The Consortium for Risk Evaluation with Stakeholder Participation (CRESP)

Co-Principal Investigators: David S. Kosson and Charles W. Powers
with Management Board: Craig Benson, Joanna Burger, Michael Greenberg, Cathy Higley, James Johnson, Shlomo Neuman & Richard Stewart

Lead Institution: Vanderbilt University, Nashville, Tennessee

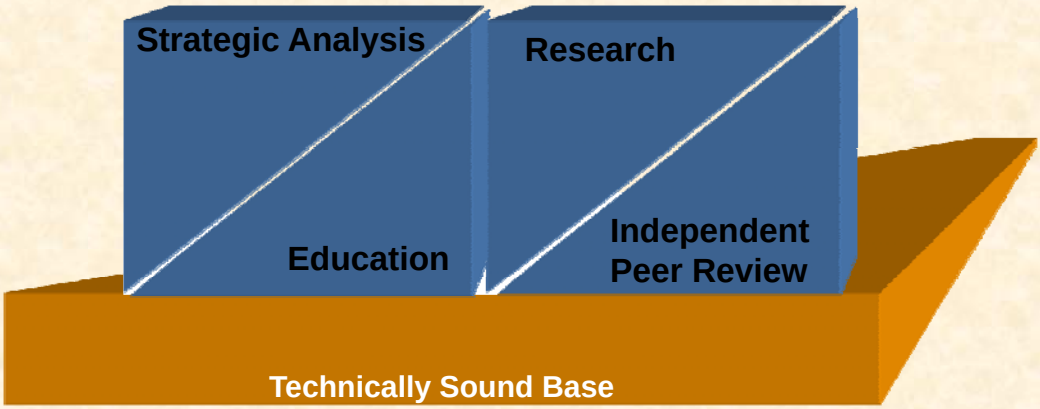
Other Participating Institutions: Rutgers University, New York University, Oregon State University, University of Pittsburgh, Howard University, University of Washington, University of Arizona, Robert Wood Johnson Medical School

CRESP Mission

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.

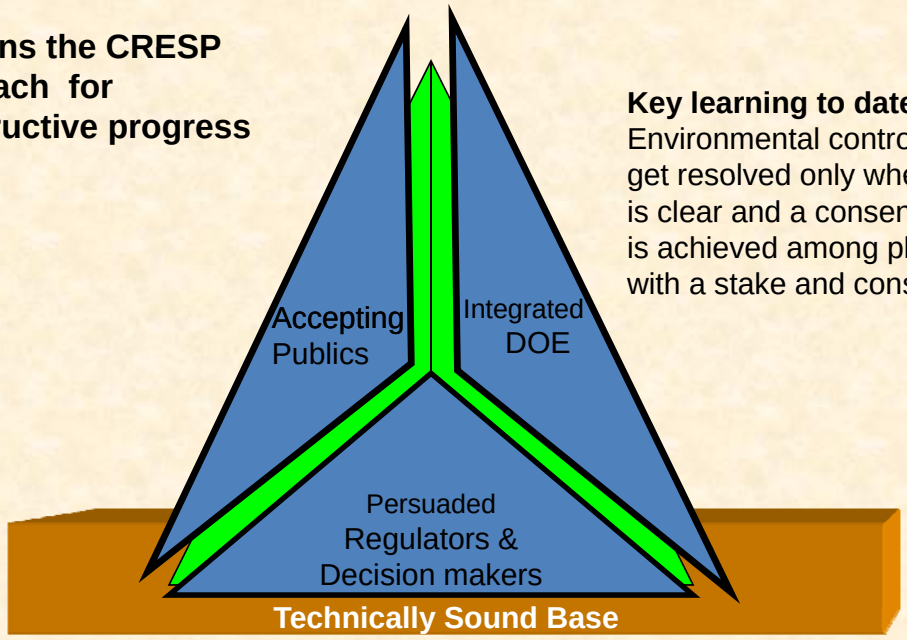
www.CRESP.org

CRESP's Four Functional Modes

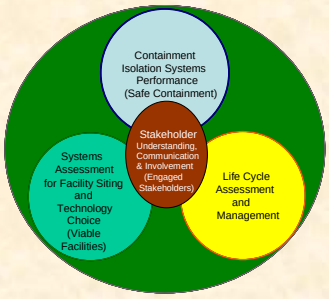


An Eternal Triangle

Explains the CRESP approach for constructive progress

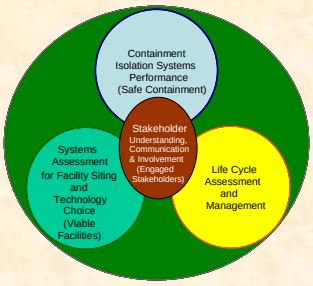


Key learning to date:
Environmental controversy get resolved only when data is clear and a consensus is achieved among players with a stake and constituency



Objectives for Focus Areas

- **Contaminant Isolation Systems Performance (Safe Containment)**
  - Develop tools and techniques to assess and enhance the integrated performance of engineered and institutional features of waste containment, land disposal systems and isolation of residual contamination after remediation and near surface waste disposal.
- **Life-cycle Risk, Cost and Benefit Analysis to Select Management Options (Life Cycle Management)**
  - Develop and demonstrate appropriate use of methodologies for comparing lifecycle risk (human health, ecological, environmental resources), evaluating technology effectiveness, and cost assessment for selection amongst different environmental restoration and waste management options for legacy wastes and new civilian waste forms.



