



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

June 14, 2006

Mr. Paul M. Golan
Acting Director
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Dear Mr. Golan:

On behalf of the Nuclear Waste Technical Review Board, I thank you and the other Department of Energy (DOE) staff who participated in the Board's meeting on May 9, 2006, in Washington, D.C. The Board welcomed the opportunity to review technical and scientific issues important to the Yucca Mountain program.

The major topic of the meeting was DOE's proposal to use a transportation, aging, and disposal (TAD) canister system for most commercial spent nuclear fuel. Without the TAD canister, planned operations at the surface facilities of a repository at Yucca Mountain would likely involve removing individual spent-fuel assemblies from transportation casks and placing them in waste packages for disposal or in storage casks or site-specific canisters for aging, which could result in handling an individual assembly as many as four times. The TAD canister system could reduce the number of times individual assemblies are handled because the canister and its contents would be handled in a single action. This could improve facility throughput at Yucca Mountain and reduce the potential for accidents during handling operations. The TAD canister system also has the potential to simplify the design and reduce the cost of repository surface facilities. For these reasons, the Board considers the TAD concept promising.

It became apparent at the meeting that hurdles must be overcome for the potential advantages of a canister-based system to be realized. Particularly important is the timing of the availability of TADs for storage at utility sites. At present, at-reactor spent-fuel storage pools are becoming filled and utilities are purchasing casks for on-site dry storage. Some of these are dual-purpose casks (or use dual-purpose canisters), which can be used for both storage and transport. If TADs are not available for use at utilities for at least 5-6 years, the quantity of spent fuel in dry storage at reactor sites will be significant. How DOE deals with these storage casks and the spent fuel remaining in the spent-fuel pools for blending to DOE requirements will determine whether the TAD concept can accomplish its objective, i.e., avoiding handling of individual fuel assemblies for reblending at Yucca Mountain.

Also of importance is that the TAD canister concept would be part of a license application for a repository at Yucca Mountain. While performance specifications are being developed for the TAD canister, a final determination on the acceptability of the TAD for disposing of spent fuel will not be known until the conclusion of the licensing proceeding for Yucca Mountain. Therefore, there is considerable risk to DOE, utilities, and cask vendors in moving forward with design and fabrication of TAD canisters without knowing whether they will be approved by the Nuclear Regulatory Commission (NRC) for disposal in a repository at Yucca Mountain.

Complicating this question is DOE's insistence that it can accept only bare fuel ("uncanisterized" fuel) according to its interpretation of contracts it has with utilities. Consequently, using DOE's own bases for acceptance, it appears that DOE will not accept canister-based fuels, which is contrary to the essence of the TAD concept. The Board also was told that, by law, DOE is not permitted to provide TADs to utilities for dry-cask storage. Thus, while the Total System Model (TSM) assumes that it will be possible to place 90 percent of spent fuel at utility reactors in TADs, this assumption may not be realistic because of blending limitations at reactor sites and the amount of fuel in non-TAD storage containers. The Board believes that these fundamental issues need to be understood better and resolved to allow a proper technical assessment of the TAD approach to managing spent fuel for the Yucca Mountain repository.

The Board is interested in the performance specification for the TAD canister and its relationship to the postclosure thermal-management strategy. The Board has a continuing interest in consistency in the multiscale model analysis and the identification of limiting conditions for the thermal loading of the repository. The Board believes that these analyses are keys to understanding postclosure conditions and that such understanding is needed for properly assessing repository performance as it relates to water ingress and temperature limits on materials, drifts, and possible failure modes.

The Board notes that the success of the TAD concept appears to rely on construction and use of a rail line through Nevada for moving transportation casks from existing rail lines to the Yucca Mountain site. The Board has commented previously on the need for contingency planning in the event that construction of the rail line is delayed. To the extent that adoption of the TAD concept also causes changes in the design of the Yucca Mountain surface facilities, DOE's ability to process legal-weight truck casks could be reduced. If so, contingency planning for a rail line delay would be even more important.

Finally, as an overarching concern, the Board believes that the existing litigation between DOE and the nuclear utilities is a significant impediment to the technical resolution of key issues regarding TAD canisters and the overall spent-fuel management system leading to disposal. The Board strongly urges DOE and the utilities to resolve their contractual differences with a sense of the urgent need for finding a waste-management solution.

DOE's TSM analyzed various scenarios involving use of TAD canisters, and the results of some of those analyses were presented at the meeting. The Board applauds DOE's development and use of TSM and encourages additional enhancements of its capabilities. TSM is an excellent tool for evaluating the performance of the waste management system from acceptance to emplacement and under alternative designs, operating assumptions, and constraints. Greater use of TSM is particularly important at this time, because the tool is demonstrating its value in identifying potential disconnects between various components of the waste management system. The Board would like to see a base (reference) case analysis that reflects current system realities and the design of the planned surface facilities at Yucca Mountain. TSM should be used to focus designers on credible scenarios for judging the viability of the waste management system, the design of the surface facilities (including aging pads), and the ability of the utilities to blend fuel so that the size of the aging pads can be minimized.

In addition, the Board recommends adding to TSM the capability to evaluate "upset" conditions, such as equipment breakdowns or closure of transportation routes, but only after the reference case is established. Moreover, implementation of TAD will have implications for the thermal management strategy that do not appear to have been considered fully. Consequently, the Board encourages adding to TSM the functionality to model DOE's thermal-management strategy. That could be accomplished by developing a constraint on waste package emplacement that ensures compliance with DOE's line-load thermal limit for the underground facility. For existing capabilities, as well as those that might be added in the future, realism will be important, if the results of TSM analyses are to be credible. The Board encourages DOE to scrutinize the TSM input assumptions and parameter values to ensure that they realistically represent the system being modeled.

The presentation on surface-facility design did not provide sufficient information for the Board to make any assessment of its feasibility or safety. The Board is interested in the details of the surface-facility design. For example, the Board would be interested in the number of receiving bays under consideration, their function, size of spent-fuel storage pool, dry cask handling facilities, provisions for handling failed fuel, anticipated processing rates, processing uncertainties, and key assumptions. The expectation is that TSM will be used to validate this design. The Board looks forward to receiving and reviewing the documents that support the upcoming CD-1 decision on the design of the surface facilities. The Board hopes to see these documents before the CD-1 submittal.

Despite recent efforts by DOE to reorganize the OCRWM program with the intent of improving Yucca Mountain Project management, the Board remains concerned about whether the appropriate level of Project integration is being achieved. In particular, no definable office exists whose duty and authority is to ensure technical interaction and problem resolution among and between functional elements of preclosure and postclosure activities. We also note that many of the key positions in the new organization chart are either unfilled or filled with people in "acting" positions. For the success of the new organizational approach, we strongly recommend that these positions be filled as soon as possible.

Finally, the Board is concerned that the newly announced Global Nuclear Energy Partnership (GNEP) may negatively affect the technical and scientific focus on Yucca Mountain.

We encourage the Project to monitor the developments in GNEP to be sure that any effects that might occur can be accommodated: for example, a change in the waste form for disposal in the future. The Board would like to have a briefing on the status of this program and possible effects on the Yucca Mountain project.

We look forward to future meetings with DOE during which we can address issues raised in this letter as well as other technical and scientific issues that the Board identifies that pertain to a repository for high-level radioactive waste and spent nuclear fuel repository at Yucca Mountain.

Sincerely,

{Signed by}

B. John Garrick
Chairman