

**EPA Region 8 Science Integration for Decision Making Fact-Finding Interviews  
December 15, 2009  
1595 Wynkoop Street, Denver, Colorado**

Four members of the SAB Committee on Science Integration for Decision Making (Drs. Catherine Kling and Rogene Henderson in person and Drs. Terry Daniel and Thomas Theis by telephone) conducted three interviews in EPA Region 8. The first interview included a subset of thirteen scientific and technical staff, the second with a group of eight managers and the final interview was held with the Acting Regional Administrator. For each interview, Dr. Anthony Maciorowski, Associate 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 8'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 Ms. Patti Tyler for coordinating the fact-finding sessions with the SAB Staff Office.

**EPA Region 8 Scientific and Technical Staff Participants (10:00 - 11:30 a.m. Session)**

Mr. Bob Brobst, Environmental Engineer, Office of Partnerships & Regulatory Assistance, Wastewater Unit  
Dr. Angelique Diaz, Environmental Engineer, Office of Partnerships & Regulatory Assistance, Indoor Air, Toxics & Transportation Unit Program  
Dr. Susan Griffin, Senior Toxicologist, Office of Ecosystems Protection & Remediation, Technical Assistance Unit  
Ms. Mary Goldade, Senior Environmental Scientist/Chemist, Office of Ecosystems Protection & Remediation, Technical Assistance Unit  
Mr. Karl Hermann, Water Quality Monitoring and Assessment Coordinator, Office of Ecosystems Protection & Remediation, Water Quality Unit  
Ms. Marcella Hutchinson, Environmental Scientist, Office of Ecosystems Protection & Remediation, Watershed and Aquifer Protection Unit  
Mr. Dan Jackson, UIC Program Energy Coordinator, Environmental Engineer, Office of Partnerships & Regulatory Assistance, Groundwater Unit  
Dr. Kristen Keteles, Toxicologist, Office of Partnerships & Regulatory Assistance, Pollution Prevention, Pesticides and Toxics  
Mr. Steve Wharton, Risk Assessor, Office of Partnerships & Regulatory Assistance, Solid & Hazardous Waste  
Ms. Sandra Spence, Environmental Scientist, Office of Ecosystems Protection & Remediation, Water Quality Unit  
Dr. Jim Berkley, Environmental Engineer, Office of Ecosystems Protection & Remediation, Watershed & Aquifer Protection Unit

Ms. Carol Russell, Climate Change Coordinator for Water, Office of Ecosystems  
Protection & Remediation, Watershed & Aquifer Protection Unit

Ms. Patti Tyler, Science Advisor and Science Liaison to ORD, Office of the Regional  
Administrator

An SAB committee member introduced the discussion by asking participants to comment, based on their experience in Region 8, on any of the five areas below of interest to the committee:

- Practices for integrating science to support decision making
- Consideration of public, stakeholder, external scientific, and other input in science assessment
- Drivers and impediments to implementing past recommendations for science integration
- Ways program receives feedback on how science is used in decision-making
- Workforce to support science integration for decision making

A scientist began the discussion by describing how Region 8 personnel helped respond to Hurricane Katrina and responded to the Murphy Oil spill in 2006. EPA staff used a decision tree that structured how to evaluate environmental conditions quickly and effectively. The use of science was so effective that EPA staff provided a large volume of information to Federal Emergency Management Agency for action very quickly. Similarly, to address the Murphy oil spill, Region 8 scientists evaluated a complex mixture of diesel, gasoline, and organic compounds and worked with stakeholders to systematically clean up hazards. The systematic approach received positive feedback from stakeholders. EPA has mobilized scientists for emergency responses associated with forest fires through Burn Area Emergency Rehabilitation Teams and has taken a similar approach.

Focusing on a different type of decision, the scientist spoke of EPA's need for more long-term, (e.g. "decadal") effects studies of the impact of biosolids pollutants over time. He noted that many current decisions are based only on two-year studies. He spoke of the need for quantitative standards that can help guide qualitative standards in waste water permits. Narrative nutrient standards, for example, and criteria such as "no toxics in toxic amounts" are problematic for permit writers, because they are difficult to interpret and enforce.

