

WM2016 Conference Panel Report

PANEL SESSION 120: **Interagency Community of Practice in Risk and Performance Assessment**

Co-Chairs: **Rateb (Boby) Abu Eid, US NRC**
Ming Zhu, US DOE EM

Panel Reporter: **Linda Lehman, CH2M**

Panelists:

1. **Horst Monken- Fernandes, IAEA, Austria**
2. **David Esh, US NRC**
3. **Stuart Walker, US EPA**
4. **Kevin Brown, Vanderbilt University**
5. **Paul Black, Neptune & Associates**
6. **Ming Zhu, US DOE EM**

Summary of Presentations

Approximately 35 people attended the Community of Practice Session which was convened by Dr. Ming Zhu to present lessons learned from experiences in risk or performance assessment. The audience was largely DOE EM contractors or DOE personnel engaged in risk or performance assessment.

Dr. Ming Zhu gave the opening overview presentation. He claimed that regulatory compliance is a top program driver for EM cleanup and closure activities. Of particular concern to the regulators are impacts of proposed remedial actions on health and the environment.

Site-specific performance and risk assessments are conducted to assess these impacts and are used to inform and support management decisions associated with CERCLA, RCRA and NEPA, as well as a DOE Order 435.1 and NDAA Section 3116 compliance.

The Performance Assessment Community of Practice was established in 2009 to provide a means to address consistency early and throughout the PA process and to provide a forum to share information regarding state of the art and specific models, data and approaches and to serve as an enduring data and modeling resource to minimize duplication of effort across DOE and train future generations of PA professionals. In 2013 the group was broadened to include risk assessments.

The P&RA CoP is governed by a steering committee through a Charter; but otherwise is self-regulating. Objectives include:

- Consolidate and expand the body of knowledge relating to the preparation and application of P&RAs that incorporates the concept of model and data reuse applicability and builds on lessons learned across the DOE Complex.
- Draft appropriate additional guidance, based upon this agreed-upon body of knowledge in a clear and easy to understand manner with particular emphasis on continuing improvements to the consistency of approaches for P&RA implementation

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- Provide support to DOE sites in the initial stages of developing and planning P&RA activities

Dr. Zhu discussed recent achievements and noted that they had developed a list of webinars that are held on a quarterly basis.

Dr. Horst Monken-Fernandes reported his experiences in Stakeholder Involvement and communication in risk-based decisions in environmental remediation. He claims that although cultural backgrounds are diverse, perception about radiation risk seems to be very similar. One must take care to be clear in the words you use to discuss or describe problems as the various words can be misinterpreted. Words such as remedy, cleanup, and contamination can require more explanation in many cultures. IAEA is questioning how available information affects the views of the public on energy-related projects. They also recognize that the public perception of risk will have an effect on remediation and decommissioning. An example was shown of Central Asian use of uranium mill tailing sites, where people swim in or drink the contaminated water and use tailing dumps for grazing animals, or building materials.

Monken-Fernandes listed four main groups of issues:

1. Long term issues: uranium mines remain dangerous after closure
2. Burden to indigenous people
3. Influence of historical legacy sites and lack of regulatory regime; and
4. The use of scientific evidence to propagate fear.

Another example was given regarding the un-reclaimed uranium mines within the Navajo Nation, where the extent of toxic waste is still unknown, yet people talk about using Indian lands to store nuclear waste. What is the “peace dividend” for the Navajo people?

The IAEA is trying to address these issues through publications and a proposal for a Project termed “CIDER Phase 2, which will focus on developing and implementing a communication and stakeholder involvement strategy in the framework of Decommissioning and Environmental Remediation programs at the IAEA.

Dr. David Esh spoke about Lessons Learned from multiple decades of PA reviews. Dr. Esh broke his presentation into four main discussion topics as follows:

1. Performance Assessment
2. Model Reviewability
3. Quality Assurance, and
4. Model Support

Performance Assessment – Dr. Esh walked the audience through the steps of creating a performance assessment going from the natural system, to the conceptual model, then the numerical model where estimated performance is calculated. Esh discussed good practices to be those that:

- Incorporated past, present and future observations into the analysis
- Model support was provided

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- Multi-faceted QA program is implemented
- Complexity is only introduced if necessary
- Completely transparent and traceable document is provided

Model Reviewability is important

- Documentation of the modeling is as important as the modeling itself
- Analysis and documentation must be transparent and traceable
- Data traceable to the source
- Model decisions should be documented, basis for assumptions and elimination or consideration of alternate conceptual modes, or FEPS

The QA program must address, data, experiments, software, models, observation and design.

