

Experience Gained On the Management and Disposition of High-Activity Waste
Summary of Presentation to the Blue Ribbon Commission on America's Nuclear Future
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U.S. Nuclear Waste Technical Review Board
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About the Board

The Board is an independent federal agency of 11 technical and scientific experts appointed by the president to 4-year terms from a list of nominees submitted by the National Academy of Sciences. The law requires the Board to conduct unbiased ongoing technical peer review of activities undertaken by the Department of Energy (DOE) related to the implementation of the Nuclear Waste Policy Act and to report its findings and recommendations to Congress and the Secretary of Energy. The Board's peer-review responsibilities continue regardless of where in DOE the activities are undertaken.

Current Board priorities

The Board's current priority study tasks are: technical gaps for very long-term dry storage of commercial spent fuel; a material-balance analytical tool for the back-end of the fuel cycle called NUWASTE; technical effects of repository delays on government-owned high-activity waste; updating the survey of worldwide nuclear waste programs; and a study of "Technical lessons Learned" from the U.S. and other repository programs, which will be the focus of the presentation.

The Board believes that regardless of whatever nuclear fuel-cycle alternatives are implemented in the future, a repository for permanent disposal of high-activity wastes will be necessary. A plan and a path forward are necessary for public confidence.

Findings

Following are "lessons learned" from the experience of *repository efforts of the U.S. and other countries* to date about geologic disposal as a permanent solution to the disposal of high activity waste:

- Deep geologic repositories are feasible.
- Expect surprises when you get underground during the site-characterization phase.
- Engineered barriers may be more predictable than the natural system, in the "near" term.
- An improved knowledge base now exists to guide future efforts in specifying waste forms.
- Prototyping of first-of-a-kind components is important.
- Direct disposal of canisters containing spent fuel in dual-purpose casks should be considered.
- Postclosure performance can be quantified using the principles of the risk sciences.
- A total systems approach to characterizing a repository site is crucial.
- A close relationship between science and engineering is essential.
- A license application can be developed that meets Nuclear Regulatory Commission review acceptance requirements
- Repository systems can be developed in a variety of geologic environments.
- Most proposed disposal concepts rely on both natural and engineered barriers, although the degree of reliance on one or the other varies considerably.
- Research carried out at-depth in underground research laboratories has been extremely valuable.