Statement of

Dr. John E. Cantlon, Chairman
U.S. Nuclear Waste Technical Review Board

before the

Subcommittee on Energy and Power
Committee on Commerce
U.S. House of Representatives

June 30, 1995

Chairman Schaefer, and members of the subcommittee.

I am John Cantlon, Chairman of the Nuclear Waste Technical Review Board. On behalf of the Board, I am pleased to be here today to provide the Board's perspective on the Department of Energy's program to develop a permanent repository for civilian spent fuel and high-level waste.

About the Board

Congress created the Nuclear Waste Technical Review Board in the 1987 amendments to the Nuclear Waste Policy Act. The Board's charge is reviewing the technical and scientific validity of all activities undertaken by the Department of Energy related to the management of spent nuclear fuel and some defense high-level radioactive waste. The Board's approach to this evaluation has been to look at these activities as a system that includes packaging, transporting, storing, and disposing of the waste. We also review the technical activities related to the DOE's site-characterization program at Yucca Mountain, Nevada, the goal of which is to determine if that site is suitable as a location for a permanent underground high-level waste repository.

Through its open public meetings, the Board serves as a catalyst for the technical community. The Board is thus able to affect the DOE’s technical and scientific program as it

unfolds. The Board helps the DOE to continuously evaluate its own activities; to examine the fundamentals of the program; and to set priorities and define the program's technical objectives. The Board also has been instrumental in fostering communication within the DOE and among the DOE and its contractors, stakeholders, and others involved with high-level waste disposal issues.

Drawing on the significant expertise of its members, consultants, and professional staff, the Board has provided Congress and the Secretary of Energy with an ongoing evaluation of the technical aspects of the DOE's waste management program in many areas, including seismology, hydrology, geochemistry, risk and performance assessment, and public health and safety.

During its first six years of operation, the Board has made a number of important contributions to the DOE program in the form of technical recommendations that have resulted in improvements to the program. For example:

- In response to Board and NRC recommendations, several important changes have been made to the DOE's design for the exploratory studies facility. The new design is a substantial improvement over earlier versions.

- The DOE has adopted the Board's recommendation to use tunnel boring machines for excavating exploratory tunnels. As compared with proposed drilling and blasting, tunnel boring machines cause less rock disturbance of the tunnel walls, are less costly per unit of advancement, and can move considerably faster.

The Board has, since its inception, urged the DOE to begin underground exploration and testing to determine as soon as possible the suitability of the Yucca Mountain site for repository development. Tunneling at the site has been initiated, and the tunnel boring machine is scheduled to reach the repository horizon in 1996.

The thermal-loading strategy selected by the DOE will directly affect the final repository design and will have important implications for aspects of the waste management system from storage through disposal. Based on a Board recommendation, the DOE management and operating (M&O) contractor is evaluating alternative thermal-loading strategies to determine how they could potentially affect the repository and the waste management system.

The Board has repeatedly urged the DOE to develop a robust, long-lived waste package that will work together with other engineered barriers and the geology at the site to provide long-term isolation of the radioactive waste from the accessible environment. The use of such waste packages can help improve confidence in the long-term performance of a repository and thus facilitate licensing of the facility. The M&O contractor has begun to evaluate the potential contributions of such long-lived waste packages.

The Board also has recommended that the DOE develop a comprehensive waste

management system from generation of the waste through disposal to minimize as much as possible the number of times waste will be handled, especially when shielding from high radiation levels is required. For example, the use of a multipurpose canister system, in which the waste can be stored, transported, and disposed, could result in much less handling than called for in the DOE's earlier baseline plan. The DOE is developing such a system.

- The Board has urged the DOE to link key decisions, testing priorities, technical activities, budgets, and schedules to a waste isolation strategy. Although the program has not yet fully achieved this level of integration, the Board is encouraged that the program is moving in this direction.

Background

As you know, Mr. Chairman, the issue of safe disposal of the country's spent fuel and high-level waste is an issue of long-standing importance. In 1957, the National Academy of Sciences first examined nuclear waste disposal and recommended permanent burial of the waste in underground repositories. The current policy of the United States, which is to proceed as expeditiously as possible to develop the capability to *dispose* of spent nuclear fuel in a geologic repository, was established in the Nuclear Waste Policy Act of 1982. The ultimate goal of this policy is to permit the radioactive material to be *permanently isolated* from the accessible environment. The decision to develop a disposal capability was premised on an overwhelming consensus among scientists and engineers in this country and abroad that there are no

fundamental technical obstacles that would impede the development of such a repository. The Nuclear Waste Policy Act laid out a process and schedule for developing a permanent repository and charged the DOE with developing a program for the acceptance and eventual disposal of high-level radioactive waste. And in the 1987 amendments to that Act, Congress selected a site at Yucca Mountain, Nevada, as the sole site to be characterized as the potential location for a deep geologic repository.

