

Appendix I

Nuclear Waste Technical Review Board Performance Plan Fiscal Year 2005

Nuclear Waste Technical Review Board 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 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.

The NWPAA limited repository development activities to a single site, 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 activities include characterizing the Yucca Mountain site and packaging and transporting spent nuclear fuel and high-level radioactive waste.

The Board's general goals and strategic objectives, which are presented in the Board's strategic plan for fiscal years (FY) 2004-2009, have been established in accordance with its statutory mandate and with congressional action in 2002 authorizing the DOE to proceed with developing an application to be submitted to the NRC for authorization to construct a repository at Yucca Mountain. The Board's goals reflect the continuity of the Board's ongoing technical and scientific evaluation and the Board's "systems view" of the repository and of waste management activities.

The Board's performance goals for FY 2005, which are included in this document, have been developed to further the achievement of the Board's general goals and strategic objectives. The performance goals have been numbered to correlate with appropriate strategic objectives, and preliminary budget amounts have been allocated to each set of performance goals.

Board Performance Goals for FY 2005

1. Performance Goals Related to the Natural System and Strategy for Achieving the Goals

(Dollars in Thousands)		
FY 03	FY 04	FY 05
795	794	800

Performance Goals

- 1.1.1. Review the technical activities and agenda of the DOE's science and technology effort.
- 1.1.2. Monitor the results of flow-and-transport studies to obtain information on the potential performance of the saturated zone as a natural barrier in the repository system.
- 1.1.3. Review DOE efforts to confirm estimates of natural-system performance and pursue independent lines of evidence, including tests of models and assumptions.
- 1.2.1. Review DOE efforts to resolve questions related to possible seismic events and igneous consequences.
- 1.3.1. Evaluate geologic, hydrologic, and geochemical information obtained from the enhanced characterization of the repository block (ECRB) at Yucca Mountain.
- 1.3.2. Evaluate data from the drift-scale heater test.
- 1.3.3. Review plans and work carried out on possible analogues for the natural components of the repository system.
- 1.3.4. Recommend additional work needed to address uncertainties, paying particular attention to estimates of the rate and distribution of water seepage into the repository under proposed repository design conditions.
- 1.4.1. Evaluate tunnel-stability studies undertaken by the DOE.
- 1.5.1. Review the DOE's efforts to integrate results of scientific studies on the behavior of the natural system into repository designs.

Strategy for Achieving Goals

The Board will accomplish its goals by doing the following.

- Holding three public meetings with the DOE and DOE contractor personnel involving the full Board, and holding meetings of the Panel on the Natural System as needed.
- Reviewing critical documents provided by the DOE and its contractors, including contractor reports, process model reports, and total system performance assessment (TSPA).

- Meeting with contractor principal investigators on technical issues, including those related to climate change, seismic and volcanic events, flow and transport in the unsaturated and saturated zones, seepage, and the biosphere.
- Observing relevant laboratory and site investigations, including those conducted in the exploratory studies facility (ESF), the ECRB, and at Lawrence Livermore National Laboratory, Lawrence Berkeley National Laboratory, and Sandia National Laboratories. Observing other field investigations and visiting potential analogue sites. Visiting countries with nuclear-waste disposal programs and attending national and international symposia and conferences.

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

(Dollars in Thousands)		
FY 03	FY 04	FY 05
954	953	960

Performance Goals

- 2.1.1. Monitor the DOE's performance allocation studies.
- 2.2.1. Review thermal testing and rock-stability testing related to potential conditions in repository tunnels.
- 2.2.2. Evaluate data from studies of the effects of corrosion and the waste package environment on the predicted performance of materials being proposed for engineered barriers.
- 2.3.1. Review the progress and results of materials testing being conducted to address uncertainties about waste package performance.
- 2.3.2. Evaluate the DOE's efforts in identifying natural and engineered analogues for corrosion processes.
- 2.4.1. Monitor the DOE's development of analytical tools for assessing the differences between repository designs.
- 2.4.2. Evaluate the accuracy and completeness of the technical bases for repository and waste package designs and the extent to which the DOE is using the technical bases for modifying repository and waste package designs.
- 2.4.4. Evaluate the integration of the subsurface design and layout with thermal management and preclosure facility operations.
- 2.5.1. Assess the integration of scientific studies with engineering designs for the repository and the waste package.

