U.S. DEPARTMENT OF ENERGY | OFFICE OF ENVIRONMENTAL MANAGEMENT

Interagency Performance & Risk Assessment Community of Practice (P&RA CoP) Status Updates

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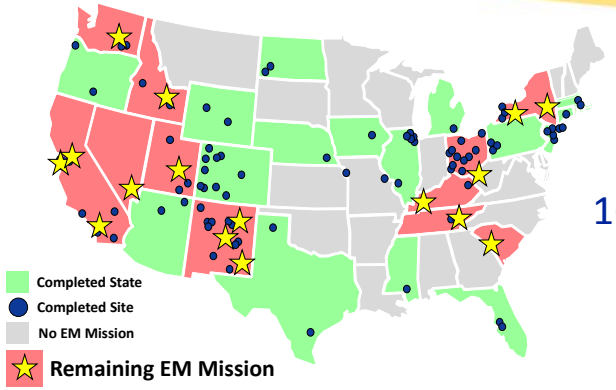
Chair of P&RA CoP

P&RA CoP Annual Technical Exchange Meeting
Germantown, MD
October 19-20, 2016

OFFICE OF ENVIRONMENTAL MANAGEMENT

DOE Environmental Cleanup Program

- Safeguards and security
- Tank waste stabilization, treatment, and disposal
- SNF & SNM disposition
- TRU and MLLW disposition
- Soil and groundwater remediation
- Facility D&D



16 Sites Remaining in FY2017

$123.7B in Cleanup from 1997-2015

Tank Farms
$ 80,509M / 37%

Nuclear Materials, Spent Nuclear Fuel, & Solid Waste
$ 34,340M/ 16%

Site Services*
$ 21,032M / 10%

*Includes Safe-guards & Security

EM's Total Remaining Lifecycle Cost Estimate- $217.1 Billion Total

Decontamination & Decommissioning
$ 58,570M / 27%

Soil & Groundwater Remediation
$ 21,539M / 10%

Environmental Compliance

- Regulatory compliance is a top program driver for environmental cleanup and closure activities.
- Environmental statutes, regulations (RCRA, CERCLA, NEPA), and state regulations give oversight authorities to U.S. Environmental Protection Agency, State environmental and health regulatory agencies, Occupational Safety and Health Administration, and U.S. Department of Transportation.
- U.S. Department of Energy self regulates radioactive waste management under DOE Order 435.1 which includes disposal of radioactive waste.
- U.S. Nuclear Regulatory Commission has a consultative and monitoring role in determining when residual waste is no longer high-level waste.

Performance and Risk Assessments

- Of particular concern to the regulators are impacts of proposed actions on human health and the environment
- Site-specific performance and risk assessments (PAs and RAs) (also called safety assessments) are conducted to assess these impacts and used to inform and support management decisions associated with CERCLA, RCRA, and NEPA, as well as DOE Order 435.1 and NDAA Section 3116 compliance
- PAs and RAs provide a demonstration of compliance and important technical inputs to meet regulatory requirements for:
  - waste form development and implementation;
  - tank closure activities;
  - waste site closure activities;
  - in-situ decontamination and decommissioning;
  - soil and groundwater remediation; and
  - management of disposal facilities

P&RA CoP Objectives

- 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 (and any desired improvements), in a clear and easy to understand manner with particular emphasis on continuing improvements to the consistency of approaches for P&RA implementation;
- Provide support to DOE sites in the initial stages of developing and planning P&RA activities;
- Formalize the conduct of technical exchanges, education, and training sessions as appropriate to accomplish the goals of the charter;
- Develop a repository of P&RAs and risk-based modeling tools, data, and supporting technical information; and
- Continue to develop the community of P&RA practitioners and technical expertise to support waste management and closure needs.

Interagency Steering Committee on P&RA CoP

- P&RA CoP activities are governed by a steering committee through a charter; otherwise, the P&RA CoP is self-directing.
- The steering committee consists of members from a variety of organizations, including:
  - Department of Energy
  - Nuclear Regulatory Commission;
  - Environmental Protection Agency;
  - State regulatory agencies;
  - DOE national labs;
  - Universities; and
  - Engineering/environmental firms.