Model Support should have elements of Verification and validation. Principles of model support include:

- Multiple lines of evidence
- Direct observations
- Level of support based on risk significance
- Longer experience requires less support
- Natural analogs for very long term performance
- Support encompasses the full range of future conditions

Esh concluded that initial efforts on quality and attention to detail will pay large future dividends.

Stuart Walker discussed lessons- learned and best practices in the risk assessment process based on his superfund experience and how they have been incorporated into EPA guidance.

1. Develop and adjust a good Conceptual Site Model

Walker stated that risk assessments should be tailored. Know when to replace default parameters with site-specific information or when to add or subtract exposure scenarios. EPA has guidance on Conceptual Site Models for all 6 of their dose assessment models.

2. Show consistency in your assessments of radioactive and chemical contamination

Out of 66 NPL sites with rad COCs, 65 also have chemical COCs. Use similar levels of protection, assessment methods and cleanup processes.

3. Develop tools to explain your risk assessments to the public. Ensure that tools are developed for the public, not for engineers, scientists or lawyers. Have some national tools, such as documents and videos that explain common questions and concerns. One good video is *Superfund Radiation Risk Assessment and how you can Help, an Overview*. EPA also has a Community Toolkit which was developed to help the public understand the risk assessment process. The Toolkit is made up of a collection of 22 fact sheets. The fact sheets also contain a compendium of information on the PRG and DCC Calculators.

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Kevin Brown indicated that a performance assessment is a confidence building exercise and several lines of evidence are necessary. You should begin with the end in mind and include expectations and guidance for how to satisfy performance objectives. Here you can introduce the different points of compliance and different times, such as 1,000 years and 10,000 years.

You should start early and provide open communication with your regulators and stakeholders. Transparency can pay tangible benefits. Initial focus should be on defining the likely scenarios as opposed to compounding conservatism. All models are wrong, some are useful.

Managing uncertainty is hard and effectively communicating the results may be harder yet. Remember uncertainty does not always decrease. Probabilistic tools such as GoldSim can play an important role in parameterization, sensitivity analysis and decision making.

Do not lose sight of the big picture by focusing on specifics and detailed analyses. There is natural tension between detailed, individual analyses of well-studied phenomena and coupling necessary phenomena. As tools get better there is a tendency to rely more on the predictions.

Dr. Paul Black discussed his thoughts and ideas. He began by defining several terms such as risk, values and uncertainty. He spoke of two types of risk, decision risk and unacceptable health risk. Black also asked what Risk-informed environmental decision making means? Black laid out some basic principles for PAs as follows:

- Decisions are made by evaluating decision risk
- Human health and environment risk are components of decision risk
- Decisions are made about populations rather than individuals
- Decision risk decreases with time (social discounting) and you need insurance to address possible future concerns.
- Probabilistic modeling should be performed in the context of decision risk

Black described Decision Analysis as “formalized common sense”. It is a set of tools for structuring and analyzing complex decision problems. It is an approach for making logical, reproducible and defensible decisions in the face of uncertainty, technical complexity, and competing objectives.

Risk-informed Decision Making is the evaluation of (multiple competing) trade-offs using decision analysis. Considering objective such as:

- Environment – eco risk
- Economics – costs of actions that are or may be taken
- Social – quality of life, engagement of stake holders
- Regulatory – legal – need to comply?

The P&RA CoP facilitates information sharing such as its webinars, meetings, web-sharing of information via a steering committee. Is there more we can do? Possibly:

- Greater engagement with the community

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- Webinars are helpful, sharing presentations is helpful, but more communication happens at technical exchange workshops. Where the focus is on real technical issues.
- You should consider developing guidance (White papers?) for technical issues of importance.

Black stated there are some difficult challenges ahead and:

- Thoughtful solutions are needed for good decisions
- Conservatism often leads to poor decisions
- Deterministic models do not allow uncertainties to be evaluated properly, and
- Stakeholders should be involved throughout the process