Sandia National Laboratories

Energy, Climate, & Infrastructure Security

Nuclear Waste Disposal Research, Development, and Demonstration (RD&D)

Nuclear Waste Disposal RD&D focuses on identifying multiple viable geologic disposal options and addressing technical challenges for generic disposal concepts in various host media (e.g., mined repositories in salt, clay/shale, and granitic rocks, and deep borehole disposal in crystalline rock). This RD&D will transition to site-specific challenges as national policy advances. RD&D goals at this stage are to increase confidence in the robustness of generic disposal concepts, to reduce generic sources of uncertainty that may impact the viability of disposal concepts, and to develop science and engineering tools that will support the selection, characterization, safety evaluation, and ultimately licensing of a repository. RD&D activities range from developing and deploying computational process and system models; developing and implementing integrated field, laboratory and in-situ experimental testing with modeling programs; and managing nuclear energy systems data for evaluating alternative fuel cycles and siting nuclear energy facilities.

Vision

To enhance the nation's security and prosperity through sustainable, transformative approaches to our most challenging energy, climate, and infrastructure problems.

Legacy of Nuclear Waste Management

SNL is the only national laboratory that has experienced and participated in two transitions from 'science to compliance,' (WIPP and YM) like those that will be required in the licensing of any future nuclear waste disposal facility. Key aspects of this experience have been the integration of experimental programs and conceptual facility design and the use of system-level analyses to guide decision making in research and regulatory environments. SNL has used this experience to inform and support key decisions concerning nuclear waste management applications both in the U.S. and internationally. Some of these applications include:

- Environmental assessment of proposed HLW repository sites
- Support to the Environmental Protection Agency (EPA) on the use of probabilistic risk analysis for the development of environmental and health standards (40 CFR Part 191) and to NRC for regulations for deep geologic disposal of HLW (10 CFR Part 60)
- Coordination and science lead for the U.S. Sub-seabed Disposal Program (SDP) and the international Seabed Working Group
- Development and demonstration of the NRC's LLW management PA for assessment of compliance with 10 CFR Part 61
- Development and implementation of the Greater Confinement Disposal PA for special-case wastes
- Design and implementation of site selection and characterization program and design validation experiments for Waste Isolation Pilot Plant (WIPP)
- Development of the conceptual design for WIPP seal systems
- Humid-air corrosion testing of advanced alloys in support of waste package development and assessment
- Development and implementation of the SDP PA
- Development and implementation of the WIPP and YM Total System PAs
- Development of physical protection system for YM surface facilities
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For more information, contact

Kevin A. McMahon, Manager
Sandia National Laboratories
kamcmah@sandia.gov
Office: (505) 844-5184
Mobile: (505) 944-6511

Website: energy.sandia.gov

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