



U.S. Department of Energy
Office of Civilian Radioactive Waste Management

Roundtable Discussion Repository Safety Strategy Path Forward

Presented to:
Nuclear Waste Technical Review Board

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YUCCA
MOUNTAIN
PROJECT

Basis for Discussion

- **Further evolution of the Repository Safety Strategy (RSS) is a work-in-progress**
 - This presentation represents the current conceptual thinking about how the RSS could evolve
- **DOE welcomes reactions and comments from the Board and other Stakeholders**
- **DOE's near-term goal is to more clearly articulate an updated RSS for the development of a safety case consistent with that strategy, to support a decision on whether or not to recommend approval of the Yucca Mountain site**

Terminology

- **Safety Strategy**: DOE’s general approach for the application of multiple lines of evidence and logical arguments to conduct a safety assessment and present a safety case
- **Safety Assessment**: “the evaluation of long-term performance, of compliance with acceptance guidelines and of confidence in the safety indicated by the assessment results”

[OECD Nuclear Energy Agency NEA/RWM/DOC(99)4]

- **Safety Case**: “a collection of arguments, at a given stage of repository development, in support of the long-term safety of the repository. A safety case comprises the findings of a safety assessment and on a statement of confidence in these findings. It should acknowledge the existence of unresolved issues and provide guidance for work to resolve these issues in future development stages.”

[OECD Nuclear Energy Agency NEA/RWM/DOC(99)4]

Evolving Conceptual Approach to RSS

- **Separate safety strategy and safety case**
 - **Changes to strategy would include**
 - ◆ **Strategy would be concise description of DOE's general approach to multiple lines of evidence and argument**
 - ◆ **Strategy would be used as a tool to facilitate communications between DOE and stakeholders**
 - **Tie safety case more directly to regulatory requirements**
 - ◆ **Safety cases would be prepared and documented at key status and decision points, consistent with the appropriate requirements**
 - ◆ **For example, a safety case would be presented to support a site recommendation decision, then a refined and updated safety case would be made in the license application**

Evolving Conceptual Approach to RSS

(Continued)

- **RSS will incorporate guiding program principles to establish a basis for application of the strategy at distinct decision points**
 - **Continuous Learning**
 - **Informed Decision Making**
 - **Responsible Stewardship**
- **Elements of the safety strategy will evolve to more fully incorporate multiple lines of evidence and argument**

Evolving Conceptual Approach to RSS

(Continued)

- **Safety strategy will include both preclosure and postclosure safety**
 - Pre- and postclosure elements of the strategy would be similar and consistent
- **The safety case will base conclusions on both direct and indirect lines of evidence**
 - ◆ Regulatory requirements and expectations will guide analyses
 - ◆ Direct evidence will be captured in arguments pertaining most directly to a repository system at Yucca Mountain
 - ◆ Indirect evidence will include natural and anthropogenic analogues, independent expert review
 - ◆ Test and evaluation program

Multiple Lines of Evidence and Argument

- **Multiple controls and barriers**
- **Ability to meet applicable standards**
- **Natural system attributes**
- **Robust and flexible design**
- **Numerical process and performance modeling**
- **Natural and anthropogenic analogues**
- **Independent expert review**
- **Test and evaluation**

Example Conceptual Framework for Evolving Elements of the RSS

