to dredging. A long history of industrial development has contaminated sediment in Region 2. Ocean dumping of contaminated sediment had been the default solution, but now environmental groups are challenging this option. Because science allows detection of pollutants and adverse effects at increasingly lower levels, EPA must engage scientists and the public in determining "how clean is clean" and convince the public of the wisdom of any sediment clean-up decision.

An impediment to the use of science arises, however, because regulations can't keep up with science. EPA's decisions need to follow the law and implementing regulations. The Marine Protection, Research, and Sanctuaries Act (MPRSA), also known as the Ocean Dumping Act, prohibits the dumping of material into the ocean that would unreasonably degrade or endanger human health or the marine environment. A team of oceanographers in Region 2 may help identify options for disposal of dredging material, but the public, including environmental groups, must be convinced that EPA is following the law.

Region 2 has taken several approaches to engaging the public and different factions of dueling science on the sediment issue. One approach was to involve over 1,000 stakeholders in a "United Nations" approach that involved too many groups and individuals early in the development of the science and policy options. Because of the complexity and controversy, that approach did not work well. Currently, peer review is the principal mechanism for reconciling dueling science. Region 2 has followed EPA's peer review process and negotiated charge questions with groups interested in or affected by the sediment issue. In one case, the contentious process for negotiating the charge was highly structured and took four years. Seven years later, EPA and the Army Corps of Engineers received the peer review and conducted the additional studies that peer reviewers identified as necessary to strengthen the science assessment. The Corps invested millions of dollars in studies. They attached radio transmitters on fish to monitor fish movements around sediment. They generated a robust data set that would support a probabilistic risk assessment, as recommended by reviewers. But, as new studies were published and data become available, the studies and data received additional scrutiny and challenge. Peer review did not provide protection from challenge.

Another example, from another program, was a variable introduced into a sediment transfer model being used in the Passaic River to evaluate current and future sediment and fish tissue concentrations. The peer-reviewers identified a specific variable to be included in the model. After two years invested in running the model with this variable sediment experts decided that the variable used was incorrect.

Ideally, managers would like Ocean Dumping Act regulations to allow more flexibility to work with available scientific information. Court rulings, however, have determined that EPA

must change regulations to achieve the flexibility desired. Exercising discretion, without explicit legal justification, raises public concerns about trust and a fear that EPA may be "tilting toward economic interests."

. Region 2 does not have economists on staff to help put a value on clean sediment and did not know if "EPA has economists" the Region could tap to help address this issue. The contaminated sediments reduction program may ultimately cost $20-30 million. If the benefits were clearer to the groups involved, some of the contentious issues could "go away."

Peer review also plays a role in the Superfund Program. Remedies over a certain threshold go to EPA's Remedy Review Board for evaluation. Sometimes issues go to a EPA's Contaminated Sediment Technical Advisory Group for reiview. The state also reviews remedies.

The Superfund Program has a structured assessment process that follows national regulations and guidelines. The program uses Integrated Risk Information System (IRIS) as a basis for toxicity values. IRIS values may sometimes not be based on the latest studies, but they are based on studies that are robust and well understood and extensively peer-reviewed..

The Superfund Program involves consideration of economics within the framework of cost-effectiveness within the nine evaluation criteria for Superfund remedial alternatives. Superfund charges EPA with developing a cost-effective solution. Region 2 evaluates effectiveness of remediation mechanisms and seeks to identify a less-cost approach that meet the threshold criteria of protection of human health and the environment and compliance with applicable or relevant and appropriate requirements.

Although the Superfund Process is highly structured, there is a "huge discretionary element at the tail end," because solutions must be human-health protective within a two-order-of-magnitude range, i.e., $10^{-4}$ to $10^{-6}$ range for cancer and also a Hazard Index equal to 1 for non-cancer. That range allows risk managers discretion to address social and economic issues as part of the nine criteria for evaluation of Superfund remedial alternatives. A manager noted that many public and technical controversies revolve around risk and exposure assessments (e.g., technical issues of whether an exposure assessment details whether typical exposure involves eating "fish with the head on" or "how often an individual eats fish from a contaminated waterbody"). It may not make sense to invest in the additional science to such a detailed level, when remediation decisions can be made in the $10^{-4}$ to $10^{-6}$ cancer range and a non-cancer Hazard Index equal to 1.

