The U.S. Nuclear Waste Technical Review Board Status Update

Presented to:
National Transportation Stakeholders Forum

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The Board’s Statutory Mandate

• The 1987 amendments to the Nuclear Waste Policy Act (NWPA) established the U.S. Nuclear Waste Technical Review Board.

• The Board evaluates the technical and scientific validity of DOE activities related to:
  – transportation, packaging and storage of spent nuclear fuel (SNF) and high-level radioactive waste (HLW)
  – site characterization, design, development, and operations of facilities for disposing of such wastes

• These activities fall under the Board’s technical peer-review mandate regardless of where in DOE those activities are undertaken.

• The Board reports its findings and recommendations at least twice each year to Congress and the Secretary of Energy.
About the Board

• The Board is not part of the Department of Energy (DOE); it is an independent federal agency.

• The 11 Board members are technical experts who are appointed by the President from a list of nominees submitted by the National Academy of Sciences.

• Board members serve on a part-time basis for 4-year terms, supported by a full-time staff.

• The Board has access to draft DOE documents to ensure that the Board’s recommendations can be made during the decision-making process, not after the fact.
The Board’s Technical Review

• The Board’s ongoing technical peer review continues even as alternatives to a Yucca Mountain repository are considered.
• The focus of the Board’s review has shifted as DOE activities have changed.
• The Board’s priority review tasks currently are:
  – Report on technical advancements and issues related to Yucca Mountain
  – Technical basis for extended dry storage and transportation of used nuclear fuel
  – Systems analysis of waste implications of fuel cycle options (NUWASTE)
  – Update of international nuclear waste management programs
  – Survey of facilities managing DOE-owned SNF and HLW
Transportation Issues Related to Yucca Mountain

• The nuclear fuel cycle includes a waste management system comprised of many interrelated components.

• Transportation is the “glue that holds the system together”.

• It is imperative that the system be analyzed and evaluated as an integrated whole.

• This is essential to harmonizing cask design, fleet acquisition, handling, access/egress and line-haul operations.

• Transportation stakeholders must be vigilant that these interdependencies are recognized and acted upon as part of system design and implementation.
Technical Basis for Extended Dry Storage and Transportation of Used Nuclear Fuel

• Research and monitoring/inspection programs are needed to demonstrate that used fuel can be stored safely for extended periods, and then transported and handled as part of a future waste management program.

• The regulations concerning dry storage of used fuel do not currently address storage for extended periods.

• There also is some inconsistency between the regulations that apply to dry storage and those that apply to transportation.

• It would be helpful in managing extended dry storage of used fuel if the regulations were revised as an integrated set.
NUWASTE Process Operations & Material Flow
Preliminary Analysis Findings

• For all scenarios, a geologic repository will be needed for direct disposal of SNF and disposal of vitrified HLW.
• Even under optimistic conditions, more than 6,000 dry-storage casks will be required.
• Maximum savings in waste packages as a result of reprocessing is approximately 25%.
• Large quantities of other radioactive wastes are produced during reprocessing.
• Maximum savings in natural uranium use from reprocessing is \( \sim 7\% \) given reprocessed uranium enrichment license limits.
• Unless sufficient MOX fuel is fabricated, reprocessing will generate significant stockpiles of plutonium.
Number of Waste Packages Required

- 3,000 MT/year Repository
- 3,000 MT/year Repository and 1,500 MT/year Reprocessing
Quantity of LLW and GTCC Waste Generated

- No Repository or Reprocessing
- 3,000 MT/year Repository
- 3,000 MT/year Repository and 1,500 MT/year Reprocessing
Direction of Future NUWASTE Activities

• Evaluate other scenarios to understand the sensitivity of analysis results to program characteristics (e.g., facility capacities, operating schedules)

• Include additional functionality
  – Facility construction, operating & decommissioning cost

• Expand NUWASTE scope
  – Transportation requirements at each stage of the fuel cycle
  – Centralized storage capacity needs
  – Disposition of DOE HLW and SNF
  – Alternative reprocessing & reactor technologies
Nuclear Waste Technical Review Board

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