Performance and Risk Assessment Community of Practice (P&RA CoP)

- DOE EM sponsored the Performance Assessment Community of Practice (PA CoP) in 2009, to:
  a) provide means to address consistency early and throughout PA process;
  b) foster early and sustained communication among CERCLA, NEPA, RCRA, and DOE Order 435.1 activities involving LLW, tank closure, and D&D;
  c) provide a forum to share information regarding state of the art and specific models, data and approaches; and
  d) serve as an enduring data and modeling resource to minimize duplication of effort across DOE and train future generation of PA professionals

- In 2013, the group was broadened as P&RA CoP to emphasize:
  a) the need for an integrated regulatory framework when cleanup work at a given site is subject to overlapping environmental regulations (CERCLA, RCRA, NEPA, DOE Order 435.1 and NDAA Section 3116); and
  b) the importance of risk assessments in non-DOE self-regulated cleanup activities
- P&RA CoP has held 5 technical exchange meetings since 2009:
  - July 13-14, 2009: Salt Lake City (http://www.cresp.org/education/workshops/pacop/)
  - April 13-14, 2010: Richland, WA (http://srnl.doe.gov/copexchange/links.htm)
  - May 25-26, 2011: Atlanta. GA (http://srnl.doe.gov/copexchange/2011/links.htm)
  - December 11-12, 2014: Las Vegas, NV (http://www.energy.gov/em/downloads/december-11-12-2014-technical-exchange-meeting-las-vegas-nevada)
  - December 15-16, 2015: Richland, WA (http://www.energy.gov/em/december-15-16-2015-technical-exchange-meeting-richland-washington)

Recent Accomplishments

- Regular Steering Committee meetings/telecons:
  - ✓ 8/2013, 3/2014, 3/18/2015, 9/23/2015, 9/30/2015, 10/14/2015, 3/9/2016, 7/14/2016, 7/27/2016, 8/16/2016, 8/31/2016
- Public Webinars, nominally on a quarterly basis:
  - ✓ 12/12/2013: Alaa Aly (INTERA) & Dib Goswami (Washington State Ecology),

    "The Use of Graded Approach in Hanford Vadose Zone Modeling"
  - ✓ 2/5/2014: David Kosson (Vanderbilt University/CRESP) et al.,

    "The Cementitious Barriers Partnership Toolbox Version 2"
  - ✓ 2/20/2014: Craig Benson (University of Wisconsin/CRESP),

