



**Department of Energy**  
Washington, DC 20585

QA: N/A

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B. John Garrick, Ph.D.  
Chairman  
Nuclear Waste Technical Review Board  
2300 Clarendon Boulevard, Suite 1300  
Arlington, VA 22201-3367

Dear Dr. Garrick:

The purpose of this letter is to respond to your letter dated January 16, 2008. I appreciate the Nuclear Waste Technical Review Board's (Board) comments related to design of surface facilities and the implementation of a transportation, aging, and disposal (TAD) canister-based concept at the Yucca Mountain repository.

As part of the process leading to the submission of the license application (LA), the U.S. Department of Energy (DOE) has undertaken a number of assessments to ensure that the LA reflects a sound operational and scientific basis for the design, construction, and operation of the repository. These assessments have included the type of contingency analyses that the Board advocates. As addressed below, we believe that the proposals for the design, construction, and operation of the repository that will be embodied in the LA are sound, and that the Board's recommendations do not present any significant new information or circumstances that would lead DOE to depart from its planning basis.

**TAD Canister Concept**

***Board Comments***

The Board considers TAD a promising concept that could result in a safer, simpler, and more efficient means of directly disposing of spent nuclear fuel. The Board notes, however, that the success of the TAD concept will depend on its being effectively integrated by DOE into the overall waste management system.

***DOE Response***

In establishing the design basis for the TAD-based repository design, DOE has considered the situation that could arise if the split between Commercial Spent Nuclear Fuel (CSNF) received in TADs, and CSNF received either in dual purpose canisters or uncanistered in transportation casks, is appreciably different than the design basis. DOE has established initial design requirements that are based on the 90 percent - 10 percent split between TAD and non-TAD CSNF and has developed a suite of facilities that can handle that projected waste stream. These facilities include a certain level of flexibility to handle a different percentage split between



TAD and non-TAD CSNF. The preclosure safety analysis (PCSA) will evaluate potential event sequences and consequences associated with operations of the facilities “at the maximum capacity and rate of receipt” as required by the regulation at 10 CFR 63.21(c)(5). DOE is confident that it has adequately evaluated the TAD interfaces in the waste management system, and the concept is now fully integrated into that system.

### **Surface-Facility Throughput**

#### ***Board Comments***

The information presented by DOE on throughput rates for the surface facilities appears to be overly optimistic - that is, actual processing rates achieved by the surface facility complex as a whole may be lower than assumed. In some cases, operational activities do not appear to have been fully accounted for (e.g., upset conditions), which may further increase operational times. In addition, if TAD utilization is reduced, the lower utilization rate could adversely affect surface facility throughput and could require construction of additional waste handling facilities. The Board recommends that DOE consider operational and design contingencies that could be implemented if TAD utilization rates turn out to be significantly lower than the 90 percent TAD utilization currently assumed.

#### ***DOE Response***

As discussed above, DOE has included a certain amount of operational and design contingencies to account for uncertainties in the mix of TAD canistered to non-TAD canistered CSNF. The Board raises the issue of evaluating certain design changes as a means of addressing operational risk and mitigating constraints on facility throughput. As part of the selection of the proposed surface facility capabilities and construction phasing, DOE assessed options similar to those raised by the Board and concluded that the proposed facilities are expected to meet DOE’s operational requirements. Because of the modular design of the surface facilities, it will be relatively easy to add additional processing capability after the repository is operational, if it is determined to be of operational benefit at that time.

### **Transportation System**

#### ***Board Comment***

The Board notes there are technical, economic, political, and legal circumstances that could create “significant programmatic risks” for the rail transportation system that DOE proposes to implement.

#### ***DOE Response***

DOE recognizes the existence of economic, political and legal challenges associated with the proposed Yucca Mountain Repository system, including the Nevada Rail Line. However, there are no significant technical challenges associated with developing the Nevada Rail Line since it is a conventional civil engineering project requiring no tunneling and construction of only one

major, standard design bridge. In a 2002 Record of Decision (69 *Fed. Reg.* 18557), DOE selected the mostly rail scenario (which includes some truck or barge shipments to railheads from reactor sites that do not have existing rail access) as the means of transporting radioactive materials to the repository. Prior to announcing that decision, DOE prepared a comprehensive, comparative analysis of alternative means of transporting such materials to the repository, including transportation modes that could be used if the rail line were not operational by the time materials would need to be transported. See *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada*, DOE/EIS-0250F (2002). Heavy-haul shipments in rural Nevada over distances exceeding 200 miles would require significant investment in alternative infrastructure and would divert resources from completion of the rail line. Our conclusion remains that the most practicable solution for SNF transportation in Nevada that integrates with repository operations is expeditious development of a new rail line.

## PCSA

### *Board Comment*

The Board is concerned that the approach outlined for the development of the PCSA is a combination of deterministic and risk-informed, probabilistic methodologies. How DOE intends to address the uncertainties associated with the aggregation of risk is not clear to the Board. The Board would like DOE to explain in greater detail how the PCSA will address the remaining design uncertainties.

### *DOE Response*

DOE has finalized the PCSA for the preclosure operational phase. This analysis, and the engineering design work upon which it is based, will largely address the Board's concerns, and it will be provided to the Board for its review. This analysis was performed to support DOE's LA; and, therefore, the analysis is necessarily focused on demonstrating compliance with 10 CFR Part 63. Part 63 does not require DOE to perform a probabilistic risk assessment similar to those completed for commercial nuclear power plants. In particular, Part 63 evaluates compliance with dose consequences based upon the frequency of potential event sequences, rather than explicitly evaluating the total aggregation of risk.

As discussed at the September 19, 2007 meeting, the PCSA analysis incorporates both epistemic and aleatory uncertainties associated with the reliability of information used in the PCSA. Determination of structures, systems, and components (SSCs) important to safety (ITS)

will be based upon the identification of SSCs that prevent or mitigate potential consequences resulting from event sequences, as provided by Part 63. DOE does not intend to classify an SSC as ITS based upon deterministic methods.

If you have any questions concerning this letter, please contact Abraham Van Luik at 702-794-1408.

Sincerely,

A handwritten signature in black ink, appearing to read 'E. Sproat, III', with a large, stylized flourish at the end.

Edward F. Sproat, III, Director  
Office of Civilian Radioactive  
Waste Management