



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

April 18, 2012

The Honorable Steven Chu
Secretary of Energy
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, DC 20585

Dear Secretary Chu:

The Nuclear Waste Technical Review Board (the Board) has read with considerable interest the final report of the Blue Ribbon Commission on America's Nuclear Future (the Commission). The report addresses a number of major issues that are important for our nation to succeed in answering the question of what we are going to do with our nuclear waste. The Commission conducted a comprehensive review of the problem and produced a frank and informative report on the many dimensions of a workable solution. The Board endorses the Commission's commitment to independent technical review, and believes that public trust in the storage and repository siting process can be enhanced by demonstrating that policy decisions have a firm and independently reviewed technical basis.

We understand that you have now appointed a Working Group to advise you on how DOE should respond to the recommendations in the report. Policies regarding nuclear waste must inherently involve questions of a technical nature. For the consideration of the DOE Working Group, we offer comments here on some of the more salient technical issues that we believe can affect the implementation of policies and the realization of plans to manage the nation's nuclear waste.

A New Consent-Based Approach to Siting Nuclear Waste Management Facilities

The Board has for some time had a keen interest in the domestic and international experience with consent-based siting approaches for nuclear waste storage and disposal facilities. We have also lamented, in the Commission's words, "the erosion of trust in the federal government's nuclear waste management program," which has certainly complicated finding technical solutions to the nuclear waste problem in our country. One aspect of establishing trust is to ensure a thorough consideration of technical issues that can guide the site-selection process. The establishment of site-independent safety criteria must be based on informed technical considerations, including technical lessons learned from both successful and failed projects in the U.S. and abroad.

Lessons learned from U.S. and international experience should be taken into account in developing guidelines, for siting, for the solicitation of volunteer sites, and for integrating the overall process. In particular, lessons learned from the failure of the nuclear waste negotiator approach should inform any consent-based volunteer-siting process.

A New Organization to Implement the Waste Management Program

The Board encourages the pursuit of the idea of “a new, single-purpose organization to provide stability, focus, and credibility.” The Board has been concerned for some time with the lack of stability and, hence, of technical focus that results from management changes that accompany inevitable changes in the federal administration. This seemingly non-technical aspect of the program can in fact have severe implications for the technical direction and emphasis of a developing waste management program, which we see as being fundamentally one of science and engineering. We agree that the issues that the Commission defines regarding organizational structure require attention. We would add that rigorous peer review of technical aspects of the project must be part of the structure as is clear from the broad international experience to date.

The Commission declined to comment on the issue of comingling of waste from defense programs with the spent nuclear fuel from commercial power reactors at a single repository site. Nevertheless, we think that this is a technical issue that deserves consideration as a new organizational structure is considered. Because spent-fuel and high-level wastes are quite different in volume and activity, we think that a technical study to determine whether to separate commercial spent-fuel from defense and DOE wastes should be expeditiously completed in order to help establish a clear vision and mission for the organization charged with implementing the waste storage and disposal program.

Prompt Efforts to Develop a New Geologic Disposal Facility

The Board agrees with the Commission’s position that disposal must be pursued with the same vigor as interim storage, because both need to be done in order to provide confidence that there is a solid integrated technical solution to the problem of the disposition of nuclear waste. One item that should be addressed expeditiously is the establishment of clear guidelines for identifying, and also potentially disqualifying, possible locations for one or more repositories. This work can draw on information from a variety of sources including geological information, census data, transportation networks, and so forth. In addition, the experience gained in other national programs should be carefully considered.

However, we are not particularly convinced that a demonstration of bore-hole disposal should be given the same priority as identifying, characterizing, designing, and developing a mined disposal site (to the point of a licensed demonstration project). The bore-hole concept has simply not yet been vetted technically to the extent that deep-mined geological disposal has. Furthermore, the need to disassemble fuel assemblies to implement bore-hole disposal would result in unnecessary worker exposure, and a decision to use bore holes might preempt retrievability options at a later time.

Another issue that the Commission recognized was the need to establish a new standard for repositories, because 10 CFR 63 is specific to Yucca Mountain. Specific choices related to the time period(s) chosen for demonstrating compliance with a standard are policy decisions, but we think scientific insights can be instructive and should be included in consideration of new standards and regulations.¹ Although one can greatly benefit from the use of probabilistic risk assessment methodologies in developing strategies for the safe disposal of highly radioactive waste, the length of the compliance period may well modify how these methods are applied. As an example, surface facilities

¹ For example, the Advisory Committee on Nuclear Waste issued a letter on the time of compliance (TOC) following a workshop that involved multiple parties (Letter of November 14 1996 to Chairman Shirley Jackson), in which it was stated that, “The dilemma in developing a TOC is that the time span must be sufficiently long to permit evaluation of potential processes and events leading to the loss of integrity of the repository and transport of radionuclides to the critical population. Yet the period must be short enough that inherent uncertainties in processes and events and in the biosphere and critical population group, which will increase with time, will not invalidate the results of the evaluation.”

that operate for 100 years can use methods of analysis presently applied to conventional reactor-type standards, while a geologic repository, for which compliance periods stretch to hundreds of thousands of years, may require additional considerations.