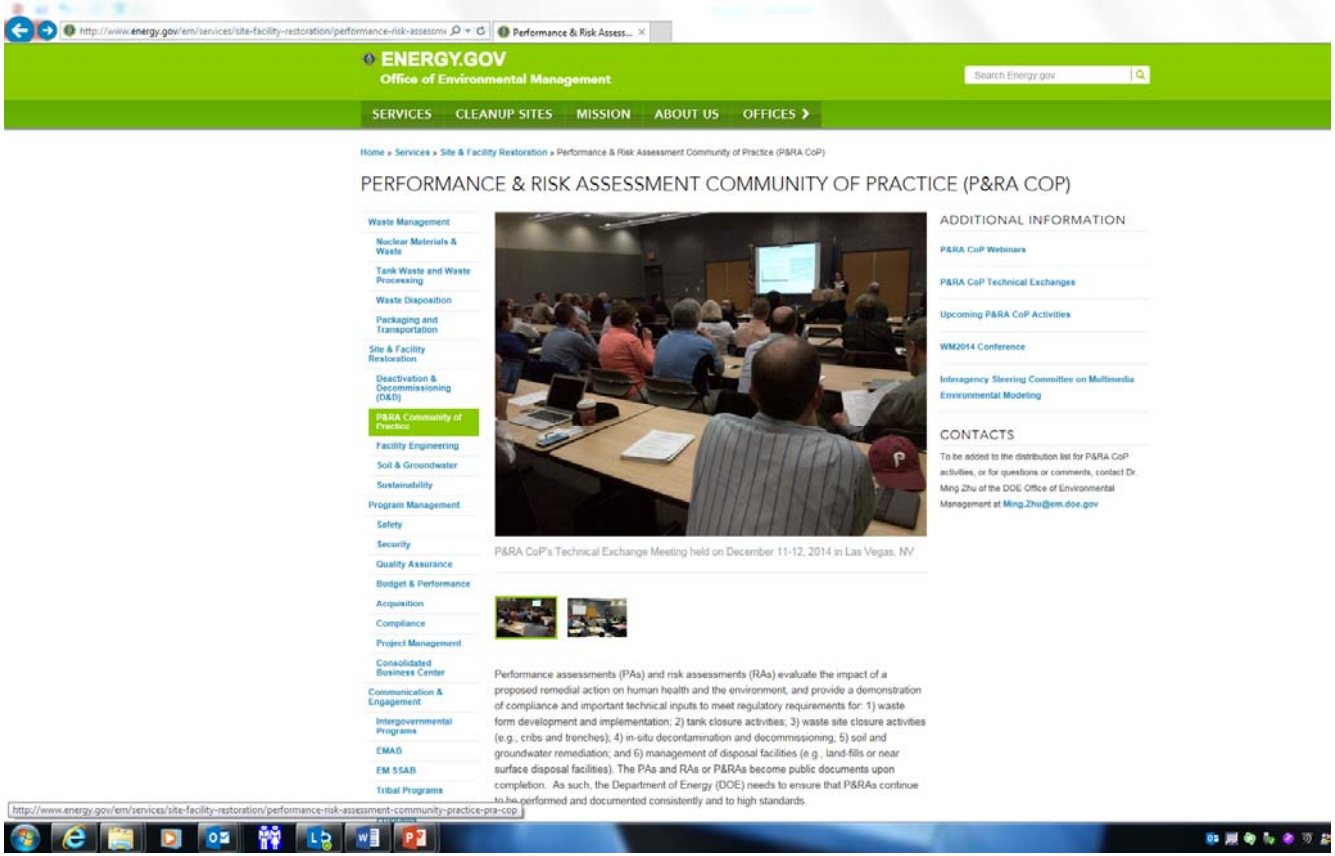
    "Performance of Engineered Barriers: Lessons Learned"
  - ✓ 6/3/2014: Geoff Freeze (SNL) and Roger Seitz (SRNL), "Features, Events, and Processes: Practical Considerations for Development and Selection of Scenarios"
  - ✓ 10/16/2014: Paul Black (Neptune), "Decision Making under Uncertainty: Introduction to Structured Decision Analysis for Performance Assessments"
  - ✓ 5/20/2015: Chris Grossman (NRC), "Guidance for Conducting Technical Analyses for 10 CFR Part 61"
  - ✓ 8/18/2015: Paul Black (Neptune) and Roger Seitz (SRNL, "Probabilistic Analysis of Inadvertent Intrusion and the International Atomic Energy Agency Human Intrusion in the Context of Disposal of Radioactive Waste (HIDRA) Project"

Recent Accomplishments (ctd)

