

# **U.S. Nuclear Waste Technical Review Board**



## **Fiscal Year (FY) 2012 Budget Request**

*Including Board Performance and Priority Goals for FY 2011-2012  
and Supplementary Information on the Board*

**Submitted: February 14, 2011**



## **U.S. Nuclear Waste Technical Review Board Budget Submittal Fiscal Year 2012**

In accordance with its enabling legislation, the U.S. Nuclear Waste Technical Review Board performs independent peer review of the technical validity of activities undertaken by the Secretary of Energy related to implementing the Nuclear Waste Policy Act (NWPA) (P.L. 97-145, as amended). Based on its review, the Board advises Congress and makes recommendations to the Department of Energy (DOE) on technical issues related to the management and disposition of spent nuclear fuel (SNF) and high-level radioactive waste (HLW). To fulfill its statutory mandate, the Board requests \$3,400,000 for fiscal year (FY) 2012. The requested amount is \$221,000 (6 percent) below the Board's FY 2008 appropriation.

### **The Board's Mission**

The Board was established in the 1987 amendments to the NWPA. According to the legislative history, the purpose of the Board is to provide objective expert advice to Congress and the Secretary on technical issues and to evaluate the technical and scientific validity of DOE's implementation of the NWPA. In accordance with its statutory mandate, the Board conducts an ongoing, independent, and integrated technical peer review of DOE activities related to the management, transportation, packaging, storage, and disposition of commercial SNF and of DOE-owned SNF and HLW. The Board reports its findings, conclusions, and recommendations to Congress and the Secretary at least twice yearly.

### **The Board's Continuing Role**

For more than 20 years, DOE focused on developing a deep geologic repository for the permanent disposal of SNF and HLW at Yucca Mountain in Nevada. In January 2010, Secretary of Energy Steven Chu appointed members to the Blue Ribbon Commission on America's Nuclear Future (BRC) that was established to consider alternatives for managing the back end of the nuclear fuel cycle. At approximately the same time, DOE petitioned the Nuclear Regulatory Commission for permission to withdraw the license application for construction of a repository for disposal of SNF and HLW at Yucca Mountain. On February 4, 2010, Secretary Chu stated at a hearing before the Senate Energy and Natural Resources Committee: *"The Administration remains committed to fulfilling its obligations under the Nuclear Waste Policy Act . . . Ongoing responsibilities under the Nuclear Waste Policy Act, including administration of the Nuclear Waste Fund and the Standard Contract, will continue under the Office of Nuclear Energy, which will lead future waste management activities."*

As noted by Secretary Chu, even as new options for managing nuclear waste are evaluated, DOE continues to have responsibility under the NWPA for the management and disposition of DOE-owned SNF and HLW and for the disposition of SNF from commercial

reactors. Similarly, the Board's statutory responsibility for conducting ongoing technical peer review of DOE's nuclear waste management and disposition activities and for advising Congress and the Secretary on the technical and scientific validity of those activities remains unchanged.

The Board's ongoing technical peer review is especially important in enhancing confidence in the technical and scientific process during periods of uncertainty. The Board's mission is both different from and complementary to the roles of other groups involved in nuclear waste management because the Board is (1) unconstrained by any stake other than technical and scientific credibility in the outcome of the activities it reviews, (2) limited by statute to reviewing the technical and scientific validity of DOE activities (not policy implications or regulatory compliance), and (3) a permanent independent federal agency whose members are nominated by the National Academy of Sciences and appointed by the President.

## Performance Plan for FY 2012

For FY 2012, the Board plans to extend and expand the three performance goals and associated priority goals established in its FY 2011 budget request. The performance and priority goals focus the Board's evaluation on DOE plans and activities related to transitioning DOE obligations under the NWPA from the Office of Civilian Radioactive Waste Management (DOE-RW) to the Office of Nuclear Energy (DOE-NE). The performance goals also reflect the Board's continuing evaluation of activities undertaken by the Office of Environmental Management (DOE-EM) related to DOE-owned SNF and HLW, which will all require disposal at some point.

The Board's performance and priority goals for FY 2012 are presented below. Progress in meeting the Board's goals for FY 2010 also is discussed.

**Performance Goal 1.** The Board will continue to compile objective information that will be necessary for it to perform its technical peer review of DOE activities. The Board also will examine the technical implications of potential waste-management alternatives from the perspective of an integrated waste management system. That information and the results of the Board's technical review of DOE activities will be useful to Congress and the Secretary of Energy in evaluating waste-management alternatives.

