Statement of

Dr. Don U. Deere, Chairman
Nuclear Waste Technical Review Board

Before the

Committee on Energy and Natural Resources
United States Senate

March 31, 1992

Mr. Chairman and members of the Committee:

I am Don U. Deere, Chairman of the Nuclear Waste Technical Review Board. I am pleased to be here today to discuss several important issues related to the civilian radioactive waste management program.

By the year 2000, the United States will have a projected 40,000 metric tons of spent nuclear fuel to dispose of. By 2035, after all existing nuclear plants have completed 40 years of operation, there will be approximately 85,000 metric tons. In 1987, Congress directed the Department of Energy (DOE) to evaluate the suitability of a site at Yucca Mountain, Nevada, for the potential development of a repository for the disposal of this spent fuel, along with some defense high-level waste from reprocessing. In the same legislation, Congress created the Nuclear Waste Technical Review Board to provide an unbiased source of expert advice on the technical and scientific validity of the DOE's work in this area.

Mr. Chairman, since I last appeared before this Committee a little more than one year ago, the Board's comprehensive evaluation of this complex program has continued. Our review indicates that the scientists working on the program are generally enthusiastic and competent and that management of the program appears to be increasingly effective. However, the Office of Civilian Radioactive Waste Management (OCRWM) operates under a number of regulatory, financial, institutional, and time constraints that significantly affect program priorities and progress.

The Secretary of Energy has two primary and equal goals for the program — to accept spent fuel by 1998 and to initiate permanent disposal by 2010. These two dates guide DOE decisions relating to program priorities and the allocation of funds among competing program elements. I would like to begin today by discussing work the Board has identified that must be undertaken to make progress toward the Secretary's goal of developing a repository by 2010.

Research Priorities

One of our earliest efforts was to encourage the DOE to determine as soon as possible whether or not the site at Yucca Mountain is suitable for repository development. And the Secretary of Energy has stated that the early determination of site suitability is a top program priority. However, citing budget constraints, the DOE has postponed construction of the underground exploratory studies facility and has focused instead on surface-based testing. Although valuable in supporting site-suitability studies, surface-based drilling alone will not provide all the critical information needed to determine site suitability. We believe that underground exploration and testing are essential in evaluating whether or not Yucca Mountain is a suitable site for potential repository development. Underground exploration and testing also will provide information important to determining overall program costs, choosing a thermal-loading strategy, and designing the repository and waste package. We strongly advocate beginning underground excavation as soon as possible.

A second area that needs more work involves the engineered barrier system. The engineered barrier system comprises all engineered parts of the waste management system that are designed to prevent the release of radionuclides into the environment. It is the Board's view that a system of well-engineered barriers designed under strict controls generally will be less variable and is likely to be more predictable over the long term than the performance of rock formations and geologic processes. We believe, for example, that robust, long-lived waste packages — when used in conjunction with a well-characterized repository horizon within a suitable site — may increase the confidence of the public and the technical community in the long-term performance of a repository. However, again citing budget constraints, the DOE has steadily reduced funding for studies of engineered barriers over the past three years. The Board strongly believes that the evaluation and development of long-lived engineered barriers should be made a more important part of the DOE program. We also are concerned that groups working on engineered barriers may disperse resulting in delays in restarting this important work.

A third area involves one of the most fundamental parameters affecting the design and long-term performance of a repository — the thermal-loading strategy. The choice of this strategy will affect virtually every aspect of the waste management system from interim storage through repository design and final disposal. The thermal-loading strategy developed by the DOE as a baseline for the Yucca Mountain site in the mid-1980s would produce waste package and near-field host rock temperatures well above the boiling point of water for a period of 300 to 1,000 years, after which temperatures would drop below boiling. There are many uncertainties associated with this strategy. Furthermore, to date, a comprehensive and systematic analysis of alternative thermal-loading strategies for the Yucca Mountain site has not been conducted. The Board believes that testing the validity of other strategies should proceed in parallel as soon as possible through a combination of modeling; field mapping; laboratory testing; and long-term, large-scale underground testing.

Finally, it also is important that the program consider the various interdependent components of the waste management system (storage, transportation, and disposal), and the need for these components to be designed to work together safely and effectively as a *system.* The Board believes that the systemwide studies recently initiated by the DOE should be comprehensive and timely so that decisions affecting system design will not preclude alternatives that may later be shown to be preferable.

Budget issues

Budget considerations play a very important role in determining OCRWM program priorities. For example, as I mentioned before, citing a $30 million reduction in appropriated funding levels for fiscal year 1992, the DOE has postponed construction of the underground exploratory studies facility and has focused instead on surface-based testing. The DOE also has cited this budget cut in explaining decisions to reduce funding for the development of an engineered barrier system. The Board believes that, given the Secretary's schedule and the OCRWM's focus on surface-based testing, the DOE site-characterization program will need substantial funding increases, over the $182 million allocated for this purpose in fiscal year 1992. Additional funding will allow the DOE to begin and continue underground exploration and testing, to reinvigorate engineered barrier studies, and to strengthen the overall systems approach to radioactive waste management, including an evaluation of alternative thermal-loading strategies. The DOE has requested $248 million for site-evaluation activities for fiscal year 1993.

The DOE has estimated that the total costs of the program, as it is currently conceived, will be approximately $6.3 billion, and that costs to complete site characterization will be about $700 million per year, over the next seven years. The Board believes that, until the underground geology of the site is better evaluated, it will be difficult to determine exactly what *total* program costs will be. However, if sufficient and predictable long-term funding is not provided for both construction of the exploratory studies facility and for necessary site-characterization activities, Congress and the Secretary of Energy should anticipate unavoidable slippage in the repository development schedule.

In closing, I would like to say that the DOE at all levels has been very responsive to our requests for data and fact-finding meetings; they also have been quite receptive to our recommendations. However, as you can see there is still much to do. The Board looks forward to continuing to play a role in the progress of the DOE's technical and scientific program.

Mr. Chairman, that concludes my remarks. I would again like to thank you and the other members of the Committee for the opportunity to be here today.