Performance Assessment Community of Practice - 10468

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ABSTRACT

The Department of Energy (DOE) Office of Environmental Management (EM) Performance Assessment (PA) Community of Practice (CoP) has been chartered to advise the Tank Waste Corporate Board regarding PAs and PA-like analyses, promote consistency in the preparation of PAs across the Department of Energy complex, to foster exchange of information among PA practitioners, and to develop appropriate guidance for PAs such that they are based on sound science and are defensible. The CoP is jointly chaired by representatives from the DOE Office of Waste Processing (EM-31) and the DOE Office of Environmental Compliance (EM-41).

The inaugural event for the PA CoP was a technical exchange on "Modeling the Performance of Engineered Systems for Closure and Near-Surface Disposal" held on July 13-14, 2009 in Salt Lake City, Utah. The technical exchange was attended by roughly 75 people, including representatives from National Laboratories, contactors, DOE Field Offices and Headquarters, the US NRC, Academia, regulators and international experts. Experts from WIPP and the Yucca Mountain project also provided presentations to provide perspective from those programs. A number of potential activities have been identified, including future technical exchanges and other activities targeting specific technical topics.

INTRODUCTION

The goal of the CoP is to advise the Tank Waste Corporate Board regarding PAs, enhance consistency in the preparation of PAs and PA-like analyses (hereafter referred to as PAs) across the Department of Energy complex, to foster exchange of information among PA practitioners, and to develop appropriate guidance for PAs such that they are based on sound science and are defensible. This guidance should address both methodology and the use of data to help promote consistency in the preparation and application of PAs and consistency and relationships between PAs and other environmental assessments within sites and across the DOE complex.

PAs support a wide variety of DOE activities [1] and thus are of interest to the Low-Level Waste and Transuranic Waste Corporate Boards in addition to the Tank Waste Corporate Board. For example, PAs provide a demonstration of compliance and important technical inputs to meet regulatory requirements for a variety of activities for Tank Wastes and many other EM activities, including:

1.) Waste form development and implementation;
2.) Tank closure activities,
3.) Waste site closure activities (e.g., cribs and trenches),
4.) In-situ Decontamination and Decommissioning, and
5.) Management of disposal facilities (e.g., land-fills, near surface disposal facilities).

Further, they become public documents on completion. As such, DOE needs to ensure that PAs continue to be performed and documented consistently and to high standards. Failure to attain consistency and high standards can lead to misunderstandings and the diversion of time and resources.

The Tank Waste Corporate Board believes that continued improvements in the consistency of PAs and reductions in their underlying uncertainty will provide a sound foundation for future decisions. The Tank Waste Corporate Board considers that regular meetings of the PA CoP for the purpose of information exchange and improvement of guidance will be highly beneficial in driving enhanced Performance Assessment consistency and defensibility throughout the DOE complex.

OBJECTIVES

The objectives for the PA CoP have been more formally defined as part of the development of the Charter. These objectives are:

1. Consolidate and expand the body of knowledge relating to the preparation and application of PAs that incorporates the concept of model and data reuse and builds on lessons learned across the Department complex;
2. Draft appropriate additional guidance, based upon this agreed-upon body of knowledge (and any desired improvements), in a clear and easy to understand manner with particular emphasis on continuing improvements to the consistency of PA implementation;
3. Provide expanded support to DOE field sites in the initial stages of developing and planning Performance Assessment activities;
4. Formalize the conduct of technical exchanges, education and training sessions as appropriate to accomplish the goals of the charter;
5. Develop a repository of PAs and risk based modeling tools, data, and supporting technical information; and
6. Continue to develop the community of PA practitioners and technical expertise to support DOE's waste management and closure needs.

ACTIVITIES OF THE COMMUNITY OF PRACTICE

The PA CoP has implemented some initial activities and is formalizing plans for future activities. In 2009, a charter was developed to formally document the PA CoP and its operating practices. Regular briefings are being provided to the Tank Waste Corporate Board, the LFRG, and other interested groups. Activities conducted to date include a technical exchange and targeted assistance. The following sections include brief summaries of the activities that have been conducted.

First Technical Exchange

The first technical exchange for the PA CoP entitled "Modeling the Performance of Engineered Systems for Closure and Near-Surface Disposal" was held on July 13-14, 2009 in Salt Lake City, Utah. The purpose of this technical exchange was to provide a forum to share information regarding the current state-of-practice, and state of evolving science and to identify opportunities to improve models used to estimate the performance of the engineered systems for environmental assessments and discuss topics for future consideration in the PA CoP.

