

**U.S. NUCLEAR WASTE TECHNICAL REVIEW BOARD
PERFORMANCE PLAN
Fiscal Year 2003**

The NWTRB's General Goals and Strategic Objectives

The national goal for radioactive waste management established by Congress in the Nuclear Waste Policy Act of 1982 (NWPA) and the Nuclear Waste Policy Amendments Act of 1987 is safe disposal of civilian spent nuclear fuel and high-level radioactive waste in a permanent geologic repository at a suitable site or sites. In the acts, Congress directed the U.S. Department of Energy (DOE) to characterize a site at Yucca Mountain, Nevada, to determine its suitability as the potential location of a permanent repository for spent nuclear fuel and high-level radioactive waste. Congress charged the U.S. Nuclear Waste Technical Review Board with reviewing the technical and scientific validity of the Secretary of Energy's activities associated with implementing the NWPA, including characterizing the Yucca Mountain site and packaging and transporting the waste. The Board's general goals have been established in accordance with its congressional mandate.

General Goals

To accomplish its congressional mandate, the Board has established four general goals.

1. Ensure that technical and scientific activities undertaken by the DOE related to characterizing and analyzing the natural components of a potential Yucca Mountain repository and predicting the performance of a potential repository establish a sound technical basis for a decision on whether to recommend the site for repository development.
2. Ensure that technical and scientific activities undertaken by the DOE related to evaluating and designing the repository and waste packages are well integrated and establish a sound technical basis for designing the repository system, including the engineered barrier system (EBS).
3. Ensure that technical and scientific activities undertaken by the DOE related to packaging, handling, and transporting spent nuclear fuel and high-level radioactive waste to a potential repository are well integrated and establish a sound technical basis for designing and operating a waste management system.
4. Ensure that technical and scientific performance-confirmation activities undertaken by the DOE establish a sound technical basis for operating a repository, reducing uncertainties related to repository performance, and revising repository and waste package designs. (Will apply only if the site recommendation is approved.)

Strategic Objectives

To achieve its general goals, the Board has established the following long-term objectives.

1. Objectives Related to the Natural Components of the Repository System and Predicting Repository Performance

- 1.1. Evaluate the technical and scientific validity of DOE studies, testing, and analyses supporting a decision on whether to recommend the Yucca Mountain site.
- 1.2. Evaluate the analyses and investigations pertaining to hydrologic and other natural processes at the Yucca Mountain site and at related analogue sites that establish the foundation for predicting repository performance.
- 1.3. Review the technical and scientific validity of models used to predict repository performance.
- 1.4. Evaluate the DOE's progress in developing a safety strategy for the Yucca Mountain site.
- 1.5. Monitor progress in completing development of standards and regulatory guidelines for a potential Yucca Mountain repository.
- 1.6. Review the *Record of Decision* and maintain awareness of legal challenges to the final environmental impact statement for a potential Yucca Mountain repository.

2. Objectives Related to the Engineered Components of the Repository System

- 2.1. Evaluate repository and waste package designs, including the technical bases for the designs.
- 2.2. Review the progress or results of materials testing being conducted to address uncertainties about waste package performance.
- 2.3. Assess the integration of science and engineering in the DOE program, paying particular attention to the effects of site-characterization studies (e.g. modeling, testing, and analyses of thermal and mechanical effects) on repository and waste package designs.

3. Objectives Related to the Waste Management System

- 3.1. Evaluate the accuracy and reasonableness of analyses, methods, and major assumptions used by the DOE in estimating health and safety risks associated with transporting spent nuclear fuel and high-level radioactive waste.

- 3.2. Review the adequacy of DOE plans for developing the transportation infrastructure and determine the effort needed to develop a large-scale transportation capability.
- 3.3. Review the adequacy of the DOE's plans for safely handling and packaging spent nuclear fuel and high-level radioactive waste for transport to a permanent repository.
- 3.4. Evaluate the effectiveness of the DOE's efforts to integrate the various components of the waste management system (packaging, handling, transport, storage, and disposal of the waste).
- 3.5. Review the DOE's plans for addressing public safety concerns and for enhancing safety capabilities along transportation corridors. This includes activities related to development of plans (e.g., route selection), coordination, accident prevention (e.g., improved inspections and enforcement), and emergency response.

4. Objectives Related to Confirmatory Testing (Will apply only if the site recommendation is approved)

- 4.1. Monitor performance-confirmation activities, including performance-confirmation planning, undertaken by the DOE that are designed to reduce uncertainties related to repository performance.
- 4.2. Monitor performance-confirmation activities undertaken by the DOE, and evaluate the need to revise repository or waste package designs on the basis of the results of such activities.