Another scientist spoke about science-integration pitfalls in ecological assessment. Based on his experience in three regions and in ORD, he observed that EPA still focuses on human health to the exclusion of ecological concerns. Although EPA has adopted some new ways of thinking (e.g., environmental justice, community involvement, tribal concerns), the Agency is a "long way" from integrating these concerns into rulemaking and site specific decisions. There is a need to bring socio-economic considerations into decisions and more fully incorporate tribal values and traditions. Impediments to integration are EPA's "stove pipe" organization that presents barriers to information flow and statutory and regulatory constraints. Regions have a different structure for feedback on science from ORD. Regions do not typically conduct field or laboratory studies and undertake peer review. Instead, for Superfund, the region typically relies on an internal remedy review board, where it is often a "challenge to bring science to the table and get attention." An example from 12-14 years ago was a "beautiful marsh" in Davenport, Iowa, contaminated with lead because of a historical skeet range. Data demonstrated wildlife mortality, but the regional review board did not take action until a

potential human health risk to trespassers was identified. He noted that at a national level, the current dioxin reassessment was driven by human health concerns, despite a large body of evidence showing ecological effects. In general, science supporting human health risks is more readily integrated into waste management and Superfund decisions than science on ecological effects.

Yet another scientist discussed groundwater protection and underground injection decisions. He described groundwater as an "unknown universe," that is, a virtually unseen resource existing in a complex and often unpredictable setting with high lateral geologic variability. EPA is tasked with protecting underground drinking water sources from contamination from injection practices. Decisions, however, are generally based on a random sampling of wells and the core definition of "contamination" is a difficult concept to interpret. "Contamination" basically means any substance not originally present in the groundwater. However, baseline conditions can be difficult to establish using existing data, because the data generally are fairly sparse, even random, especially for very shallow and deep non-production zone aquifers, and it usually exists in fairly limited datasets.

Such groundwater characterization issues become important due to several significant emerging groundwater protection issues related to injection for in-situ uranium recovery, carbon geosequestration, aquifer recharge, and potentially unconventional gas (shale gas) production. Regulating carbon ge-sequestration injection potentially could involve a relatively massive human resource investment to hire and train regulatory agency scientists. To be effective in regulating geosequestration injection, EPA's future workforce must have, and continue to develop and improve, reliable professional capacity to evaluate carbon dioxide plumes in four dimensions (e.g., spatially and through time), over a timeframe of 10-to-200 years, including capability to interpret remote sensing data such as multi-component four-dimensional seismic data, and to evaluate complex groundwater and geological models and geochemical monitoring results. The public generally lacks knowledge about groundwater and groundwater science, so uncertainty, doubt and even fear can make it difficult to effectively communicate the complex scientific evaluations involved in agency data gathering and decision making.

Radiation science in Region 8 was the next topic. A scientist described the challenge that exists in overcoming Region 8 stove piped programs to work beyond one program on radiation issues and communicating complex science, poorly understood by most people, on a "highly political topic." She noted several possible impediments to science integration:

- Highly technical people (e.g., engineers and toxicologists) are managed by "non-technical people" who may not fully understand the technical details of science supporting decisions
- Because the topic is highly political and the science is often not completely understood, people may use their personal opinion on the topic instead of the scientific data, and the proper integration of science into decision making may be impeded.
- Too often science receives only limited or no peer review
- Some staff work outside their area of expertise, because of resource constraints
- Contractors conduct some of the region's technical work, and the region needs to strengthen its science base to fully evaluate contractors' work

- Limited hiring of knowledgeable radiation scientists/engineers may result in EPA being ill-prepared to address the many technical radiation challenges we are faced with.

EPA radiation scientists have multiple mechanisms for information exchange. There are monthly teleconferences for radiation scientists in EPA laboratories, ORD, program offices, and the regions. Rulemaking workgroups, as for National Emission Standards for Hazardous Air Pollutants for radon emissions from uranium mill tailings, allow opportunities for science to contribute to regulatory development.

The next scientist described her 13-year history in the Source Water Protection (SDWA) and Nonpoint Source (CWA) programs, both voluntary programs. The NPS program has a limited budget and lacks regulatory authority to address non-point sources of pollution to water bodies. The program promotes best management practices based on science. As a watershed coordinator, she evaluates non-point source projects and related monitoring developed by states to determine "if environmental benefits are happening." Although she is a geologist, she devotes most of her time to grants administration. She finds it hard to find time to monitor environmental benefits and expand her knowledge of the science underlying water quality remediation and protection of ground and surface waters.