Concerns about Change in Policy

The Board is concerned that some of the legislative proposals offered this year could — intentionally or inadvertently — change the focus of current national policy, from permanent disposal to long-term, centralized storage of the waste. I would like to comment briefly on the potential effects of this change in focus.

Storage of spent fuel is not a substitute for disposal. Eventually, high-level waste will have to be permanently disposed of. The Board recognizes and appreciates the important role storage plays in the management of commercial spent fuel. Indeed, the Board has long urged the DOE to address the implications of extended storage as part of a comprehensive waste management system that includes transportation, storage, and disposal. However, we are concerned that, as a result of efforts to find a solution for the nuclear utilities' concerns associated with spent fuel storage, the repository development program may be curtailed as funds are diverted for storage activities not originally envisioned. During a period of limited resources, increasing the emphasis on storage and decreasing the emphasis on disposal could adversely

affect the viability of the repository program. Furthermore, a national policy that contains a major storage component may not be able to gain public acceptance unless it is accompanied by a credible repository development program that provides the confidence that disposal capability ultimately will become available.

Although the pace of the disposal program has been slower than many of us would like, the last two years have brought significant progress. More than one half mile of tunneling in the underground has been completed. In addition, mapping is being done, and hydrologic tests have been initiated. Furthermore, if excavation continues without further delays, the next few years will bring substantial amounts of information from the underground that will be crucial to the evaluation of the suitability of the Yucca Mountain site. In fact, the tunnel boring machine is scheduled to reach the repository

horizon in 1996. The Board believes that a disruption of site characterization at this juncture would be a set back in achieving the important national goal of permanently disposing of spent fuel and high-level waste in a deep geologic repository.

The Repository Program

As I mentioned previously, during the past two years, significant progress has been made in the program. This is not to say, Mr. Chairman, that further improvements cannot be made. In the past, program plans and activities have not been as well integrated as they need to be, and integration remains a challenge for this large and complex program. In addition, the Board has long advocated that program managers allocate a greater proportion of whatever funds the program receives to scientific and technical work and a smaller portion to overhead and infrastructure costs. Although Dr. Dreyfus has initiated a trend in this direction, the number of people working on the program still seems to be increasing. As budgetary constraints are imposed, program managers will face even greater challenges in the future to ensure that the scientific work gets done. This will be especially true if the activities related to site characterization and repository development have to compete for limited funds with an ambitious storage program.

The United States has selected and is characterizing a specific site that could be used as the permanent repository. While the U.S. program is envied by other countries for its ability to study the actual site where nuclear waste could eventually be placed, the program also is facing a particularly complicated and difficult task. Scientific and technical work related to both

characterizing the site and to designing and licensing a repository — should the site prove suitable — are being undertaken simultaneously. As a result, it is a challenge for program managers to sort out exactly what work is the most critical. This challenge is compounded by the complex organizational structure of the DOE program, which includes many contractors, laboratories, and federal agencies.

To assist the program in setting priorities for characterizing the Yucca Mountain site, the Board sent a letter to the DOE in December 1994 outlining exploration and testing activities the Board believes should be completed to ensure confidence in a site-suitability finding. (With your permission, Mr. Chairman, I would like to ask that the full text of this letter be entered in the record.) We anticipate that, if the program is streamlined and priorities are set effectively, even with reduced funding, the program can continue and real progress can be made in determining the suitability of the Yucca Mountain site. However, it seems clear that even if priorities are set effectively, with substantial reductions in funding, site characterization will take longer than is currently scheduled.

Storage Report

At this point, Mr. Chairman, I would like to summarize briefly the major points from a Board report on spent fuel storage that will be published later this summer. In it, we attempt to shed light on the wide range of issues that could influence the debate over how and where to store spent nuclear fuel.

In 1982 when the current nuclear waste policy was adopted, the decision was made to ; move quickly toward the permanent disposal of spent fuel in a deep geologic repository. At that time, the storage of this waste, either at reactors or off site, was considered a temporary measure to accommodate the 5- to 10-year interval between the removal of spent fuel from a nuclear reactor and the disposal of the spent fuel in a repository, which was expected to begin operating in 1998.

If these earlier expectations had been met, no more than 40,000 metric tons of spent fuel would have required storage at any one time (Figure 1.). However, the challenge of developing a repository is taking longer than was envisioned in 1982. It is now clear that a repository will not begin operation until 2010, at the very earliest. Because the amount of utility spent fuel needing storage increases by approximately 2,000 tons every year, 60,000 metric tons of spent fuel will have been generated if the repository begins operating in 2010 (Figure 2.). Under a less optimistic scenario where repository operation is delayed until 2020, as much as 80,000 metric tons would have to be stored — somewhere (Figure 3.). But even if a decision were made today to develop interim storage capacity, it probably would take 5-10 years to site, license, construct, and begin operations. Furthermore, it will take time to transport the accumulated stockpile from reactor sites to a centralized facility once it is ready. Therefore, it now makes more sense to speak in terms of *extended,* rather than interim, storage of this waste.