Performance Goals for FY 2003

The Board's performance goals for fiscal year (FY) 2003 have been developed to further the achievement of the Board's general goals and strategic objectives. Because some of the general goals and strategic objectives relate to work and activities that will be undertaken in the future, they may not have corresponding annual performance goals in any given year.

1. Performance Goals Related to Site Suitability and Predicting Repository Performance and Strategy for Achieving Performance Goals

Performance Goals

- 1.1.1 Review for technical validity the technical and scientific components of the DOE's ongoing site investigations (if applicable).
- 1.1.2. Monitor the DOE's efforts to quantify uncertainties related to estimates of repository performance.
- 1.2.1. Monitor the results of flow-and-transport studies being conducted to obtain information on the potential performance of the saturated zone as a natural barrier in the repository

system.

- 1.2.2. Evaluate geologic, hydrologic, and geochemical information obtained from the enhanced characterization of the repository block at Yucca Mountain.
- 1.3.1. Determine the strengths and weaknesses of the total system performance assessment (TSPA).
- 1.3.2. On the basis of an evaluation of the natural processes at work at the Yucca Mountain site, recommend additional work needed to address uncertainties, paying particular attention to estimates of the rate and distribution of water seepage into the proposed repository under proposed repository design conditions.
- 1.3.3. Evaluate the DOE's quantification of uncertainties and conservatisms used in TSPA.
- 1.3.4. Recommend additional measures for strengthening the DOE's repository safety case.
- 1.3.5. Evaluate data from the drift-scale heater test.
- 1.4.1. Review plans and work carried out on natural and engineered analogs to the repository system.

Strategy for Achieving Goals

The strategy for achieving performance goals for 2003 is similar to that used and proven successful in previous years. The Board will accomplish its goals by doing the following.

- Reviewing critical documents provided by the DOE and its contractors, including contractor reports, process model reports, and TSPA.
- Meeting with contractor's principal investigators on technical issues, including those related to climate change, flow and transport in the unsaturated and saturated zones, seepage, and the biosphere.
- Holding public meetings with DOE and contractor personnel at least three times a year involving the full Board and holding several meetings with individual Board panels.
- Visiting and observing ongoing laboratory investigations, including the facilities at Lawrence Livermore National Laboratory, Lawrence Berkeley National Laboratory, Sandia National Laboratories, and the engineered-barrier test facility. Observing field investigations.
- Meeting with other entities carrying out research on, or providing input to, scientific and technical issues related to waste disposal, including the Nuclear Regulatory Commission and its contractors, the Southwest Research Institute, The Nye County Early Warning

Drilling Program, the Environmental Protection Agency, and the State of Nevada Nuclear Waste Projects Office.

2. Performance Goals Related to the Engineered Repository System and Strategy for Achieving Performance Goals

Performance Goals

- 2.1.1. Monitor the DOE's development of analytical tools for assessing the differences between different repository designs.
- 2.1.2. Evaluate the accuracy and completeness of the technical bases for repository and waste package designs.
- 2.1.3. Evaluate the extent to which the DOE is using the technical bases for modifying repository and waste package designs.
- 2.1.4. Monitor and evaluate the DOE's progress in developing a technical basis for modified or novel design features.
- 2.2.1. Evaluate data from studies of corrosion and the waste package environment on the predicted performance of materials being proposed for the EBS.
- 2.3.1. Assess the integration of scientific studies with engineering designs for the repository and the waste package. In particular, monitor the results of ongoing thermal tests and evaluate DOE plans for using the test results to support models of the thermally disturbed region near the repository and for deciding on spacing between emplacement drifts, degree of preclosure ventilation, and closure date of the potential repository.
- 2.3.2. Evaluate the DOE's efforts in identifying natural and engineered analogs (see also 1.4.1.).

Strategy for Achieving Goals

The Board will accomplish its goals by doing the following.

- Evaluating the technical bases for the EBS design by reviewing technical documents and databases (e.g., the controlled design assumption document and the technical database), paying particular attention to the technical bases for making and inspecting final closure welds of the waste package and methods for making sections of the drip shields. Meetings will be held with project personnel as necessary to obtain clarification and confirmation.
- Evaluating the technical bases for repository design by reviewing DOE documents and databases, paying particular attention to design features developed to promote drainage, control ventilation, and protect workers in the exhaust end of the ventilation system.