In contrast, the next interviewee described her intensive involvement in science issues, where she has worked on projects where there are promising but not firm links to decision making. She listed at the start several impediments to science integration:

- EPA as an agency has not invested in hiring new scientific and technical staff and providing existing staff with meaningful technical training over the last 8 years. It is not clear if this is simply an artifact of budget limitations but it has had an impact on staff development and capabilities.
- EPA as an agency appears to lack systematic planning for the science needed to support regional decision making. It is not apparent whether EPA HQ is sufficiently organized or structured so that problems are clearly identified and strategic approaches to addressing such problems (problem formulation, analytical planning, development of data quality objectives, formulation of decision rules) are developed, implemented, and communicated to the regions. Hence, EPA as an agency has difficulty in making progress on national issues even when the pollutant impairments or technical issues have been understood for decades (examples include nutrient and pathogen impairments in surface waters). This lack of strategic planning impacts the regions such that we have to address these issues on a case-by-case basis using our own technical assessments (for example nutrient target setting in TMDLs when no nutrient water quality standard is available). This places the burden on the regions to move forward in areas where national policy is undecided leaving us vulnerable and open to legal challenge. One wonders how EPA as an agency will make progress on more difficult problems such as the environmental impacts of endocrine disruptors when we continue to struggle with these older issues.
- EPA appears to have an aversion to political and fiscal risk, but not an equal aversion to environmental risk. She noted that only 4% of sewage treatment plants have effluent limits for nutrients, although the science showing adverse impacts of nutrients is firm and EPA has regulatory authority in this arena.

She briefly described her efforts to assess avian risks from mercury in the Great Salt Lake. Although Utah issued an avian consumption advisory in 2004, the state did not address the Great Salt Lake because there was no approved process for evaluating data. Stakeholders identified a problem. She partnered with the state and the Fish and Wildlife Service to gather and evaluate data on avian impacts and has leveraged resources by using interns to complete an analysis that finds measurable risk associated with avian diet in the Great Salt Lake. She is hopeful that this scoping study will be used to affect water quality decisions, but is not clear about how the decision making process will integrate this new information.

The next interview participant expressed the view that the SAB's science integration for decision making effort did not appear to have a problem statement. In his view, integration, may not be the problem with EPA science, instead it may be its credibility. He suggested that rather than assume what the problem is, a root-cause analysis should be conducted to identify the problem(s) to assure that the SAB study is addressing root causes instead of symptoms. He offered "Questions, Comments, and Suggestions" (Attachment A), along with several publications and white papers,\* for the SAB to consider. From his point of view, credibility and salience of EPA science and engineering and legitimacy of process are key concerns at EPA internally and with the public. He suggested that the context of EPA's work and thus the criteria for credibility, salience and legitimacy has changed since the creation (1970) of the Agency and that EPA has not explicitly acknowledged these changes and accounted for them in the way it does business. He suggested EPA address the three previously mentioned criteria by:

- Acknowledging that the EPA assumption that the public accepts experts as the sole source of credible information no longer holds
- Providing clearly written science and engineering policies and approaches as described in the Bipartisan Policy Center Report
- Making greater use of open and transparent processes that make use of third-party review of science and engineering products in controversial projects
- Enhancing EPA problem solving ability by defining distinctions among science, engineering, policy, and politics in science-policy decision making discussions.
- Providing well articulated set of principles and guidelines for the effective use of science and engineering advice in decision making

His remarks were echoed by another scientist who voiced concern that EPA must maintain the transparency of its science to maintain public trust and EPA's credibility. Regional scientists, in her view, need to understand science and decision making and translate science for communities. She expressed confidence that even poor, uneducated communities can help

---

\*Bipartisan Policy Center. 2009. Science for Policy Project; Interim Report

Government of Canada. 2000. A Framework for Science and Technology Advice: Principles and Guidelines for the Effective Use of Science and Technology advice in Government Decision Making. CAT.No. C2-500/2000

Cash, D., et al. 2002. "Salience, Credibility, Legitimacy, and Boundaries: Linking Research, Assessment and Decision Making." John F. Kennedy School of Government, Harvard University, Faculty Research Working Papers Series

Ludwig, Donald. 2001. "The Era of Management is Over." *Ecosystems* 4: 758-764.

