



U.S. Nuclear Waste Technical Review Board

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U.S. Nuclear Waste Technical Review Board: Mission and Focus

Presented to:
International Partnership Workshop on Used Nuclear Fuel & High Level Radioactive Waste

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The Board's Role

- Conduct an independent & ongoing evaluation of the technical validity of activities undertaken by the Secretary of Energy related to the management of:
 - High-level radioactive waste (HLW)
 - Commercial, research, and defense-related spent nuclear fuel (SNF)
- Report its findings to Congress and the Secretary of Energy at least twice per year
- The Board's mandate is unchanged by the status of the Yucca Mountain repository project, though the activities the Board reviews will necessarily be different



About the Board

- The 11-person Board was created in the 1987 amendments to the Nuclear Waste Policy Act
- Candidates are nominated by the National Academy of Sciences and appointed by the President. Members serve in a part-time capacity
- The Board is an independent agency in the Executive Branch, **not** a part of the Department of Energy (DOE)
- Member expertise includes risk assessment, nuclear engineering, geoscience, systems analysis & transportation
- We typically hold 2 or 3 public meetings each year, plus smaller topical meetings and fact-finding trips



The U.S. Program in Transition

- In 2008, DOE submitted the license application for the Yucca Mountain repository and the NRC accepted it for review
- DOE has since announced its intention to terminate the Yucca Mountain program
 - Funding reallocated
 - Application made to withdraw the license application - with prejudice
 - Many project personnel dispersed
- Office of Civilian Radioactive Waste Management (DOE-RW) responsibilities reassigned within DOE
 - Office of Nuclear Energy (DOE-NE): SNF and HLW management
 - Office of Environmental Management (DOE-EM): Closure of YM facilities
- Blue Ribbon Commission on America's Nuclear Future created



Blue Ribbon Commission

- Chaired by former Congressman Lee Hamilton and General Brent Scowcroft; thirteen other members with diverse backgrounds
- Different from NWTRB, the BRC:
 - Considers nuclear options for back end of nuclear fuel cycle
 - Has a short duration (2 years)
 - Members are appointed by the Secretary of Energy
 - Is policy oriented; may suggest changes to the Nuclear Waste Policy Act
- Final BRC report due February 2012



Board Priority Tasks – Part 1

- **Systems Analysis.** In 2009, the Board began developing a systems analysis tool (NUWASTE) to support its technical evaluation of SNF and HLW management activities.
- **“Stranded” SNF and HLW.** After visiting DOE sites, the Board will prepare a report describing:
 - Waste amounts and characteristics
 - Alternatives for their management and disposition
 - Technical issues that need to be resolved
- **Very-Long-Term Dry Storage.** The Board is preparing a “white paper” on technical needs for very-long-term dry storage.



Board Priority Tasks – Part 2

- **Survey of National Programs.** In November 2009, the Board issued a report entitled, *Survey of National Programs for Managing High-Level Radioactive Waste and Spent Nuclear Fuel*. It can be accessed at www.nwtrb.gov. The report is being updated and expanded for issue early in FY 2011.
- **Experiences in the U.S. and Abroad.** On the basis of in-depth reviews of repository programs in the U.S. and other countries, the Board is preparing a report containing technical information and insights that can contribute to the national dialogue on waste management alternatives. Issue also planned for early in FY 2011.



Board Priority Tasks – Part 3

- **Office of Nuclear Energy.** The Board will continue to evaluate activities conducted by DOE-NE under the NWPA and identify technical issues that should be addressed concerning waste management options.
- **Office of Environmental Management.** The Board will continue to review activities undertaken by DOE-EM that are related to DOE's obligations under the NWPA.
- **Office of Legacy Management.** The Board may review the technical validity of DOE plans and activities related to the preservation of Yucca Mountain data and documents.



