



Department of Energy

Washington, DC 20585

May 19, 1998

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Dr. Jared L. Cohon
Chairman
Nuclear Waste Technical Review Board
2300 Clarendon Boulevard
Arlington, Virginia 22201-3367

Dear Dr. Cohon:

This letter transmits the Department of Energy's response to the Nuclear Waste Technical Review Board's second report of 1997 to the U.S. Congress and the Secretary of Energy, also referred to as the Board's *Fifteenth Report*, that was issued on December 23, 1997. Our response to the Board's comments on several key issues is found in the enclosure.

The Department appreciates the Board's recognition of the considerable progress we have made in characterizing the Yucca Mountain site and our efforts to improve interactions between the Department and the Board. Additionally, we appreciate the Board's recognition of the well-integrated effort that resulted in the timely completion of the drift scale test facility and the initiation of important thermal tests. We look forward to continuing to receive the Board's evaluations as we pursue completion of the viability assessment. If you have any questions, please contact me at (202) 586-6842.

Sincerely,

A handwritten signature in black ink, appearing to read "Lake H. Barrett".

Lake H. Barrett, Acting Director
Office of Civilian Radioactive
Waste Management

Enclosure

**DOE Response to Comments on Several Key Issues
by the Nuclear Waste Technical Review Board in its
Second Report of 1997 to the U.S. Congress
and the Secretary of Energy, December 1997**

Viability Assessment

The Department agrees with the Board that the viability assessment (VA) is an important intermediate milestone on the path to an evaluation of site suitability rather than a decision point and should be kept in the proper context. We expect that the VA will provide information to facilitate intermediate evaluation of the potential Yucca Mountain Monitored Geologic Repository. The independent views of the Board will be important in this evaluation process. From the Department's perspective, the VA components will objectively describe the design, performance, and cost of a Yucca Mountain repository based on the information collected to date. The assessment will also include a proposed path forward for completing site characterization and developing a site recommendation and a license application (LA).

Repository and Waste Package Designs

The Department recognizes the advantages of using a robust engineered barrier system in combination with geologic barriers, as suggested by the Board. Our reference design includes a multi-metallic robust waste package that is projected to contain the waste for thousands of years in the repository environment.

As part of its ongoing design and analysis programs, the Department is developing design alternatives for the repository and the engineered barrier. We are preserving flexibility in the existing design approach to ensure that design alternatives now foreseen, as well as those that may emerge with advancements in technology, can be accommodated in the repository development process, as recommended by the Board. We expect that design alternatives will continue to be evaluated throughout repository licensing, construction, and operation. As modifications to the reference design and concept of operations are proposed and analyzed, the Department will share those with the Board.

A reference design, however, is essential for the VA, and a reference design will be essential for the rational completion of site characterization and the licensing process. Such a reference design and an assessment of its performance provide the frame of reference required to evaluate the sufficiency of site characterization data and analyses. This use of a reference design ensures that the components of the VA, and later key documents, relate to a coherent proposed facility and rely on consistent information. Consideration of significant alternatives to the reference design

will continue to be an important part of the design development process. Discussion of alternatives is required for the license application and will be included at a conceptual level in the VA.

Total System Performance Assessment

We recognize the importance of support from the scientific community at large for the Department's technical work. We appreciate the Board's strong support of our efforts to solicit the views of outside experts on the interpretation of data obtained in site characterization and the development of appropriate process models for use in total system performance assessments (TSPA). Expert elicitations in five focused subject areas have been conducted to help define and, where possible, quantify the uncertainties in parameters and models to be used in the TSPA-VA. These elicitation addressed: unsaturated-zone flow; waste package degradation; saturated-zone flow and transport; near-field and altered zone coupled effects; and waste form degradation. These elicitations are intended to supplement data collection and analysis by focusing on uncertainties in the currently available information. In each of these elicitations, the experts were asked to recommend additional data collection and analysis activities that, in their opinion, could lead to a significant reduction in the existing uncertainties. The Department will make full use of the information provided by the experts for evaluating predictive models and as a guide for future testing.

In addition to the focused input we receive from outside experts, we have formed an independent peer review panel to review the entire total system performance assessment process. This review is ongoing. We have received two interim reports from the panel, which are being used to improve our performance assessment process. The panel's final report will follow the VA and will influence how the Department proceeds with the performance assessment for the LA. The Department appreciates the interest that the Board has shown in the TSPA peer review process and encourages your continued participation as observers at the peer review briefings to the Department.

The Department agrees with the Board that expert elicitation is dependent on collected data and can guide additional data collection, but is not a substitute for reasonably obtainable data. We have structured our ongoing expert elicitations to be generally consistent with guidance from the Nuclear Regulatory Commission on the use of expert elicitation, which is also based in part on these premises.

Enhanced Characterization of the Repository Block

We appreciate the significance of hydrologic data that will come from studies in the cross drift that is being constructed as part of the enhanced characterization of the repository block. The construction of the starter tunnel for the cross drift is well under way, and the tunnel boring machine started boring on March 31, 1998, approximately three weeks ahead of schedule. Excavation is expected to be completed later this year.

The testing for the enhanced characterization of the repository block will continue for several years after excavations are completed; however, visual observations and mapping will be performed as excavation proceeds. The Department understands and agrees with the Board's desire to see included in the VA as much as possible of the data collected from the enhanced characterization of the repository block program. We expect that the observational data collected during construction will be included in the VA to the extent practicable. These data could include identification of faults exposed in the cross-drift and preliminary information on fracture distributions. It is not likely that there will be sufficient time to complete sample collection and analysis or in situ testing prior to issuing the VA. The results of these investigations will be included in the LA.

In addition to the cross drift, the Department is constructing an underground facility at Busted Butte in the Calico Hills formation to provide a test site in the same rock unit that exists below the western part of the proposed repository block. This testing is intended to reduce uncertainties in the Yucca Mountain Project's assessment of the potential transport of key radionuclides from the repository area, through the unsaturated zone, to the water table underlying Yucca Mountain. Tests also will address the importance of colloid-facilitated transport of radionuclides in fractured and unfractured rock. Underground construction began in mid-December 1997 and testing will continue through August 1999.