



**UNITED STATES
NUCLEAR WASTE TECHNICAL REVIEW BOARD**

2300 Clarendon Boulevard, Suite 1300
Arlington, VA 22201-3367

January 24, 2002

Honorable John Ensign
United States Senate
364 SROB
Washington, DC 20510-2805

Dear Senator Ensign:

Enclosed are responses to the questions posed in letter of November 26, 2001 from you and Senator Hany Reid. As you know, the Board provides independent advice on the technical issues associated with the management of the country's commercial spent nuclear fuel and defense high-level radioactive waste. The Board offers its technical views to help inform the larger consideration of issues that face the Department of Energy and Congress in their evaluation of the suitability of the Yucca Mountain candidate repository site.

The Board is keenly aware that many of the issues that must be considered in making decisions in this policy area are technical ones but that other issues are not. We believe that Congress and the Secretary will find it useful to have our views on the technical and scientific information related to a possible site recommendation. As noted in our responses, policy-makers will decide how much technical certainty is acceptable for a site recommendation.

Please let me or the Board's staff know if we can provide you or your staff with additional information on the enclosed responses.

Sincerely,

A handwritten signature in black ink that reads "Jared L. Cohon". The signature is written in a cursive style.

Jared L. Cohon
Chairman

Enclosure

NUCLEAR WASTE TECHNICAL REVIEW BOARD
RESPONSE TO QUESTIONS FROM
SENATORS HARRY REID AND JOHN ENSIGN
JANUARY 24, 2002

1. How strong is the current technical basis for DOE's repository design and for the analysis that supports the site recommendation?

In evaluating the DOE's technical and scientific work related to individual natural and engineered components of the proposed repository system, the Board finds varying degrees of strength and weakness. Such variability is not surprising, given that the Yucca Mountain project is in many respects a first-of-a-kind, complex undertaking. When the DOE's technical and scientific work is taken as a whole, the Board's view is that the technical basis for the DOE's repository performance estimates is weak to moderate at this time. As discussed in the Board's January 24, 2002 letter to Congress and the Secretary of Energy, the Board believes that it is possible to increase confidence in the DOE's projections of repository system performance.

The DOE's estimates of repository performance currently rely heavily on engineered components of the repository system, making corrosion of the waste package very important. High temperatures in the DOE's base-case repository design increase uncertainties and decrease confidence in the performance of waste package materials. Confidence in waste package and repository performance potentially could increase if the DOE adopts a low-temperature repository design. However, a full and objective comparison of high- and low-temperature repository designs should be completed before the DOE selects a final repository design concept.

The Board makes no judgment on the question of whether the Yucca Mountain site should be recommended or approved for repository development. Those judgments, which involve a number of public policy considerations as well as an assessment of how much technical certainty is necessary at various decision points, go beyond the Board's congressionally established mandate.

2. How confident are you that the current DOE program would lead to a safe repository that protects human health and the environment at Yucca Mountain?

At this point, no individual technical or scientific factor has been identified that would automatically eliminate Yucca Mountain from consideration as the site of a permanent repository. The Board believes, however, that specific activities can and should be pursued to increase confidence in the projections of performance of the proposed repository at Yucca Mountain. Those activities include identifying, quantifying, and communicating clearly the extent of the uncertainty associated with the DOE's performance estimates; comparing and evaluating a low-temperature repository design with the DOE's current base-case high-temperature design; increasing the fundamental understanding of the potential behavior of the proposed repository system; developing multiple lines of evidence; and strengthening arguments about defense-in-depth (or redundancy). The Board also believes that uncertainties related to the performance of waste package materials under high-temperature conditions should be addressed. The Board's January 24, 2002 letter to Congress and the Secretary of Energy also contains suggestions about new initiatives that the DOE might undertake to increase confidence. Many

factors, such as the DOE's ability to improve the integration of scientific and engineering activities, are likely to influence whether those activities can be successfully completed.

3. Is it premature for the DOE to make a recommendation that the site is suitable for a geologic repository?

The timing of a decision on whether the Yucca Mountain site should be recommended or approved for repository development is a judgment involving a number of public policy considerations as well as an assessment of how much technical certainty policy-makers believe is necessary at the time decisions are made. As stated in the answer to question 1, these judgments go beyond the Board's congressionally established mandate.