The focus on modeling approaches for engineered features reflects the high level of attention that is currently being placed on these aspects of modeling efforts being conducted primarily for Tank Closure, but also in areas such as D&D and LLW disposal. The engineered system is defined to include the waste form(s), engineered barriers to contaminant release such as vaults, tanks, caps, and the near field physical-chemical interactions of these systems with the immediate surroundings that impact contaminant release. For each topic, the presentations and discussions provided examples of the state of practice and the state of science, with discussion focused on opportunities, near-term and longer-term directions. The topical areas are summarized in Table I.

The technical exchange was attended by roughly 75 people representing the different organizations involved in the conduct of PAs and risk assessments, including representatives from National Laboratories, contactors, DOE Field Offices and Headquarters, the US NRC, Academia, regulators and international experts. Experts from WIPP and the Yucca Mountain project also provided presentations for perspective regarding modeling approaches from those programs. The technical exchange was organized by Vanderbilt University/Consortium for Risk Evaluation with Stakeholder Participation (CRESP) and Savannah River National Laboratory.

The technical exchange featured many lively discussions and a number of suggestions were identified for future activities. The results of the technical exchange are being summarized in a report and the Steering Committee for the Community of Practice is working to prioritize future efforts for presentation to the Tank Waste Corporate Board. Potential future activities are discussed in a separate section in this paper.

Table I. Sessions and Selected Topics at PA CoP Technical Exchange

Session	Topical Areas
Introductory Presentations	DOE EM-31 and 41 perspectives* International Atomic Energy Agency views Overview of Data and Modeling Considerations
State of Practice for Assessment of Engineered Barriers	Waste Isolation Pilot Plant Yucca Mountain Nuclear Regulatory Commission International Example DOE Tank Closure Example
Modeling Releases from Waste Forms	Glass Cement Tank Residuals
Modeling Performance of Barriers and Barrier Materials	Liners/Caps Cement Barriers
Interfaces, Integration, and Uncertainty	Multiple Engineered Features Material/Environment Interfaces Integrated Systems Approach for PAs Multi-scale Modeling and Abstraction

* EM-31 and EM-41 were EM-21 and EM-11, respectively at the time of the technical exchange.

Technical Support Activities

One of the key objectives for the PA CoP is to provide a means to support sites developing PAs early in the process to supplement the LFRG role which is to review the PAs after they have been completed. Providing support up-front is intended to help improve consistency and support continuous improvement through sharing of lessons learned, ideas and approaches that have proven successful.

Prototype support activities at Hanford and Idaho have been undertaken during the course of 2009. At Hanford, support has been provided for implementation of a scoping process to directly involve regulators and key stakeholders in the development of key assumptions for the PA being undertaken for Tank Closure. The support includes participation in planning and implementation of scoping meetings and technical insights for specific topics being addressed as part of the scoping process.

Idaho has started efforts to develop the PA for a proposed new disposal facility for remote-handled low-level radioactive waste. A site visit was conducted to provide feedback during the process of developing plans for completion of the PA. A variety of topics were discussed including general planning considerations and technical issues. A number of items for follow-up were developed that were presented to the DOE customer.

FUTURE PLANS

The team developing the initial plans for the PA CoP has identified nine potential activities for consideration based on discussions at the first PA CoP Technical Exchange. The activities are listed in no specific order in Table II and a brief description of each activity is provided in this section. Some other activities directly linked to DOE-HQ initiatives are also being considered.

TABLE II. Proposed Future Activities from Discussions at PA CoP Technical Exchange

Direct support for the update of DOE Order 435.1
Workshop to highlight PA needs for requirements development for ASCEM and CBP
Performance Assessment Assistance Teams
Workshop on Decision Making Using Probabilistic Results
Performance Assessment Awareness Workshop
Workshop on use of PA for a Risk Communication Tool
Performance Assessment Information Repository
PA CoP Newsletter or Electronic Information Distribution
Peer Reviewed Reports on Technical Topics

Note: No priority is implied by the order of the list

The PA CoP is seen as a potential vehicle to provide technical support to the project for the update of DOE Order 435.1. There are a number of technical issues that are being considered in the update process and the PA CoP provides a pool of technical resources. This interaction should be symbiotic because it will help to make the broader community aware of issues that are being considered as part of the update process and will also provide the broader community an opportunity to identify other topics that may need to be considered.