Other managers agreed that additional scientific precision often is not useful to managers and sometimes introduces complexity difficult to understand. Experts often disagree on technical issues and it is difficult to communicate the results of a complex model with many uncertainties to the public. One manager noted that the air program used a well-established approach for managing change in models over time; such a program would be useful for models in the Superfund and sediment management programs

Region 2 relies on science generated outside EPA to support many decisions. Managers rely on highly trusted local colleges and universities for specific expertise, such as Manhattan College and on relationships with other federal agencies. They also evaluate and use science generated by Potentially Responsible Party(ies) and their contractors. Region 2 managers did not view EPA scientists as national experts in some technical fields related to their programs (e.g., sediment modeling), compared with EPA's high level of expertise in air quality and modeling, which is recognized nationally and internationally. Region 2 receives some support from ORD's sediment/fish modeling experts in Athens, Georgia, but needs more technical support than those experts can provide based on resources and time constraints. Region 2 managers observed that their decisions depend on complex sediment modeling, which is difficult to evaluate, given EPA's current expertise.

Managers noted that EPA traditionally relies on principles to interrupt exposures if Agency scientists can't quantify risk (i.e., absence of a toxicity value)_. One manager wanted robust science that fully characterizes a problem to the extent possible so he will have flexibility to make the best management decision. The key question for him is whether it is worth investing billions of dollars in cleaning up the Passaic River. If the river will clean itself in 10 years, such a cost would not be worthwhile. He needs to consider available science related to sediment transport and human and ecological risk to help him make the decision. Data provided by discharge permittees, ambient monitoring data, and data to develop Total Maximum Daily Loads are used to check models and also provide information that feed into his decision.

A manager briefly described science integration for dredging projects less controversial than the Passaic River site. For most sites, project managers coordinate with the U.S. Geological Service, Fish and Wildlife Service, and the Agency for Toxic Substances and Disease Registry of the Centers for Disease Control and Prevention. Technical documents receive internal review, inter-agency review and where appropriate external peer review. Science integration impediments involve limited budgets for sites; potentially responsible parties that contest Agency science; and differing scientific interpretations across federal agencies working on a single site.

Region 2 managers described mechanisms to collaborate with ORD. The Superfund Program has an ORD technical liaison, who helps remedial project managers contact ORD laboratories. Region 2 has a special relationship with ORD's Narragansett and Gulf Breeze laboratories and holds weekly calls with those laboratories. Region 2 managers praised a recent technical workshop on storm water science issues organized by Region 1 and ORD, because it provided a valuable opportunity to exchange scientific information. Region 2's risk assessors work with ORD's National Center for Environmental Assessment, a source for exposure factor information and IRIS toxicity values and with other portions of ORD where appropriate. Regional scientists also coordinate with other regions and coordinate with the Agency's science Policy Council, Office of Science Advisor, and Risk Assessment Forum. Regional scientists also work with the Regional Science Liaison to identify resources within ORD.

Several managers described science integration for watershed protection. To protect the New York City watershed, Region 2 and other stakerholders work with Cornell University to promote agricultural practices that protect against pathogens and phosphorus runoff. Region 2

seeks to demonstrate effective strategies, such as waterfowl management, that protect watersheds in a cost-effective way. Where scientific data can show dramatic improvements in source water quality, science can help persuade people to participate in voluntary programs.

A manager mentioned planning for the future of land acquisition in the Catskills to protect the New York City watershed. Although a land acquisition program has protected the watershed in the past, it is unclear how much land acquisition will be sufficient for the future, and local communities want economic development and are resisting additional purchases. Region 2 could use a stronger base of science to help establish a reasonable threshold.

Managers discussed human resource needs related to science integration. To attract new scientists, Region 2 has used a student career employment program that allows the Agency to hire University students who work for 600 hours per year" as they study for their degree. One student in this program obtained a doctorate. To date, three students have completed this program and are working as risk assessors in the region. Managers have also taken advantage of the current economy to hire fairly well-trained new employees. Region 2 does not currently have succession planning. The age of the workforce differs across programs in the region because of different historical hiring patterns. Funds for travel and training are limited. Managers are able to send staff to a minimum of one professional scientific conference per year. Managers provide training funds for college courses and professional development and complimented the region's scientific speaker series. In addition, scientists are able to attend webinars, conference calls, etc. that are organized to provide training on specific scientific issues.