- Evaluating repository and waste package designs to identify which parts (if any) of the designs do not have a technical basis.
- Evaluating the technical basis for the DOE's work on alternative design features.
- After identifying the corrosion mechanisms most important to performance of the overall repository system, reviewing the common database (literature, laboratory, and field data) and judging the adequacy of the database for a decision on repository development.

3. Performance Goals Related to the Waste Management System and Strategy for Achieving Performance Goals

Performance Goals

- 3.1.1. Monitor efforts by the NRC to update estimates of risk associated with transportation of spent nuclear fuel and high-level radioactive waste.
- 3.1.2. Evaluate the operation of the entire repository facility, including the surface and subsurface components.
- 3.2.1. Evaluate the effects of "off-normal" events at the surface facility and how the events could affect the ability of the facility to receive waste shipments.
- 3.2.2. Evaluate the effects of reduced receiving capacity at the repository surface facility on the nationwide transportation system.
- 3.3.1. Examine the ability of storage casks and containers, including multipurpose canisters, to serve as disposal casks and containers in a repository.
- 3.3.2. Evaluate effects of human errors in risks associated with packaging and transporting spent nuclear fuel.
- 3.4.1. Evaluate logistics capabilities of the transportation system.
- 3.4.2. Monitor progress in implementing new technologies for improving transportation safety for spent fuel (e.g., electronic braking, wheel-bearing monitoring).
- 3.4.3. Review criteria for waste acceptance for storage to ensure that accepted material has been suitably characterized for subsequent disposal.
- 3.4.4. Evaluate the DOE's plans for enhancing safety capabilities along transportation corridors, and review the DOE's planning and coordination activities (e.g., route selection), accident prevention activities (e.g., improved inspections and enforcement), and emergency response activities.

Strategy for Achieving Goals

The Board will accomplish its goals by doing the following.

- Meeting with the American Association of Railroads, individual railroad companies, and railroad infrastructure manufacturers to determine the current state of rail infrastructure, and noting the effects of a sustained transportation campaign on the railroad industry.
- Attending meetings of the DOE-sponsored Transportation External Coordination Working Group to determine how well the DOE is working to implement Section 180(c) of the Nuclear Waste Policy Act.
- Holding meetings of the Board's Panel on the Waste Management System, as appropriate.

4. Performance Goals Related to Long-Term Activities and Strategy for Achieving Performance Goals (Will apply only if the site is found suitable and a site recommendation is ratified.)

Performance Goals

- 4.1.1. Monitor the DOE's proposed plans for performance confirmation to help ensure that uncertainties identified as part of the site recommendation process are addressed.
- 4.1.2. Monitor design modification activities undertaken by the DOE.

Strategy for Achieving Goals

The Board will accomplish its goals by doing the following.

- Reviewing critical documents provided by the DOE and its contractors, including contractor reports, process model reports, and TSPA.
- Reviewing performance-confirmation plans and meeting with DOE personnel to discuss aspects of the plans.

Evaluating the Board's Performance

The Board believes that measuring its effectiveness by directly correlating improvements in the DOE program with Board actions and recommendations would be ideal. However, the Board has no implementing authority, so it cannot compel the DOE to comply with its recommendations. Consequently, a judgment about whether a specific recommendation had a positive outcome for the DOE program is, in most cases, (1) subjective and (2) an imprecise indicator of Board performance because implementation of Board recommendations by the DOE 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. Were the reviews, evaluations, and other activities undertaken under the auspices of the goal completed?
2. Were the results of the reviews, evaluations, and other activities communicated in a timely, understandable, and appropriate way to Congress and the Secretary of Energy?

If both measures are met, the Board's performance in meeting the annual goal will be judged effective. If only one measure is 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.

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 the DOE program, to establish its annual performance objectives and develop its budget request for subsequent years. The results of the Board's performance evaluation are included in the Board's annual summary report to Congress and the Secretary.

Board Operations

The Board is composed of 11 members appointed by the President who serve on a part-time basis; are eminent in a relevant field of science or engineering, including environmental sciences; and are appointed solely on the basis of distinguished service. Because of the comprehensive nature of the program and the part-time availability of the members, Congress authorized the Board to maintain a small professional staff of 10 full-time employees to support the Board's comprehensive review of the DOE program. In addition to the members and professional staff, the Board maintains a small administrative staff that supports its activities.

The full Board meets three or four times each year. The Board has organized itself into panels that meet as needed. The Board also gathers information from field trips to the Yucca Mountain site, visits to contractor laboratories and facilities, and informal meetings with individuals working on the project. On the basis of the information gathered throughout the year, the Board issues its findings in letters and reports.