

Use of Risk-Informed Management in the Cleanup of Former Defense Nuclear Sites

**Omnibus Risk Review
Committee**

November 10, 2015

PART 1. CONTEXT

Broad Study Objectives

- The Consolidated Appropriations Act, 2014 (H.R. 3547, Omnibus) directed the Department of Energy (DOE) to “retain a respected outside group ... [to] undertake an analysis of how effectively [DOE] identifies, programs, and executes its plans to address risks [to public health and safety from the DOE’s remaining environmental cleanup liabilities], as well as how effectively the Defense Nuclear Facilities Safety Board (DNFSB) identifies and elevates the nature and consequences of potential threats to public health and safety at the defense environmental cleanup sites.”

Human Health & Safety

Committee Charge As Agreed to By DOE and Congressional Staff (Committee not involved in process)

- identify and review how specific federal policies and guidance shape DOE-EM's evaluation and use of risks to human health and safety as part of program decisions;
- review how the DNFSB identifies and elevates threats to public health and safety, and how DOE considers DNFSB concerns as part of program decisions;
- review how risks to public health and safety are considered as part of state and federal regulatory compliance and priorities at DOE-EM cleanup sites;
- review how DOE-EM uses human health risk and public safety input and information from a broader range of sources as part of program decisions; and
- review how DOE-EM uses the range of human health risk and safety information available along with the broader range of input and constraints to balance cleanup priorities within and between cleanup sites.

Omnibus Risk Review Committee Members

- **Michael Greenberg**, Chair, Distinguished Professor and Faculty Dean, Bloustein School of Planning and Public Policy, Rutgers, NJ
- **George Apostolakis**, Professor Emeritus, Massachusetts Institute of Technology, Cambridge, MA [former Commissioner US NRC]
- **Timothy Fields**, Senior Vice President, MDB, Inc., Washington DC [former Assistant Administrator for Office of Solid Waste and Emergency Response, EPA]
- **Bernard Goldstein**, Professor of Environmental and Occupational Health, School of Public Health, University of Pittsburgh, Pittsburgh, PA [former Assistant Administrator for Research and Development, EPA]
- **Steven Krahn**, Professor of Practice of Nuclear Environmental Engineering, Vanderbilt University, Nashville, TN [former Deputy Assistant Secretary for Safety & Security in OEM]
- **R. Bruce Matthews**, Independent Consultant, Goleta, CA [former board member of DNFSB]
- **James Rispoli**, Professor of Practice, Center for Nuclear Energy Facilities and Structures, North Carolina State University, Raleigh, NC [former EM-1]
- **Jane Stewart**, International Environmental Legal Assistance Program, New York University School of Law, New York, NY [former senior staff attorney, Natural Resources Defense Council]

Methods

- DOE EM requests Consortium for Risk Evaluation with Stakeholder Participation (CRESP) to organize review team.
- Committee of eight members appointed with backgrounds in risk analysis, public health and safety, nuclear safety, risk management, and environmental law, regulation and public policy.
- Committee reviews literature, designs study, obtains IRB approval
- Interviews DOE EM staff at Hanford, Savannah River, Oak Ridge, DOE EM HQ, DNFSB, EPA HQ and Regional staff, representative of WA, SC, TN, and several contractors. In total more than 100 interviews. Notes fact-checked.
- Limitations: Time – report due January 2015; no interviews at other 13 DOE sites, did not meet with DOE CAB panels, nor with Tribal nations. Did not have safety culture as explicit topic at outset.
- Initial draft of report reviewed by peers under CRESP auspices
- Draft final report provided to DOE, EM, DNFSB, EPA, representatives of states of WA, SC, and TN
- Final report submitted August 2015

Study Context

- A great deal of taxpayer money spent: \$144B between 1989 and 2013; \$200-\$300B more by to 2060?
- DOE EM budget constrained compared to American Recovery & Reinvestment Act (2009) period;
- High expectations for rapid progress at the sites, in their surrounding regions, tribes, local labor and worker groups;
- States with different legal mechanisms to provide inputs and with different expectations;
- Committee views DOE complex from a national perspective;
- Recommendations are for Congress and federal government and focus on prioritizing human health and safety

Balancing Human Health and Safety and Other Competing Demands

- Federal legal and statutory history and requirements
- States critical role, rights and historical involvement
- Tribal Nations with important rights
- Other factors noted by FFERDC:
 - ✓ cultural, social, and economic factors, notably environmental justice;
 - ✓ long and short-term ecological impacts,
 - ✓ life cycle costs, cost effectiveness, application of new technologies;
 - ✓ importance of reducing infrastructure and operation-maintenance costs:
 - ✓ practical considerations, such as accomplishing projects and working on remediation projects without hindering others activities.

