

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



## **Fiscal Year 2013 Budget Request**

*Including Board Performance Goals and Priority Tasks for FY 2012-2013, and  
Evaluation of Board Performance for FY 2011*

**February 13, 2011**



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

## **Budget Submittal**

### **Fiscal Year 2013**

## **Summary**

The U.S. Nuclear Waste Technical Review Board is an independent federal agency in the Executive Branch. The Board performs unbiased peer review of the technical validity of activities undertaken by the Secretary of Energy related to implementing the Nuclear Waste Policy Act (NWPA) (Public Law 97-145, as amended). The Board also advises Congress and makes recommendations to the U.S. Department of Energy (DOE) on technical issues related to managing and disposing of spent nuclear fuel (SNF) and high-level radioactive waste (HLW). The Board's system-wide perspective and ongoing technical evaluation of nuclear waste issues is especially important during periods of change and uncertainty in programs for managing SNF and HLW.

The Board's budget request for fiscal year (FY) 2013 is \$3.4 million, which reflects the Board's commitment to sound budgeting and cost-effective management practices. The requested amount is 12 percent below the Board's enacted funding level for FY 2011, and is equal to its enacted level for FY 2012.

## **The Board's Mission**

The Board was established in the 1987 amendments to the NWPA (Public Law 100-203). According to the legislative history, Congress intended that the Board should perform a technical evaluation of DOE's implementation of the NWPA and provide objective expert advice to Congress and the Secretary of Energy on technical issues related to radioactive waste management. In accordance with its statutory mandate, the Board performs ongoing, independent, and integrated technical peer review of DOE activities related to transporting, packaging, storing, and disposing of commercial SNF and DOE-owned SNF and HLW. The Board is required by statute to report 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 established the Blue Ribbon Commission on America's Nuclear Future (BRC) to consider alternatives for managing the back end of the nuclear fuel cycle. At approximately the same time, DOE petitioned the Nuclear Regulatory Commission (NRC) for permission to withdraw the license application for construction of the Yucca Mountain repository.

Even as new options for managing nuclear waste are evaluated, DOE continues to have responsibility under the NWPAs for managing and disposing 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 activities, and for advising Congress and the Secretary on technical aspects of those activities, remains unchanged.

The Board's mission is both different from and complementary to the roles of other entities involved in nuclear waste management. The Board is not a regulatory agency. It focuses on fundamental understanding of technical issues associated with the design and performance of the waste management system, including the integration and interdependence of system components such as transportation, packaging, and handling of SNF and HLW, as well as facility operations. The Board is (1) completely independent and 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 decisions or regulatory compliance), and (3) a permanent independent federal agency whose 11 members are nominated by the National Academy of Sciences and appointed by the President.

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## **The Board's Performance Plan and Goals for FY 2012-2013**

To focus and facilitate its ongoing technical review, in FY 2010, the Board established three overarching "Performance Goals" related to its statutory mandate. Those Goals have been updated and continue through FY 2013. The Board identifies "Priority Tasks" that support the achievement of the Performance Goals on an annual basis. Following are Priority Tasks identified by the Board for FY 2012-2013, presented under the appropriate Performance Goals.

**Performance Goal 1.** In accordance with its statutory mandate, the Board will continue its *technical peer review and evaluation of DOE activities* related to implementation of the NWPAs. The Board will report on its evaluation of the technical validity of DOE's work to Congress and the Secretary of Energy.

Priority Tasks, which are planned to support this goal in FY 2012-2013, are listed below.

### **Goal 1 Priority Tasks**

**Task 1-A.** Evaluate and report on the technical validity of activities proposed or undertaken by DOE's Office of Nuclear Energy (DOE-NE) Office of Used Fuel Disposition Research and Development, including the following:

- Generic research and development (R&D) on potential geologic media for deep geologic disposal
- Generic engineered barrier system evaluation
- Thermal modeling for repositories in granite, clay, and salt
- R&D and technical bases for very long-term storage of SNF
- Issues related to transporting SNF after very long-term storage

**Task 1-B** Evaluate and report on activities undertaken by DOE’s Office of Legacy Management (DOE-LM) related to preserving Yucca Mountain data, documents, and other materials.