Strategy for Achieving Goals

The Board will accomplish its goals by doing the following.

- Holding three public meetings with DOE and contractor personnel involving the full Board, and holding meetings of the Panel on the Engineered System as needed.
- Reviewing critical documents provided by the DOE and its contractors, including contractor reports, process model reports, and TSPA.
- Meeting with contractor principal investigators on technical issues.
- 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.
- Reviewing the common database (literature, laboratory, and field data) and judging the adequacy of the database for a decision on repository development.
- Observing relevant laboratory investigations, including those conducted at Lawrence Livermore National Laboratory and Lawrence Berkeley National Laboratory. Visiting countries with nuclear-waste disposal programs and attending national and international symposia and conferences.

3. Performance Goals Related to Repository System Performance and Integration and Strategy for Achieving Performance Goals

(Dollars in Thousands)		
FY 03	FY 04	FY 05
636	635	640

Performance Goals

- 3.1.1. Identify which technical and scientific activities are on the critical path to reconciling uncertainties related to the DOE’s performance estimates.
- 3.1.2. Determine the strengths and weaknesses of TSPA.
- 3.1.3. Evaluate the DOE’s treatment of seismic and volcanism issues in TSPA.
- 3.2.1. Evaluate the DOE’s quantification of uncertainties and conservatisms used in TSPA.
- 3.2.2. Review new data and updates of TSPA models, and identify models and data that should be updated.
- 3.3.1. Evaluate the DOE’s efforts to create a transparent and traceable TSPA.
- 3.3.2. Evaluate the DOE’s efforts to develop simplified models of repository performance.
- 3.3.3. Evaluate the DOE’s efforts to identify analogues for performance estimates of the overall repository system.

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- 3.4.1. Evaluate the DOE's efforts to analyze the contribution of the different engineered and natural barriers to waste isolation.
 - 3.5.1. Evaluate technical aspects of value engineering and performance-related trade-off studies, including criteria, weighting factors and decision methodologies for such studies and how technical uncertainties are taken into account.
 - 3.6.1. Recommend additional measures for strengthening the DOE's repository safety case.
 - 3.7.1. Evaluate the DOE's efforts to develop a feedback loop among performance-confirmation activities and TSPA models and data.
 - 3.7.2. Monitor the DOE's proposed plans for performance confirmation to help ensure that uncertainties identified as part of the site recommendation process are addressed.

Strategy for Achieving Goals

The Board will accomplish its goals by doing the following.

- Holding three public meetings with DOE and contractor personnel involving the full Board and holding meetings of the Panel on the Repository System Performance and Integration, as needed.
- Reviewing critical documents provided by the DOE and its contractors, including contractor reports, process model reports, and the DOE's TSPA.
- Meeting with contractor's principal investigators on technical issues.
- Observing ongoing laboratory investigations, including those conducted at Lawrence Livermore National Laboratory, Lawrence Berkeley National Laboratory, Sandia National Laboratories, and the engineered-barrier test facility. Observing field investigations. Visiting countries with nuclear-waste disposal programs and attending national and international symposia and conferences.

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

(Dollars in Thousands)		
FY 03	FY 04	FY 05
795	794	800

Performance Goals

- 4.1.1. Evaluate the operation of the entire repository facility, including the surface and subsurface components.
- 4.1.2. Monitor the identification of research needs to support improved understanding of the interaction of components of the waste management system.

