



UNITED STATES  
NUCLEAR WASTE TECHNICAL REVIEW BOARD  
2300 Clarendon Boulevard, Suite 1300  
Arlington, VA 22201-3367

March 5, 1999

The Honorable Joe Barton  
Chairman  
Subcommittee on Energy and Power  
Committee on Commerce  
U.S. House of Representatives  
2125 RHOB  
Washington, DC 20515-6115

Dear Mr. Barton:

On behalf of the Nuclear Waste Technical Review Board, I am enclosing answers to follow-up questions directed to the Board after the February 10 hearing on H.R. 45 before the Subcommittee on Energy and Power. We hope you will find the information contained in the answers useful.

I was pleased to represent the Board at the hearing. I hope you will not hesitate to call on the Board should the Subcommittee require additional technical and scientific information related to the management of spent nuclear fuel and high-level radioactive waste.

Sincerely,

A handwritten signature in black ink that reads "Jared L. Cohon".

Jared L. Cohon  
Chairman

Enclosure

cc: The Honorable Ralph M. Hall, Ranking Minority Member

**SUBCOMMITTEE ON ENERGY AND POWER  
FOLLOW UP QUESTIONS TO DR. JARED COHON  
NUCLEAR WASTE POLICY ACT OF 1999**

1. *In your schedule, you indicate there are many uncertainties that need to be resolved about the performance of the repository. Does the schedule in the current DOE program plan, dated July 1998, provide sufficient time to resolve these uncertainties and for the Board to complete its technical review function?*

**Answer:** The schedule set forth in the DOE program plan includes making a decision in 2001 about whether to recommend the site. In the Board's view, this schedule is very ambitious, and much scientific and engineering work remains to be completed. The DOE identified a number of research priorities for reducing key site uncertainties, priorities that are consistent with those discussed by the Board in its November 1998 *Report to the U.S. Congress and the U.S. Secretary of Energy*. However, there are many significant uncertainties about the magnitude and distribution of water that would seep into repository tunnels, how designs for the repository and waste package would affect waste isolation, and the potential of the saturated zone to act as a natural barrier through dispersion and dilution.

The Board believes that a repository design based on lower waste package surface temperatures has the potential to significantly reduce uncertainty, enhance licensability, and simplify the analytical bases required for a possible site recommendation. However, the Board notes that time is short, money is tight, and other priorities, including addressing quality assurance problems, could slow progress in developing design alternatives and addressing the remaining site uncertainties. If substantial progress on the research and alternative design work identified in the VA is not made by the 2001 date in the program plan, the uncertainties about the performance of the repository system will remain.

The Board was charged by Congress in the Nuclear Waste Policy Amendments Act of 1987 with reviewing activities undertaken by the Secretary of Energy, including characterizing the Yucca Mountain site and packaging and transporting spent fuel and high-level radioactive waste. The Board's review is conducted concurrently with these activities. Consequently, the schedule is not really a constraint on the Board's review, but it may very well constrain the activities undertaken by the Secretary.

2. *Is the TRB prepared to fulfill that same role on the accelerated timeline for an interim storage facility as proposed in H.R. 45?*

**Answer:** The timeline is less of a concern than are the resources required. Because storage has been a relatively small part of DOE program activities to this point, the Board's involvement in storage issues has been limited. Obviously, if H.R. 45 is enacted, the Secretary's activities in this area would greatly increase, and the Board would be required to review those activities. In addition, the Secretary would substantially expand transportation activities, requiring a commensurate increase in Board effort in this area. Unfortunately, budget limitations have prevented the Board from filling a vacant position on the technical staff that supports the Board's work on transportation. This position also would likely cover one significant component of storage-related activities for the Board. The Board's technical staff that supports other areas of the Board's review is already working to maximum capacity and would be hard pressed to cover these two areas adequately. These problems would be greatly alleviated if the Board receives its full budget request for fiscal year 2000 (see answer to question 3).

3. *Does the Board have sufficient funds in the President's budget request for Fiscal Year 2000 to carry out its Congressional mandate to review the validity of the technical and scientific activities of the Department of Energy with respect to the permanent repository?*

**Answer:** Yes. However, if the Board receives *less* than requested, the Board will have great difficulty carrying out its congressional mandate adequately. Critical program milestones are approaching quickly, and the activities of the Secretary and the Board will increase significantly over the next two years to meet program deadlines. As described in the answer to question 2, if legislation is enacted authorizing an interim storage facility and expanding transportation activities, the Board's resources will be stretched even more than they are currently. The Board is very concerned that its review, which many believe is important to the technical credibility of the DOE program, will be adversely affected if the Board does not receive its full appropriation for fiscal year 2000. In the past, the Board has supplemented its appropriations with carryover funds from previous years. This carryover has been fully expended.

4. *Does the Board have sufficient resources to conduct the additional review entailed by the interim storage site as proposed in H.R. 45?*

**Answer:** See the answers to questions 2 and 3.

5. *How do the recent earthquakes in the vicinity of Yucca Mountain affect your assessment of the Yucca Mountain site?*

**Answer:** In its *Fifth Report to the U.S. Congress and the U.S. Secretary of Energy*, the Board stated, “In general, the Board views earthquake-related vibratory ground motion as primarily an issue of appropriate design and construction, rather than an issue of site suitability.” On the basis of the information available at this point, the Board sees no reason to change this assessment because of the recent earthquakes in the vicinity of Yucca Mountain.

