The Consortium for Risk Evaluation with Stakeholder Participation (CRESP): Overview & Experiences with Stakeholder Engagement

David S. Kosson (PI), Michael R. Greenberg, Kathryn A. Higley, and Steven L. Krahn

Meeting of The National Academies Committee on
Developing a Long-Term Strategy for Low-Dose Radiation Research in the United States

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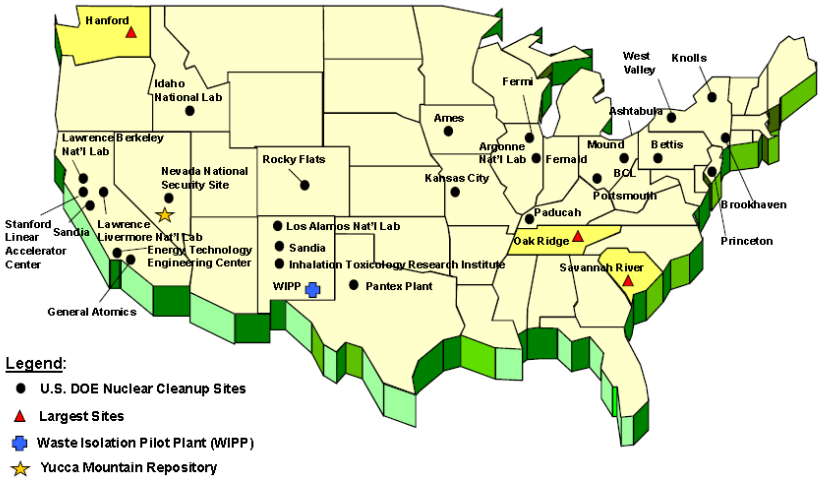
CRESP

Support safe, effective, publicly-credible, **risk-informed management of existing and future nuclear waste** from government and civilian sources through independent strategic analysis, review, applied research and education.

www.CRESP.org

The U.S. Department of Energy's Cleanup Sites



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CRESP

CRESP

DOE

Understanding & Acceptance	Regulatory Evolution	Technology Innovation	Operational Deployment	
Essential Elements	Engagement & Communication	Laws & Policy	Performance Assessment	Technology Evaluation	Processing Safety	Cost, Schedule & Project Management

CRESP

Technically Sound Base to help DOE accomplish environmental management priorities

Focus Areas	Waste Processing & Special Nuclear Materials	Remediation, Near Surface Disposal & Long-term Stewardship	Nuclear Waste Management Policy and Strategy	Stakeholder Engagement and Communication
CRESP Functional Approach	Strategic Assessment	Applied Research	Review	Education

- **CRESP** is a multi-university consortium that has served DOE and its stakeholders since 1995, currently through a cooperative agreement awarded to Vanderbilt University.

- **CRESP** was founded under the leadership of Drs. Bernard Goldstein (PI), Charles Powers (Executive Director), Gilbert Omenn, John Moore and Arthur Upton in response to a National Academies recommendation and a competitive proposal process.

- For additional history, see http://www.cresp.org/approach/history/

Who is CRESP?

CRESP III Management Board (1/2)

Principal Investigator: **David S. Kosson**, Ph.D., Distinguished Professor of Civil & Environmental Engineering, Vanderbilt University (david.kosson@vanderbilt.edu)

Craig Benson, Ph.D., P.E., N.A.E., Distinguished Professor Emeritus, University of Wisconsin

Joanna Burger, Ph.D., Distinguished Professor of Biology, Rutgers – The State University of New Jersey

Kevin Brown, Ph.D., Associate Research Professor, Civil and Environmental Engineering, Vanderbilt University

Michael Greenberg, Ph.D., Distinguished Professor and former Dean, Bloustein School of Planning and Public Policy, Rutgers – The State University of New Jersey

Kathryn A. Higley, Ph.D., C.H.P., Professor, Nuclear Engineering & Radiation Health Physics, Oregon State University

