

**EPA Region 3 Science Integration for Decision Making Fact-Finding Interviews  
January 19, 2010  
1650 Arch Street, Philadelphia, PA**

Four members of the SAB Committee on Science Integration for Decision Making conducted three interviews in EPA Region 3: Drs. Thomas Burke and Taylor Eighmy in person and Drs. Deborah Cory-Slechta and Thomas Theis by telephone. For each interview, Dr. Anthony Maciorowski, Deputy 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. Maciorowski noted in each interview that the purpose of the interview was to help SAB Committee members learn about Region 3'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. Maciorowski thanked participants for taking time for the interviews and thanked Mr. Stuart Kerzner for serving as liaisons with the SAB Staff Office in planning the interviews

**EPA Region 3 Managers (9:00 a.m. - 10:15 a.m. Session) Participants**

Mr. David Arnold, Director, Air Protection Division,  
Mr. Jon Capacasa, Director, Water Protection Division  
Mr. John Armstead, Water Protection Division  
Ms. Vicky Binetti, Water Protection Division  
Ms. Heather Grey, Office of Regional Council  
Ms. Cathy Libertz, Office of State and Congressional Relations  
Mr. John Krakowiak, Office of Policy & Management  
Mr. Wayne Naylor, Land and Chemicals Division  
Mr. Abe Ferdas, Land and Chemicals Division  
Mr. Larry Teller, Public Affairs,  
Ms. Kathy Hodgkiss, Hazardous Site Cleanup

A regional manager began by emphasizing that regions focus on implementation and enforcement of programs developed by national program offices. Science integration opportunities can be "intense" in new and emerging areas where path "isn't well worn" and science is needed to inform policies. Science plays an important role in decisions in the Chesapeake Bay program and mountain top mining. There are usually separate forums that provide input on policy and science issues to decision makers.

Managers addressed the unique aspects of regional work that present science integration challenges. One manager described how Superfund and RCRA "clean-up programs" depend on EPA's ability to absorb new science. The Integrated Risk Information System (IRIS) lags seven years behind schedule and, as a result, Potentially Responsible Parties (PRPs) can integrate new science into their site assessments in some cases when EPA regions can not. He expressed the desire for EPA's assessment programs to "absorb and digest" new science in the IRIS and Office

of Water Maximum Contaminant Level (MCL) programs. Currently, the public is aware of new scientific findings and "blames EPA" for not basing clean-up decisions on recent science. The lag in integrating available science into regional decisions creates a transparency issue difficult for regions to address. Vapor intrusion and trichloroethylene are key examples.

Another example of science integration at the regional level for clean-up programs involves ecological effects. Region 3 does have an active Biological Technical Administration Group (BTAG), with participation from the National Oceanic and Atmospheric Administration and Fish and Wildlife Service. There are, however, no standard procedures for ecological clean-ups. Sediment data on the Anacostia River show ecological effects at levels where there are no human health effects, but clean-ups are costly. There is a "significant feeling that we should be doing something" but no clear guidance for integrating the science.

Emerging challenges identified by science create another kind of science integration issues. Region 3 needs to address total dissolved solids related to mountain top mining and their impact on the environment. The region must take science-based action to address water quality problems created with drilling for natural gas in Marcellus Shale. EPA needs programs to address water quantity problems, to determine the "proper amount of flow." These issues do not fit easily into EPA's current regulatory programs. The region looks for opportunities across all EPA programs (regulatory and non-regulatory) to address problems.

The region has a complicated relationship with its states on these issues. For some issues, scientific findings seem to threaten important industries in a state. In other cases, EPA can fund state research (e.g., for source tracking of mercury, exposure assessments) that lead to a good dialogue with states and stakeholders). Sometimes a state leads in use of science in a program (e.g., Pennsylvania's Brownfield Program) and is an example for other states.

Region 3 managers expressed appreciation for the ORD Regional Science Liaison position, which enhances communication with ORD. The region also supports an internal regional science council, participates in the Regional Applied Research Efforts (RARE) and collaborates with ORD in sponsoring forums with states and academia (e.g., on connectivity, total dissolved solids, and climate change) that provide a science foundation for the region's work.

Region 3 also uses the Multicriteria Integrated Resource Assessment (MIRA) decision science model and related logic model. MIRA developed to support air rulemakings developed by Region 3 for making attainment decisions. Region 3 develops more rulemakings of this type than other regions. MIRA helps the regions integrate multiple levels of data through indexing data for comparisons and explicitly incorporating human preferences. Region 3 had a scientist expert in the analysis, a policy context where the decision-science approach was needed to integrate multiple kinds of expertise, and managers who were "comfortable and confident" enough to use the new tool. Managers noted that MIRA has also proved useful in explaining EPA's decision and supporting rationale to the public.

