**Integration Group for the Safety Case (IGSC) Symposium 2024***MOVING TOWARDS THE CONSTRUCTION OF A SAFE DGR – GETTING REAL*

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| **Abstract Number: 54** | **Session 6.3.4** |
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| **Abstract Title:** The Status of, and Challenges to, Developing Safety Cases for Disposal of Spent Nuclear Fuel and High-level Radioactive Waste in the United States | |
| **Abstract (300-500 words):**  In the United States, current uncertainty in the policy for managing and disposing of commercial and defense spent nuclear fuel (SNF) and high-level radioactive waste (HLW) in a geologic repository affects the development of safety cases. Outstanding decisions on basic concepts such as the number of repositories and types of waste to be disposed of, and the acceptability for disposal of large dual-purpose (storage and transportation) canisters impact development of safety cases. For example, in 2008, the U.S. Department of Energy (DOE) presented a safety case for the unsaturated volcanic tuff repository at Yucca Mountain, Nevada for the disposal of commercial and defense SNF and HLW, which did not include a separate federal consolidated interim storage facility as part of the waste management system. The characteristics of the different waste types (thermal load and the number of different waste package types) were an integral part of the Yucca Mountain safety case. In 2010, licensing and development of a repository at the Yucca Mountain site was suspended, and no alternative repository site or the type of rock to host a repository has been chosen. A 2015 Presidential Memorandum found that a separate repository for the disposal of HLW resulting from atomic energy defense activities only was required, which added a second repository to accommodate some undefined fraction of the U.S. inventory of SNF and HLW. In 2021, Congress began funding DOE to develop a consent-based siting approach for a federal consolidated interim storage facility.  Since 2012, Congress has funded DOE to conduct non-site-specific repository studies relevant to several other types of host rocks (crystalline, clay/shale, and salt) that have focused on disposal of commercial SNF. In 2013, DOE completed a generic deep geologic disposal safety case report whose emphasis was on the long-term post-closure safety of the repository. Since then, DOE non-site-specific repository studies have focused on developing and applying an enhanced performance assessment modeling capability to reference cases for disposal in crystalline, clay/shale, and salt host rocks. The U.S. Nuclear Waste Technical Review Board (Board) is required to evaluate the scientific and technical validity of DOE’s efforts to manage and dispose of SNF and HLW. In reviewing, DOE’s non-site-specific repository studies program, in 2021, the Board recommended that DOE make clear and effective communication of its disposal options, and their associated barriers, barrier functions, and supporting technical bases, an integral part of its disposal R&D program and include pre-disposal management activities such as any repackaging or storage that are required prior to disposal. The Board is conducting a review of DOE’s research and development activities related to non-site-specific disposal of radioactive waste in crystalline host rocks. The Board will hold a meeting on this topic in May 2024. This paper will discuss the Board’s evaluation of DOE’s efforts to address the Board’s recommendation of adopting a safety case approach as applied to its non-site-specific disposal of radioactive waste in crystalline host rocks and discuss the challenges DOE faces in developing safety cases. | |