The CRESP Management Board is comprised of technical, engineering, scientific and policy experts from seven university consortium member institutions

CRESP III Management Board (2/2)

Kimberly Jones, Ph.D., Professor and Chair of the Department of Civil and Environmental Engineering, Howard University

Steven Krahn, Ph.D., Professor of the Practice of Nuclear Environmental Engineering, Vanderbilt University

Martha Grover, Ph.D., Professor & Associate Chair, School of Chemical & Biomolecular Engineering, Georgia Institute of Technology

Jane B. Stewart, J.D., Director, International Environmental Legal Assistance Program, New York University

Additional CRESP Senior Researchers

Andrew Garrabrants, Ph.D., Research Associate Professor; **Jesus Gomez Velez**, Ph.D., Assistant Professor; **Florence Sanchez**, Ph.D., Professor, Civil and Environmental Engineering, Vanderbilt University; **Tim Fields**, Sr. VP, Michael D. Baker, Inc. (environmental policy); **Jenn Guelfo**, Assistant Professor, Texas Tech University; **Michael Gochfeld**, M.D. (occupational medicine); **Hank Mayer,** Ph.D. (policy and economics); **Ronald W. Rousseau**, Ph.D., Professor, Georgia Tech., Chem. Eng.; **Richard B. Stewart**, LL.B., University Professor and Director, NYU Center on Environmental and Land Use Law

Why CRESP?

- Independent team of multi-disciplinary, world-class experts focused on EM challenges and Sites
  - Nuclear and environmental law, social science and policy; landfills performance; leaching assessment; nuclear waste processing and safety, environmental health physics; ecology
  - Highly leveraged EM benefit, both on research support and service for national agencies/advisory groups (e.g., NRC, EPA, DNFSB, National Academies, GAO, etc.)
  - Ability to tackle sensitive challenges, within academic setting without “group think” or dominant self-interest/conflicts-of-interest
  - Reach back to leading group of universities and national experts
- Flexible response on time-sensitive and high-priority technical issues
- Longer-term outlook and institutional memory
- Offers graduate, post-doctoral and professional training

CRESP Provides Unique Capabilities

Assists with decision making for DOE strategic planning and investments:

- Develops proof-of-concepts with multi-disciplinary teams
  - Science & Engineering
  - Safety, Health & Environment
  - Policy, Economics & Law
- Supplies recognized leading experts to directly engaged in DOE problem solving
- Provides independent review & assessment
- Considers and receives input from broad range of stakeholders

CRESP Operational Aspects

- CRESP has been awarded in 5 year renewal intervals, with annual scope and budget allocation developed by CRESP leadership in dialogue with DOE-Office of Environmental Management (EM).
- Ad-hoc reviews and projects often requested during each year.
- Frequent dialogue between CRESP leadership and senior DOE-EM management and field offices, as well as by individual researchers with project-specific points-of-contact.
- Results of projects and reviews are briefed to DOE and other interested stakeholders; project reports and reviews posted to CRESP website; publications and presentations do not require prior review by DOE; quarterly progress reports.
- Usually there is not a formal process for evaluating effectiveness and implementation of CRESP recommendations

Current Projects Related to Engagement and Communication with Stakeholders

- Engagement and communication with stakeholders is inherent in a large fraction of CRESP projects. Relevant stakeholders vary by project.
- CRESP is often requested to assist DOE with stakeholder communication; usually associated with independent review. Examples:
  - Restart of unfiltered ventilation using the 700C fan at WIPP
  - Review of Portsmouth Environmental Reports
  - Risk Communication for Portsmouth Detection of Np-247 at a Public School
  - Risk Communication Workshop for SSAB Chair Meeting
- Communications–centric projects:
  - Measuring and Communicating EM Objectives and Accomplishments
  - Improving Risk Communications – Special issue of journal ***Risk Analysis***
  - The Role of Social Media in Public Engagement