To Increase Focus on Human Health & Safety

PART 3. ALL RECOMMENDATIONS (N=24) Nuclear Safety & Human Health Recommendations (Theme 1)

[key page #s are indicated in [#] [19-41]

- DOE-EM should review its technical capacity to address technical issues, and propose innovative ways to ensure that important technical and safety issues are tracked through to resolution and to retain key technical experts to advise senior decision makers. A strong engineering capability should be built into the DOE-EM organization, taking into consideration the role of the applicable DOE national laboratories, along with appropriate roles for site deployed and centralized technical staffs. [30, 39-40, 92]
- DOE-EM should move ahead in a timely manner to evaluate the benefits that could be derived from implementing PRA and risk-informed decision-making for its high-hazard non-reactor nuclear facilities; this should include near-term identification of high-leverage pilot PRA studies, funding for such studies, and planning to incorporate the results of these pilots into a DOE-EM risk-informed decision-making process [23-24, 29, 33-34, 39-41, 122, 150-151, 185, 192-193]

Nuclear Safety & Human Health (Theme 1)

- DOE should develop and issue reliability, maintainability, and availability analysis expectations—taking advantage of available industry standard practices—and implement an engineering analysis of aging critical facilities and infrastructure at major EM sites (Hanford and Savannah River on a priority basis) to identify urgently needed repair and maintenance needs for systems, components and infrastructure that are vitally necessary to support safety systems and emergency management. [7, 9, 12, 27-30, 38-41]
- EM-1 should personally conduct and lead periodic performance reviews of major EM projects and operations, to include safety, cost and schedule performance, quality, and risk management, among other elements of the applicable project. [24, 29, 37]
- The Board should consider holding a series of public hearings to investigate potential worker safety impacts and concerns arising from implementation of remediation and environmental regulatory requirements. [31, 36-37]

Nuclear Safety & Human Health (Theme 1)

- The DNFSB and DOE should collaborate to develop an efficient process that reduces the time it takes to resolve a safety issue identified by the Board, from its initial identification to DOE-EM through letters, subsequent elevation to a formal DNFSB recommendation, DOE response and development of an effective implementation plan and DOE follow-through to expeditiously carry out all steps in the plan. [36-38, 40-41]
- The DNFSB should state in its letters to DOE whether a particular recommendation refers to an adequate protection issue, in which case cost should not be a consideration, or is a safety enhancement, in which case cost and other considerations should be part of the decision-making process. [5, 27, 31-32, 35,41]

Inconsistencies in Cleanup Requirements and Policies Among Sites (Theme 2) [42-77]

Legislative and Regulatory Regimes

- Congress should establish a standing Interagency Task Force, comprised of senior officials of DOE, EPA, DNFSB, and independent experts, and co-chaired by DOE and EPA. [72-77] ITT should prepare annual report for Congress, DOE Secretary, EPA Administrator, funding to be provided.
- Congress should extend the Section 3116 process for HLW to DOE's Hanford and West Valley sites, in order to more efficiently enable low-level fractions of tank waste at Hanford to be managed as LLW and to enable empty HLW tanks at the West Valley site to be closed.

[49-50, 72]

- Congress should authorize DOE to reclassify, on a sound scientific basis, defense HLW, based on their degree of hazard and intrinsic characteristics, instead of based on their origins as is presently the case. [50, 72]

Implementation of National Contingency Plan (Theme 2)

- DOE: The NCP remedy selection process should be reinstated at all DOE sites, as soon as possible, including remedy selection considering, rigorously and in depth, all nine CERCLA remedy selection criteria and designated land uses. Final RI/FSs, Proposed Plans and final RODs should be completed before cleanup takes place. Interim actions at DOE sites should be limited, going forward, to short-term risk reduction interventions in compliance with the NCP with clear guidelines to be established by the Interagency Task Force. [46-48, 51-52, 55-57, 67, 73]

Determination of Applicable or Relevant and Appropriate Requirements (ARARs) (Theme 2)

- The ITF should direct DOE and EPA to work together to ensure that potentially “high-cost” state ARAR decisions are made on the basis of a rigorous analysis of the grounds for the decision and through a transparent, well-documented process (e.g., when the cost exceeds \$75 million, consistent with NRRB review threshold). The Committee recommends requiring preparation by EPA of a detailed, written analysis of state ARAR applicability or relevance and appropriateness, begun early in the remedial process, for any potential state ARAR that is a potential major remedial cost driver at a DOE site. The analysis should assess the grounds on which applicability of the State ARAR is asserted by the state and provide a detailed analysis of whether and how statutory preconditions for applicability or relevance and appropriateness of the State ARAR have been met and assess whether there may be any potential grounds for a waiver. The Review Committee also recommends that all such analyses should be required to be reviewed and approved by DOE and EPA headquarters-level officials and made publicly available prior to use of a high-cost state ARAR in the remedy development process. [13-14, 42-44, 47-48, 53-58, 69, 73]

Land Use Determinations (Theme 2)

- The Interagency Task Force should develop a consistent process and criteria for making—and, when necessary, revising-- land use determinations and devise ways to ensure that these land use determinations are used appropriately in risk assessments and other remedy selection steps at all sites in the DOE complex. [8, 13, 42, 48, 59-67, 74-76]
- DOE Headquarters and EPA Headquarters should work together to provide effective oversight and ensure that site cleanup levels and remedies at all DOE sites are selected to match DOE land use determinations that have been made in accordance with Congressional land use planning mandates to DOE and consistent with relevant EPA Headquarters CERCLA Land Use guidance. [8, 13, 42, 48, 59-67, 74-76]

