



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

October 21, 2010

The Honorable Inés R. Triay  
Assistant Secretary for Environmental Management  
U.S. Department of Energy  
1000 Independence Ave., SW  
Washington, DC 20585

Dear Dr. Triay:

The U.S. Nuclear Waste Technical Review Board held a public meeting in Idaho Falls, Idaho, on June 29, 2010. The principal topics were (1) management and ultimate disposition of the spent nuclear fuels (SNF) and high-level radioactive wastes (HLW) that are the responsibility of the U.S. Department of Energy's Idaho Operations Office (DOE-ID) and the Naval Nuclear Propulsion Program and (2) future technologies and activities that could affect the amounts and forms of SNF and HLW that will require management and disposal or could affect the radioactive hazard levels of the SNF and HLW over time.

Several of the 11 people who made presentations at the meeting were employees of DOE-ID. We greatly appreciate their participation and the quality of their presentations.

The Board was established as an independent federal agency in the 1987 amendments to the Nuclear Waste Policy Act. The Board's statutory role is to review the technical validity of activities undertaken by the Secretary of Energy related to implementation of the Nuclear Waste Policy Act. The Board reports its findings and recommendations to Congress and the Secretary of Energy at least twice a year. According to the legislative history, the Board is expected to make its recommendations before decisions are made, not after the fact. Thus, the Board established a practice many years ago of sending a follow-up letter after each of its public meetings to the appropriate DOE program managers. This letter continues that practice.

### **DOE-ID Spent Nuclear Fuel**

Much of the SNF under the jurisdiction of DOE-ID already is in dry storage, and plans are under way to move the remaining SNF to dry storage. The Board has not identified any immediate technical issues with dry storage of this SNF. However, the Board recommends that the as-built lifetimes (as opposed to the design lifetimes) of all SNF dry-storage systems under DOE-ID's responsibility be assessed because it is not known at this point when a repository or storage location outside Idaho will be available, and that uncertainty may continue well into the future. In addition, the Board believes that studies should be undertaken to identify and plan for actions that are needed for preventing problems from occurring during the transportation, repackaging, or disposal of SNF following *extended*

periods of dry storage. Studies of the safety, cost, and technical issues associated with various alternatives for managing, packaging, and transporting the SNF also would be invaluable to the Blue Ribbon Commission for America's Nuclear Future, to the Office of Environmental Management for its long-term planning, and to the Board in setting priorities for its technical peer review.

DOE's National Spent Nuclear Fuel Program carried out extensive work in developing packaging systems that would be acceptable for disposal in a repository at Yucca Mountain. Whether the size, materials of construction, or other attributes of packaging developed for the Yucca Mountain repository would be suitable for other geologic disposal media is not known. Consequently, analysis of the issues associated with disposing of DOE-ID and other DOE-owned SNF in geologic settings other than unsaturated tuff would be appropriate. The Board recommends that DOE undertake such studies. This would include reexamination of studies performed more than 25 years ago in the United States as well as examining more-recent geologic disposal efforts of other countries.

### **DOE-ID Calcine**

Virtually all of the liquid HLW at Idaho National Laboratory was calcined years ago into a solid granular form and is being stored in shielded bins. The design lifetime of the bin storage system is asserted to be 500 years. Designing a civil system made from ferrous alloys and concrete for such a period is unprecedented. The technical basis for the design lifetime estimate should be examined in detail, and the results of the examination — including any assumptions regarding inspection and maintenance frequencies — should be conveyed to the programs within DOE carrying out research on very-long-term dry storage. The results also should be transmitted to outside entities now carrying out such research, including the Electric Power Research Institute and the U.S. Nuclear Regulatory Commission.

In December 2009, DOE decided to treat the calcine by hot isostatic pressing before transporting it off the site. The decision was based in part on a cost estimate comparing various treatment alternatives. A key technical assumption affecting this decision was that treated calcine would be loaded into "standardized canisters" (2 feet in diameter by 10 feet or 15 feet long) that would subsequently be loaded into larger outer containers for storage, transportation, and disposal. This assumption may not be necessary for some treatment methods yet may increase the number of containers requiring storage, transportation, and disposal. In addition, it is not clear whether the operational risk of various treatment options was taken into account or whether probabilistic risk assessments (PRAs) were performed on the safety of the various alternatives after disposal in a repository. The Board believes that another cost comparison should be conducted that takes into consideration appropriate technical assumptions and the aforementioned risks.

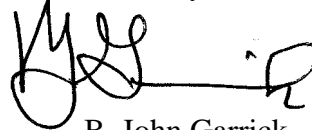
### **DOE-ID Sodium-Bearing Waste**

Whether sodium-bearing waste (SBW) is a high-level waste remains an open matter that appears to be more of a regulatory issue than a technical one. Perhaps a risk assessment could help in the determination. In any case, we agree that changing the SBW from its current liquid form to a solid form is necessary.

More technical detail would be helpful in understanding and evaluating the basis for the selection of steam reforming for treating SBW. Although steam reforming is not a new technology, using it to treat SBW is a novel application. If SBW is classified as a high-level waste, the characteristics of the final waste form resulting from treating SBW with steam reforming and the final disposition of the resulting solid would be of particular interest to the Board.

Thank you for helping make the Board's meeting in Idaho Falls a success.

Sincerely,

A handwritten signature in black ink, appearing to read 'B. John Garrick', with a stylized flourish at the end.

B. John Garrick  
Chairman