U.S. Nuclear Waste Technical Review Board
Strategic Plan
FY 2008-2013

SUMMARY STATEMENT OF THE BOARD

The Nuclear Waste Policy Amendments Act (NWPAA) of 1987 directed the U.S. Department of Energy (DOE) to characterize one site, at Yucca Mountain in Nevada, to determine its suitability as the location of a permanent repository for disposing of commercial spent nuclear fuel and defense high-level radioactive waste. The NWPAA also established the U.S. Nuclear Waste Technical Review Board as an independent agency within the executive branch of the United States Government. The NWPAA requires the Board to evaluate the technical and scientific validity of activities undertaken by the Secretary of Energy related to implementing the Nuclear Waste Policy Act (NWPA) and to report its findings and recommendations to the Secretary and Congress at least twice yearly. The Board only can make recommendations; it cannot compel DOE to comply with its recommendations.

Congress created the Board to perform ongoing independent technical and scientific evaluation—crucial for confidence in decisions related to disposing of spent nuclear fuel and high-level radioactive waste. The Board strives to provide Congress and the Secretary of Energy with unbiased, credible, and timely technical and scientific evaluations and recommendations achieved through peer review of the highest quality. By law, the Board will cease to exist not later than one year after the date on which the Secretary begins disposal of high-level radioactive waste or spent nuclear fuel in a repository.

This strategic plan includes the Board's goals and objectives for fiscal years (FY) 2008 through 2013. During that period, DOE plans to submit to the U.S. Nuclear Regulatory Commission (NRC) an application for authorization to construct a repository. Although the Board realizes that DOE's efforts will be focused on compliance activities, in conducting its evaluation, the Board will encourage DOE through its science and technology program to undertake research and analyses that will increase basic understanding of the potential performance of the entire waste-management system. The Board believes that improving basic understanding will increase confidence in DOE's performance estimates and make them more realistic.

The Board has organized its review of DOE activities into three technical areas: *preclosure operations*, including surface-facility design and operations and the transport of spent nuclear fuel and high-level radioactive waste from nuclear utility reactors or storage facilities to the repository site; *postclosure* repository performance issues, including the nature of the source term and the movement of the radionuclides most significant to dose through the engineered and natural barriers; and *integration* of science and engineering and preclosure and postclosure activities, including the effects of temperature on repository performance and the effects of waste package designs on the temperatures in the repository. The Board's strategic goals and objectives have been organized around these three technical areas, and the Board's panels have been realigned to help facilitate and focus the Board's review.

MISSION

The Board's mission, established in the Nuclear Waste Policy Amendments Act (NWPAA) of 1987 (Public Law 100-203), is to ". . . evaluate the technical and scientific validity of activities [for disposing of high-level radioactive waste] undertaken by the Secretary after the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987, including –

(1) site characterization activities; and

(2) activities relating to the packaging or transportation of high-level radioactive waste or spent nuclear fuel."

By law, the Board will cease to exist not later than one year after the date on which the Secretary begins disposal of high-level radioactive waste or spent nuclear fuel in a repository.

VISION

By performing ongoing and independent technical and scientific peer review of the highest quality, the Board makes a unique and essential contribution to increasing the technical validity of DOE activities related to disposing of the nation's spent nuclear fuel and high-level radioactive waste. The Board provides vital technical and scientific information to decision-makers in Congress and at DOE and to the public on issues related to disposing of, packaging, and transporting spent nuclear fuel and high-level radioactive waste.

VALUES

To achieve its goals, the Board conducts itself according to the following values.

- The Board strives to ensure that its members have no real or perceived conflicts of interest related to the outcome of the Secretary's efforts to implement the Nuclear Waste Policy Act (NWPA).

- Board members arrive at their conclusions on the basis of objective and unbiased evaluations of the technical and scientific validity of the Secretary's activities.

- The Board's deliberations are conducted in such a way that the Board's integrity and objectivity are above reproach.

- The Board's findings, conclusions, and recommendations are technically and scientifically sound and are based on the best available technical analysis and information.

- The Board's findings, conclusions, and recommendations are communicated clearly and in time for them to be most useful to Congress, the Secretary, and the public.

- The Board encourages public comment and discussion of DOE activities and Board findings, conclusions, and recommendations.

GOALS AND STRATEGIC OBJECTIVES

The nation's goals related to disposing of spent nuclear fuel and high-level radioactive waste were set forth by Congress in 1982 in the NWPA. The goals are to develop a repository or repositories for disposing of high-level radioactive waste and spent nuclear fuel at a suitable site or sites and to establish a program of research, development, and demonstration for disposing of such waste.

In 1987, the NWPAA limited site-characterization and repository-development activities to a single site, at Yucca Mountain in Nevada. The NWPAA also established the Board and charged it with evaluating the technical and scientific validity of the Secretary of Energy's activities associated with implementing the NWPA. The Board's general goals were established in accordance with its statutory mandate and with congressional action in 2002 authorizing DOE to proceed with the preparation and submittal of an application to the Nuclear Regulatory Commission (NRC) for authorization to construct a repository at Yucca Mountain.

