The Role of Science Supporting the Waste Isolation Pilot Plant

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The presentation briefly addresses three topics.

First, science has played an important role throughout the history of the WIPP project, beginning with site selection in the middle 1970s. Science was a key part of site characterization in the 1980s, providing basic information on geology, hydrology, geochemisty, and the mechanical behavior of the salt, among other topics. Science programs also made significant contributions to facility design, specifically in the area of shaft seal design and testing. By the middle 1990s, emphasis shifted from site characterization to regulatory evaluations, and the science program provided one of the essential bases for certification by the Environmental Protection Agency in 1998. Current science activities support ongoing disposal operations and regulatory recertification evaluations mandated by the EPA.

Second, the EPA regulatory standards for long-term performance frame the scientific evaluations that provide the basis for certification. Unlike long-term dose standards applied to Yucca Mountain and proposed repositories in other nations, the WIPP regulations focused on cumulative releases during a fixed time interval of 10,000 years, and placed a high emphasis on the consequences of future inadvertent drilling intrusions into the repository. Close attention to the details of the regulatory requirements facilitated EPA's review of the DOE's 1996 Compliance Certification Application.

Third, the scientific understanding developed for WIPP provided the basis for modeling studies that evaluated the long-term performance of the repository in the context of regulatory requirements. These performance assessment analyses formed a critical part of the demonstration that the site met the specific regulatory requirements as well as providing insight into the overall understanding of the long-term performance of the system.

The presentation concludes with observations on the role of science in the process of developing a disposal system, including the importance of establishing the regulatory framework, building confidence in the long-term safety of the system, and the critical role of the regulator in decision making.

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