Pielske, Roger A., Jr. 2007. *The Honest Broker; Making Sense of Science in Policy and Politics*. Cambridge University Press

make sound decisions when they understand the central principles and findings underlying EPA science. As an example, in the Animas watershed, a stakeholder process was used for developing science-based TMDLs. To maintain this transparency, regional scientists and decision makers must have access to the full scientific assessment for a chemical and be able to describe uncertainties. An example is metal toxicity. It is important to look at different metal compounds, bioavailability, and speciation because different metal compounds behave differently in the environment. Regional decision makers can make more effective, practical decisions, if they can take more complete risk information into account. In her view, EPA needs to be more resilient and respond to changing issues and science more quickly to provide the information regions truly need.

The next scientist also focused on risk assessment and science integration issues for regions. Although EPA scientists are excellent and EPA has published outstanding risk assessment guidance, EPA's National Center for Environmental Assessment has not provided the scientific information needed with respect to the IRIS Program. "Program offices pick and choose science to protect their decisions and strip out uncertainties, all in the interest of a corporate culture of control and consistency." One example is carbon tetrachloride. The SAB reviewed EPA's draft assessment and identified pros and cons concerning the use of linear defaults, but the final IRIS file simply included discussion of the linear default. Because the resulting assessment was simplified and does not follow EPA's 2006 cancer guidelines, EPA regions lost access to key science and the flexibility to use it for decision making. Citizens in communities want to negotiate novel approaches to address environmental problems that can abate environmental hazards and meet economic and social needs, but regions are limited by the risk assessment information provided by national programs. Regions are capable of communicating information about variability and uncertainty to communities. Once these nuances are communicated and understood, many new options are possible. "When we are just given a number, all this is taken off the table."

Ecological assessment was the topic of the next speaker who reaffirmed a previous scientist's observation that EPA still focuses on human health to the exclusion of ecological concerns and noted science integration opportunities for EPA to gather ecological data for ecological risk assessment while it collects human health data. Economies of scale are possible, if a more integrated approach were planned and implemented. She provided a long list of impediments to science integration:

- She echoed concerns about reduced technical training and expertise in the region and sensed a "vise-grip stunting" the region's scientists.
- She voiced distress that her unit has a policy that no one can attend a professional conference without presenting a paper, a policy that stifles information exchange and personal growth.
- Region 8 has an increasingly limited number of scientists available to support the inherently governmental function to review contractors' products to ensure that they support EPA's decision making needs and meet guidelines and science policy.
- Region 8 does not consistently get "Scientists to the table" when decisions are made. Only project managers who appreciate science input ensure that scientists are involved.
- Difficulties accessing ORD science and getting support for regional issues.

The next scientist offered a cross-regional perspective based on prior experience in Region 1. She noted that Region 1 has incorporated ecological risk assessments in decision making especially related to site-specific hazardous waste sites and consistently brings scientists from different disciplines to the table when decisions are being made. Region 1 has a strong commitment to its Regional Science Council, which facilitates science integration across regional programs and activities.

Region 8 does have a regional science program that offers opportunities for integrating scientific information into programmatic decision making. , ORD's regional science program sponsors the Regional Applied Research Effort (RARE). Regional Methods, Regional Science Workshops, Regional Research Partnership Program (RRPP). RRPP is an opportunity for a regional scientist to participate in a short term training opportunity at an ORD laboratory or center.

She also noted barriers to science integration. She agreed that ecological risk assessment does not receive the same weight or attention in decision making as human health assessment. Efforts to develop an approach to cumulative risk have taken "way too long." EPA has delayed developing approaches for evaluating non-chemical stressors. Other impediments include:

- Lack of sufficient training funds
- Need to increase expertise in decision sciences
- More effective mechanisms to resolve differences among technical staff in Region 8 on science issues
- Lack of understanding about where the regions fit into the "ORD transformation" being planned and a need for a formal collaborative process to demonstrate an equal partnership between ORD and the regions
- More ORD attention to regions' needs for technical support.

Emerging science and EPA's lag to keep up was the focus of the next speaker. She noted that emerging science related to endocrine disruptors highlights the role of timing of exposures, but current regulations don't take this factor into account.

She also called for EPA to take a life-cycle or "precautionary" approach before it supports new technologies or new uses of chemicals. Tire crumb, for example, should have been evaluated more fully before EPA supported its use for children's playgrounds and ball fields. Stove piping and lack of communication between program offices prevents EPA from conducting a full life cycle risk assessment "up front." The result is a costly effort "*post hoc*" to assess children's exposures to tire crumb waste, a problem that could have been prevented. She also expressed the view that science exists to support an EPA approach to cumulative risk and voiced concern that some Agency products, like the National Air Toxics Assessment , were influenced more by politics than by science and do not include recent science.

