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

December 23, 1997

The Honorable Newt Gingrich
Speaker of the House
United States House of Representatives
Washington, D.C. 20515-6501

The Honorable Strom Thurmond
President Pro Tempore
United States Senate
Washington, D.C. 20510

The Honorable Federico Peña
Secretary
U.S. Department of Energy
Washington, D.C. 20585

Dear Speaker Gingrich, Senator Thurmond, and Secretary Peña:

The Nuclear Waste Technical Review Board (the Board) herewith submits this second report of 1997 as required by the Nuclear Waste Policy Amendments Act of 1987, Public Law 100-203.

The Nuclear Waste Technical Review Board was created by Congress in the Nuclear Waste Policy Amendments Act of 1987. Consistent with its mandate established in the Act, the Board evaluates the technical and scientific validity of the Department of Energy's (DOE) activities related to evaluating the suitability of the Yucca Mountain site and takes a long-term view of the overall system for managing spent fuel and defense high-level waste. The Board includes its findings and recommendations in biannual reports to Congress and the Secretary of Energy. This short letter report includes comments on several key issues that will be part of the Board's review in the coming year, including the DOE's viability assessment (VA) of the Yucca Mountain site, design of the repository and waste package, the total system performance assessment (TSPA), and enhanced characterization of the repository block.

The Board believes that the DOE's Office of Civilian Radioactive Waste Management (OCRWM) has made considerable progress in characterizing the Yucca Mountain site. We also appreciate recent efforts by OCRWM program managers to facilitate and enhance direct interactions between the Board and the OCRWM. Such interactions will become even more important as work undertaken by the program increases in intensity and consequence.

For the next several months, the DOE will continue developing its VA. After the VA is completed, the significance of any remaining scientific uncertainties must be analyzed and addressed before suitability is determined and a decision is made about whether to recommend the site to the President. Then, if the site is found suitable for repository development, the program will focus on activities related to licensing the repository.

During the next year, the Nuclear Waste Technical Review Board will be reviewing the DOE's progress in developing its VA, currently scheduled for completion in September 1998. As the DOE has observed, the VA is an important *intermediate* milestone on the path to an evaluation of site suitability. The VA will include several major components: the TSPA, preliminary designs for the repository and waste package, and cost parameters for work still to be accomplished. The VA will be helpful in identifying remaining areas of uncertainty to be addressed before a site-suitability determination can be made. Keeping the VA in its appropriate context, however, will be important: It is a management tool, not a formal decision point.

The following three areas are of particular interest to the Board.

Repository and Waste Package Designs

As part of its review of the VA, the Board will continue evaluating the DOE's work related to designing the repository and the waste package. From the Board's inception, it has held the view that reducing overall uncertainty about a repository's long-term performance should be possible by relying on geologic barriers *in combination with* a robust engineered barrier system, including a long-lived waste package. To achieve the greatest advantage from a waste-isolation system that includes both natural and engineered barriers, the Board believes that the DOE should develop viable alternatives to its current reference repository and waste package designs. These alternatives should change over time to reflect an increased understanding of the repository geology that is acquired through collection and analysis of new data.

An important consideration associated with designing the repository and the waste package involves understanding how elevated temperatures within the repository caused by heat generated by the spent fuel will affect the waste packages and the rock surrounding the waste packages. Because of the importance of the "thermal load" for repository and waste package design, we are pleased to note that the drift-scale thermal testing facility at the site was completed ahead of schedule and that thermal tests began there in early December. The facility, which was constructed through the coordinated efforts of the DOE, the management and operating (M&O) contractor, the United States Geological Survey, and the national laboratories, should provide valuable data that will help in understanding better the implications of various thermal loads for performance of the repository and the waste package. The Board congratulates all involved on this well-integrated effort.

Total System Performance Assessment

The TSPA, which is an important component of the VA, uses scientific and engineering data and predictive models to analyze the effectiveness of strategies for containing and isolating waste for long periods of time. The future of the Yucca Mountain program depends to no small extent on the DOE's ability to convince the scientific community at large, as well as the regulatory bodies, that its conclusions are based on well-founded models and appropriate data. To assist in this effort, the DOE is making extensive use of outside experts to help interpret data obtained from exploration and testing. The Board is pleased with the DOE's expert elicitations and strongly urges the DOE to make full and effective use of the information provided by the experts for evaluating predictive models and as a guide to obtaining data. However, the Board cautions against using expert opinion as a substitute for data that could reasonably be obtained from scientific exploration and testing.

Enhanced Characterization of the Repository Block

The DOE recently approved a program of enhancements to the characterization of the repository block that should provide important hydrologic data. The data will come from a tunnel— the "east-west crossing" — that will be excavated at Yucca Mountain above and across the proposed waste emplacement area. The importance of direct exploration of the repository block is underscored by recent findings indicating that more water is percolating through the site than originally anticipated. This discovery is especially important because repository design and operational plans, as well as expectations about repository performance, will be affected strongly by estimates of how much water will eventually seep into the emplacement drifts. It should be possible to obtain crucial hydrologic data that not only will help in developing and confirming TSPA models but also will be important in developing appropriate designs for the repository and the engineered barriers. Because the tunnel will be constructed as the VA is being developed, most of these valuable data will be obtained from the tunnel only after the DOE issues its VA. Some data may be available before the VA, however, and the Board encourages the DOE to include as much of these data as possible in the VA.

The Board stands ready to provide any information you may require as you address the many challenges associated with disposing of the country's spent fuel and high-level radioactive waste.

On behalf of the Board,

Jared L. Cohon
Chairman