### Goal 1 Priority Goals

**A. Systems Analysis of Waste Management Alternatives.** Over the last two years, the Board has developed a personal-computer-based analytical tool for informing its evaluation of DOE's fuel-cycle program and related activities. In FY 2012, the scenario analyses produced by that tool will provide the basis for Board reports to Congress and the Secretary of Energy on the technical implications of waste management alternatives being considered by DOE and the implications for waste management of potential fuel-cycle initiatives. The reports also will be useful to the BRC.

**B. Survey and Report on "Stranded" DOE SNF and HLW.** Termination of the Yucca Mountain repository program will leave thousands of tons of government-owned SNF and HLW with no place to go—at least in the near term. These wastes are stored primarily at Hanford in Washington, at Idaho National Laboratory (INL) in Idaho, and at the Savannah River Site (SRS)

in South Carolina. Much of the waste is subject to legal agreements between the federal government and the respective states. The agreements include commitments for timely transportation of SNF and HLW from the sites to final disposal locations. In FY 2010, the Board visited Hanford and the SRS and at both locations was briefed on the technical work being carried out to prepare the SNF and HLW for permanent disposition. The Board toured the INL site and held a meeting in June 2010 in Idaho Falls, Idaho, at which the waste being stored at DOE-Idaho was discussed. In FY 2012, the Board expects to issue a report that summarizes the amounts and characteristics of the waste, the alternatives under consideration for their management and disposition, and technical issues that need to be resolved.

**C. Analysis and Report on the Technical Implications of Very-Long-Term Dry Storage.** Whatever alternative is selected for final disposition of nuclear waste, commercial SNF will most likely remain in storage much longer than previously anticipated. The Board convened a panel of experts in June 2009 to identify the data needs for very-long-term dry storage of commercial SNF in support of its evaluation of DOE technical activities related to long-term dry storage. On the basis of those discussions and its own review of the technical literature and government reports, in December 2010, the Board issued a “white paper” on technical needs for very-long-term dry storage that will serve as a framework for evaluating DOE activities and for advising Congress and the Secretary on these issues. The information also will be useful to the BRC.

**Performance Goal 2. The Board will report to Congress and the Secretary of Energy on findings and information gained from its 20-year experience with the U.S. nuclear waste management and disposal program and from observing waste management efforts in other countries.** The Board’s views on the experiences of the United States and other countries with nuclear waste programs will be particularly valuable to Congress and the Secretary as they evaluate alternatives for nuclear waste management. The information also will be useful to the BRC.

### Goal 2 Priority Goals

**A. Technical Lessons Learned.** On the basis of the Board’s 20 plus years of in-depth evaluation of the U.S. repository program and its long experience with high-activity waste management programs in several other countries, the Board is preparing a lessons-learned report. The emphasis in the report is on technical information and insights that can be applied to future domestic waste management and disposal programs. The benchmark is current and past programs, including the Yucca Mountain project, and how the technical work supporting those programs may be enhanced for the future consideration of a permanent solution to the disposal of high activity waste. A few non-technical enhancements may be included in the report as an appendix. The Board expects that the report will contribute significantly to the national dialogue on waste management alternatives.

**B. Update of Survey of National Programs.** In November 2009, the Board issued a report titled *Survey of National Programs for Managing High-Level Radioactive Waste and Spent Nuclear Fuel* in which the Board provides up-to-date information to Congress and the Secretary of Energy about the wide range of technical approaches and institutional arrangements that have been adopted in the United States and 12 other countries. The report has been distributed widely, and Board members and staff have been requested to make presentations on the material in the

report by a wide range of organizations involved in nuclear waste management, including the BRC and congressional staff. The report can be accessed on the Board's Web site at [www.nwtrb.gov](http://www.nwtrb.gov). The Board plans to update and extend the report.

**C. Risk-Based Performance Assessment.** In FY 2010, the Board began preparing a paper that describes a risk-based method of assessing repository performance based on the source term (the amount and type of radioactive material that could be released from waste packages).

**Performance Goal 3.** In accordance with its statutory mandate, the Board will continue its technical peer review and evaluation of DOE activities related to nuclear waste management and will report on the technical validity of the DOE activities to Congress and the Secretary of Energy.

### Goal 3 Priority Goals

**A. Review of Nuclear Waste Management Activities Undertaken by the Office of Nuclear Energy (DOE-NE).** In FY 2010, the Board began its evaluation of technical activities related to nuclear waste management that are being conducted under the auspices of DOE-NE. In June 2010, the Board held a meeting in Idaho Falls, Idaho, at which some of these activities and future plans were discussed. On the basis of information presented at the June meeting, the Board is identifying technical issues that should be addressed concerning alternative waste management and fuel-cycle options being considered by DOE. The Board will perform ongoing review of DOE activities and report to Congress and the Secretary during FY 2012.