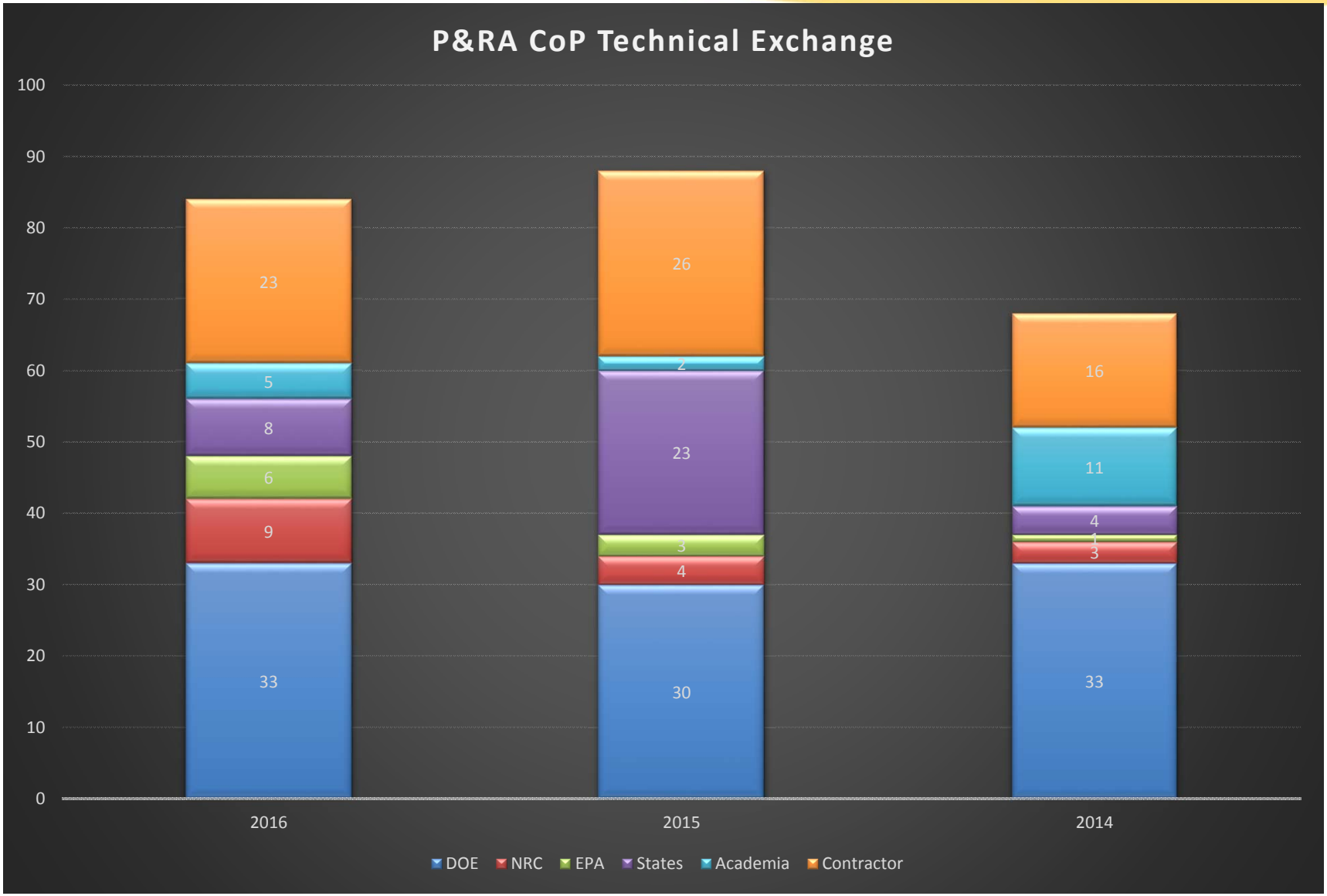
- Public Webinars, nominally on a quarterly basis (ctd):
  - ✓ 10/13/2015: Stuart Walker (EPA), "U.S. EPA Superfund Remedial Program's Approach for Risk Harmonization when addressing Chemical and Radioactive Contamination"
  - ✓ 11/10/2015: Michael Greenberg (Rutgers University), Steven Krahn (Vanderbilt University), and Timothy Fields, MDB), "Congressionally Mandated Review of the Use Of Risk-Informed Management in the DOE EM Program"
  - ✓ 11/12/2015: Stuart Walker (EPA), Kirby Biggs (EPA), "Implementing Optimization in the Superfund Program"
  - ✓ 1/26/2016: Matt Kozak (INTERA), "Borehole Disposal of Spent Sources (BOSS)"
  - ✓ 2/23/2016: Igor Linkov and Matthew Bates (U.S. Army Corps of Engineers), "Multi-Criteria Decisional Analyses: Methodology and Case Studies "
  - ✓ 5/16/2016: Craig Benson (University of Virginia/CRESP), "Predicting the Service Life of Geomembranes in Low-Level and Mixed-Waste Disposal Facilities: Findings from a Long-Term Study"

Recent Accomplishments (ctd)