Application of Cleanup Technologies/Approaches (Theme 2)

- DOE should commission independent, site-specific risk reviews, for major DOE sites (i.e., those with cumulative expenditures of greater than \$250 million) to help assure risk-informed prioritization and resource allocation within and across the complex. The reviews should be performed by a well-qualified, non-conflicted entity that is independent of the cleanup contractors performing work at that, or other DOE sites. [48, 67-69, 76]
- The Interagency Task Force should develop guidance to ensure consistency in implementation of appropriate legislative authority, national regulations, and policies at DOE sites when selecting cleanup technologies and approaches addressing similar categories of site activity. [48, 67-69, 76]

Dispute Resolution Method (Theme 2)

- Congress should establish an alternative dispute resolution process to which parties to an FFA or FFA consent decree would be required to resort if exhaustion of FFA dispute resolution procedures does not result in a satisfactory resolution of the matter under dispute (EPA administrator is final step in process). This process would involve resolution of disputes by an expert national panel whose decision would be binding, subject to opportunity for judicial review of its decision in the Court of Appeals for the D.C. Circuit. It would be in lieu of a consent decree or resort to litigation in a local federal court and would result in a binding decision applicable to all the parties to the FFA. [13, 70-71, 76-77]

National Remedy Review Board (Theme 2)

- The Interagency Task Force should (1) evaluate the feasibility of creating an EPA RCRA team analogous to the National Remedy Review Board (NRRB) (with the provision of adequate resources) to expeditiously review all high cost RCRA corrective action remedies at DOE sites and (2) develop an effective procedure for assuring appropriate DOE input to NRRB and RCRA team deliberations and ensuring action by EPA, DOE, and applicable state officials in response to NRRB and RCRA team recommendations. [46, 57-58, 68-70]

Risk Informed Prioritization and Resource Allocation (Theme 3) [78-91]

- DOE HQ, with advice from the Task Force should provide more detailed guidance to DOE sites to inform site priority-setting and budgeting. DOE HQ should work with the sites to ensure that HQ guidance is implemented consistently at all sites and that prioritization and budgeting are fully risk-informed. DOE EM and EPA headquarters need to play a more active role in the process in order to provide a national perspective and better match resources to risks. [78-80]
- DOE HQ should compare/rank priorities across sites on the basis of risk and use this risk comparison/ranking as a primary basis for risk-informed cleanup resource allocation in an integrated national EM budget. HQ should further develop clear criteria for, and document its decisions regarding, integration of site criteria into a unified national EM remediation risk-informed priority list. The ultimate objective should be to assure best use of limited budgets. [78-88]

Risk Informed Prioritization and Resource Allocation (Theme 3)

- DOE: Prioritization and budgeting at the site and HQ level should be informed by risk reviews conducted at all major DOE sites. The Committee recommends, consistent with the Secretary's approach in his December 1, 2014 Memorandum on Improving the Department's Management of Projects, that these reviews be performed by a well-qualified, non-conflicted entity that is independent of the cleanup contractors performing work at that, and other sites. [76, 88]
- EM should utilize current cost and time-phased projections of cleanup work, based upon a realistic near and out year budget projection, align that work with regulatory milestones, and renegotiate milestones as applicable with the regulators. If such budget-constrained cleanup schedules at that level of detail are not available to EM, then an independent development of such a timeline should be accomplished across the complex. By doing this, the various regulators, as well as the EPA HQ, will be able to see realistic projections of milestone accomplishment, and also be able to evaluate whether a re-prioritization of activities should be considered in the resource-constrained and risk-informed environment. [78-88]

Risk Informed Prioritization and Resource Allocation (Theme 3)

- DOE HQ should create a separate budget category for maintenance and renewal of infrastructure, and should implement a consistent infrastructure prioritization process complex-wide, such as is done at the Savannah River Site using their Critical Infrastructure Integrated Priority List (CIIP) process. EM should provide guidance on how to integrate such CIIP requirements into each site's annual budget scenario input to EM headquarters. [78-88]

Site Flexibility Recommendation

- Congress along with DOE HQ should provide a mechanism that will permit site managers with more flexibility in moving funds within and among PBSs' and control points in order to address emerging issues. This will permit the Site Managers, who are charged with, and accountable for, operations and safety at complex nuclear sites, to be responsive to emerging situations that could impose significant risk, as well as the flexibility to address risk reduction as may be required. The Committee is not recommending the elimination of control points, it is recommending that Congress review the process that constrains the reallocation of funds insofar as they may impact site management ability to respond to an emerging threat. [88-91]

Post report release

- Briefs DOE and EPA HQ staff, House Appropriations Committee; DOE site and HQ staff; & OMB staff.
- Will prepare an epilogue to add to report