**B. Analysis and Report on Corrosion Issues.** In FY 2010, the Board performed a review of DOE activities related to corrosion of waste packages and other elements of the engineered elements of a repository system that were being proposed by DOE-RW. These issues may be applicable to other parts of the waste management system. For example, corrosion issues are part of the Board's examination of long-term-dry-storage issues as well as some of the lessons that can be learned about the engineered system from the experience of the U.S. program.

**C. Review of Office of Environmental Management (DOE-EM) Activities Related to DOE-Owned SNF and HLW.** The Board will continue to review activities undertaken by DOE-EM that are related to DOE's obligations under the NWPA (See Goal 1, Priority Goal B.). For example, in contrast to HLW at Hanford and SRS, which is mostly in liquid or sludge form in tanks, most HLW at Idaho National Laboratory (INL) is in solid granular form in bins. In December 2009, DOE decided that the HLW in bins located at INL will be processed by hot isostatic pressing before disposal in a geologic repository. The Board discussed the technical basis and timing of that decision at its June 2010 meeting and in a letter to DOE following the meeting. The Board will continue to monitor DOE's activities in this area.

**D. Review of Plans for Preservation of Yucca Mountain Documents.** The Board is developing a scope of work related to reviewing the technical validity of plans developed by, and activities undertaken by DOE's Office of Legacy Management to preserve Yucca Mountain data and documents. The Board also may review the technical validity of DOE's implementation of its preservation plans.

## Accomplishing the Performance Goals and Priority Goals

**Board Panels.** The Board maintains the option of organizing panels and working groups that correspond with its performance and priority goals to help facilitate and focus its technical review.

**Information Gathering.** The law grants significant investigatory powers to the Board: The Board may hold such hearings, sit and act at such times and places, take such testimony, and receive such evidence as it considers appropriate. At the request of the Board and subject to existing law, DOE is required to provide all records, files, papers, data, and information necessary for the Board to conduct its technical review, including drafts of work products and documentation of work in progress. According to the legislative history, Congress provided such access with the expectation that the Board will review and comment on DOE decisions, plans, and actions as they occur, not after the fact.

Much of the Board's peer review and information gathering takes place at open public meetings where technical information is presented according to an agenda prepared by the Board. At these meetings, Board members and staff question presenters, and time is provided at the meetings for comments from interested members of the public. The Board typically holds two or three public meetings each year. Board panels and other small groups of Board members and staff meet, as needed, to investigate specific technical topics. The Board's public meetings are announced in the *Federal Register* four to six weeks before the meetings are held.

The Board also gathers information from site visits; visits to national laboratories and facilities; and meetings with DOE, national laboratory, and contractor staff working on specific projects and programs. Board members and staff attend national and international symposia and conferences related to the science and technology of nuclear waste management and disposition. From time to time, Board members and staff visit other countries to meet with organizations involved in the management of SNF and HLW to review best practices, perform benchmarking, and assess potential analogs.

**Technical Analysis.** Analysis of technical information is performed by Board members with assistance from a full-time senior professional staff. When necessary, the Board is authorized to hire expert consultants to perform in-depth reviews of specific technical and scientific topics. On the basis of the analyses, the Board reports its findings and recommendations to Congress and the Secretary of Energy. All Board documents, including reports, testimony, correspondence and meeting agendas, transcripts, presentations, and public comments, are posted on the Board's Web site at [www.nwtrb.gov](http://www.nwtrb.gov).

## Board Commitment to Government-Wide Initiatives

**Greenhouse Gas Emission Reduction.** The Board strongly supports goals set forth in Executive Order 13514, "Federal Leadership in Environmental, Energy, And Economic Performance," and is committed to reducing its greenhouse gas (GHG) emissions where practicable. In accordance with that commitment, in FY 2010, the Board launched an agency-wide initiative to promote energy efficiency and resource conservation and to reduce associated GHG emissions. As part of that initiative, the Board reviewed its operations and activities,

established the FY 2008 GHG emissions baseline, and identified actions that can result in real and enduring future GHG emission reductions.

Small leveraged investments made in FY 2010 support the development and implementation of EO13514. Present Board staffing is adequate for developing and implementing all policy goals related to EO13514. The Board's sustainability plan is available online at [www.nwtrb.gov/plans/NWTRBSustainability.pdf](http://www.nwtrb.gov/plans/NWTRBSustainability.pdf).