Managers acknowledged a need for more training and orientation to products and technical tools developed by ORD. Although some ORD programs provide strong technical support, there is no consistent approach to technical support for regions.

**Discussion with EPA Region 2 Deputy Regional Administrator, George Pavlou (1:00 - 1:45 p.m. Session)**

The Deputy Regional Administrator began the discussion by noting his pride in the caliber of Region 2's scientists, their commitment to the region, and their interest in learning the latest science. He also expressed pride in the region's scientific work products. Science permeates Region 2's activities and is a major focus of public meetings. In some ways, the science supporting decisions is the "easy part," compared to other factors.

He described a recent issue involving polychlorinated biphenyls (PCBs) in caulk, where he has developed an agreement in principle with the City of New York. PCBs have been used historically to make caulk malleable, but regulations under the Toxic Substances Control Act (TSCA) require that materials that have PCBs that exceed 50 parts per million (ppm) must be removed.

After PCBs were identified in caulk and local media focused on the problem, nine schools tested their caulk and identified PCBs **over 50 ppm.** The city took remedial action at those sites and the Parents and Teachers Association began to sue the school system.

As a decision maker, the Deputy Regional Administrator found himself in a quandary. Regulations require PCB removal, but PCB removal is very expensive and New York City schools have major budget issues. There is no requirement for testing, and even if PCBs are found, removal of the caulk may cause additional risks if not conducted appropriately. Nevertheless, members of the public pressured him to require the school system to conduct tests.

To make a more informed decision, he decided to defer decisions on testing caulk until the region and the public understood the overall context for PCB exposures (e.g., whether there are PCBs in floor tiles, or fluorescent lights) and was convinced that there was an unacceptable risk. The school system conducted air sampling and Mr. Pavlou consulted with Region 2's risk assessors about a "safe" level for cumulative exposures to PCBs, which was identified as 400 micrograms per cubic meter and also consulted with ORD about PCB detection technology. He took a Superfund-site approach, rather than a strict regulatory approach based on TSCA. He defined the problem, defined options, and then is moving to implement a solution. In his view, "science opens the door, helps the decision maker to frame questions, and get solutions." Science may even help to identify options that may not even exist within a specific regulation.

For the caulk issue, Mr. Pavlou intends to sign a "precedent setting agreement," which requires the school system to test five sites for PCBs in the air, caulk, and other media. He hopes that it will become a model approach, because risk management cannot ignore socio-economic issues, and regions must address emerging issues in a practical way.

He noted that such a complex and precedent-setting decision should be made at a senior-level, such as the level of Deputy Administrator, after consultation with peers in the Office of Solid Waste and Emergency Response (OSWER), ORD, and enforcement, and after elevating the issue for the Administrator's attention. Where science is not available, as in the case of the World Trade Center catastrophe, where there was no science indicating a safe return level or safe clean-up level, EPA must make the best decision it can, knowing that science will evolve.

In some cases, regulations do not give decision makers flexibility to make decisions based on science. TMDLs based on EPA-accepted state water quality standards for PCBs, for example, require facilities to reduce wastewater discharges to concentrations of parts per quadrillion. Technologies don't exist to reduce discharges to that level and even if discharges were to be so reduced, PCBs from other sources could re-contaminate the waterbody. Companies may now file suit because of these science issues, but if Region 2 sets policy based on the science and allows greater PCB discharge, environmental groups might challenge the alternative approach.

Mr. Pavlou spoke of barriers to science integration. He called for resources for more risk assessors so that programs beyond Superfund could have better access to science. He called for reassessment of priority chemicals with attention on children and vulnerable populations.

He also noted that it may be useful for the region to have more social science to inform policy. Risk managers need flexibility and decisions could be enhanced by analyses showing justification for taking socio-economic factors into account. He also acknowledged the need to represent tribal issues and tribal perspectives and the difficulty of factoring their concerns into

ecological risk assessment and climate change decision making. It may be helpful to engage social scientists to work with these concerns. He noted that he has asked tribes to consider ways they could monitor climate change impacts that would reflect their values and traditional knowledge, such as monitoring changes in growth of reeds used for basket weaving.