In H. Rept. 112-118 accompanying the FY 2012 Energy and Water Development Appropriations bill, the House Committee on Appropriations directed the Board to “provide support to the Department of Energy and Nuclear Regulatory Commission’s efforts to archive and preserve all Yucca Mountain-related documents and physical materials of scientific value.” As part of its ongoing technical review, the Board has interacted with personnel from DOE’s Office of Legacy Management (DOE-LM) since the fall of 2010 while physical materials, electronic databases, and software from the Yucca Mountain Project (YMP) have been transferred to the DOE-LM archiving facility at Morgantown, West Virginia.

The Board will continue its limited review of DOE-LM efforts to preserve scientific and technical information developed by the YMP by evaluating DOE-LM plans and activities and performing spot checks to verify functional access to important YMP records. Specifically, when substantially all records and other materials have been received at the archiving facility, Board personnel plan to visit the facility to demonstrate that selected YMP physical and electronic records can be accessed and that selected YMP electronic databases and software function appropriately. The Board expects this visit to take place early in 2012. A second visit is planned for later in 2012 to confirm the Board’s original assessment. A report documenting the Board’s oversight activities will be issued following each visit.

**Task 1-C.** Evaluate and report on the technical validity of activities undertaken by DOE’s Office of Environmental Management (DOE-EM) related to storage, transportation, and disposal of DOE-owned SNF and HLW. In FY 2012-2013, the Board plans to:

- Complete a report started in FY 2011 on management of DOE-owned SNF and HLW at DOE facilities
- Monitor progress and follow up on issues raised in Board letters, such as the final disposition form and treatment of calcined waste at Idaho National Laboratory (INL)
- Evaluate and report on technical issues associated with long-term storage and transportation of HLW and DOE-owned SNF

**Performance Goal 2.** The Board will develop and compile objective technical information to *advise Congress and the Secretary* on technical issues related to SNF and HLW management.

Priority Tasks, which are planned to support this goal in FY 2012-2013, are listed below.

## **Goal 2 Priority Tasks**

**Task 2-A.** Explore options for expanding the application of the Board's computer-based systems analysis tool, the Nuclear Waste Assessment System for Technical Evaluation (NUWASTE), for system enhancements and for other activities, including:

- Applications
  - Complete sensitivity analyses to understand the impacts on dry storage cask requirements, amount of SNF and HLW destined for a repository, mass of natural uranium used and volumes of new waste streams generated, of variables such as:
    - Start date of facility operations
    - Facility throughput
    - SNF burn-up
    - Future nuclear generation capacity
    - Fuel composition
  - Perform evaluations of SNF and HLW management options under consideration by DOE, as they emerge
- System enhancements
  - Include mass of tailings and mine waste from natural uranium mining
  - Add DOE-owned HLW and SNF to process flow
  - Design methodology to evaluate transportation requirements associated with alternative waste-management scenarios
- Other activities
  - Participate in benchmarking workshops, as appropriate
  - Evaluate limitation on the number of times plutonium can be recycled in mixed oxide (MOX) fuel

**Task 2-B.** Develop information on generic disposal issues to enhance the evaluation of DOE activities and provide information to decision-makers and the public on the following:

- Technical issues associated with designing repositories for specific waste forms, including:
  - Deep borehole disposal for unrecyclable HLW, such as vitrified waste
  - Potential repository media that would allow for recovery of SNF, following disposal, for reprocessing and recycling of the recovered uranium and plutonium
- Technical issues associated with optimizing HLW and SNF package sizes as a function of potential repository geologic media

**Task 2-C.** Assess the effects of taking burnup credit on the management and disposal of SNF.

**Task 2-D.** Evaluate the impact of the projected trend towards SNF with higher burnups, including the following:

- Minimum time before transfer to dry storage facilities
- Minimum time before transport to centralized storage facility
- Quantities of HLW and other radioactive waste streams generated
- Potential for recycle of separated uranium and plutonium in thermal reactors and the effect on HLW generation

**Performance Goal 3.** The Board will gather information and report findings and *recommendations from experience gained over twenty years of reviewing the U.S. nuclear waste management and disposal program* and from observing waste management efforts in other countries.

Priority Tasks, which are planned to support this goal in FY 2012-2013, are listed below.

### **Goal 3 Priority Tasks**

**Task 3-A.** Update the Board's *Survey of National Programs Report* issued in December 2009. The tables in the widely-used report on the programs in 13 countries will be revised to reflect changes that have occurred since the original report was completed. Information on additional programs in other countries will be added; to the extent it is available.