**Managed Trusted Internet Protocol Service (MTIPS).** The Board plans to use specially designated funds to implement the requirements of OMB memoranda M-08-05 (Implementation of Trusted Internet Connections (TIC); M-08-27 Guidance for Trusted Internet Connection (TIC) Compliance; and M-09-32 Update on Trusted Internet Connection Initiative). This will include purchase of a new T-1 line to meet Board needs and contracting for 2 MTIPS compliant services and new equipment to monitor the existing and new T-1 lines.

## Evaluating Board Performance

In addition to a qualitative evaluation of its performance, beginning in FY 2012, the Board will use a numerical scale to measure its performance in achieving its performance goals for a given fiscal year. For each priority goal, the Board will consider the following criteria:

1. Did the Board undertake the activities needed to complete the priority goal effectively and efficiently?
2. Did the Board complete its review of DOE's work on schedule and at reasonable cost?
3. Were the findings and recommendations associated with the priority goal transparent and communicated in a timely, understandable, and appropriate way to Congress, the Secretary of Energy, and the public?

Progress in meeting the priority goals will be evaluated quarterly, and adjustments will be made, as necessary. At the end of the fiscal year, the Board's success in meeting each of the performance criteria will be measured on a numerical scale of 1 to 5, with 1 being minimally successful and 5 being fully successful. Each priority goal will be given an overall performance measure based on the sum of the three criteria. The Board will use the evaluation of its performance as input in developing its annual performance goals and performance budget for subsequent years. As in the past, the results of the Board's annual performance evaluations will be included in its summary reports.

# **Nuclear Waste Technical Review Board**

## **Salaries and Expenses**

**(Including Transfer of Funds)**

For necessary expenses of the U. S. Nuclear Waste Technical Review Board, as authorized by Public Law 100-203, section 5051, *\$3,400,000* to be derived from the Nuclear Waste fund and to remain available until expended.

## **Budget Details**

To fulfill its statutory mandate for reviewing the technical and scientific validity of activities undertaken by the Secretary of Energy related to nuclear waste management and for providing independent technical information and advice to Congress and the Secretary, the Board requests \$3,400,000 for fiscal year (FY) 2012. A detailed explanation of the Board's request by Object Class follows.

### ***Object Class 11.1, Full-Time Permanent Staff: \$1,386,000***

The estimate for this object class includes funding for Executive Schedule senior professional staff and General Schedule support staff. The senior professional staff members support the work of the 11 part-time Board members who are charged with evaluating the technical and scientific validity of DOE activities related to SNF and HLW management. The General Schedule staff members perform administrative activities related to the Board's ongoing technical and scientific evaluation and the operation of the organization. Such activities include budget preparation and financial management, dissemination of Board publications, information technology, management of meeting logistics, and preparation and implementation of Board responses to federal directives. The Board is in compliance with the Executive Order dated December 22, 2010, signed by the President, which prohibits statutory pay adjustment for most Federal civilian employees.

### ***Object Class 11.3, Base Pay - Intermittent: \$330,000***

The estimate for this object class includes compensation costs for 11 part-time Board members, all of whom are Special Government Employees. In accordance with the Board's enabling statute, each Board member is compensated at the rate of pay of Executive Schedule Level III for every day that the member is engaged in work for the Board. The Board is in compliance with the Executive Order dated December 22, 2010, signed by the President, which prohibits statutory pay adjustment for most Federal civilian employees.

### ***Object Class 11.5, Incentive Awards: \$0***

This estimate is for funding performance awards earned by Board employees in accordance with provisions of the Performance Management System.

### ***Object Class 12.0, Civilian Personnel Benefits: \$421,000***

The estimate in this object class represents the government's contribution for employee benefits at an average rate of 28.8 percent for staff and 7.65 percent for Board members.

### ***Object Class 21.1, Travel and Transportation: \$381,000***

The estimate in this object class includes travel costs for Board members, staff, and consultants who are required to travel to Board meetings, professional meetings, conferences, orientation activities, analog sites, national laboratories, and other events and venues related to accomplishing the Board's mission and performance goals. The amount estimated assumes that each of the 11 Board members will attend four Board meetings and an average of five miscellaneous meetings for approximately three days each during the year. The assumption is that the professional staff members will travel an average of eight times for similar activities and that each trip will last approximately three days.

***Object Class 23.1, Rental Payments to the General Services Administration (GSA): \$206,000***

The estimate represents the amount that the Board will pay to the General Services Administration for rental of 5,216 square feet of office space.

***Object Class 23.3, Communication, Utilities, Miscellaneous: \$75,000***

The estimate represents costs for long-distance and local telephone service, postage, local courier services, video teleconferencing, internet, and mailing services. This object class also includes purchase of new equipment and payment for communications services to meet the Managed Trusted Internet Protocol Services (MTIPS) requirements of OMB M-08-05, M-08-27, and M-09-32.

