



U.S. Nuclear Waste Technical Review Board

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

Presented to:

**Nevada Legislative Committee on High-Level Radioactive Waste**

Presented By:

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EXHIBIT C - HLRW  
Document consists of 15 pages.  
Entire Exhibit Provided  
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# The Board's Role

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- Conduct an independent and ongoing evaluation of the technical and scientific validity of activities undertaken by the Secretary of Energy related to the management of high-level radioactive waste (HLW) and commercial, research, and defense-related spent nuclear fuel (SNF)
- Report its findings to Congress and the Secretary of Energy at least two times per year
- The Board's mandate is unchanged by uncertainty in the future of the Yucca Mountain repository project, though the activities the Board reviews may be different



# About the Board

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- 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 for terms of four years
- The Board is an independent agency in the Executive Branch, **not** a part of the Department of Energy (DOE)
- Board member expertise includes risk assessment, nuclear engineering, geosciences, systems analysis and transportation
- The Board typically holds two or three public meetings each year, plus smaller topical meetings and fact-finding trips



# The U.S. Program in Transition

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- In 2008, DOE submitted the license application for the Yucca Mountain repository and the NRC accepted it for review
- In 2010, DOE announced the 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

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- 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
  - Is a temporary, 2-year Commission
  - 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 Priorities

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- The Board has refocused its priority goals for fiscal years 2010-2011; the Board will:
  - Compile objective information to perform its technical review of DOE activities and to advise Congress, the Secretary, and the Blue Ribbon Commission
  - Update its information on, and report on, experiences from the U.S. nuclear waste program and programs in other countries.
  - Review and report on the technical and scientific validity of DOE activities, including those that transition from DOE-RW to DOE-NE and DOE-EM, together with activities undertaken by DOE-EM related to defense SNF and HLW.



# Board Priority Tasks

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- **Systems Analysis.** In 2009, the Board began developing a systems analysis tool (“NUWASTE”) to support its evaluation of DOE’s SNF and HLW management activities.
- **“Stranded” SNF and HLW.** After visiting DOE sites, the Board will prepare a report on the amounts and characteristics of the waste, the alternatives under consideration for their management and disposition, and 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 (Cont.)

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- **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*. The Report can be accessed on the Board's website at [www.nwtrb.gov](http://www.nwtrb.gov). The Board is currently updating the report for issue in 2011.
- **Report on Experiences in the U.S. and Worldwide.** On the basis of in-depth reviews of repository programs in the US 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 planned for late 2010.





# Board Priority Tasks (Cont.)

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- **Office of Nuclear Energy.** The Board will continue to evaluate activities conducted by DOE-NE under the auspices of the NWPA and identify technical issues that should be addressed concerning alternative 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

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- 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 whole US 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 Evaluations to Date

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



# Next Steps

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- Continue to identify and analyze additional scenarios
- Prepare reports on NUWASTE methodology and results
- Develop effective report formats for 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



# Current Board Members

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- **B. John Garrick, Ph.D., P.E.**  
**Chairman**
- **Mark D. Abkowitz, Ph.D.**
- **William Howard Arnold, Ph.D., P.E.**
- **Thure E. Cerling, Ph.D.**
- **David J. Duquette, Ph.D.**
- **George Hornberger, Ph.D.**
- **Andrew C. Kadak, Ph.D.**
- **Ronald M. Latanision, Ph.D.**
- **Ali Mosleh, Ph.D.**
- **William M. Murphy, Ph.D.**
- **Henry Petroski, Ph.D., P.E.**





# U.S. Nuclear Waste Technical Review Board

The U.S. Nuclear Waste Technical Review Board was established as an independent federal agency in the Nuclear Waste Policy Amendments Act of 1987. The Board's role is to provide objective expert advice to Congress and the Secretary of Energy on technical issues and to review the technical validity of Department of Energy (DOE) activities related to implementing the Nuclear Waste Policy Act. Three attributes combine to make the Board unique among federal agencies: (1) the Board is independent; (2) the Board advises both Congress and the Secretary of Energy; and (3) the Board performs an ongoing and integrated technical peer review of DOE nuclear waste management activities, including acceptance of spent nuclear fuel (SNF) from nuclear utilities; transportation, packaging, storage, and disposition of SNF and high-level radioactive waste (HLW); and design and operation of nuclear waste facilities.