The final scientist participant spoke of his role using science in EPA's water programs supporting states' 303(d) and 305(b) listings. He expressed concern that ORD has abandoned some activities like Environmental Monitoring and Assessment Program, which benefited Region 8 and the states. He spoke of the importance of stakeholder processes in strengthening science for environmental protection. Colorado has a strong and meaningful process that

allows stakeholders to raise questions about EPA science. As a result, Region 8 scientists are "pushed to do better science," to use all available scientific data, and to evaluate the data from different perspectives.

### **EPA Region 8 Manager Participants (1:00 - 2:30 p.m. Session)**

Dr. Mark Burkhardt, Director of Golden Laboratory, Office of Technical and Management Services

Ms. Karen Hamilton, Chief of the Water Quality Unit, Office of Ecosystems Protection & Remediation.

Ms. Deborah Lebow-Aal, Manager of the Indoor Air, Toxics and Transportation Unit, Air Program, office of Partnerships & Regulatory Affairs

Ms. Nancy Morlock, Manager of the Corrective Action Unit, Solid & Hazardous Waste Program, Office of Partnerships and Regulatory Assistance

Dr. Deborah McKean, Chief of the Technical Assistance Unit, Program Support, Office of Ecosystems Protection & Remediation

Ms. Melanie Pallman, Program Manager of the Pollution Prevention, Pesticides & Toxics Program, Office of Partnerships & Regulatory Assistance

Ms. Sandra Stavenes, Program Manager of the Wastewater Unit, Office of Partnerships & Regulatory Assistance

Ms. Patti Tyler, Science Advisor and Science Liaison to ORD, Office of the Regional Administrator

SAB members asked managers to describe their decision making practices, the decisions made in their organization and the role that science plays. Managers were also asked about the processes for public and stakeholder involvement, impediments to bringing science into decision making and workforce issues that affect science integration into decision making.

One manager described the Superfund program and described the Libby Montana site as the exemplar. Her unit includes toxicologists, hydrogeologists, and modelers, who respond when a remedial project manager requests technical support. Libby is a large and complicated site that will have far reaching implications on other asbestos sites. Key decisions are made throughout the analysis process: in the development of sampling and analysis plans, definition of exposure, choice of toxicity factors, and exposure factors. The region typically convenes a technical work group with risk assessors from OSWER, other regions, and ATSDR for peer review of technical documents like sampling and analysis plans. If the community feels methods are insufficiently sensitive, the region seeks their input so that site-specific investigations can include local knowledge. The regional team holds public meetings on a regular basis to provide progress updates to the community. The analysis might "pull in a number" from IRIS, but if the region feels that the IRIS toxicity values are not relevant, site-specific studies will be conducted such as animal laboratory studies to derive a site-specific cleanup standard.

She has not had much experience with retrospective assessments and the use of science in Region 8, but did describe her experience with past Incidents of National Significance and partnerships with the National Homeland Security Research Center (NHSRC), CDC and

Department of Homeland Security in an effort to develop a "more scientifically based clean-up goal rather than a non-detect level" for anthrax. NHSRC sought an approach that would provide a scientifically-based, yet cost-effective clean-up goal that included the involvement of the local public health and community members, this protocol was reviewed by the SAB. .

The next manager reflected that science integration was not difficult for the water quality program. Data limitations, instead, were the principal issue. Developing nutrient criteria on an eco-regional basis is resource intensive, yet essential. The science is enormously complex and costly to establish nutrient criteria. When EPA requires wastewater treatment plants to reduce nutrient emissions, green house gas emissions go up, and EPA "scrambles to research that question" with limited resources. Sometimes interns and volunteers fill the gap. Her staff attempts to fill the gap but it's "a struggle." There are limited funds for professional development and conferences. Travel funds are typically reserved for providing technical assistance or investigation.

She described a controversial science integration issue involving generation of a selenium water quality standard for the Great Salt Lake, one of the few efforts to develop a selenium water quality standard specific for that water body. The state of Utah, working with stakeholders, developed a standard based on a scientifically sound study of this unique water body by a panel, noted selenium experts who gathered specifically for this 4 year, \$2.5 M research study. EPA has provided support through grants and workgroup participation, but has not yet approved the proposed standard because the Fish and Wildlife Service (FWS) alleged EPA would violate the Migratory Bird Treaty Act if it approved the standard. The FWS advocates a stricter standard (in part based on a no-effect concentration vs. an EC 10 concentration) and views the state's (an approval organization) proposed standard as allowing a "taking" of birds.