Notable CRESP Successes in Engagement & Communications

- Amchitka, Alaska – Evaluation and Biomonitoring of Human Health and Ecological Risks from Underground Nuclear Tests
- Hanford Site-wide Risk Review
- Cementitious Barriers Partnership
- Landfills Partnership

Key Risk Communications Lessons Learned

- Engage with stakeholders early and often.
  - Individual, small group and open public meetings are all important
  - Different stakeholders have different information needs – one size does not fit all
  - Be approachable and familiar to stakeholders
- Listen to input and provide feedback on how input was addressed and influenced the outcome.
- Make the science, facts and uncertainties clear and communicated in a manner appropriate and understandable to the intended audience.
- Use examples that are relevant to the audience.
- Be clear about your role in the process.

Recent Case Study Examples

Portsmouth Gaseous Diffusion Plant (PORTS) Public Communications

- In Spring 2019, Neptunium-237 was detected in the ceiling tiles of the Zahns Corner Middle School, which was attributed by a community consultant to activities from PORTS.
- This precipitated a series of sampling and analysis activities by DOE EM and engagement with community leaders and members of the public.

Portsmouth Gaseous Diffusion Plant (PORTS) Public Communications

- CRESP provided insight into the radiological collection and analysis.
- CRESP had one member participate in follow-on meetings with the public and the Scientific Advisory Board regarding the risk posed by this radionuclide.
- Most recently CRESP has provided one member to provide explanations on radiological and other contaminant risk to members of the public as a consequence of facility demolition. This has occurred in four public meetings over the last two months.

Plutonium Finishing Plant D&D Restart Oversight

- In the Spring of 2018, several events involving the unintentional spread of radioactive contamination, which occurred as a result of a project to decontaminate and deconstruct the Plutonium Finishing Plant, resulted in DOE's Deputy Secretary forming an Expert Panel to advise DOE on the proper precautions to put in-place prior to restart.

- High hazard work completed
- Lower radiological risk building demolition underway

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- CRESP provided two researchers experienced in radiation protection and nuclear facility D&D as members of the Expert Panel; the panel: assessed the DOE Richland Office occurrence report/evaluation, reviewed contamination patterns, evaluated revisions to contamination control practices, and assessed DOE-RL's restart preparation.
- The two CRESP researchers participated in weekly panel meetings, contributed to panel interactive comments on revised radiological protection measures and restart preparations, and provided formal inputs to the Expert Panel's final report to the Deputy Secretary.

Waste Isolation Pilot Plant (WIPP) Analysis and Support

- DOE-EM has been evaluating the restart of an unfiltered ventilation system (the “700C Fan”), for use only during operations that do not involve the movement of transuranic waste, to address revised air quality requirements (10CFR850) and enhance the overall air quality in the repository.
- Increases airflow for mining & ground control activities, and improves overall operational efficiencies.
- Improves worker health and safety.
  - Improves overall air quality by exhausting diesel emissions more efficiently
  - Reduces potential for heat stress

Waste Isolation Pilot Plant (WIPP) Analysis and Support

- CRESP has assisted DOE-EM & the Carlsbad Field Office (CBFO) with:
  - Review and comment on testing procedures and nuclear safety analysis,
  - Independent analysis and comment on historical radiological data and testing data resulting from a limited test of the system,
  - Risk communication experience and feedback, and,
  - Attendance at a virtual public meeting addressing ventilation system testing.
- The results of CRESP's review and comment have been communicated to CBFO and DOE-EM in a number of teleconferences, several e-mails which included detailed comments from CRESP researchers and two CRESP letter reports.

A Review of the Use of Risk-Informed Management in the Cleanup Program for Former Defense Nuclear Sites

- The **Consolidated Appropriations Act, 2014** (H.R. 3547, was an omnibus spending bill). Language attached to the legislation directed the DOE to "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."

