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The Role of Engineered Barriers at the Potential Yucca Mountain Repository

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Abstract

The U.S. Nuclear Regulatory Commission (NRC) will be reviewing a potential license application for the high-level radioactive waste repository to be located at Yucca Mountain. The U.S. Department of Energy is considering the disposal of 70,000 MTHM (metric tons of heavy metals) of high-level radioactive waste in the form of spent nuclear fuel and vitrified waste at the potential repository. The potential repository is expected to provide protection to the public and environment through natural and engineered barriers. The engineered barriers may be constructed approximately 300 m [1,000 ft] below the land surface of Yucca Mountain and may enclose the wasteform in a corrosion resistant Alloy 22 waste package. The waste packages may be placed on a pallet in a drift and covered with a titanium drip shield. The release of radionuclides from the wasteform depends on the quantity and chemistry of water that enters through the breached waste packages. The breach could occur because of initial defects, corrosion, or stress corrosion cracking during the performance period. Because of the long time scales and process uncertainties, a probabilistic approach has been adopted to evaluate the performance of engineered barriers. The presentation will discuss how the performance of engineered barriers, including wasteforms, is incorporated in the probabilistic performance assessment.

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