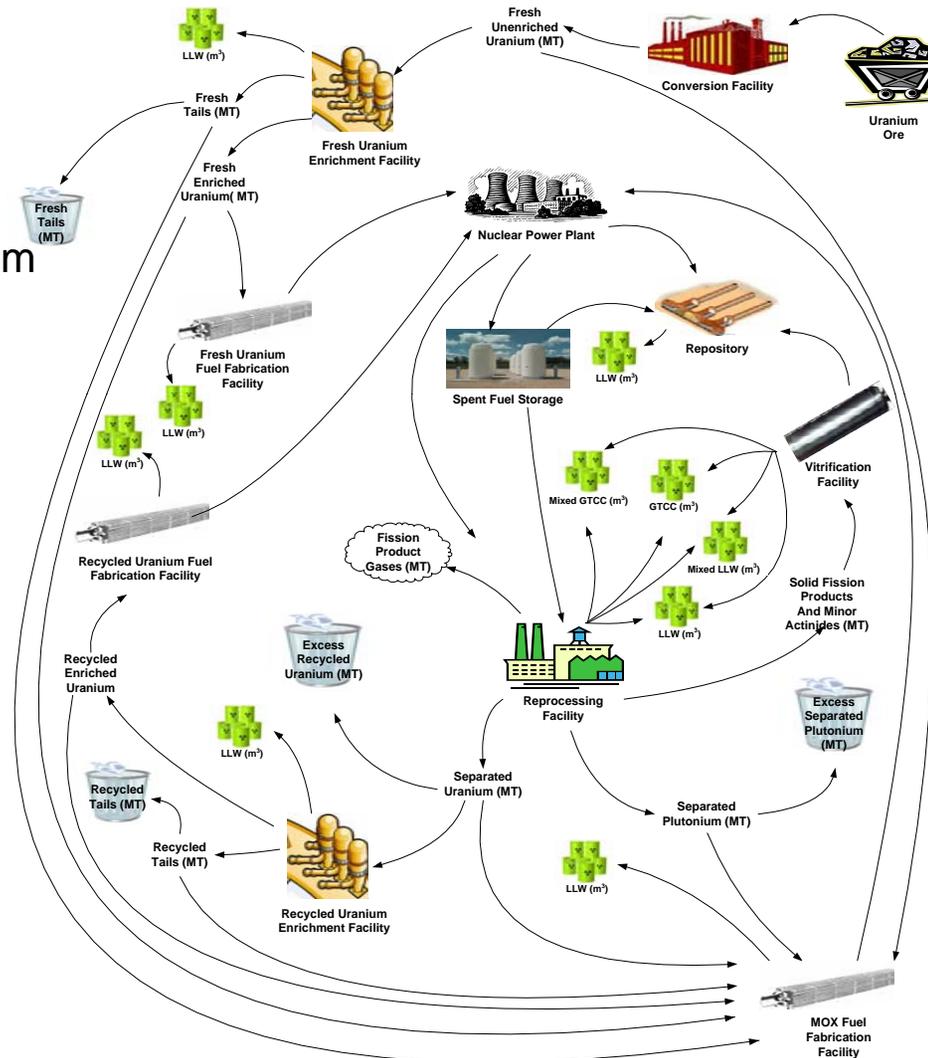
NUWASTE - Nuclear Waste Assessment System for Technical Evaluation

- Enable the Board to understand the impact of DOE's potential fuel cycle initiatives on generation and management of SNF and HLW
- Projects types, volumes and locations of SNF, HLW and other wastes
- Includes entire U.S. program – not focused only on specific waste streams or fuel cycle facilities
- Limited currently to LWR program using existing technologies
- Evaluate the impact of alternative spent fuel management options:
 - Dry surface storage
 - Reprocessing/recycling
 - Direct disposal
- Electricity generating capacity alternatives
 - Present nuclear power plants only
 - Present plus planned nuclear power plants
 - New nuclear power plants as needed to maintain present generating capacity
- Fuel fabrication alternatives
 - New uranium fuel
 - Recycled uranium fuel
 - MOX fuel



NUWASTE - Process Operations & Material Flow

- Waste streams generated
 - Fission products & minor actinides
 - Fuel assembly components
 - Tails from new and recycled uranium
 - LLW
 - GTCC
 - TRU (in process)
- New facilities required
 - Recycled uranium enrichment
 - Recycled fuel fabrication
 - Spent fuel storage
 - Reprocessing
 - Vitrification
 - CSNF & HLW repository
 - Repositories for other wastes
- Transportation logistics



NUWASTE Evaluations to Date

- Extended dry storage needs for commercial spent nuclear fuel - assuming no repository or reprocessing
- Disposal of commercial spent nuclear fuel without reprocessing
- Alternative reprocessing programs for light water reactors
- Opportunities to balance potentially conflicting benefits of reprocessing and recycling, including:
 - Reduction of waste volumes for repository disposal
 - Use of MOX fuel
 - Non-proliferation objectives



NUWASTE - Next Steps

- Identify and analyze additional scenarios
- Prepare reports on NUWASTE methodology and results
- Communicate results to BRC and others
- Pursue topics warranting further investigation
- Extend NUWASTE capabilities
 - Small modular reactors
 - Advanced (Gen III and IV) reactor designs
 - Processing of DOE SNF, disposal of all DOE HLW
 - Transportation equipment/facility characteristics and logistics
 - Away from reactor central storage facility/facilities

