UNITED STATES
NUCLEAR WASTE TECHNICAL REVIEW BOARD
2300 Clarendon Boulevard, Suite 1300
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January 24, 2002

Honorable Joe Barton
Chairman
Subcommittee on Energy and Power
Committee on Energy and Commerce
U.S. House of Representatives
Room 2125, Raybum House Office Building
Washington, DC 20515-6115

Dear Mr. Barton:

Enclosed are responses to the questions posed in your letter of December 11,2001. 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 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,

Jared L. Cohon
Chairman

Enclosure

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NUCLEAR WASTE TECHNICAL REVIEW BOARD
RESPONSE TO QUESTIONS FROM
REPRESENTATIVE JOE BARTON
JANUARY 24, 2002

7. *Does the Board have any reason to believe that the site currently being studied at Yucca Mountain could not be made suitable for the development of a repository? If so, please explain any such reason(s)?*

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. However, the DOE uses a complex integrated performance assessment model to project repository system performance. Performance assessment is a useful tool because it assesses how well the repository system as a whole, not just the site or the engineered components, might perform. However, gaps in data and basic understanding cause important uncertainties in the concepts and assumptions on which the DOE's performance estimates are now based. Because of these uncertainties, the Board has limited confidence in current performance estimates generated by the DOE's performance assessment model. This is not an assessment of the Board's level of confidence in the Yucca Mountain site.

The Board believes that confidence in performance estimates can be increased. Future scientific investigations may show that components of the repository system perform better than or not as well as the DOE's performance assessment model now projects. It is impossible to know with absolute certainty whether issues or concerns that cannot be mitigated might arise in the future. This would be the case at any potential repository site.

2. *What improvements can DOE make in its research and design that would improve the effectiveness of a repository at that location? In keeping with the "step-wise repository development" approach recommended by the National Academy of Sciences, how can such improvements best be phased into the evolving repository design?*

If policy-makers decide to approve the Yucca Mountain site, the Board strongly recommends that in addition to demonstrating regulatory compliance, the DOE continue a vigorous well-integrated scientific investigation to increase its fundamental understanding of the potential behavior of the repository system. The Board believes, in addition, that specific activities can and should be pursued to increase confidence in the projections of performance of the proposed repositoiy at Yucca Mountain. Those activities include systematically integrating new data and analyses produced by ongoing scientific and engineering investigations; identifying, quantifying, and communicating clearly the extent of the uncertainty associated with its 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 has not evaluated the implications of a “step wise” approach to repository development. However, in its January 24, 2002 letter to Congress and the Secretary of Energy, the Board suggests several new actions that should be considered if policy-makers approve the Yucca Mountain site, regardless of the development approach used. The actions include monitoring repository performance before, during, and after waste emplacement; developing a strategy for modifying or stopping repository development if potentially significant unforeseen circumstances are encountered; and continuing external review of the DOE’s technical and scientific activities. The Board notes that the National Academy of Sciences (NAS) is scheduled soon to release a preliminary report describing the advantages and disadvantages of applying a step wise approach specifically to the development of a repository at Yucca Mountain. As part of its ongoing evaluation, the Board will review the technical and scientific validity of any plans that the DOE adopts in response to the NAS report.