***Object Class 24.0, Printing and Reproduction: \$38,000***

The estimate is for costs associated with publication of Board reports that are required by statute to be sent to Congress and the Secretary of Energy at least two times per year, publication of additional reports or technical materials, and meeting notices in the *Federal Register*. The Board expects to publish at least two major reports in FY 2012. The estimate also includes the costs of producing and disseminating press releases and other information necessary for informing the public of the Board's activities. To reduce costs, the Board uses electronic publishing to the extent feasible. To comply with Board standards of quality and transparency established in 2001, physical copies of Board materials are sent to the public upon request.

***Object Class 25.1, Consultants: \$60,000***

The estimate includes funding for consultants to support and supplement Board and staff analyses of specific technical and scientific issues as authorized by Congress.

***Object Class 25.2, Contractual Services - Other: \$331,000***

The estimate for this object class includes costs associated with court-reporting services for Board meetings; meeting-room rental and related services; and maintenance agreements for equipment rental, professional development for both supervisors and staff, and services from commercial sources. The Board also contracts with part-time technical consultants to supplement and support in-house operations, including information technology (IT) technical support, Web site management, and report production and editing. The Board supports and complies with Administration initiatives, which include financial auditing in accordance with the Accountability of Tax Dollars Act. The Board supports the goals set forth in Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," and is committed to reducing its greenhouse gas emissions where practicable. Funding necessary for implementing the Board's Sustainability plan would be included in this object class.

***Object Class 25.3, Services from Other Government Agencies: \$93,000***

The Board's enabling legislation authorizes the Board to procure necessary administrative services from the General Services Administration (GSA) on a reimbursable basis. This estimate includes funding for administrative support services (payroll, accounting, personnel, etc.) provided by GSA, legal advice from GSA, security clearances through the Office of Personnel Management, and other miscellaneous interagency agreements.

***Object Class 26.0, Supplies and Materials: \$40,000***

This estimate includes anticipated expenses for office supplies, subscriptions, library materials, and off-the-shelf technical reports and studies.

***Object Class 31.0, Equipment: \$39,000***

The estimate for this object class includes costs associated with miscellaneous equipment, including computer hardware and software. The object class also includes the continuation of upgrades to IT security, continuity of operations (COOP), support of E-Gov telecommuting efforts, and technical support of the management of electronic records and e-mail.

**Nuclear Waste Technical Review Board**  
**Projected Fiscal Year 2012 Expenditures**  
**Object Classifications**

(In Thousands of Dollars)

		<u>A</u>	<u>B</u>	<u>C</u>
		Actual	Annualized	Request
		FY	CR	FY
<b>Classification code 48-0500-0-271</b>		<b>2010</b>	<b>FY 2011</b>	<b>2012</b>
<i>Expenditures</i>				
11.1	Full-time Permanent Staff	\$1,678		\$1,386
11.3	Base Pay – Intermittent/Board members	274		330
11.5	Incentive Awards	<u>20</u>		<u>0</u>
<b>Total</b>	<b>Total Personnel Compensation</b>	<b>\$1,972</b>		<b>\$1,716</b>
12.0	Civilian Personnel Benefits	518		421
21.1	Travel and Transportation	281		381
23.1	Rental Payments to GSA	203		206
23.3	Communication, Utilities, Miscellaneous	26		75
24.0	Printing and Reproduction	51		38
25.1	Consultants	51		60
25.2	Contractual Services - Other	394		331
25.3	Services from other Government Agencies	200		93
26.0	Supplies and Materials	29		40
31.0	Equipment	<u>28</u>		<u>39</u>
	<b><i>Total Obligations</i></b>	<b><u>\$3,753</u></b>	<b><u>\$3,891</u></b>	<b><u>\$3,400</u></b>

(Numbers may not add because of rounding)

Identification Code 48-0500-0-1-271	FY 2010 Actual	FY 2012 Request
Total Number of Full-Time Permanent Positions	14	14
Total Compensable Work-years: Full-Time Equivalents	14	14

## U.S. Nuclear Waste Technical Review Board

### Members

The U.S. Nuclear Waste Technical Review Board is composed of 11 members who are appointed by the President from a list of nominees submitted by the National Academy of Sciences (NAS). Nominees to the Board must be eminent in a field of science or engineering and are selected solely on the basis of established records of distinguished service. The Board is nonpartisan and apolitical. By law, no nominee to the Board may be an employee of DOE, a National Laboratory under contract to DOE, or an entity performing spent nuclear fuel or high-level radioactive waste activities under contract to DOE.

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 a professor of history at Duke University.