Objectives for Focus Areas

- **Systems Assessment for Facility Siting and Technology Choices for Future Waste Management Facilities (Viable Facilities)**
  - Evaluate the evolving technical approaches to future fuel cycles, emphasizing the external technical (e.g., ultimate waste and secondary waste requirements), economic, social and policy considerations associated with implementation and site selections for interim storage, fuel reprocessing and geologic repositories.
- **Stakeholder Understanding, Communication and Involvement (Engaged Stakeholders)**
  - Assess and recommend approaches for more effective and credible ways to incorporate involvement of diverse stakeholders to understand and shape technically complex waste management decisions.

CRESP Senior Leadership

Management Board

- **Charles W. Powers**, Ph.D., Professor, Co-PI (Vanderbilt) – environmental management and policy, organizational design and development, and ethics.
- **David S. Kosson**, Ph.D., Professor and Chair of Civil and Environmental Engineering, Co-PI (Vanderbilt) – chemical and environmental engineering, remediation, leaching processes, and contaminant mass transfer.
- **Craig Benson,** Ph.D., Professor and Chair of Civil and Environmental Engineering (U. of Washington) – performance of near surface disposal units, environmental geotechnical eng., environmental geochemistry.
- **Joanna Burger**, Ph.D., Distinguished Professor, (Rutgers) – restoration ecology, ecological risk assessment, biological systems, and stakeholder involvement.
- **Michael Greenberg**, Ph.D., Distinguished Professor and Associate Dean (Rutgers, Bloustein School of Public Policy) – public policy, economics and risk communication.
- **Kathy Higley**, Ph.D., C.H.P., Professor (Oregon State) – environmental health physics, radiological dose and risk assessment, radioecology, nuclear emergency response.
- **James Johnson**, Ph.D., Dean (Howard U.) – environmental engineering, nuclear waste management.
- **Shlomo P. Neuman**, Ph.D., Regents Professor, (U. of Arizona) – expertise in vadose zone and groundwater hydrology, contaminant transport; member National Academy of Engineering.
- **Richard Stewart**, LL.B., University Professor and Director, NYU Center on Environmental and Land Use Law – environmental and administrative law and public policy; former Assistant Attorney General for environmental issues.

Additional Key Personnel

- **Mark Abkowitz**, Ph.D., Professor (Vanderbilt), – expertise in transportation risk; member Nuclear Waste Technical Review Board (Presidential appointment).
- **Kevin G. Brown,** Ph.D., Senior Scientist (Vanderbilt) – expertise in systems modeling, risk assessment, high level waste processing
- **James Clarke**, Ph.D., Professor of the Practice (Vanderbilt) – expertise in environmental remediation, risk assessment, environmental forensics; former member Advisory Committee on Nuclear Waste for NRC.
- **Michael Gochfeld**, M.D., Ph.D., Professor (RWJMS, Division of Occupational Medicine) – expertise in occupational medicine, industrial safety and risk analysis.
- **George Hornberger**, Ph.D., Distinguished University Professor (Vanderbilt) – expertise in water resources, hydrology; member Nuclear Waste Technical Review Board (Presidential appointment); member National Academy of Engineering.
- **Sankaran Mahadevan**, Ph.D., Professor (Vanderbilt) – expertise in systems reliability and risk.
- **Henry Mayer**, Ph.D. (Rutgers, Bloustein School of Public Policy) – expertise in economics, financial systems, contracts
- **Todd Palmer**, Ph.D., Associate Professor (Oregon State) – expertise in nuclear engineering, computational methods for radiation transport and diffusion, physics of nuclear reactors.
- **Frank Parker**, Ph.D., Distinguished Professor (Vanderbilt) – expertise in environmental systems, civil and environmental engineering, nuclear materials; member National Academy of Engineering.
- **Michael Stabin**, Ph.D., CHP, Assistant Professor (Vanderbilt) – expertise in radiation health physics, dose assessment, radiological measurements and instrumentation
- **Jane Stewart**, Environmental lawyer and consultant.
- **Ray Wymer**, Ph.D., Adjunct Professor (Vanderbilt) - Nuclear chemistry and separation processes (ret'd from ORNL)

What Does CRESP Actually Do? (Examples)

Research

- Life-cycle Risk Analysis of DOE Buried Wastes (Bear Creek Burial Grounds, OR; Subsurface Disposal Area, ID)
- Cementitious Barriers Partnership (with NRC, NIST, ECN, SRNL, SIMCO)
- Ecosystem contaminant uptake and exposure (e.g., fish studies at Amchitka, AK, SRS, Oak Ridge)
- Long-term performance of near-surface disposal systems
- Leaching assessment methodologies
- Model uncertainty in subsurface contaminant fate and transport
- Public perceptions of nuclear waste management and energy

