UNITED STATES
NUCLEAR WASTE TECHNICAL REVIEW BOARD
2300 Clarendon Boulevard, Suite 1300
Arlington, VA 22201

May 31, 2002

The Honorable Jeff Bingaman
Chairman
Committee on Energy and Natural Resources
U.S. Senate
Washington, DC 20510-6105

Dear Senator Bingaman:

Thank you very much for the opportunity to present the views of the Nuclear Waste Technical Review Board at the hearing of the Committee on Energy and Natural Resources on May 23, 2002. Following up on issues raised during the hearing, the Committee sent questions to the Board on May 29, 2002. Enclosed are the Board's responses to those questions.

As you know, the Board is charged by Congress with conducting an ongoing and independent review of the technical and scientific validity of activities undertaken by the Secretary of Energy associated with the management of the country's commercial spent nuclear fuel and defense high-level radioactive waste. The Board provides its technical views to help inform policy-makers as they deliberate on issues that face the Department of Energy related to nuclear waste disposal.

Please do not hesitate to contact me or have your staff contact Bill Barnard, the Board's executive director, if you have questions related to the Board's responses or any other issue related to the Board's technical and scientific review.

Sincerely,

{Signed by}

Jared L. Cohon
Chairman

RESPONSES TO QUESTIONS ASKED BY THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

Could you further explain what you meant in your testimony about "gaps in data and basic understanding cause important uncertainties in … DOE's performance estimates"?

Gaps in data and basic understanding exist in a number of areas including: the hydraulic properties of faults and other significant rock-mass discontinuities at Yucca Mountain; thermal, hydrologic, and mechanical characteristics of the repository rock formations (especially thermal conductivity); the properties of the in-drift environment; fundamental mechanisms underlying long-term corrosion and passive-film behavior; the chemical composition of salt solutions on the waste package surface that could promote corrosion; colloid formation and dissolution; modeling of rock-matrix diffusion and radionuclide transport in the drift shadow; oxidation-reduction conditions in the saturated zone; and consequences of igneous activity. Because of the cumulative effect of these and other uncertainties, the Board has limited confidence in current estimates of repository performance generated by the DOE's performance assessment model. Increased understanding in these key areas could show that components of the repository system perform better than or not as well as the DOE's performance assessment model now projects.

Based on the International Atomic Energy Agency's (IAEA) assertion that the modeling already incorporates many conservatisms, do you believe that many of the uncertainties in the performance estimates may already be well within an acceptable risk range?

Although the IAEA peer review group pointed out a number of conservatisms, it also mentioned a number of potential non-conservatisms and areas where additional data are required to achieve an increased level of understanding and confidence. More specifically, in the Board's view, the DOE's current performance estimates for Yucca Mountain are based on a mix of conservative, realistic, and non-conservative models and assumptions. This mix and the gaps in data and basic understanding, such as those mentioned above, make it very difficult to estimate what the "true" overall level of uncertainty is and whether or not this uncertainty lies within an acceptable range of risk. So that policy-makers can determine whether the risks and associated uncertainties are acceptable, the Board has recommended that meaningful quantification of conservatisms and uncertainties be a high priority for the DOE.