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

July 30, 1998

Mr. Lake Barrett
Acting Director
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
Washington, DC 20585

Dear Mr. Barrett:

I am pleased to forward the Board's comments on the June 1998 meeting, which all the members felt was very productive and stimulating. The Board was pleased that you were able to join us for the field trip to Yucca Mountain and the Nevada Test Site and that you attended the entire meeting. Bob Andrew's presentation was even better than the one he gave to our Panel on Performance Assessment in April. Holly Dockery's demonstration slide show is a promising approach for making total system performance assessment (TSPA) more transparent. Claudia Newbury also deserves special credit for coordinating the Office of Civilian Radioactive Waste Management's (OCRWM) participation and for planning the informative field trip.

We have some specific impressions about the presentations, as well as some thoughts on issues that arose during the meeting.

Total System Performance Assessment. Bob Andrew's latest presentation shows that the OCRWM continues to refine its thinking about the TSPA being developed for the viability assessment. This latest analysis leaves the clear impression that the projected performance of the repository system is highly dependent on the corrosion resistance of the waste package.

Any set of calculations, however, is only as valid as the underlying assumptions, models, and data used. For example, the uncertainty analyses were highly dependent on the *assigned* uncertainty. Important issues, such as cladding performance, did not appear important only because they were assigned a low uncertainty. Also not evident was whether the correlation between parameters, such as infiltration and seepage fraction, had been taken fully into account.

The Board recognizes the need to make judgments in any analysis. However, these judgments and their bases need to be stated explicitly and clearly. In 1997, the Board provided a number of suggestions on how TSPA could meet this and other challenges. These suggestions appear in the Board report on its 1996 activities (March, 1997) and in a letter sent to April Gil (April 15, 1997) in response to the OCRWM's request for comments on proposed revisions to 10 CFR 960. In that report and letter, the Board laid out some suggestions on how to prepare a

technically persuasive and robust performance assessment. We believe that the OCRWM's assessments should increasingly incorporate those ideas.

License Application Plan. The Board was pleased with Jack Bailey's presentation because it showed the beginnings of a systematic effort to assess technical priorities. He laid the groundwork for a methodology to identify the critical research that needs to be conducted before a site recommendation and the possible submittal of a license application to the Nuclear Regulatory Commission. This information is helpful. The Board believes, however, that the OCRWM needs to define key measures of knowledge, uncertainty, and value more rigorously. It also needs to make its decision-aiding methodology more transparent.

Determination of Importance Evaluation (DIE) on the East-West Crossing. The Board reviewed the latest revision to the DIE. It believes that the OCRWM has not addressed adequately mountain-scale coupled thermal, hydrologic, and mechanical (THM) processes. The Board has not seen any rigorous THM analysis of whether the east-west crossing will affect long-term repository performance or will foreclose repository design alternatives. Nor has the Board seen evidence that efforts are planned in this area. The Board, once again, urges the DOE to carry out a systematic study of the potential effect of the east-west crossing.

Observations from the Field Trip. The Board was impressed with the speed at which the Busted Butte experiment was conceived, designed, and constructed. Data from this effort could reduce some of the significant uncertainties in understanding how radionuclides are transported in the unsaturated zone matrix below the repository horizon. The data also could strengthen the conceptual foundation of the performance assessments. If the project has not already done so, it should examine work on plutonium and colloidal transport that was carried out at Hanford as part of the Basalt Waste Isolation Plant (BWIP).

The Board believes that tunnels at the Nevada Test Site, such as the N-tunnel, could provide information on the percolation flux above the repository horizon in the unsaturated zone under conditions of higher precipitation. The data might be quite useful in modeling repository performance under pluvial conditions.

Environmental Impact Statement. The Board's concerns about the alternatives to be analyzed in the draft environmental impact statement for the repository were not reduced by Wendy Dixon's presentation. Two conclusionary statements were made in the presentation to the effect that the implementing alternatives "bracket" the relevant environmental impacts. No technical basis was given for those statements despite the Board's specific request that all technical analyses dealing with the choice of alternatives be presented. We look forward to being provided with additional information on this issue.

Alternative Repository Designs. Michael Voegele presented a plan for examining alternative configurations before selecting a repository design that the OCRWM will carry forward to site recommendation and license application. The Board is pleased that the OCRWM has made this commitment. The Board is concerned, however, that, according to budget figures available to it and the current level of project activities, this examination may not be as comprehensive as the Board believes it ought to be and that it might not be completed in time to play a meaningful

role in the May 1999 design decision. The Board reemphasizes the importance it attaches to a full-scale systems engineering analysis. Such an analysis should evaluate alternative system concepts incorporating various combinations of repository and waste package features, including, but not limited to, restricting peak temperature to below 80° C, long-term ventilation, and the location of the corrosion-resistant layer in the waste package design. Again, if the project has not already done so, it should examine work in this area done at the BWIP.

In closing, I congratulate you and your staff for putting together a meeting containing such a high level of technical content. The exchanges between the Board and project participants were enlightening and significant. Again, I thank you.

Sincerely,

[signed by]

Jared L. Cohon
Chairman