Goldschmidt 2024 Abstract
https://doi.org/10.46427/gold2024.22924

Academic-industry-government partnerships in nuclear waste management to advance applied research and workforce development in the US

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Seventy-five years of nuclear material production in diverse industries has left our society with a legacy of wastes that require a range of disposition pathways. This includes permanent disposition in deep geologic systems for radioactive waste managed in the U.S. Department of Energy (DOE) Office of Spent Fuel and Waste Disposition (SFWD). Because of the unique properties and environmental behavior of radioactive waste, DOE has maintained programs that seek to build communities of expertise in radioactive waste science, engineering, and public engagement. This includes collaborations among academia, industry, government, and intergovernmental institutions in the U.S. and globally.

One example is a 2023 workshop focused on building international communication and collaboration around concepts for deep borehole disposal (DBD) of radioactive waste. Sandia National Laboratories hosted this workshop for SFWD and included technical organizations from 10 countries and industry investigators. In the Sandia DBD reference design, waste packages are emplaced in the lower 2 km of a 5-km deep borehole in crystalline rock. Due to the lack of a field-scale DBD demonstration, international collaboration among academic researchers, industry partners, and government regulators is viewed as one way to accelerate towards a demonstration. Collaboration among research groups was seen as an efficient way to reduce geological and engineering uncertainties concerning DBD. This resulted in a set of research priorities for the international community (including the need for deep groundwater geochemistry and the need for a field demonstration), as well as priorities for SFWD.

SFWD has also developed a robust pipeline of internships and post-doctoral positions that develop a continually thriving workforce in radioactive waste management, as well as executing public engagement activities with university partners to raise awareness and understanding of nuclear science, engineering, geoscience, and radioactive waste management issues among experts and non-experts alike. In early 2024, national lab scientists participated in a public webinar series entitled “Next Generation Workforce Development for Nuclear Waste Disposal R&D” where presentations like “Disposal 101” introduced undergraduate students and the public to the fundamental technical and social concepts and issues around radioactive waste disposition.

SNL is managed and operated by NTESS under DOE NNSA contract DE-NA0003525.