

**NUCLEAR WASTE TECHNICAL REVIEW BOARD  
FY 1999 PERFORMANCE PLAN AND EVALUATION  
(Revised January 19, 2000)**

## **NWTRB General Goals and Strategic Objectives**

The national goal for radioactive waste management established by Congress in the Nuclear Waste Policy Act of 1982 and the Nuclear Waste Policy Amendments Act of 1987 is to safely dispose of civilian spent nuclear fuel and high-level radioactive waste in a permanent geologic repository at a suitable site or sites. Congress charged the Nuclear Waste Technical Review Board with reviewing the technical and scientific validity of the Secretary of Energy's activities associated with achieving this goal. 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 U.S. Department of Energy (DOE) related to determining the suitability of the Yucca Mountain site as the possible location of a permanent 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 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 permanent repository are well integrated and establish a sound technical basis for designing and operating a waste management system.
4. Ensure that technical and scientific activities undertaken by the DOE related to licensing the proposed site for repository development establish a sound technical basis for applying for a license application and that technical and scientific performance confirmation activities undertaken by the DOE during licensing, construction, and operation of the proposed repository establish a sound technical basis for operating a repository, reducing uncertainties related to repository performance, and revising repository and waste package designs.

## *Strategic Objectives*

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

### **1. *Objectives Related to Site Suitability 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 hydrologic and other natural processes at the Yucca Mountain site 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 EIS for a potential Yucca Mountain site.

### **2. *Objectives Related to the Engineered 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 and other federal agencies in estimating health and safety risks associated with transporting spent fuel.
- 3.2 Review the adequacy of plans and requirements for developing the transportation infrastructure necessary to move significant amounts of spent fuel from individual reactor sites to a DOE storage or disposal site. Compare these requirements with current transportation capabilities, and determine the effort needed to develop a large-scale transportation capability.

- 3.3 Review the adequacy of DOE plans for safely handling and packaging spent fuel and high-level radioactive waste for transport to a permanent repository.
- 3.4 Evaluate the effectiveness of DOE 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 Licensing and Confirmatory Testing** (Will apply only if the site is found suitable and a site recommendation is ratified)

- 4.1 Monitor DOE activities related to the quality of data to be used in a licensing proceeding.
- 4.2 Help the DOE ensure that if there is a license application, the technical and scientific information on which it is based is technically defensible.
- 4.3 Monitor performance-confirmation activities undertaken by the DOE during licensing, construction, and operation of the repository that are designed to reduce uncertainties related to repository performance.
- 4.4 Monitor performance-confirmation activities undertaken by the DOE during licensing, construction, and operation of the repository, and evaluate the need to revise repository or waste package designs on the basis of the results of such activities.

## **Performance Goals for 1999**

The Board developed its fiscal year 1999 performance goals on the basis of its general goals and strategic objectives.

### ***Performance Goals Related to Site Suitability and Predicting Repository Performance***

- 1.1.1 Determine what the DOE's viability assessment can and cannot tell us about further activities needed to determine the suitability of the Yucca Mountain site and ascertain the extent to which the repository and engineered barrier designs at the time of the viability assessment are likely to support decisions about the suitability of the site.
- 1.2.1 Identify and evaluate the technical issues required to make a technically supportable site-suitability decision. Increase the Board's understanding of the natural processes at work at the Yucca Mountain site by recommending additional studies needed, paying particular attention to estimates of infiltration rates and identification of fast pathways for water flow.

- 1.3.1 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 a repository.
- 1.4.1 Determine the strengths and weaknesses of TSPA-VA and how they could influence the conclusions to be drawn from the viability assessment.
- 1.4.2 Evaluate the DOE's use of risk assessment and quantification of uncertainty and determine whether it is being used appropriately.
- 1.4.3 Determine how the design of the waste package (for disposal) at the time of the viability assessment is likely to influence decisions about the suitability of the site.
- 1.5.1 Monitor progress being made on the environmental radiation protection standards for a Yucca Mountain repository to be developed by the U.S. Environmental Protection Agency and the implementing regulations to be developed by the U.S. Nuclear Regulatory Commission. Advise the DOE and the Congress of the technical implications (e.g., cost, ability to demonstrate compliance of the standards and regulations).
- 1.6.1 Review the technical basis for the environmental impact statement being prepared for the Yucca Mountain site, issues to be addressed, and the validity of the data used to project potential environmental effects. Advise the DOE and Congress of any weaknesses or shortcomings found.

***Performance Goal Related to the Engineered Barrier System***

- 2.3.1 Explore the relationship between science and engineering in the DOE program, especially the way results from site-characterization studies do or do not influence design of the engineered barrier system.

***Performance Goal Related to the Waste Management System***

- 3.1.1 Evaluate the DOE's plans for enhancing safety capabilities along the transportation corridors by reviewing DOE's planning and coordination activities (e.g., route selection), accident prevention activities (e.g., improved inspections and enforcement), and emergency response activities.

**Performance Measurement**

The Board believes that measuring its effectiveness by directly correlating improvements in the DOE program to the Board's recommendations and actions would be ideal. However, the Board has no implementing authority, so it cannot compel the DOE to comply with its recommendations. Consequently, the judgment of whether a specific recommendation had a positive outcome for the DOE program is, in most cases, (a) subjective and (b) an imprecise

indicator of Board performance because implementation of Board recommendations by the DOE is outside the Board's direct control. Furthermore, even if the Board's recommendation is implemented by the DOE, a correlating change in the DOE program may not be evident for several years.

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

1. Whether the reviews, evaluations, and other activities undertaken under the auspices of the goal were completed.
2. Whether the results of the reviews, evaluations, and other activities were 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 the performance goal. To supplement its own evaluation, the Board will seek comments from Congress, the DOE, and the public on the timeliness, clarity, and effectiveness of its recommendations and reports.