- 4.1.3. Review the technical and scientific basis of the DOE's analyses of component interactions under various scenarios, including the degree of integration and redundancy across functional components over time.
- 4.1.4. Evaluate the effects of reduced receiving capacity at the repository surface facility on the nationwide transportation system.
- 4.1.5. Review criteria for waste acceptance for storage to ensure that accepted material has been suitably characterized for subsequent disposal.
- 4.2.1. Monitor the DOE's efforts to implement Section 180 (c) of the NWPA.
- 4.3.1. Monitor the DOE's progress in developing and implementing a transportation plan for shipping spent nuclear fuel and high-level radioactive waste to a Yucca Mountain repository.
- 4.3.2. Review the DOE's efforts to develop criteria for decisions on transportation mode and routing.
- 4.3.3. Evaluate logistics capabilities of the transportation system.
- 4.3.4. Monitor progress in implementing new technologies for improving transportation safety for spent nuclear fuel.
- 4.3.5. 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.

- Holding three public meetings with DOE and contractor personnel involving the full Board, and holding meetings of the Board's Panel on the Waste Management System in appropriate areas of the country.
- Reviewing critical documents provided by the DOE and its contractors, including contractor reports, process model reports, and TSPA.
- Meeting with groups involved in implementing transportation plans, including the NRC, the Department of Transportation, railroad and trucking companies, nonprofit groups, the utilities, and other stakeholders. Visiting countries with nuclear-waste transportation and disposal programs and attending national and international conferences and symposia.

Appendix J

Nuclear Waste Technical Review Board Performance Plan

Fiscal Year 2006

Nuclear Waste Technical Review Board Goals and Strategic Objectives

The nation's goals related to the disposal of spent nuclear fuel and high-level radioactive wastes were set forth by Congress in the NWPA. The goals are to develop a deep geologic 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 the disposal of such waste.

The NWPAA limited 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 NWPAA. Such activities include characterizing the Yucca Mountain site and packaging and transporting spent nuclear fuel and high-level radioactive waste.

The Board's general goals and strategic objectives, which are set forward in its strategic plan for FY 2004-2009, have been established in accordance with its statutory mandate and with congressional action in 2002 authorizing the DOE to proceed with the development of an application to be submitted to the NRC for authorization to construct a repository at Yucca Mountain. The Board's goals reflect the continuity of the Board's ongoing technical and scientific evaluation and the Board's view that both the repository and waste management activities should be evaluated as systems.

The Board's performance goals for FY 2006 are listed below. The performance goals are divided into four areas that correlate with Board panel jurisdictions and have been numbered according to the appropriate strategic objectives included in the Board's Strategic Plan for FY 2004-2009. Budget amounts for FY 2006 have been preliminarily allocated to each set of performance goals.

Board Performance Goals for FY 2006

1. Performance Goals Related to the Natural System and Strategy for Achieving the Goals

(Dollars in Thousands)		
FY 04	FY 05	FY 06
868	852	903

Performance Goals

- 1.1.1. Review the technical activities and plans for the DOE's science and technology program.
- 1.1.2. Monitor the results of flow-and-transport studies to obtain information on the potential performance of the saturated zone as a natural barrier in the repository system.
- 1.1.3. Review DOE efforts to confirm estimates of natural-system performance, including tests of models and assumptions, and the pursuit of independent lines of evidence.
- 1.2.1. Review DOE efforts to resolve questions related to possible seismic events and igneous consequences.
- 1.3.1. Evaluate geologic, hydrologic, and geochemical information obtained from the enhanced characterization of the repository block (ECRB) at Yucca Mountain.
- 1.3.2. Evaluate data from the drift-scale heater test.
- 1.3.3. Review plans and work carried out on possible analogues for the natural components of the repository system.
- 1.3.4. Recommend additional work needed to address uncertainties, paying particular attention to estimates of the rate and distribution of water seepage into the repository under proposed repository design conditions.
- 1.4.1. Evaluate tunnel-stability studies undertaken by the DOE.
- 1.5.1. Review the DOE's efforts to integrate results of scientific studies on the behavior of the natural system into repository designs.

Strategy for Achieving Goals

The Board will accomplish its goals by doing the following.

- Holding three public meetings with the DOE and DOE contractor personnel involving the full Board and holding meetings of the Panel on the Natural System, as needed.
- Reviewing critical documents provided by the DOE and its contractors, including contractor reports, process model reports, and total system performance assessment (TSPA).