Region 3 managers expressed a need for a balance of scientists with backgrounds in physical science and engineering (especially for the air program), Environmental Protection

Specialists, and social scientists. Managers voiced concern that the federal Government's new hiring procedures create artificial barriers to hiring people with the kinds of expertise and training needed by EPA programs. Many excellent candidates want to work for EPA, but the hiring process makes it difficult to select them. And, where there are new personnel, an increasing number remain at EPA only for a short time, creating continuity problems. The region's laboratory has programs hiring scientists with the high level of expertise needed for analytical work. Managers noted that regional scientists are knowledgeable and nimble enough to work on problems as they arise, but Region 3 does not have all the expertise needed and often has to "search hard to get support from ORD." Region 3 managers noted that ORD often hires scientists, who, even though they are "terrific scientists," do not want to "do the applied science regions need." **Rather, there is often a conflict between ORD's obligation to doing more basic vs applied science and ORD researchers don't get the encouragement/support for applied science.**

One manager observed that "often ORD isn't even in the picture, can't move fast enough." Managers discussed the possibility of ORD scientific "Tiger Teams" to flex where regions are getting challenges and provide the best science. A model might be the Superfund Rapid Response Team. Region 3 managers noted that these teams form at the regional level.

Managers discussed the next challenges facing Region 3. The most urgent is Marcellus Shale, which involves subsurface gas drilling and hydro fracturing formations to extract natural gas in the Appalachians. The Appalachians offer a huge reservoir of natural gas, close to population centers. Region 3 used the Logic Model and MIRA to integrate information for problem formulation, is convening key offices at EPA to identify knowledge gaps, and is involving other federal agencies and states to discuss the problem and how to address it. This urgent issue has no research program supporting it, but yet are key science and research questions involving connectivity criteria, total dissolved solids, toxics from fractive fluids, and water quantity.

Another important issue involves sustainability and material management. One manager spoke of the need to develop the field of lifecycle analysis

Managers concluded the meeting by discussing impediments to science integration and discussing the impact of guidance received from the National Research Council and SAB:

- Lack of monitoring data on human health and environmental impacts, especially for groundwater quality and soil
- Lack of guidance from public affairs offices about communicating uncertainties to the public. If EPA scientists have conflicting data or interpretations, how transparent should communications be about these "less-than-perfect decisions?"
- Need for guidance on risk communication. Complex risk assessments for well-studied chemicals, with multiple endpoints and data susceptible groups are difficult to communicate. EPA may have a rich data base on a chemical like Perchlorate, but it is unclear whether all the effects are actionable and how to communicate the science and its importance.
- Need for NAS and SAB reports that translate science advice into actions for EPA regions.

## **EPA Region 3 Scientific and Technical Staff (10:30 a.m. - 12:00 a.m. Session) Participants**

Mr. Stuart Kerzner, Acting Regional Science Liaison  
Mr. Joel Hennessy, Land & Chemical Division  
Ms. Kathy Davies, Hazardous Site Cleanup Division  
Mr. Bill Hagel, Hazardous Site Cleanup Division  
Ms. Erin Sullivan, Office of Policy & Management  
Dr. David Kargbo, Environmental Assessment & Innovation Division  
Ms. Ellen Schmitt, Water Protection Division  
Dr. Cynthia Stahl, Environmental Assessment & Innovation Division  
Dr. Amy Bergdale, Environmental Assessment & Innovation Division  
Dr. Al Cimerelli, Environmental Assessment & Innovation Division  
Dr. Janet Kremer, Environmental Assessment & Innovation Division  
Dr. William Jenkins, Environmental Assessment & Innovation Division  
Mr. John Butler, Land and Chemical Division

The first participant spoke of EPA's slow progress towards integration. Risk assessment provided a first step, but EPA's statutory framework and organization reinforce stove piping. Integration requires a change in statute or a "management imperative backed up with resources." Integration requires more than a guidance document or pilot project. Another participant commented on difficulties communicating across divisions even within Region 3. Region 3 recently completed a "2010 analysis" attempted to address environmental health of region and look beyond individual program areas. It highlighted the need to characterize uncertainties in science and enhance communication, especially between the air and water programs.

