



Department of Energy

Washington, DC 20585

June 1, 2009

B. John Garrick, Ph.D.
Chairman
Nuclear Waste Technical Review Board
2300 Clarendon Boulevard, Suite 1300
Arlington, VA 22201-3383

Dear Dr. Garrick:

Thank you for your April 6, 2009, letter providing the Nuclear Waste Technical Review Board (Board) observations and suggestions on information presented by the U.S. Department of Energy (DOE) at the Board's meeting on January 28, 2009. Responses to your observations and comments are enclosed.

If you require further clarification regarding any of these issues, please contact me at (202) 586-6850, or Abraham E. Van Luik at (702) 794-1424.

Sincerely,

A handwritten signature in black ink, appearing to read "Christopher A. Kouts". The signature is stylized with a large, sweeping initial "C" and a long horizontal stroke at the end.

Christopher A. Kouts
Acting Director
Office of Civilian Radioactive
Waste Management

Enclosure



**RESPONSES TO THE NUCLEAR WASTE TECHNICAL REVIEW BOARD'S
APRIL 6, 2009, LETTER FROM DR. B. JOHN GARRICK, CHAIRMAN**

Emplacement Drift Stability

Board Observation and Comment:

The Board believes that the Department of Energy (DOE) “should conduct full-scale or near-full-scale thermo-mechanical testing of fractured lithophysal tuff to help validate the novel project models and estimates.” This is to address Board concerns over uncertainty concerning the “behavior of the lithophysal rock during the thermal period immediately following repository closure.” The Board agrees that enough is known to allow the design of a preclosure ground support system, but that there are concerns about the ability to monitor and maintain drifts, if maintenance is needed, prior to final closure.

DOE Response:

DOE disagrees that it would be beneficial to have additional data on the lithophysal rock portion of the repository in terms of response to thermal stresses after closure, because DOE has concluded that rock fall after closure of emplacement drifts in the lithophysal zone will not impact system safety or regulatory compliance. Potential rock fall in the lithophysal area of the repository could occur more often than in the non-lithophysal zones of the repository, however, the smaller size of any falling rocks in the lithophysal area makes them less likely to cause drip shield damage.

Although a full-scale thermo-mechanical test in lithophysal rock would contribute to additional confidence in prediction of drift stability during the thermal period, the existing data and models provide conservative estimates of the drift response. DOE’s modeling of drift stability in the lithophysal rock mass is based on a methodology used in mining, civil, and petroleum engineering industries for more than 20 years, and the approach has been calibrated for this application to ensure that it over-predicts thermally induced damage and rockfall in drifts.

Moreover, the stability of the existing mined openings is being monitored on a regular basis. This permits DOE to evaluate potential differences in the response of lithophysal versus non-lithophysal rocks on an ongoing basis over time.

Criticality

Board Observation and Comment:

The Board would like to see the work planned to increase understanding in the area of burnup credit carried to completion. In addition, the Board would like to suggest that the current fleet of Dual Purpose Canisters (DPC) ought to be considered for direct disposal, and that prescribing loading strategies for new DPCs could minimize the criticality issue associated with DPC disposal.

DOE Response:

DOE believes that burnup credit and criticality safety are issues that cut across all areas of nuclear fuel management and handling and suggests that some of the planned Office of Civilian Radioactive Waste Management (OCRWM) work in this area could be picked up by parties outside OCRWM.

The Board notes that DOE's repository surface facilities will have the capability to reopen DPCs and move their contents into transportation, aging, and disposal (TAD) canisters. However, the Board raises legitimate issues from a cost, efficiency, and worker safety perspective regarding the handling of DPC's which would require DOE to put in place a research effort. The current Administration policy that Yucca Mountain is not a workable option and our budget constraints do not allow the implementation of such an effort.

Welding – Waste Package Closure System Prototype**Board Observation and Comment:**

The Board complimented DOE, the Idaho National Laboratory, and Bechtel-SAIC, LLC, for a job well done in demonstrating the prototype waste package closure weld robotic system. The Board questioned current plans to evacuate and inert the inner waste package with helium since the TAD canister, inside of which the waste is located, is sealed and already inerted with helium. The Board expressed concern over the narrow groove between the lid and the waste package wall which may result in problems for the placement process.

DOE Response:

DOE agrees that this work was well done, and has led to significant insights that will be implemented, and was well worth the investment. Much was learned that will be directly applied in designing the waste package closure system and in writing the system operations manuals.

The inerting of both the TAD canister and the void-space in the waste package around the TAD serves to provide enhanced thermal conduction from the TAD to the package inner wall. However, the Board raises a valid technical issue that may need to be addressed in future activities that raise the same issue.

Science**Board Observation and Comment:**

The Board was pleased to have an overview of the science work still in progress and recently completed. The Board made several suggestions for continued work in terms of monitoring the existing mined openings now, and in the future perhaps a resumption of the forward-looking Science and Technology Program.

DOE Response:

The current Administration policy that Yucca Mountain is not a workable option and our budget constraints do not allow the implementation of such an effort.

Corrosion**Board Observation and Comment:**

The Board was interested in the U.S. Geological Survey (USGS) work on the loss of nitrate from dust at elevated temperatures. The Board was not convinced by DOE's argument concerning the low likelihood of forming corrosive brines, and the low likelihood of sufficient brine volumes to be meaningful from a corrosion perspective. The Board suggested that some additional laboratory work could be useful in addressing this question.

DOE Response:

DOE considers its assessment concerning limited brine volumes to be justified and defensible. NRC has asked a question similar to that posed by the Board concerning implications of the USGS work on nitrate to chloride ratios in dust. DOE's response to NRC's Request for Additional Information (RAI) can be viewed in NRC's ADAMS database under accession number ML091140365 (RAI Volume 3, Chapter 2.2.1.3.3, Number 16).