



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

May 7, 1999

Mr. Lake H. Barrett
Acting Director
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
1000 Independence Ave.
RW-2/5A-085
Washington, DC 20585

Dear Mr. Barrett:

The Board thanks you, your staff, and management and operating (M&O) personnel for providing briefings, draft reports, and other material that have helped facilitate the Board's review of alternative repository designs being analyzed by the Department of Energy. As you know from previous Board meetings and communications, the Board believes that preparations for a decision on site suitability will need to address concerns among stakeholders, the Congress, and the Administration that may extend beyond the issues that are central to a license application in a regulatory proceeding. This is particularly applicable to the technical defensibility of the performance of the natural barriers as well as the public case for defense-in-depth.

The extensive studies that have been completed at Yucca Mountain have yielded substantial information about the site. Studies under way should provide additional valuable data that may increase the level of confidence in predictions of the performance of the repository system. Nonetheless, at the time of a suitability determination, large uncertainties will remain about key elements of the natural system. Of particular significance will be uncertainties about the effects of heat from the waste on repository performance. Although performance assessment techniques may provide insights into the importance of uncertainties to waste isolation, performance assessment cannot eliminate these uncertainties. For this reason, the Board has urged the DOE to evaluate alternative repository designs—especially designs with below-boiling temperatures that may have the potential to reduce some key uncertainties related to waste isolation. Selecting a design that appropriately balances reduction of uncertainty against cost, flexibility, and other aspects of the design is the most important decision the program will need to make in the near future. Because the Board thinks the repository design affects confidence in the suitability decision to be made in 2001, we would like to make this subject a central topic of our June 29-30 meeting in Beatty, Nevada.

The DOE's M&O contractor has completed evaluating several repository design alternatives and is preparing to recommend adoption of one of those alternatives as the preferred

design. Because of the importance of repository design to site suitability, the evaluation and selection process should be well founded, well documented, and easily understood by the technical community and the public. At the Beatty meeting, we would like to review the process that the M&O used to evaluate design alternatives and to select a preferred design. We are most interested in learning how scientific uncertainty and opportunities to reduce uncertainty were weighed against other factors during the design selection process. The following are of special interest to the Board:

- Definitions of important terms (e.g., multiple barriers, defense-in-depth)
- Key assumptions (e.g., thermal management of spent fuel before emplacement)
- Criteria for identifying alternatives and for eliminating some of those alternatives from consideration
- Weighting and selection criteria (both explicit and implicit), especially those involving reduction of uncertainty and trade-offs between uncertainty reduction and other design criteria
- Technical analyses used to support comparative evaluations of alternative designs
- The influence of policy decisions on the evaluation of alternative designs, and the separation of true technical constraints from policy decisions
- Transparent documentation of the process and its results.

Thank you again for providing key information that will help facilitate the Board's review of these issues. We look forward to an informative and productive Board meeting in June.

Sincerely,

Jared L. Cohon
Chairman