The next manager described how RCRA decisions rely on risk information. The Region 8 states are authorized for RCRA and with the exception of a few sites in the region that are being directly implemented by EPA. The states have the lead for RCRA. The region's role is technical assistance and oversight of the authorized state programs. EPA provides staff support or contractor support to the states on issues such as groundwater modeling and risk assessment as requested. Each year, Region 8 reviews a sample of state decisions to evaluate appropriateness and efficacy. The RCRA process mandates public involvement; some states provide opportunities for substantial public involvement.

Several managers commented on retrospective assessments of science used for decision making. A manager noted that the Superfund program has a review requirement of decisions as part of each site's five year review. The Superfund Remedy Review Board conducts these reviews to ensure national consistency. Another manager noted that there is a requirement for water quality standards to be reviewed every three years to incorporate new science. The public has the opportunity to bring new science to the table and new science also can come from ORD. The Agency has been inconsistent in meeting this requirement. A manager noted that in the last administration, states had no triennial review for three cycles.

Several managers noted that EPA receives criticism whenever it makes a decision and that the level of controversy doesn't depend on whether bad or good science is used. It was noted

that if the scientific information is available, EPA is eager to use it. EPA's science is strong but the transition to policy appears to be more challenging. SAB members asked whether additional investment in science communication would be useful. Managers responded that effective communication and lack of public understanding were not the key issues. There is controversy when people don't like EPA's decisions. One manager expressed concern that given limited budgets for research, it may not be wise to invest in risk communication.

An SAB member asked managers to comment on Region 8 staff concern that contractors are increasingly tasked with scientific work and that staff do not have the time or sometimes the expertise or appropriate software tools to evaluate contractor's work. Managers responded that Region 8 programs have project officers responsible for implementing quality assurance/quality control processes to review contractor's work.

Managers discussed the role of science in controversial issues. One manager noted that EPA is generally confident about its science. In the case of the Utah selenium standard for the Great Salt Lake, the policy issue is the focus of controversy, not the science. Another scientist spoke about "dueling science" at the Pavillion Wyoming site involving hydraulic fracturing perspective production zones. Chemical analytical tools can be used to determine the presence of constituents and can be further used in case preparation. Another manager spoke about the misalignment between radiation science and implementation of outdated guidance that make revising radon standards difficult. Federal programs have internal struggles over interpretation and implementation of existing guidance. Another manager spoke of "dueling science" concerned with the "woody biomass issue" involving air quality issues associated with fuel burning, where there is a paucity of data, outdated policies in which a definition of carbon neutral is needed. These issues have resulted in disagreements between EPA and the Forest Service.

Managers spoke of the need for new ways to interact with ORD. One noted that ORD scientists are specialists, but that Regions have broad research and data needs. Many key regional needs don't fit within ORD long-term research plans. Other managers acknowledged this as a long-term issue. In general, if ORD science exists to help address a regional issue, Region 8 will use it. Otherwise, Region 8 uses its "own resources" to obtain the scientific information or conduct the necessary research.

One interviewee called for more strategic thinking at EPA on science issues. There's a need to anticipate the need for scientific data, so toxicology and other sciences can be ready to assist decision makers in making policy decisions. For example, a recent concern arose about the problems of PCBs in caulk in one of the other EPA regions. In Region 8, no monitoring has been done to determine whether or not PCBs in caulk is a problem in our region. Therefore, we may or may not be making decisions which adequately protect the regulated community. Another example is the limited information we have about the blood lead levels in tribal children. If more information was available concerning the tribal children's blood lead levels then we may be making different decisions on funding tribal lead programs. In the past, the lead program has made additional funding available where blood lead levels are high; however, areas where blood lead levels have not been tested have not received adequate funding. EPA is using

science in decision making, but there is the need to have that science available and EPA has not had adequate funding to ensure that this science is always available.

Some managers discussed possible new approaches to providing the science regions need. One manager proposed cadres of national experts devoted to particular topics. A directory of EPA's expertise was also recommended. Region 8 could identify its particular expertise niche, such as metals toxicity. Another manager spoke of Cooperative Research and Development Agreements (CRADAs) that permit regions to identify needs and collaborate with ORD and external experts. Such agreements result in usable products and foster relationships among experts. He also suggested that EPA plan for succession and encourage GS-13 scientific staff to build relationships with ORD scientist to maintain their technical expertise.