- The CRESP-organized Committee interviewed DOE EM staff at headquarters (HQ) and at multiple sites, DNFSB staff at headquarters and at the Hanford and Savannah River sites. It also spoke with representatives of the EPA and selected states (Washington, South Carolina, and Tennessee), as well as contractors. Overall, more than 100 interviews in person, at sites, and on the phone, and many documents were reviewed. The resulting report was fact-checked by an independent peer-review and by those who were interviewed and submitted to Congress.

A Review of the Use of Risk-Informed Management in the Cleanup Program for Former Defense Nuclear Sites

- More than two dozen findings and 24 recommendations were made:
  - The Review Committee found that concern for human health and safety plays a significant role in prioritization and budgeting at the sites the Review Committee visited. The extent to which allocation of resources is risk driven at individual DOE sites −and nationally− is, however, unclear.
  - As a practical matter, a host of other factors also come into play, including: consent decrees (which give priority to activities where DOE has missed milestones, even if those activities would not otherwise be given priority); regulatory requirements (that may not directly correlate with significant risk to human health and safety); and stakeholder inputs such as from citizen advisory boards, local chambers and officials, and worker groups.
  - The views of Tribal nations in the vicinity of DOE sites to exercise their treaty rights are part of the decision-making considerations.
  - DOE must take into account the need for maintaining minimum requirements for safe operations (min-safe) at all nuclear facilities; resources required for security of nuclear materials and facilities; work force stability and maintenance of specialized nuclear expertise; recently identified concerns with the reliability and operability of critical infrastructure; social justice issues and DOE's commitment to assure some measure of support to all its remediation sites.

Paper: M. Greenberg, G. Apostolakis, T. Fields, B. Goldstein, D. Kosson, R.B. Matthews, S. Krahn, J. Rispoli, J. Stewart, R. Stewart. Advancing Risk-Informed Decision-Making in Managing Defense Nuclear Waste in the United States: Opportunities and Challenges for Risk Analysis. *Risk Analysis*. 39, 32, 375-388, 2019.

Supporting Information

Communicating about Contaminated Site Cleanup using Coordinated and Consistent Metrics

- Despite the expenditure of hundreds of billions of dollars on site remediation, some stakeholders worry about the risks associated with the cleanup.
- It is important that both U.S. taxpayers and workers and residents living near the sites that are impacted by site conditions and activities, clearly understand the progress that is being made toward achieving published cleanup goals, and a timeline for completion.
- This research asks how lessons drawn from risk communication literature can inform practices for communicating metrics related to cleanup progress at U.S Department of Energy former nuclear weapon sites to different audiences.
- CRESP explored metrics being used and communicated on the websites of DOE and its largest sites, and discussed the lack of consistency of these metrics and implications for public understanding and trust of progress being made.
- We applied the principles from the literature to the findings from the case study to suggest how the DOE could consider improvements in the format, content or delivery of cleanup progress metrics to its various audiences.

Paper: Karen Lowrie, Henry Mayer, and Michael Greenberg, Communicating about Contaminated Site Cleanup using Coordinated and Consistent Metrics: Opportunity and challenge for the DOE, Risk Analysis. *Risk Analysis*. vol. 41 (8), 2021, 1478-1491.

Evaluation of and Approaches for Improving EM Risk Communications

- Provide EM with actionable recommendations regarding risk communication.
- Provide specific suggestions about how to be prepared with a communication plan, as well as how to be a more effective speaker and listener. This is done through a combination of papers written by experts and interviews with individuals who have been involved in communicating not only about EM issues but also about climate change, cancer clusters, chemical waste contamination in the United States and in other countries with the general public, media, government officials, court officers and other stakeholders.
- Special issue sections:
  - Overview of risk communication from the perspective of communicator and perspective of the audience.
  - Overview of risk communication challenges at nuclear sites.
  - Interviews of more than a dozen experts with experiences speaking before multiple audiences including public meetings, elected officials and staff, the media, and many others.
  - Set of academic paper that address issues such as using the social media, communicating during crises, dealing with fake news, and others.
- Special issue in *Risk Analysis* expected Summer 2022.