General Goals of the Board

The Board believes that the nuclear waste-management system includes all elements of waste management and disposal. To accomplish its congressional mandate, the Board has organized its review around three technical areas: *preclosure operations*, including surface-facility design and operations and the transport of spent nuclear fuel and high-level radioactive waste from nuclear utility reactors or storage facilities to the repository site; *postclosure* repository performance issues, including the nature of the source term and the movement of the radionuclides most significant to dose through the engineered and natural barriers; and *integration* of science and engineering and preclosure and postclosure activities, including the effects of temperatures on repository performance and the effects of waste package designs on the temperatures in the repository.

The Board's general goals for FY 2008-2013 reflect the importance of gaining a realistic understanding of the potential performance of the proposed repository and the interdependence and interactions of all elements of the nuclear waste management system. The Boards general goals for FY 2008-2013 are the following:

1. Evaluate the technical and scientific validity of activities undertaken by DOE related to preclosure operations.

2. Evaluate the technical and scientific validity of activities undertaken by DOE related to postclosure repository performance.

3. Evaluate the technical and scientific validity of activities undertaken by DOE related to integrating science and engineering and cross-cutting preclosure and postclosure issues.

Strategic Objectives of the Board

To achieve its general goals, the Board has established the following 5-year objectives.

1. *Objectives Related to the Preclosure Period*

1.1 Evaluate the technical and scientific validity of DOE efforts to implement its canister-based transportation, aging, and disposal (TAD) concept.

1.2. Evaluate DOE efforts to design and construct surface facilities and infrastructure at the proposed repository site.

1.3. Review DOE efforts to develop a plan for transporting waste from nuclear utility reactors or federal storage sites to the proposed repository.

2. *Objectives Related to the Postclosure Period*

2.1. Evaluate DOE studies and analyses related to determining the source term—the release of dose-contributing radionuclides as a function of time from the engineered-barrier system.

2.2. Encourage DOE to develop realistic performance models and review the technical and scientific validity of DOE efforts to gain a more realistic understanding of potential repository performance.

2.3. Evaluate the technical and scientific validity of DOE data and analyses related to infiltration, flow and transport through the natural system, and seepage into drifts.

2.4. Assess DOE efforts to increase understanding of repository tunnel environments and the potential for localized corrosion of waste packages in the proposed repository.

2.5. Review DOE activities related to predicting the potential effect on dose of disruptive events.

3. *Objectives Related to System Integration*

3.1. Evaluate DOE efforts to develop thermal criteria for the repository and a strategy for managing the effects of heat on preclosure operations and postclosure repository performance.

3.2. Evaluate the integration of science and engineering in the DOE program, especially the integration of new data into repository and waste package designs.

3.3. Review DOE integration of operational and performance models.

3.4. Review DOE analysis and integration of issues and designs related to receipt, processing, aging, and emplacement of spent nuclear fuel and high-level radioactive waste (e.g.,

TAD and Yucca Mountain surface facilities).

ACHIEVING BOARD GOALS AND OBJECTIVES

The NWPAA grants significant investigatory powers to the Board. In accordance with the NWPAA, the Board may hold such hearings, sit and act at such times and places, take such testimony, and receive such evidence as the Board considers appropriate. At the request of the Board and subject to existing law, the NWPAA directs DOE to provide all records, files, papers, data, and information requested by the Board, 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.

By law, no nominee to the Board may be an employee of DOE, a National Laboratory, or DOE contractors performing activities involving high-level radioactive waste or spent nuclear fuel. The Board has the power, under current law, to achieve its goals and objectives.

Board Panels

To facilitate and focus the Board's review, the Board has established three panels. The respective focus of the panels corresponds to the Board's general goals.

1. Panel on Preclosure Operations

Panel Focus - Evaluate the technical and scientific validity of activities undertaken by DOE related to waste-management system activities and operations before repository closure.

2. Panel on Postclosure Repository Performance

Panel Focus - Evaluate the technical and scientific validity of activities undertaken by DOE related to understanding, analyzing, and modeling the performance of geologic and engineered components of a proposed Yucca Mountain repository after repository closure.

3. Panel on System Integration

Panel Focus - Evaluate the technical and scientific validity of activities undertaken by DOE related to integrating scientific and engineering activities, operational and performance issues, and preclosure and postclosure design and strategies.

Information Gathering

Much of the Board's information gathering occurs at open public meetings arranged by the Board. At each meeting, DOE, its contractors, and other program participants present technical information according to an agenda prepared by the Board. Board members and staff question presenters during the meetings. Time is provided at the meetings for comments from members of the public and interested parties. The full Board usually meets three times each year. The Board's panels and smaller Board cohorts meet as needed to investigate specific issue areas. Typically, two of the three full Board meetings are held in Nevada each year.

The Board also gathers information from trips to the Yucca Mountain site, visits to contractor laboratories and facilities, and meetings with individuals working on the project. Board members and staff attend national and international symposia and conferences related to the science and technology of nuclear waste disposal. From time to time, Board members and staff also visit programs in other countries to review best practices, perform benchmarking, and assess potential analogs.

