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

March 6, 2006

Mr. Paul M. Golan
Acting Director
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Dear Mr. Golan:

On behalf of the Nuclear Waste Technical Review Board, I thank the Department of Energy (DOE) staff and contractors who participated in the Board's meeting on February 1, 2006, in Las Vegas, Nevada. The Board welcomed the opportunity to review technical and scientific issues important to the Yucca Mountain program.

At the meeting, Russell Dyer presented a new organization chart of the Office of Civilian Radioactive Waste Management showing program activities divided into science, engineering, transportation, operations, licensing, and eight other areas, all reporting to the Office of the Director. Because the Board is charged with ongoing review of all DOE scientific and technical activities in support of the proposed Yucca Mountain repository, not only the science program, the Board looks forward to future interaction with DOE at all program and program management levels. The Board is particularly interested in how a new organization that has all functions reporting directly to the Director will affect the technical direction and quality of the program.

In response to the technical presentations, the Board recommends that the DOE prepare full and realistic process models that account for the transport of neptunium-237 (^{237}Np) and plutonium-242 (^{242}Pu) from the engineered barrier system (EBS) to the biosphere over a million years, the period during which peak dose is predicted to occur. There is considerable evidence that these radionuclides are major contributors to peak dose. At the meeting, the DOE presented its current understanding of the modes of ^{237}Np transport from spent fuel, an understanding that has evolved as a result of a decade of research. The presentation highlighted the limited understanding in this area and showed the importance of continuing current research, especially relating to radionuclide source term exiting the EBS as a function of time. Of continuing and particular interest to the Board are the forms of ^{237}Np and ^{242}Pu exiting the EBS. The presentations by the Nuclear Regulatory Commission (NRC), including the chairman of the NRC Advisory Committee on Nuclear Waste, highlighted the sensitivity of dose results to different models: for example, different assumptions on the partitioning of the dose between inhalation and ingestion. The Board continues to have an interest in a realistic dose assessment to serve as a reference point in discussions of conservatism and whether such differences in modeling as noted are rooted in simplifying assumptions that may or may not be conservative.

The Board is concerned that the methods used by the DOE in its Total System Performance Assessment (TSPA) do not properly represent the natural correlations of some specific parameters. For example, TSPA allows for combinations of physical parameters that produce extreme travel-times (a decade or less and hundreds of thousands of years) that are not considered technically credible. Another example is that peak-dose sensitivity analyses indicate that seepage of water into the drifts is significant to dose but that percolation of the water that produces the seepage is not a significant parameter—a decoupling not well explained. Improved treatment of parameter correlations can enhance the technical credibility of TSPA.

Finally, because the Board is focused on repository performance to peak dose and the DOE continues primarily to emphasize a 10,000-year compliance period, the Board is not getting the information it needs to evaluate the overall performance analysis of the repository. The Board strongly recommends that the DOE adopt a more risk-informed analysis—that is, a more realistic analysis—of the repository over a period that clearly includes the peak dose at the accessible environment.

We look forward to future meetings in which the DOE is prepared to address these issues in a focused manner.

Sincerely,

{Signed By}

B. John Garrick
Chairman