- Meeting with contractor principal investigators on technical issues, including those related to climate change, seismic and volcanic events, flow and transport in the unsaturated and saturated zones, seepage, and the biosphere.
- Visiting and observing ongoing exploratory studies facility (ESF), ECRB, and laboratory investigations, including the facilities at Lawrence Livermore National Laboratory, Lawrence Berkeley National Laboratory, and Sandia National Laboratories. Observing other field investigations and visiting potential analogue sites.
- Visiting programs in other countries and attending national and international symposia and conferences.

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

(Dollars in Thousands)		
FY 04	FY 05	FY 06
1,041	1,023	1,082

Performance Goals

- 2.1.1. Monitor the DOE's performance allocation studies.
- 2.2.1. Review thermal testing and rock stability testing related to potential conditions in repository tunnels.
- 2.2.2. Evaluate data from studies of the effects of corrosion and the waste package environment on the predicted performance of materials being proposed for engineered barriers.
- 2.3.1. Review the progress and results of materials testing being conducted to address uncertainties about waste package performance.
- 2.3.2. Evaluate the DOE's efforts in identifying natural and engineered analogs for corrosion processes.
- 2.4.1. Monitor the DOE's development of analytical tools for assessing the differences between repository designs.
- 2.4.2. Evaluate the accuracy and completeness of the technical bases for repository and waste package designs and the extent to which the DOE is using the technical bases for modifying repository and waste package designs.
- 2.4.3. Evaluate the integration of the subsurface design and layout with thermal management and preclosure facility operations.
- 2.5.1. Assess the integration of scientific studies with engineering designs for the repository and the waste package.

Strategy for Achieving Goals

The Board will accomplish its goals by doing the following.

- Holding three public meetings of the full Board with DOE and contractor personnel involving the full Board and holding meetings of the Panel on the Engineered System, as needed.
- Reviewing critical documents provided by the DOE and its contractors, including contractor reports, process model reports, and TSPA.
- Meeting with contractor principal investigators on technical issues.
- 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.
- Reviewing the common database (literature, laboratory, and field data) and judging the adequacy of the database for a decision on repository development.
- Visiting and observing ongoing laboratory investigations, including the facilities at Lawrence Livermore National Laboratory and Lawrence Berkeley National Laboratory.
- Visiting programs in other countries and attending national and international symposia and conferences.

3. Performance Goals Related to Repository System Performance and Integration and Strategy for Achieving the Goals

(Dollars in Thousands)		
FY 04	FY 05	FY 06
694	682	721

Performance Goals

- 3.1.1. Identify which technical and scientific activities are on the critical path to reconciling uncertainties related to the DOE’s performance estimates.
- 3.1.2. Determine the strengths and weaknesses of TSPA.
- 3.1.3. Evaluate the DOE’s treatment of seismic and volcanism issues in TSPA.
- 3.2.1. Evaluate the DOE’s quantification of uncertainties and conservatisms used in TSPA.
- 3.2.2. Review new data and updates of TSPA models, and identify models and data that should be updated.
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- 3.4.1. Evaluate the DOE's efforts to analyze the contribution of the different engineered and natural barriers to waste isolation.
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- Visiting programs in other countries and attending national and international symposia and conferences.

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

(Dollars in Thousands)		
FY 04	FY 05	FY 06
869	853	902

Performance Goals

- 4.1.1. Evaluate the operation of the entire repository facility, including the surface and subsurface components.
- 4.1.2. Monitor the identification of research needs to support improved understanding of the interaction of components of the waste management system.

- 4.1.3. Review the technical and scientific basis of the DOE's analyses of component interactions under various scenarios, including the degree of integration and redundancy across functional components over time.
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- 4.3.1. Monitor the DOE's progress in developing and implementing a transportation plan for shipping spent nuclear fuel and high-level radioactive waste to a Yucca Mountain repository.
- 4.3.2. Review the DOE's efforts to develop criteria for transportation mode and routing decisions.
- 4.3.3. Evaluate logistics capabilities of the transportation system.
- 4.3.4. Monitor progress in implementing new technologies for improving transportation safety for spent nuclear fuel.
- 4.3.5. 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.

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- Visiting programs in other countries and attending national and international conferences and symposia.