The earthquakes to which you refer occurred at a distance of about 45 km from the proposed repository. They are near, and may possibly be associated with, the eastern end of the Rock Valley fault, a known active fault on the Nevada Test Site. Earthquakes often have occurred on this fault. In the very extensive seismic-hazard investigations and evaluations conducted for the proposed repository, the assumption has been that this fault could cause earthquakes releasing more than 1,000 times the energy released by the largest earthquake in the current swarm. Even such a large earthquake, occurring about 25 km from the proposed repository (the closest approach of the Rock Valley fault), would not pose a serious threat to well-engineered structures at the repository surface or underground. A well-known and well-documented fact is that earthquake shaking at depth is markedly less than such shaking at the surface. Although the Board does not believe that the recent earthquakes alter previous assessments, these events provide additional useful information to repository designers and safety analysts.

6. *How does the recent discovery of relatively rapid migration of radioactive materials from the Nevada Test Site affect your assessment of the long-term safety of the Yucca Mountain site?*

**Answer:** The migration of radionuclides from an underground test conducted at the Nevada Test Site in the 1960’s seems to be related to colloidal transport of plutonium and is being addressed in a number of ways by the DOE program. Colloidal transport also is of great interest to the nonnuclear geochemical community. We can expect additional information to be developed from many sources over the next couple of years on this subject. At this point, it is too early to assess the significance of this discovery for a Yucca Mountain repository.

7. *From your review of the DOE work to date and from your own knowledge of the Yucca Mountain site, do you see any technical reason why a permanent repository could not be built safely at the Yucca Mountain site?*

**Answer:** The Board has not identified any features or processes that would automatically disqualify the site. Therefore, as we stated in our testimony, the Board believes that the Yucca Mountain site continues to merit study as the candidate site for a permanent geologic repository. However, making a technically defensible decision about a permanent repository at Yucca Mountain will require affirmative judgments about the capacity of the natural and engineered barriers to work together as a system in isolating wastes for thousands of years.

Yucca Mountain has a complex geology, and many important hydrologic processes—especially in the unsaturated zone where the waste will be emplaced—are not well understood. Furthermore, a dose-based standard increases the importance of the saturated zone (SZ) as a natural barrier, and very little data have been obtained that can be used to support predictions of flow and transport in the SZ.

Other critical factors affecting the performance of a proposed repository system are the designs for the repository and the waste package. Predicting the performance of the current repository design will be difficult, especially considering the many thousands of years of concern. The Board believes that a repository design based on lower waste package surface temperatures has the potential to significantly reduce uncertainty, enhance licensability, and simplify the analytical bases required for site recommendation.

*Is there any technical reason why an interim storage site, such as proposed in H.R. 45, could not be built at Yucca Mountain?*

From a technical standpoint, the construction of an aboveground storage facility would be relatively straightforward, involving well-established engineering practices. Consequently, there are no significant engineering challenges associated with the actual construction of a storage facility at Yucca Mountain or at any other location.



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Dear Mr. Barton:

On behalf of the Nuclear Waste Technical Review Board, I am enclosing the Board's response to a question that you forwarded to the Board from Representative Edward J. Markey. The question is a follow up to the February 10 hearing on H.R. 45 before the Subcommittee on Energy and Power. We hope Mr. Markey will find the information contained in the answer useful.

The Board appreciated the opportunity to present its views to the Subcommittee at the hearing. We look forward to providing whatever technical and scientific information the Subcommittee may find helpful as it considers the many challenging issues related to the management of spent nuclear fuel and high-level radioactive waste.

Sincerely,

A handwritten signature in black ink that reads "Jared L. Cohon".

Jared L. Cohon  
Chairman

Enclosure

cc: The Honorable Ralph M. Hall, Ranking Minority Member  
The Honorable Edward J. Markey

**Subcommittee on Energy and Power**  
**Follow Up Question For the Record**  
**H.R. 45, Nuclear Waste Policy Act of 1999**  
(Question from Mr. Markey to Dr. Cohon)

*In 1996 the Board states that "There are no compelling technical reasons for moving commercial spent fuel to a centralized storage facility at this time," and suggested that "it makes technical, management, and fiscal sense to await the decision on the suitability of the Yucca Mountain site for repository development before beginning development of a federal centralized storage facility." Has anything changed to provide a compelling technical reason for centralized storage?*

**Answer:** The Board observed in its March 1996 report "... there appear to be no compelling technical reasons for moving spent fuel to a centralized interim storage facility *for the next few years.*" This conclusion reflected statements by the NRC and others that spent fuel can be stored safely at reactors *or* at a centralized storage facility for up to a hundred years. However, the Board went on to say that a large centralized storage facility (with the accompanying transportation infrastructure) offers logistical and operational advantages for the waste management system. The Board felt that it made sense to have an interim storage facility developed and receiving spent fuel at a rate of 3,000 MTU per year by about 2010, when civilian reactors start closing down in significant numbers. The Board noted that there are advantages to collocating a centralized storage facility with an operating repository and that developing the transportation infrastructure necessary to begin moving significant amounts of waste likely will take several years. Therefore, the Board suggested that it made sense to continue site-suitability studies, to begin developing the needed transportation infrastructure, and to make a decision about centralized storage after a determination of the suitability of the Yucca Mountain site.

While the Board found no compelling technical reasons for moving commercial spent fuel to a centralized storage facility for the next few years, the Board acknowledged in its report that there could be important *nontechnical* reasons that might prompt policy makers to consider developing a centralized storage facility before a site-suitability determination. The Board feels that its role should be to provide decision makers with technical and scientific information, which they can take into consideration when making decisions about waste management and disposal, and it was in that spirit that the Board released its report on storage. However, the Board understands that a decision about whether or when to develop a centralized storage facility is a policy decision that is outside its technical purview.