



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

April 19, 2005

Mr. Theodore Garrish
Deputy Director
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Dear Mr. Garrish:

On behalf of the Nuclear Waste Technical Review Board, I thank you and your staff for participating in the Board's meetings on February 9, 2005, in Las Vegas and February 10, 2005, in Caliente, Nevada. The Board's comments on these meetings are summarized below.

Total System Performance Assessment (TSPA). Current TSPA calculations are based on a standard with a regulatory period of 10,000 years. However, the July 9, 2004, decision of the U.S. Court of Appeals for the District of Columbia Circuit, which remanded to the U.S. Environmental Protection Agency its Yucca Mountain repository standard, could result in a longer regulatory period. If the regulatory period is extended, the program could encounter technical challenges, including a need to address in TSPA relevant hydrogeologic and climatic processes that may be significant beyond 10,000 years. The Board requests that the DOE provide descriptions of technical and scientific elements of TSPA that might change if the standard is modified.

Program Integration. Program integration is of continuing Board interest and could potentially affect elements of the DOE's safety case. The Board endorses the DOE's use of a total system model (TSM) for planning and integrating various elements of the waste-management system. We look forward to learning more about TSM model components, structure, output metrics, underlying assumptions, and event uncertainties (e.g., weather events that may cause significant delays).

The design of surface facilities at Yucca Mountain should be an integrated part of the total waste-management system. The Board is concerned that assumptions related to receipt of spent fuel from utilities and the DOE's thermal-management strategy could result in excessive handling of spent-fuel assemblies as fuel is blended and aged before disposal. The Board believes that the DOE needs to evaluate and compare pre- and post-closure human exposure to radiation.

Specifically, the Board recommends that the DOE evaluate the costs and benefits of using dual-purpose (transportation and storage) or multipurpose (transportation, storage, and disposal) casks for transporting, storing, and disposing of spent fuel at Yucca Mountain. The use of such casks has the potential to limit the number of times that spent-fuel assemblies must be handled and, thus, the risks and radiation exposures associated with such handling. The Board also believes that

increasing communication with utilities, the railroad industry, and affected parties could improve planning for developing the waste-management system.

The DOE's focus on a mostly-rail scenario and the planned construction of a branch rail line to Yucca Mountain appear to have constrained planning for truck and intermodal transportation. Delays in the availability of a rail line to Yucca Mountain or the potential that such a line might not be built could result in a significantly larger number of truck shipments than currently anticipated throughout the system or could require intermodal shipments. Provisions for dealing with these scenarios, including cask design, cask availability, rolling stock, use of overweight shipments, and plans for loading and unloading, need to be considered explicitly in transportation planning.

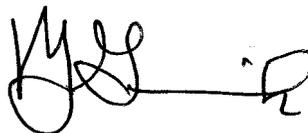
The Board believes that many activities identified in the performance-confirmation program can provide valuable information for validating modeling assumptions that form the basis of the TSPA. For example, hydraulic testing of major block-bounding faults can enhance the technical basis of the analyses supporting the license application. However, the performance-confirmation program appears to be operating independently of TSPA and of the ongoing work on repository design.

The types and structures of organizations that will design, build, and operate a repository at Yucca Mountain and the associated transportation system need to be considered. The qualifications of the participants and the need for interactions among participants, if multiple organizations are involved, could affect both the safety and the efficiency of the overall system. The Board would like to receive a draft of the DOE's implementation plans for construction, management, and operation of the repository and transportation systems.

Science and Modeling Update. The science and modeling update was very worthwhile. For example, the DOE presented state-of-the-art age dating of opal mineral deposits as evidence that seepage rates are unaffected by climate change. Although the large changes in the rate of growth of those minerals may have occurred hundreds of thousands of years ago and are poorly understood at present, ultimately they may provide important clues to the understanding of flow in the unsaturated zone at Yucca Mountain. Other laboratory experiments show that some oxides of neptunium may have low solubilities under a range of environmental conditions. Furthermore, the DOE cited recent reports that neptunium may be incorporated into minerals that can be stable for very long periods. Finally, DOE findings that mixtures of certain salts can raise the temperature limit for deliquescence above 160°C indicate that progress has been made in improving fundamental understanding of the conditions that could produce deliquescence. These examples illustrate the importance of a sustained science program in enhancing confidence in repository performance analyses.

Thank you again for the DOE's support of this meeting.

Sincerely,

A handwritten signature in black ink, appearing to read "B. John Garrick". The signature is stylized and somewhat cursive, with a long horizontal line extending to the right.

B. John Garrick
Chairman