## The Board's Continuing Role

For more than 20 years, DOE focused on developing a permanent geologic repository for nuclear waste disposal at Yucca Mountain in Nevada. During that time, the Board reported on the technical validity of DOE activities to Congress and the Secretary of Energy in reports issued at least twice yearly, in testimony, and in correspondence. In January 2010, Secretary Steven Chu appointed a Blue Ribbon Commission to consider alternatives for nuclear waste management. As Secretary Chu has observed, even as new options for managing nuclear waste are evaluated, DOE continues to have responsibility under law for the disposition of SNF and HLW. Similarly, the Board's statutory responsibility for conducting ongoing technical peer review of DOE activities related to the management and disposition of SNF and HLW remains unchanged.

## Refocusing Board Priorities

In accordance with its statutory mandate, the Board has refocused its priority goals for fiscal years 2010-2011 to reflect anticipated and ongoing DOE activities. During that period the Board will

- Compile objective technical information required to perform its technical review of DOE nuclear waste management activities and to advise Congress, the Secretary, and the Blue Ribbon Commission on the technical implications of nuclear waste management alternatives.
- Update and report on Board experience with the U.S. nuclear waste program and programs in other countries.
- Review and report on the technical validity of DOE activities related to implementation of the NWPA, including those activities transitioning from the Office of Civilian Radioactive Waste Management to the Offices of Nuclear Energy and activities undertaken by the Office of Environmental Management related to the disposition of defense SNF and HLW.

## Information on the Board

Information on the Board, including all Board reports, correspondence, congressional testimony; and meeting announcements, transcripts, and agendas can be obtained by accessing the Board's website at [www.nwtrb.gov](http://www.nwtrb.gov).

## Members of the Board

The Board is composed of 11 members who serve on a part-time basis. Board members are appointed by the President from a list of candidates submitted by the National Academy of Sciences. By law, nominees to the Board are selected solely on the basis of distinguished professional service and are eminent in a field of science or engineering, including environmental sciences.

The names and affiliations of the current Board members are listed below.

**B. John Garrick, Ph.D., P.E.**, is Chairman of the Board. A founder of PLG, Inc., he retired from the firm in 1997 and is a private consultant.

**Mark D. Abkowitz, Ph.D.**, is professor of civil and environmental engineering at Vanderbilt University and director of the Vanderbilt Center for Environmental Management Studies.

**William Howard Arnold, Ph.D., P.E.**, is a private consultant with long experience as a top executive in the nuclear industry. He retired from a 40-year career, first with Westinghouse and then with Louisiana Energy Services, in 1996.

**Thure E. Cerling, Ph.D.**, is Distinguished Professor of Geology and Geophysics and Distinguished Professor of Biology at the University of Utah.

**David J. Duquette, Ph.D.**, is John Tod Horton '52 Professor of Engineering in the Department of Materials Science and Engineering at Rensselaer Polytechnic Institute.

**George M. Hornberger, Ph.D.**, is a Distinguished University Professor at Vanderbilt University where he is director of the Vanderbilt Institute for Energy and Environment. He also is the Craig E. Philip Professor of Engineering and a Professor of Earth and Environmental Sciences there.

**Andrew C. Kadak, Ph.D.**, is a Principal in Exponent, a consulting engineering firm. Before joining Exponent in 2010, he was a Professor of the Practice in the Nuclear Science and Engineering Department at the Massachusetts Institute of Technology.

**Ronald M. Latanision, Ph.D.**, is emeritus professor of materials science and engineering and of nuclear engineering at the Massachusetts Institute of Technology and a Corporate Vice President of the engineering consulting firm, Exponent.

**Ali Mosleh, Ph.D.**, is Nicole J. Kim Professor of Engineering, director of the Reliability Engineering Program, and director of the Center for Risk and Reliability at the University of Maryland.

**William M. Murphy, Ph.D.**, is professor of Geological and Environmental Sciences at California State University, Chico. He also is a technical administrative judge on the Atomic Safety and Licensing Board Panel of the U.S. Nuclear Regulatory Commission.

**Henry Petroski, Ph.D., P.E.**, is Aleksandar S. Vesic Professor of Civil Engineering and professor of history at Duke University.