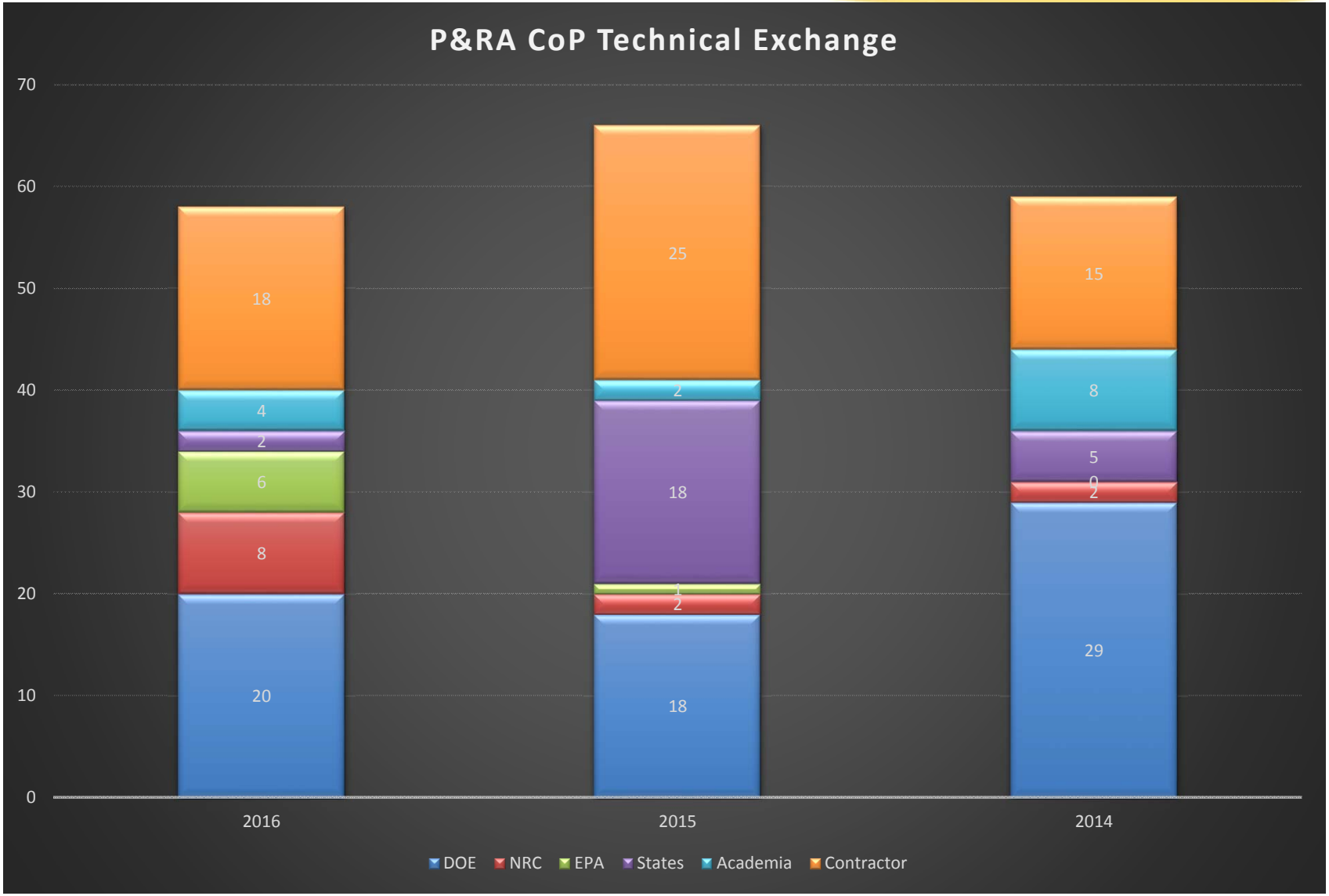
- P&RA CoP Website hosted by DOE EM
  - ✓ Charter
  - ✓ Webinar presentations
  - ✓ Technical Exchange Meeting presentations
  - ✓ Links to other resources



Technical Exchange Meeting Attendance



Technical Exchange Meeting In-Person Attendance



Preliminary Plans for 2017

- Continue quarterly Webinars:
  - Commercial LLW Disposal Activities
  - Effective risk communications
  - Other topics
- Steering Committee meeting:
  - On sidelines of WM2017 in Phoenix, March 2017
- Topical analyses and white papers/guidance:
  - Service Life of Engineered Barriers: Making The Case For Low Level And Mixed Waste Facilities
  - Structured Decision Making That Engages Stakehoders
  - Managing Uncertainty
  - Other topics
- Annual Technical Exchange Meeting
  - October 2017, TBD

This Technical Exchange Meeting: Background

- Omnibus Risk Review Committee recommended that DOE EM move ahead in a timely manner to evaluate the benefits that could derive from implementing PRA and risk-informed decision-making for its high-hazard, non-reactor nuclear facilities

- National Academy of Sciences (2009) identified key technical challenges for the EM program, including:
  - Contaminant subsurface behavior poorly understood (High Priority)
  - The long-term ability of cementitious materials to isolate wastes is not demonstrated (High Priority)

- EM-1 commitment in response to GAO-11-143 Recommendation:
  - Develop Guidance for Models Used to Support Environmental Cleanup Decisions

This Technical Exchange Meeting

- This technical Exchange focuses on decision making using probabilistic risk assessments with understanding of Tc behavior
  - Keynote speech by Tim McCartin on risk informing regulations under uncertainty
  - EPA and NRC policies and guidance, DOE projects, and regulators perspectives relating to use of PRAs
  - Recent studies of Tc , I, and Rn release and transport behavior
  - Software qualification and model verification; and
  - ASCEM and CBP program updates