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 civilian radioactive waste program, to establish its annual performance goals and to 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.

## **Performance Evaluation for Fiscal Year 1999**

Using the performance measures described above and based on the following evaluation, the Board's performance for fiscal year 1999 was found to be effective.<sup>1</sup>

### ***Performance Evaluation of Goals Related to Site Suitability and Repository Performance***

1.1.1 Determine what the DOE's viability assessment can and cannot tell us about further activities needed to determine the suitability of the Yucca Mountain site, and ascertain the extent to which the repository and engineered barrier designs at the time of the viability assessment are likely to support decisions about the suitability of the site.

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<sup>1</sup> All documents referred to in the evaluation are available on the Board's Web site at [www.nwtrb.gov](http://www.nwtrb.gov).

- *Evaluation of 1.1.1: The Board completed the initial part of its assessment and communicated its views and findings to Congress and the Secretary of Energy in its report Moving Beyond the Viability Assessment, issued April 1999. Specific recommendations were communicated to the DOE in letters to the acting director of the OCRWM dated July 9, 1999 and August 3, 1999.*

1.2.1 Identify and evaluate the technical issues required to make a technically-supportable site-suitability decision. Increase the Board's understanding of the natural processes at work at the Yucca Mountain site by recommending additional studies needed, with particular attention to estimates of infiltration rates and identification of fast pathways for water flow.

- *Evaluation of 1.2.1: The Board continued its evaluation of key technical issues and commented on needed additional studies in its report April 1999 report Moving Beyond the Viability Assessment and in letters to the acting director of the OCRWM dated July 9, 1999, August 3, 1999, and November 10, 1999.*

1.3.1 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 a repository.

- *Evaluation of 1.3.1: The Board continued to monitor the results of thermal tests undertaken at the site and commented on (1) the status of the tests, (2) when results might be expected, and (3) the implications of the results of such tests for repository design and potential repository performance in a July 9, 1999, letter to the director of the OCRWM.*

1.4.1 Determine the strengths and weaknesses of TSPA-VA, and how they could influence the conclusions to be drawn from the viability assessment.

- *Evaluation of 1.4.1: The Board reviewed the TSPA-VA and commented on its strengths and weaknesses in its report Moving Beyond the Viability Assessment in April 1999.*

1.4.2 Evaluate the DOE's use of risk assessment and quantification of uncertainty and determine whether it is being used appropriately.

- *Evaluation of 1.4.2: The Board conducted its evaluation and commented to the Department of Energy in a letter to the acting director of the OCRWM on November 10, 1999.*

1.4.3 Determine how the design of the waste package (for disposal) at the time of the viability assessment is likely to influence decisions about the suitability of the site.

- *Evaluation of 1.4.3: The Board examined extensively the evaluation conducted by the OCRWM related to repository design and commented to the DOE on its views and recommendations in letters to the acting director of the OCRWM dated July 9, 1999, May 7, 1999, and March 3, 1999.*

1.5.1 Monitor progress being made on the environmental radiation protection standards for a Yucca Mountain repository to be developed by the U.S. Environmental Protection Agency and the implementing regulations to be developed by the U.S. Nuclear Regulatory Commission. Advise the DOE and the Congress of the technical implications (e.g., cost, ability to demonstrate compliance of the standards and regulations).

- *Evaluation of 1.5.1: The Board's purview includes reviewing the technical and scientific validity of activities undertaken by the Secretary of Energy. Therefore, the Board determined that the appropriate Board involvement relating to the radiation protection standard is to monitor progress in developing the standard but not to comment on the substance of the standard.*

1.6.1 Review the technical basis for the environmental impact statement being prepared for the Yucca Mountain site, issues to be addressed, and the validity of the data used to project potential environmental effects. Advise the DOE and Congress of any weaknesses or shortcomings found.

- *Evaluation of 1.6.1: The Board reviewed the DOE's draft environmental impact statement (DEIS) and has provided ongoing feedback to the DOE. The Board will provide its written comments on the DEIS during the first months of 2000. The Board's performance related to meeting this objective is determined to have been effective because its review and comments are on schedule.*

### ***Performance Evaluation of Engineered Barrier System Annual Goals***

2.3.1 Explore the relationship between science and engineering in the DOE program, especially the way results from site-characterization studies do or do not influence design of the engineered barrier system.

- *Evaluation of 2.3.1: The Board commented on the integration of science and engineering and the need to consider alternative repository and waste package designs in its November 1998 Report to Congress and the Secretary of Energy and in its March 3, 1999, and July 9, 1999, letters to the acting director of the OCRWM.*

### ***Performance Evaluation of Waste Management System Annual Goals***

3.1.1 Evaluate the DOE's plans for enhancing safety capabilities along the transportation corridors by reviewing DOE's planning and coordination activities (e.g., route selection), accident prevention activities (e.g., improved inspections and enforcement), and emergency response activities.

- *Evaluation of 3.1.1: The OCRWM deferred most activities related to transportation of spent nuclear fuel and high-level radioactive waste. Therefore, the Board on monitoring the efforts of the railroad industry to create a performance specification for the transportation of spent fuel and high-level radioactive waste. The Board also monitored industry capability to manufacture shipping and storage casks for a potential major shipping campaign.*



## **Board Operations**

The Board consists of 11 members appointed by the President on the basis of distinguished service. The Board members serve on a part-time basis and are eminent in a field of science or engineering, including environmental sciences. Because of the comprehensive nature of the program and the part-time availability of the members, Congress authorized the Board to maintain a professional staff of 10 full-time employees. The professional staff 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 to support its activities. The full Board meets three or four times each year and Board panels meet as needed. The Board also gathers information through 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.