Technical Analysis

Technical analysis is performed by Board members with assistance from the full-time technical staff. When necessary, the Board hires special expert consultants to perform in-depth reviews of specific technical and scientific topics.

CROSS-CUTTING FUNCTIONS

As discussed in the following paragraphs, the Board's ongoing peer review complements the activities of other organizations involved in disposing of and managing spent nuclear fuel and high-level radioactive waste.

- *Congress and the Administration, including the Secretary of Energy,* make decisions on and establish national policies for nuclear waste disposal. They also determine how such decisions and policies will be implemented. The Board's role in this process is to help ensure that policy-makers receive unbiased and credible technical and scientific analyses and information as context for their decision-making.

- *Other federal agencies* with roles in disposing of and managing spent nuclear fuel and high-level radioactive waste include DOE, the NRC, the Environmental Protection Agency (EPA), the Department of Transportation (DOT), and the United States Geological Survey. DOE and its contractors are responsible for developing and implementing waste management plans and for conducting analytical and research activities related to licensing, constructing, and operating a repository. The NRC is the regulatory body having responsibility for licensing the construction and operation of a proposed repository and for certifying transportation casks. The EPA is responsible for issuing radiation safety standards that the NRC uses to formulate its repository regulations. The DOT is responsible for regulating the transporters of the waste.

- *State and local governments* comment on and perform oversight of DOE activities, and other interest groups monitor DOE activities related to a Yucca Mountain repository. The Board's technical evaluation is at once different from and complementary to the activities of these groups in that they are (1) unconstrained by any stake in the outcome of the endeavor besides the credibility of the scientific and technical activities, (2) confined to scientific and technical evaluations, and (3) conducted by an independent federal agency with Board members who are nominated by the National Academy of Sciences and appointed by the President on the basis of their expertise in the various disciplines represented in the DOE program.

KEY EXTERNAL FACTORS

Some factors are beyond the Board's control and could affect its ability to achieve its goals and objectives. Among them are the following.

- *The Board has no implementing authority*. The Board is, by statute, a technical and scientific peer-review body that makes recommendations to DOE. According to the legislative history, Congress expected that DOE would accept the Board's recommendations or indicate why the recommendations could not or should not be implemented. However, DOE is not legally obligated to accept any of the Board's recommendations. If DOE does not accept a Board recommendation, the Board's recourse is to advise Congress or reiterate its recommendation to DOE, or both. The Board's recommendations and DOE's responses are included in Board reports to Congress and the Secretary.

- *Legislation and budget considerations could affect nuclear waste policy*. The level of funding provided to the Board affects its ability to comprehensively review DOE activities. Funding levels for the program also may influence activities undertaken by DOE in a given year or over time. In addition, it is not possible to predict if legislation related to nuclear waste disposal will be enacted or how the Board might be affected by such legislation.

The Board will evaluate the status of these external factors, identify any new factors, and, if warranted, modify the “external factors” section of the strategic plan as part of the annual program evaluation described below.

EVALUATING BOARD PERFORMANCE

The Board believes that measuring its effectiveness by directly correlating Board recommendations with improvements in the technical and scientific validity of DOE activities would be ideal. However, the Board cannot compel DOE to comply with its recommendations. Consequently, a judgment about whether a specific recommendation had a positive outcome as defined above may be (1) subjective or (2) an imprecise indicator of Board performance because implementation of Board recommendations is outside the Board's direct control. Therefore, to

measure its performance in a given year, the Board has developed performance measures. For each annual performance goal, the Board considers the following.

1. Did the Board undertake the reviews, evaluations, and other activities needed to achieve its goal?

2. Were the results of the Board's reviews, evaluations, and other activities communicated in a timely, understandable, and appropriate way to Congress and the Secretary of Energy?

If both measures were met in relation to a specific goal, the Board's performance in meeting that goal will be judged effective. If only one measure was met, the performance of the Board in achieving that goal will be judged minimally effective. Failing to meet both performance measures without sufficient and compelling explanation will result in a judgment that the Board has been ineffective in achieving that performance goal. If the goals are deferred, that will be noted in the evaluation.

The Board will use its evaluation of its own performance from the current year, together with its assessment of current or potential key issues of concern related to DOE's program, to develop its annual performance objectives and performance-based budget request for subsequent years. The results of the Board's performance evaluation are included in its annual summary report.

CONSULTATIONS

In developing its original strategic plan, the Board consulted with the Office of Management and Budget, DOE, congressional staff, and members of the public and provided a copy of the plan to the NRC and to representatives of state and local governments. The Board first solicited public comment and presented its strategic plan at a session held expressly for that purpose during a public Board meeting in Amargosa Valley, Nevada, on January 20, 1998. During 2003, the Board again solicited and received comment on its revised strategic plan and performance plan, which were incorporated in an earlier revision. Comments on this revised strategic plan will be solicited on the Board's Web site: www.nwtrb.gov.