Support for Underground Test Facilities

From a technical point of view, the Board generally supports the development of underground research laboratories as a preliminary step in designing and constructing a full-scale geologic repository. International experience has demonstrated the scientific and public acceptance benefits of the concept of geologic disposal. The ideal scenario from the point of view of economics and timing is a laboratory at a site that has been selected on the basis of a comprehensive siting process, the suitability of which is confirmed with strong scientific evidence from a variety of sources, including the underground research laboratory. To be sure there are circumstances where it may be expedient to use a surrogate site for an underground research laboratory that is an analog to the actual site or sites selected. There is the possibility that social or other reasons may exist for not locating an underground laboratory at a potential repository site. There is also the possibility that by the time a site is selected in the U.S. sufficient underground research exists in different geological media that a convincing scientific and technical basis can be developed to support a site without the need for a site-specific laboratory. The key point is that the siting process, whether it is for a repository, a laboratory, a pilot repository with a laboratory, or the combination of a laboratory and a full-scale repository, must make the intentions explicitly clear and acceptable to all stakeholders prior to project initiation.

Prompt Efforts to Develop One or More Consolidated Interim Storage Sites

Spent fuel is presently being stored at reactor sites. The BRC recommended, for several reasons, that this spent fuel be moved to one or more centralized interim storage sites. With the curtailment of the Yucca Mountain Project, the appeal for this interim step increases since it is not clear when a disposal site might be available. This is particularly true for decommissioned sites where the only remaining vestige of nuclear power operation is the spent fuel casks on secure pads. In the spirit of a pilot-scale approach, the Board recommends that an interim site be used for the early demonstration of the safe shipment of spent fuel to a centralized interim storage site. This would provide early technical input regarding the implementation of a much larger transportation program described below. Logical site choices with the consent of the states and local population would include national laboratories, DOE facilities, and former military sites where security and infrastructure would already be present. The interim nature of this storage would be evidenced by moving this spent fuel to the centralized storage facility when it becomes operational in the future.

Early Preparation for the Eventual Large-Scale Transport of Spent Nuclear Fuel and High-Level Waste to Consolidated Storage and Disposal Facilities

Regarding transportation, which is a near-term need for centralized interim storage and a mid-term need for repository disposal, the Board does not believe that the Commission report goes far enough. In order to handle the massive shipments of spent fuel that will be involved and to implement the needed infrastructure in terms of rail cars and handling systems, work needs to be started now. The technical challenges of upgrading existing rail lines have been evident in just the maintenance of the infamous Northeast Corridor to carry high-speed rail traffic. Different but analogous technical challenges can be expected to accompany the adaptation of existing rights-of-way to accommodate nuclear waste shipments, even if they will not travel at commuter speeds. The construction of new rail lines where none at all currently exist might present even greater technical challenges. The early selection of a centralized interim storage site could be the starting point for developing strategies and methods for the transport of highly radioactive waste to a geologic repository. The Private Fuel Storage Project has done much of this work already and that should be used as a basis. A solid technical understanding of the capacities and

limitations of the existing rail network and the possibilities for expanding it may have profound effects on where candidate sites can reasonably be located.

We support the recommendation that DOE should make public its suite of preferred routes for shipment of nuclear waste, because independent of site location this can reveal technical challenges involved (such as possible pinch points) and encourage open discussion of innovative technical solutions. We also support strongly the development of a technical basis for burn-up credit, i.e., the taking into account the reduction in reactivity that results from nuclear fuel having been used in a reactor, because this will greatly simplify all aspects of storage, transportation, and disposal. Finally, while the Commission has addressed transportation in its report, it does not address the difficult process of dealing with multiple state agencies for the transportation of spent fuel across states. The merits of having initial and daily inspections designed to insure the safety of the shipments augmented by detailed inspections at each state border deserve discussion that includes technical issues that may help shape risk-informed regulations.

Updating the Waste Classification System

Lastly, we support the need to review the outdated waste classification system and make it based on the form and activity of the waste rather than its source. Currently there is some waste generated at DOE sites that is orphaned in that there is no regulatory path for disposal. Rationalization of the waste classification system is needed to resolve this problem.

In summary, the Board believes that there are many technical issues that should be part of the discussions of the Working Group. Our aim in this letter is to convey what the Board considers to be some of the most important issues. Thank you for considering our thoughts on these important matters.

Sincerely,

{Signed by}

B. John Garrick
Chairman

cc:

Subcommittee on Energy and Water Development, Committee on Appropriations, U.S. Senate
Committee on Energy and Natural Resources, U.S. Senate
Subcommittee on Clean Air and Nuclear Safety, Committee on Environment and Public Works,
U.S. Senate
Subcommittee on Energy and Water Development, Committee on Appropriations,
U.S. House of Representatives
Subcommittee on Environment and the Economy, Committee on Energy and Commerce,
U.S. House of Representatives
Committee on Science, Space, and Technology, U.S. House of Representatives