



U.S. Nuclear Waste Technical Review Board

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Management of Spent Nuclear Fuel: What, Where – and When?

Presented to:
INMM 30th Spent Fuel Management Seminar

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The Nuclear Waste Technical Review Board

- Established by the 1987 amendments to the Nuclear Waste Policy Act to:
 - Evaluate the “technical and scientific validity” of DOE activities related to implementing the NWPA, including
 - Transportation, packaging, and storage of spent nuclear fuel (SNF) and high-level radioactive waste (HLW)
 - Site characterization, design, and development of facilities for disposing of such wastes.
- Required by law to report its findings, conclusions, and recommendations at least twice each year to Congress and the Secretary of Energy.
- Eleven Board members:
 - Technical and scientific experts
 - Nominated by the National Academy of Sciences; appointed by the President
 - Serve on a part-time basis for four-year terms.
- Board documents:
 - Reports, correspondence, meeting transcripts and materials, congressional testimony, etc. can be found at www.nwtrb.gov
 - Basis for Board perspectives on SNF and HLW program



The Big Picture in 2015

- Disposal of SNF and/or HLW in deep underground repository – internationally accepted concept
- Many countries with nuclear power programs have plans for repository disposal of SNF and/or HLW
- Many countries with repository programs have had resets
- No SNF or HLW disposed of to date
- No country has an operational repository for SNF or HLW
- No country has a repository licensed for SNF or HLW
- Reprocessing is not a final solution
- Long-term storage of SNF and/or HLW is today's reality – mainly at nuclear power plant sites



Progress Is Being Made...

- Sweden:
 - Osthhammar/granite
 - License application submitted 2011 – under review by regulator
 - SKB/KBS-3 concept, small SNF canisters (4 PWR/9 BWR)
- Finland:
 - Olkiluoto/granite
 - License application submitted 2012 – under review by regulator
 - SKB/KBS-3 concept, small SNF canisters (4 PWR/9 BWR)
- France:
 - Bure/argillite (clay)
 - Public Debate concluded in 2014
 - License application scheduled for submission to parliament 2017
 - Vitrified HLW containers, now adding PWR MOX SNF



In the Works...

- Belgium
 - Not officially adopted repository as strategy for SNF disposition
 - Completing performance assessment on data from URL in boom clay near the Dessel/Mol site
- Canada
 - Adaptive Phased Management approach
 - 22 communities expressed interested
 - 9 now eliminated for technical reasons
- China
 - Planning a URL in granite near Beishan
 - Now also considering a URL at a clay site
- Germany
 - Repository Siting Act passed in 2014
 - Commission created to develop a siting process



In the Works... (cont'd)

- Japan
 - Moved away from former consent-based process
 - Central government to identify potential sites
- Korea
 - Centralized interim storage facility planned by 2024
- Russia
 - Centralized wet and dry SNF storage facilities at Zheleznogorsk
 - URL planned in granite (Nizhnekansk) at intended repository site
 - Repository schedule: decision by 2025; operations by 2035
- Spain
 - Repository disposal is long-term strategy for SNF disposition
 - Centralized interim storage facility for SNF to be built
 - Site at Villar de Canas selected using consent-based siting process
- Switzerland
 - Away-from-reactor centralized storage facility operating since 2000
 - URLs in granite (Grimsel) and opalinus clay (Mont Terri)
 - Sectoral Plan extended in 2014 by additional two to five years



In the Works... (cont'd)

- United Kingdom
 - “Managing Radioactive Waste Safely” being revised/replaced
 - New approach outlined in 2014 government White Paper
- United States
 - Yucca Mountain
 - SERs to be completed by January 31, 2015
 - Contentions remain unresolved
 - BRC Report, January 2012, recommended:
 - “Adaptive, staged, consent-based, transparent, standards-and-science based” site selection process
 - Single-purpose organization with necessary authority and resources
 - One or more consolidated interim storage facilities for SNF
 - DOE Response/Administration Strategy, January 2013, planned:
 - Interim Storage Facilities: pilot in 2021, larger facility in 2025
 - Repository operations to start in 2048
 - DOE-NE “Disposal Options” report, October 2014, recommended:
 - Separate repository for some DOE SNF and HLW and some navy SNF
 - Research, development and demonstration program for borehole disposal



Is There Common Ground?

- Sweden, Finland and France:
 - All used consent-based site selection processes
 - All have single-purpose implementers
 - All have long-term, multi-year assured budgets
 - All have stable political support
 - All have high staff retention rates
 - All have focused on:
 - Demonstration of long-term safety, rather than just meeting regulatory requirements
 - Establishing and maintaining public acceptance
- However:
 - None of these factors guarantees success
 - Sweden and France initially had “resets”
 - Each program has its own individual characteristics



Related Board Reports, etc.

- “Survey of National Programs for Managing High-Level Radioactive Waste and Spent Nuclear Fuel”: 2009 – update planned for 2015.
- “Evaluation of the Technical Basis for Extended Dry Storage and Transportation of Used Nuclear Fuel - Executive Summary”: 2010.
- “Experience Gained from Programs to Manage High-Level Radioactive Waste and Spent Nuclear Fuel in the United States and Other Countries”: 2011.
- “DOE Activities to Preserve Yucca Mountain Repository Project Records”: 2013.
- “Designing a Process to Site a Deep-Mined Geologic Repository for High-Level Radioactive Waste and Spent Nuclear Fuel”: to be issued in 2015.