**Task 3-B.** Gather information on the basis for assessing site-suitability and "best practices" that can be determined from work done to characterize repository sites in other countries. The information will be used by the Board in its review of DOE's technical activities and also may be the basis for a separate report.

**Task 3-C.** Evaluate the appropriate mix of engineering and science in repository development, identify natural transition points for a change in the mix, and make recommendations on how science and engineering can be integrated. The Board may issue a report based on its evaluation.

**Task 3-D.** Observe the management in other countries of spent MOX and recycled uranium fuel from thermal reactor operations.

## **Board Commitment to Government-Wide Initiatives**

In addition to the Goals and Tasks identified above, the Board is strongly committed to achieving goals established in federal government initiatives, including the following:

- **Greenhouse Gas Emission Reduction.** The Board is committed to reducing its energy use and greenhouse gas (GHG) emissions where practicable, as directed in Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance. The Board's sustainability plan is available 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). The Board selected an MTIPS vendor in FY 2011 using the Fair Opportunity selection process, and expects to have an MTIPS T-1 line installed during the first quarter of calendar year 2012 to replace its existing direct Internet T-1 connection.

## **Accomplishing the Performance Goals and Priority Tasks**

**Board Panels.** The Board establishes panels and working groups, as necessary, to help facilitate and focus its technical review and accomplish its Performance Goals and Priority Tasks.

**Information Gathering.** Public Law 100-203 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 they are held.

The Board also gathers information from site visits; visits to national laboratories and facilities; and meetings with DOE, and 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 SNF and HLW 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, among other things.

**Technical Analysis.** Analysis of technical information is performed by Board members with assistance from a small 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 these analyses, the Board reports its findings and recommendations to Congress and the Secretary of Energy. All Board 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).

## Evaluation of Board Performance — FY 2011

The Board's progress in achieving its priority tasks is reviewed quarterly and a qualitative evaluation of the Board's performance in completing and achieving its goals is performed annually. This performance evaluation is used as input for the development of the Board's annual budget submittal. Results of the Board's annual performance evaluations are included in its summary reports. Following are the Board's performance goals and priority tasks for FY 2010-2011, followed by an evaluation of the Board's performance in completing the priority tasks.

**Performance Goal 1.** *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.*

Presented below are the Board's Priority Tasks under Goal 1 for FY 2010-2011, followed by an evaluation of the Board's performance in completing the tasks.

### *Goal 1 Priority Tasks*

**Task 1-A. Review Nuclear Waste Management Activities Undertaken by the Office of Nuclear Energy (DOE-NE).** In FY 2010, DOE transferred responsibility for implementing its obligations under the NWPA to DOE-NE from the Office of Civilian Radioactive Waste Management (DOE-RW). The Board will continue its ongoing review of DOE-NE waste management activities and report to Congress and the Secretary during FY 2010-2011.

- **Board Performance:** Beginning in June 2010 and continuing through FY 2011, the Board held several meetings at which DOE's work in this area was presented and discussed. The Board used its system analysis tool, NUWASTE, to analyze the implications for waste management of various fuel-cycle options considered by DOE-NE. In June 2011, the Board issued a report with initial results from NUWASTE analyses.

**Task 1-B. Analyze and Report on Corrosion Issues.** The Board will review DOE activities related to corrosion of waste packages and other engineered elements of the repository system. The Board will report its findings in future reports.

**Board Performance:** The Board visited Sandia National Laboratory in FY 2010 to review corrosion testing being undertaken at the lab. Corrosion issues were addressed in Board reports on extended storage of SNF and on "lessons learned" from U.S. and international waste management efforts.

**Task 1-C. Review of 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.

- **Board Performance:** As part of its ongoing review of DOE-EM activities, during FY 2010-2011, the Board visited federal spent-fuel storage and management facilities at Hanford in Washington, INL in Idaho, the Savannah River Site in South Carolina, and the West Valley Demonstration Project (WVDP) in New York, and sent letters to DOE with observations on technical issues identified during its tour of the facilities. Based on these visits, the Board expects to issue a report on DOE-owned wastes in FY 2012. (See discussion of Priority Task 2B.)