The last manager discussed the disconnect between the regional programs and regional laboratories and noted that regional laboratories are not tapped as scientific resources, as a "regional asset." The technical input of the laboratory scientists is not always considered. There is a need to monitor and develop new analytical methods for emerging chemicals, such as pharmaceuticals, personal care products and endocrine disruptors. He noted the need to balance between the short term and long term needs and his goal of having "resident metal experts," reducing the need to "chase down ORD experts." However, this collaboration within the region would require lab involvement in project planning, strategic focus on priorities and team building.

Discussion with the EPA Region 8 Acting Regional Administrator, Ms. Carol Rushin (3:00 - 4:00 p.m. Session)

The Acting Regional Administrator reflected on 25 years in Region 10 and Region 8 focused on implementing environmental regulations and policies. Almost every implementation action involves science. Some actions are informed by established methods and collection of data and others involve scientific information that is "less than clear," such as narrative standards and conflicting opinions surrounding the interpretation of the science, "dueling science".

Science does not always introduce clarity and a bright line. For example, in the air program, Region 8 evaluates criteria for evaluating the complex science (in air monitoring, modeling, meteorology, the demographics of changing population growth rates, and economics) in state implementation plans (SIPs). Even with the good processes in place, there remain disagreements when evaluating the weight and importance of the criteria, due to the significant economic impacts SIPs can have.

Community involvement is a requirement when determining decisions for Superfund sites and there are times when the community objects to a decision despite the high quality science or the states acceptance. She noted greater confidence in making those decisions when site-specific data has been collected and alignment between viewpoints of the regional and national scientists exists. She commented that more attention to social sciences might assist the region to better assess community interests earlier in the process.

She feels most comfortable when the region makes site decisions using site-specific data that represent local conditions rather than having to depend upon default values. As an example, ambient air and blood lead levels were collected at a site in which the community voiced concerns about children's blood lead levels. The region investigated the downward trend of lead concentrations in ambient air and blood for over 10 years and ultimately found the strongest exposure pathway from airborne emissions. The region had the necessary time and resources to study and complete the assessment.

In the absence of site-specific data, EPA uses default values that are difficult to explain to communities. To communicate science effectively to communities in such cases, we establish interactive relationships, build trust, and share data and progress updates on a continual basis. The ideal scenario is to engage the community throughout the process. Such an approach is working well at a Wyoming site, where the region has developed a communication strategy and shares analytical results with the community on a regular basis to respond to environmental question posed by the community. EPA has had the money, time, and technology to explain findings and uncertainties. Region 8 has had more mixed results at the Libby, Montana site, where EPA initiated their investigation following reported adverse health outcomes, cases of asbestosis and mesothelioma. One of the technical challenges has been the inability to measure amphibole asbestos. However, risk management objectives were clearly defined during clean-up formulation and many removal actions have already been completed to reduce exposure. Toxicological and epidemiological studies along with activity based sampling are currently being conducted to support the derivation of risk based cleanup levels that are protective of human health and the environment. The community is pressing EPA to develop a cleanup level, but currently the region does not have the necessary toxicological information. Region 8 has invested considerable resources towards the remedial investigation of this site. It has stationed staff to live in the community; funded contractors to conduct activity based sampling; and funded a grant for a physician to conduct an epidemiological study. The community is impatient with the uncertainties and "just wants a green or red light."

Ms. Rushin noted that when the Region uses standard Agency toxicity values, there is less focus on uncertainties, although regional managers and scientists realize that the values change over time when new scientific information or data becomes available. As a manager, she realizes that "a lot of up front work" goes into developing health-protective national standards; and, as a result, she is confident about these values.

SAB members asked Ms. Rushin to comment on aspects of the scientific and technical workforce that may need attention. The Acting Regional Administrator responded that Region 8 has a fairly senior staff, with individuals who have the ability to synthesize decades of work. It is a challenge to strategically hire so that bright new staff can work in tandem with those retiring, to gain their institutional knowledge. She spoke of the need to collect environmental data that can be stored in accessible databases and used to meet multiple purposes to validate modeling and strengthen our decision making. She suggested the Office of Research and Development and Office of Environmental Information as leaders for this activity.