**EPA Region 2 Techical Staff Participants (2:00 - 3:30 p.m. Session)**

Division of Environmental Planning and Protection
- Clean Water Regulatory Branch
  - Doug Pabst – Leader of the Dredging Sediments and Ocean Team
  - Mark Reiss – Dredging Sediments and Ocean Team
  - Wayne Jackson – TMDL Standard Team
  - Rosella O'Connor – TMDL Standard Team
- Watershed Management Branch
  - Mark Tedesco – Long Island Sound Office
  - Rick Balla – New York Watershed Management Section

Emergency and Remedial Response Division
- Jon Josephs – Superfund and Technology Liaison
- Marian Olsen – Program Support Branch

Division of Environmental Science and Assessment
- Marie O'Shea – Regional Science Liaison

SAB members asked scientists to describe the decisions made in their programs and their role in those decisions. A risk assessor described his role in the sediment program, where he received "on-the-job training." The Superfund and Technology liaison described how he worked to advise ORD about regional needs. Another scientist described the Peconic Estuary Program and his role in synthesizing information related to atmospheric deposition, non-point source impacts, land use, and agriculture. He spoke of the need for social science to improve nonpoint source management and pollution prevention (e.g., reducing use of fertilizers on lawns)..

Other scientists spoke of the wide variety of models used in the TMDL programs. Some have few data and simple models, while others are data and model intensive and receive a high level of scrutiny from citizen's groups and regulated entities. In setting TMDLs, water quality standard coordinators work with the Office of Water, states, tribes, and regional staff needs and to provide regional staff with scientific and technological information needed to support decisions. However,, some of the information may not be as current as one would like.

Several scientists voiced frustration with peer review, which they had noted had been viewed as a "panacea to give us cover for our science." They noted that peer reviewers often provided comments from an academic perspective and sometimes provided comments that led the region away from safe, proven scientific areas. Occasionally, as with ecological assessments designed to support a sediment decision, peer reviewers "pushed" the region toward "overly elaborate models that did not contribute to decision making.

One scientist emphasized the importance of stakeholder involvement in developing EPA's science. Stakeholders often do not want to hear "some of the elaborate model outputs

peer reviewers want," He suggested that EPA should invest more in building public understanding of the limits of the data. EPA "can't hide behind peer reviewers." Scientists from the estuary program noted that they involve stakeholders during problem formulation and scoping in problem identification and study design. Scientists working with the dredging program, however, took a different view. In their contentious program, "you can't show a chink in your armor," but such an approach makes it difficult to "tweak and adjust" science.

Scientists expressed the desire that ORD provide very fundamental types of data on chemical hazard, rather than sophisticated models and genome effects, which do not provide a basis for regulatory decisions. An interviewee noted that regions find it difficult to fit into the ORD research planning process.

Region 2 interviewees were aware of ORD's ecosystem services research. They noted that there is currently no ORD Region 2 project on ecosystem services and overall a limited budget for ecosystem service research. Several scientists spoke of the potential value of such an approach for the New York City watershed and of interest in the Delaware Bay. Scientists noted that Region 2 had conducted a study of ecosystem services related to the Peconic Estuary 15 years ago. At that time, the ability to quantify services was data limited, because the region lacked local information about how land-use decisions were made. Members spoke about the important impacts of nutrients on coastal watersheds and the need to strengthen the science to understand non-point sources of pollution. There is a need to understand development density and intensity, alternative land-use options, and how people make land use decisions. Social science is a key to understanding land use, changing personal and community behavior, and social-base marketing. For problems where there are no regulatory tools, social science needs to become part of the management approach.

Scientists noted several barriers to science integration supporting decision making. Decision makers depend on updated science assessment and risk numbers. Although it is a labor intensive process to develop the assessments, important clean-up decisions depend on those assessments and should be made on updated values reflecting the best, most current science. There is also a need for ongoing processes to approve analytical methods, so EPA is not limited by using outdated methods. The region also needs modeling staff to run regulatory environmental models. Currently, the region depends on contractors to run many important models and to evaluate modeling provided by Potentially Responsible Parties. Several regional scientists suggested that ORD provide centers of excellence for modeling support.

Scientists noted that Region 2 provides "fair to good" support for travel and training for professional development. The challenge for regional staff is to find time for training. Several interviewees noted the value of technology-based training, such as Clu-in, where Region 2 scientists do not need to schedule several days or a week away from work. Although such electronic training does not provide the same kinds of opportunities for networking and personal interaction as a conference, it can be very useful.