**Task 1-D. Review DOE Plans for Preservation of Yucca Mountain Documents.**

The Board will develop a scope of work related to reviewing the technical validity of plans developed by, and activities undertaken by, DOE-LM to preserve Yucca Mountain data and documents. The Board also may review the technical validity of DOE's implementation of its preservation plans.

**Board Performance:** The Board has interacted with personnel from DOE-LM since the fall of 2010 while physical materials, electronic databases, and software from the Yucca Mountain Project (YMP) were transferred to the DOE-LM archiving facility at Morgantown, West Virginia. As directed by the House Appropriations Committee, the Board will continue its limited review of DOE-LM efforts to preserve scientific and technical information developed by the YMP by evaluating DOE-LM plans and activities and performing spot checks to verify functional access to important YMP records and will report on its activities to Congress and the Secretary.

**Performance Goal 2.** *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.*

Presented below are the Board's Priority Tasks for FY 2010-2011 under Goal 2, followed by an evaluation of the Board's performance in completing those tasks.

**Goal 2 Priority Tasks**

**Task 2-A. Conduct a Systems Analysis of Waste Management Alternatives.** In FY 2010-2011, the scenario analyses produced by NUWASTE, a computer-based systems analysis tool developed by the Board, 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.

- **Board Performance:** The Board completed preliminary development of its computer based tool, Nuclear Waste Assessment System for Technical Evaluation (NUWASTE). A report discussing results from initial NUWASTE analyses was completed and posted on the Board's Web site in June 2011. A

workshop was sponsored by the Board on June 6-7, 2011, in Arlington, Virginia. The object of the workshop was to allow NUWASTE results to be benchmarked against other computer tools and codes that project SNF and HLW generation from the US nuclear program. The workshop was attended by representatives of DOE and other entities involved in similar analyses. The Board continues to investigate applications for the analytical tool to support its technical review of DOE activities.

**Task 2-B. Survey and Report on “Stranded” DOE SNF and HLW.** The Board expects to issue a report that summarizes the amounts and characteristics of DOE-owned wastes, the alternatives under consideration for their management and disposition, and technical issues that need to be resolved.

- **Board Performance:** The Board completed its tour of DOE facilities with a visit to the WVDP in April 2011. A report on Board findings and recommendations from its evaluation of DOE facilities is planned for release in FY 2012. (See discussion of Priority Task 1-C.)

**Task 2-C. Analyze and Report on the Technical Implications of Very-Long-Term Dry Storage.** On the basis of its review of the technical literature and government reports, the Board will report 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 of Energy on these issues. The information also will be useful to the BRC.

- **Board Performance:** The Board completed a technical White Paper and issued an Executive Summary report on these issues titled, *Evaluation of the Technical Basis for Extended Dry Storage and Transportation of Used Nuclear Fuel*, in December 2010. The White Paper and the report are posted on the Board’s Web site.

**Performance Goal 3.** *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 management 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.*

Presented below are the Board’s Priority Tasks under Goal 3 for FY 2010-2011, followed by an evaluation of the Board’s performance in completing those tasks.

### **Goal 3 Priority Tasks**

**Task 3-A. Report on Technical Lessons Learned from Yucca Mountain and Other Programs.** On the basis of the Board’s 20 plus years of in-depth evaluation of the U.S. repository program and its extensive knowledge of high-activity waste management programs in several other countries, the Board will prepare a report on lessons that can be learned from the experiences of the programs. The Board expects that the report will contribute significantly to the national dialogue on waste management alternatives.

- **Board Performance:** In June 2011, the Board's report, *Technical Advancements and Issues Associated with the Permanent Disposal of High-Activity Waste – Lessons Learned from Yucca Mountain and Other Programs*, was completed and posted on the Board's Web site.

**Task 3-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 on a wide range of technical approaches and institutional arrangements that have been adopted in the United States and 12 other countries. The Board plans to update and extend the report.

- **Board Performance:** In April 2011, the Board issued a report expanding on the Survey of National Programs report issued in 2009. The report, *Experience Gained from Programs to Manage High-Level Radioactive Waste and Spent Nuclear Fuel in the United States and Other Countries*, extended the scope of the Survey report to include an analysis of how technical and nontechnical “filters” have been applied in other countries during the site-selection process for geologic repositories.

**Task 3-C. Prepare Paper on Risk-Based Performance Assessment.** The Board will prepare a paper that describes a risk-based method of assessing the performance of a geologic repository based on the “source term” (the amount and type of radioactive material that could be released from repository waste packages over very long time periods following repository closure).