ASCEM and the CBP are both actively working to develop tools that are intended to be used by the PA community. Especially in the context of ASCEM, the timing is very good to provide input for the development of requirements that can be considered in the design of the tools. It is recommended that a workshop or technical exchange be organized in which ASCEM and CBP personnel can describe their plans and PA and risk assessment implementers at the different sites can provide summaries of their modeling efforts to identify potential gaps and key areas of need. The PA CoP also can serve as a focused group that can provide continuous feedback and potentially test the tools being developed in ASCEM and the CBP.

The limited technical support examples described in the previous section are prototypes of how the PA CoP can be used to provide technical support early in the PA process. The vision is to further develop this capability to include deployment of small teams as appropriate to address specific needs at individual sites developing PAs. Such PA Assistance Teams can provide the mechanism to share lessons learned and good practices, which will help to improve PA consistency and contribute to continuous improvement of PAs across the DOE Complex.

Probabilistic assessment approaches using quantitative uncertainty analysis are being increasingly used for PAs which in many cases are still judged against deterministic performance objectives. It is proposed to arrange a workshop to discuss how probabilistic results are used to inform decision making in different regulatory environments and other applications. Graded approaches to uncertainty characterization and reduction could also be discussed in the context of more formal approaches for the iterative PA process. Using those examples, specific recommendations would be developed for decision making using probabilistic results in the context of deterministic performance objectives and to help drive the iterative PA process.

The benefit of providing an educational forum or workshop on the PA process for Senior DOE managers, external stakeholders (e.g., regulators, CAB Members), and young professionals from across the DOE Complex (e.g., regulators and CAB Members) was discussed. The intent would be to highlight the role of PAs in decision making and efficient approaches for implementing PAs, including prioritization of data collection and identifying appropriate levels of modeling detail for specific aspects of the problem. A workshop on the use of PAs as risk communication tools and experiences involving stakeholders in the PA process and policy needs has also been proposed to be conducted in conjunction with the educational forum or workshop or independently. Including young professionals is an opportunity to foster development of the next generation of PA practitioners.

An important goal for the CoP is to foster an enduring PA resource. A key part of this resource is envisioned to include development of a structured repository of data, models and research results that reflects information gained through links to activities for USDOE Complex PAs and associated research, USNRC research, Office of Science research, International activities, etc. A number of ideas have been discussed regarding implementation of a PA information repository or multiple repositories, which would also help to improve consistency of PAs by providing a mechanism to survey data and models available at other sites.

The benefits of a PA CoP newsletter or similar means of distributing information regarding developments in the PA community was also discussed. Options ranging from a formal hardcopy newsletter to an email notification system have been discussed. Such a system would provide a more regular mechanism to distribute information and news to the PA community between formal technical exchanges or workshops.

The final category of recommended activities is development of white papers, reports, or guidance on specific technical topics and/or to address issues that have been identified. This activity is seen as providing a means for EM to facilitate sharing of more detailed technical information on topics that may not be being addressed in other projects. For example, some of the efforts of the DOE-EM Tank Waste Integrated Project Team could be supported by the PA CoP.

SUMMARY

The concept of the PA CoP was introduced early in 2009 as a potential means to help improve the consistency of PAs being conducted around the DOE Complex [1]. A number of activities associated with implementing that vision have since been completed. The PA CoP has been formally chartered by DOE-EM with joint Chairs from EM-31 and EM-41 and regular briefings are taking place with the Tank Waste Corporate Board and other interested groups.

The first technical exchange was successfully conducted with attendance of roughly 75 people representing a broad cross-section of people interested in PAs, including those implementing PAs, developing specific modeling tools and data to be used in PAs, overseeing PA projects, and regulating PAs. A number of discussions were held during and at the end of the technical exchange to identify issues and areas where further guidance or clarification could be useful. A subset of those recommendations has been prioritized as ideas for PA CoP activities in the near future.

REFERENCES

1. Letourneau, M.J. et al., “Improving Consistency of Performance Assessments in the USDOE Complex,” Proceedings from Waste Management 2009, March 1-5, Phoenix, Arizona (2009).