The Board's report contains a number of conclusions related to the question of how and where to store spent fuel for an extended period of time.

First, as mentioned before, storage of spent fuel — whether for a short time or for an extended period — is a temporary measure. It can postpone — but not eliminate — the need to dispose of spent fuel and high-level waste.

Second, the success of any approach to spent fuel storage will depend to a large extent on an understanding that a viable and credible repository development program is under way. Previous U.S. attempts to develop a centralized storage facility have met with opposition based on public concern that the facility would become a *de facto* repository. By the same token, public opposition to increasing storage capacity at any site is likely to grow if it appears there is little chance of later moving spent fuel off site. For example, in Minnesota this issue formed the basis of opposition to the utility's request to expand its dry storage capacity.

Third, there are no clear technical reasons for selecting one spent fuel storage option over another. Furthermore, the choice of an option is unlikely to make a significant difference in the low levels of health, safety, transportation, and environmental risks to which the general public and workers might be exposed. It is important to note, however, that extended storage of waste at utility reactors means that spent fuel may be stored there *after* the reactors cease generating electricity. Although safe, storing spent fuel at shut down reactors may be institutionally and economically cumbersome.

And fourth, under any realistic scenario, only token amounts of spent fuel could be removed from utility reactor sites by January 1998. No matter what policy is decided on for storing spent fuel, removal of the spent fuel from reactor sites will not occur quickly.

Under our current national policy, storage of spent fuel at reactor sites is the responsibility of the nuclear utilities. Should a decision be made to increase federal involvement in developing off-site storage capability, decision makers will face a number of options, several of which may pose real dilemmas. For example:

(1) If the objective is to ease the burden at reactor sites, a storage facility probably should be large enough to hold at least 30,000 metric tons of spent fuel, and, if repository operation is further delayed, this amount could increase to as much as 80,000 metric tons. However, constructing a large storage facility also could increase fears that the facility could become a *de facto* repository (siting several smaller facilities may help alleviate this concern but also could multiply the siting challenges).

(2) Collocating a storage facility at or near Yucca Mountain could reduce fuel handling and transportation, but only if that site proves suitable for repository development. On the negative side, locating a storage facility so close to the potential repository site before a suitability decision is made could generate institutional momentum to find the Yucca Mountain site suitable even if deficiencies are found in the site. This could compromise the credibility of the DOE program and undermine the national goal of finding a site that will safely isolate the waste for thousands of years.

Concluding Comments

Mr. Chairman, the Board believes that policy makers run the risk of being caught in a vicious circle. Safe disposal of nuclear waste in a deep geologic repository is an objective that is widely shared in the United States and abroad; it also appears to be technically feasible. Yet, the prevailing fiscal environment — coupled with pressure to begin removing spent fuel from reactor sites by 1998 — may well dictate that the repository program will operate at a lower funding level than anticipated, at least for the next few years. A program constrained by funding most likely will translate into major delays in repository start up. Delays in repository start up will in turn increase pressures to develop a large centralized storage facility. As storage activities increasingly compete with disposal activities for limited resources, a valued national goal — geologic disposal — will recede further and further into the future.

Yet, storage is not a panacea. In fact, very little, if any, storage capacity can be made available by 1998 and it could be 2005 or later before meaningful storage capacity becomes available. No matter what is decided about centralized storage, high-level radioactive waste ultimately will require permanent disposal.

Substantial progress is being made at Yucca Mountain. Barring delays in the tunneling schedule, significant information will soon be acquired about the suitability of the site. The Board believes it would be very unfortunate if the DOE's focus — and funding — were now seriously diverted from the disposal program just when we are about to reap the benefits of past expenditures.

As it debates what approach should be taken to address the relatively near-term problem of spent fuel storage, Congress may wish to keep in mind the implications of its actions for the long-term goal of disposal and of demonstrating the feasibility of deep geologic disposal at Yucca Mountian. In fact, lack of continuing progress toward a permanent disposal solution may only add credence to those who argue that any storage site ultimately will be come a *de facto* repository.

We have the technical know-how; we have assembled the human resources and implemented the program; and many continue to argue that we owe it to future generations to cany on this effort. It is the Board's view that maintaining the major focus on site characterization at Yucca Mountain and on the continued development of a credible repository program may be the best way of reaching the national goal of safe disposal while helping ensure the success of any storage option.

Thank you.