What Does CRESP Actually Do? (Examples)

Stakeholder Communication and Education

- The Reporter's Handbook on Nuclear Materials, Energy, and Waste Management (M. Greenberg, et al)
- Stakeholder Risk Communication for the Columbia River Corridor (Hanford)
- Development of Nuclear Environmental Engineering Curriculum (with NRC)
- Short Course: Introduction to Nuclear Chemistry and Fuel Cycle Separations
- Symposium: Uncertainty in Long Term Planning – Nuclear Waste Management, A Case Study

What Does CRESP Actually Do? (Examples)

Reviews

- Major Risk Factors Integrated Facility Disposition Project (Oak Ridge)
- Tank Waste Chemistry and Processing (Hanford)
- Low Activity Waste Systems Review (Hanford)
- Evaluation of System Level Modeling and System Tools for Liquid Waste Processing (Savannah River, Hanford)

What Does CRESP Actually Do?

Native Americans & Fish in the Savannah River- at Amchitka – at Hanford

Creation of a Cementitious Barriers Partnership Collaboration for diverse nuclear applications – to build on decades of leaching work

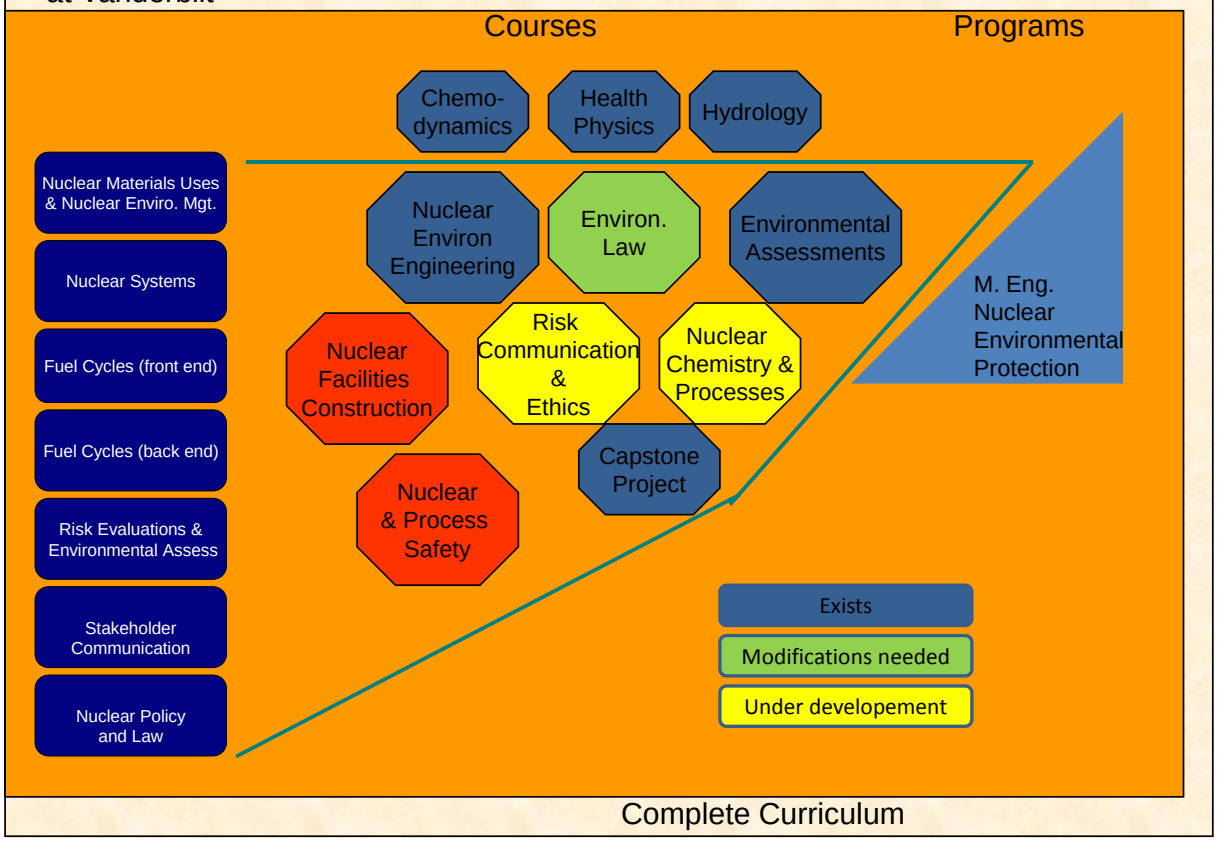
Reporters' Handbook on all nuclear Issues

Diverse regulatory innovations – such as the Integrator Operable Unit at SRS

Legal analysis of US nuclear waste law and of Natural Resource Damages

Groundwater characterization and technology assessment – and when to stop

Independent reviews - from troubled waste treatment processes to epidemiology

Education of award-winning nuclear pre-professionals and mid-career professionals

Example M.Eng. in Environmental Eng'g (Nuclear Environmental Protection Focus) at Vanderbilt