- **Board Performance:** A discussion of the implications and importance of quantifying the radiation source term was included in the Board's report on “Technical Advancements and Issues.” A fact sheet, *The Importance of Quantifying the Radiation Source Term in a Geologic Repository*, also was completed and posted on the Board's Web site.
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# **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. (*Energy and Water Development and Related Agencies Appropriations Act, 2012.*)

## **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) 2013. A detailed explanation of the Board's request by Object Class follows.

### ***Object Class 11.0, Total Personnel Compensation: \$1,768,000***

The estimate for this object class includes funding for 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. This object class also includes funding for Executive Schedule senior professional staff and General Schedule support staff. The senior professional staff members support the work of the 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 to support 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 services, management of meeting logistics, and preparation and implementation of Board responses to federal directives. This estimate also includes funding for performance awards earned by Board employees in accordance with provisions of the Performance Management System.

### ***Object Class 12.0, Civilian Personnel Benefits: \$426,000***

The estimate in this object class represents the government's contribution for employee benefits at an average rate of 28.6 percent for staff and 7.65 percent for Board members.

### ***Object Class 21.0, Travel and Transportation: \$342,000***

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 during the year, each of the 11 Board members will attend three Board meetings and an average of six miscellaneous meetings each lasting about three days. The assumption is that the professional staff members will travel an average of seven 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***

This is the amount the Board will pay to the General Services Administration for rental of the Board's office space in Arlington, VA.

### ***Object Class 23.3, Communication, Utilities, Miscellaneous: \$36,000***

The estimate represents costs for long-distance and local telephone service, postage, local courier services, video teleconferencing, internet, and mailing services.

***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 and technical materials, and meeting notices in the *Federal Register*. The Board expects to publish at least two major reports in FY 2013. 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 on request.

***Object Class 25.0, Consultants: \$96,000***

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: \$308,000***

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 contracts 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, including 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 is included in this object class.

***Object Class 25.3, Services from Other Government Agencies: \$100,000***

The Board's enabling legislation authorizes the procurement of necessary administrative services from the General Services Administration (GSA) on a reimbursable basis. The estimate for this object class 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 for purchase of miscellaneous equipment, including computer hardware, and upgrading computer 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 for the management of electronic records and e-mail.

**The Nuclear Waste Technical Review Board  
Projected Fiscal Year 2013 Expenditures  
Object Classification**

(in Thousand Dollars)

	A	B	C
	Act	Enact	Req
Classification code 48-0500-0-271	FY 2011	FY 2012	FY 2013
<i>Expenditures</i>			
11.0 Total Personnel Compensation	\$2,054	\$1,716	\$1,768
12.0 Civilian Personnel Benefits	503	421	426
21.0 Travel and Transportation	340	381	342
23.1 Rental Payments to GSA	201	206	206
23.3 Communication, Utilities, Misc.	61	75	36
24.0 Printing and Reproduction	28	38	38
25.0 Consultants	149	60	96
25.2 Contractual Services - Other	391	331	308
25.3 Services from other Government Agencies	151	93	100
26.0 Supplies and Materials	25	40	40
31.0 Equipment	<u>112</u>	<u>39</u>	<u>39</u>
<b><i>Total Obligations</i></b>	<b><u>\$4,016</u></b>	<b><u>\$3,400</u></b>	<b><u>\$3,400</u></b>

(Numbers may not add because of rounding)

	Actual FY 2011	Request FY 2012	Request FY 2013
Total Number of Full-Time Permanent Positions	14	14	14
Total Compensable Work-years: Full-Time Equivalents	14	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.

**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.

**Sue B. Clark, Ph.D.**, is professor and Chair of the Chemistry Department at Washington State University.

**Rodney C. Ewing, Ph.D.**, is professor in the Department of Materials Science and Engineering; Donald R. Peacor Collegiate Professor, Department of Geological Sciences; and Kerr Professor, Department of Nuclear Engineering & Radiological Sciences at the University of Michigan. He also is Adjunct Professor of Geology, Aarhus University, Denmark.

**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.

**Linda K. Nozick, Ph.D.**, is professor in the School of Civil and Environmental Engineering and director of the College Program in Systems Engineering at Cornell University.

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