Participants spoke about barriers to integrating information for decision making, including:

- Academic training encourages reductionism and limited acknowledgement of other disciplines' perspectives.
- For traditional issues, it is hard to acknowledge new information, new interpretation of data
- Interdisciplinary work difficult (e.g., experts often speak different languages and have different assumptions)
- Managers sometimes act as if science can "make the decisions" and that values don't enter in, but values must be integrated as well. Stakeholders don't believe the message that science compels environmental decisions.
- Limited availability of ORD science for regional needs (one participant noting... "Don't find much of the D in ORD;" others, in contrast, commending the Athens lab for support of regional needs); ORD reward structure rewards publications, rather than support for regional needs
- Participants observed that STAR grant participants were not generally useful to the regions, because STAR grantees often have projects of limited interest to the region.
- Scientists do not always participate in the scoping/problem formulation stage that precedes risk assessment. (Superfund and RCRA corrective action projects do generally involve scientists in scoping projects in their initial stages)

Forces encouraging integration include:

- Different forums across EPA encouraging information exchange (e.g., Groundwater Forum, Federal Facilities Forum, Risk Assessment Forum)
- Regional science details with ORD centers and laboratories
- Scientists' individual networks and the ORD Regional Science Liaison .
- Some participants reported great luck using ORD's "Science Connector" to identify ORD scientists working on a topic (nuy other participants noted that the system, like many others, was not fully populated with useful information.)
- The MIRA paradigm provides a process for scientists to contribute to problem formulation and scoping. Once a decision context is identified, it allows scientists to identify disparate pieces of data that will be significant indicators and index their significance. The process forces different scientists to assign a value to their indicator on a decision scale.
- Use of models, such as the CADDIS model, that shows ecological problem formulation for large problems like Marcellus Shale, so managers, scientists, and stakeholders can visualize stressors and impacts and identify data gaps.

Scientists emphasized that even when new tools for scoping and developing conceptual models are successful at integrating data together for analysis, full integration depends on breaking down stove-piped environmental management (the CADDIS tool, for example, may identify concerns about private drinking wells, but EPA does not have programs to address them). Scientists also may tee up complex information for decision makers, only to hear that "the science isn't good enough for a decision," a response that constitutes a decision in itself, either made consciously or unconsciously, about the value of information.

Several scientists agreed that integration is more than looking at the sum of program impacts sequentially and it is more than looking at transdisciplinary knowledge. It is the use of these insights for good decision making, explicit consideration of the benchmarks for evaluating whether an upcoming decision is a good one, and ongoing evaluation of decisions by explicit criteria. Such science integration for decision making requires a long time frame.

### **EPA Region 3 Deputy Regional Administrator and Senior Managers (2:30 p.m. - 3:30 p.m. Session)**

Mr. William Early, Deputy Regional Administrator

The Deputy Regional Administrator spoke of the intense need in Region 3 for science-based decision making and Region 3's progress over the past four years in using the logic model to and MIRA process to identify key priorities. The "2010 report" uses science and data in a structured way to identify Region 3's key priorities. Many of them cut across traditional program areas. The Region's leadership on MIRA and other decision science applications developed as EPA responsibilities grew and its budget declined. Region 3 found it a practical way to define

where to invest and where to disinvest, how to manage program integration, and how to explain these choices in a coherent way. The MIRA approach is valuable, but it is still challenging to get the scientific and modeling information needed to make it work as effectively as it can.

Region 3 managers and staff are increasingly looking at integrated impacts. There is increased attention to cumulative and synergistic effects. These activities track with the Administrator's priorities. Maps and geographic information systems help the region look at clusters of effects over time and space. Region 3 forms interdisciplinary buckets with staff across divisions to break down stove pipes and address priority issues (e.g., energy bucket, clean communities, mountaintop mining). This approach allows the region to identify "whatever regulatory hooks we have" for priority challenges, such as mountaintop mining. A division director typically supervises a "bucket." Project coordinators develop work plans that identify responsibilities for members across the organization.

The most significant barriers to science integration occur when EPA lacks direct information to address a problem and must rely on anecdotal information. Where that occurs for high priority issues, Region 3 turns to ORD and other partners for science and data to inform decisions. There are opportunities for greater alignment between regional needs and ORD's focus. It would be helpful if ORD developed workable approaches for cumulative impact analysis and took note of regional cross-media, cross-program concerns. It would be helpful to establish an ongoing dialogue to discuss "individual and collective group responsibility" for meeting the science and research needs of the regions. There are needs especially for more IRIS numbers that reflect recent science and have meaning,

The science rationale for EPA's decisions affects Region 3's relationships with its states. States look to EPA for science and consistency, because they lack resources and view science as EPA responsibility.

Region 3 is considering succession planning for "brain drain and retirement issues" that cluster in some divisions as significant proportion of staff grow older. The region will need to plan for scientists to step into essential technical functions. There is a need for economists, social scientists and behavioral scientists in the region to address community health and cumulative risk questions. There is a "much more involved and skeptical public who are concerned" and asking "what this all means for me." EPA needs to have discussions with all sectors of public and needs to communicate its science and what it means in terms of cumulative risk. There is a significant need to present science and information more effectively in public meetings and press releases.