

September 30, 1999

Dr. B. John Garrick, Chairman  
Advisory Committee on Nuclear Waste  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

SUBJECT: COMMENTS ON THE U.S. DEPARTMENT OF ENERGY'S LICENSE  
APPLICATION DESIGN SELECTION PROCESS AND  
RECOMMENDED REPOSITORY DESIGN

Dear Dr. Garrick:

I am responding to your August 9, 1999, letter to Chairman Dicus conveying your observations and recommendations on the U.S. Department of Energy's (DOE's) License Application Design Selection (LADS) process, and the Management and Operating Contractor's recommended repository design for the site recommendation and license application. I would like to thank you for sharing your observations on the LADS process, and for providing the recommendations in Dr. Fairhurst's white paper, "Engineered Barriers at Yucca Mountain - Some Impressions and Suggestions," presenting an innovative design concept for the repository and suggestions on geotechnical aspects of the design.

Our responses to the Advisory Committee on Nuclear Waste's (ACNW's) observations and recommendations are presented in Enclosure 1. As discussed in Enclosure 1, the Commission has set forth the regulatory responsibilities of the U.S. Nuclear Regulatory Commission (NRC) with respect to the consideration of alternative sites or designs (see Enclosure 2). Consistent with this Commission position, the staff did not review the white paper in detail. Instead, consistent with the NRC's independent regulatory role, the staff proposes to evaluate the design the DOE will propose as part of its license application.

Dr. B. John Garrick

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Because the DOE is currently considering what design it will ultimately select for the repository, the ACNW may want to consider providing the white paper directly to the DOE. I trust this letter responds to your concerns.

Sincerely,

***/RA/***

William D. Travers  
Executive Director  
for Operations

Enclosures:

1. NRC Staff Response to ACNW Observations and Recommendations
2. Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions and Related Conforming Amendments  
49 FR 9352, March 12, 1984

cc: Chairman Dicus  
Commissioner Diaz  
Commissioner McGaffigan  
Commissioner Merrifield  
Office of the Secretary

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U.S. NUCLEAR REGULATORY COMMISSION STAFF  
RESPONSE TO THE ADVISORY COMMITTEE ON NUCLEAR WASTE  
OBSERVATIONS AND RECOMMENDATIONS

Observation 1: The License Application Design Selection (LADS) process is not transparent enough to support selection of the EDA-II design.

Response: The U.S. Nuclear Regulatory Commission (NRC) staff agrees that the basis for the Management and Operating Contractor's (M&O's) recommendation of the EDA-II design is not totally transparent. We are aware that the M&O recommended the EDA-II design for the site recommendation (SR) and license application (LA), and that the U.S. Department of Energy (DOE) has not yet made a decision on accepting the M&O's recommended design. The NRC staff has attended the DOE's briefings on the LADS, and is aware of the Advisory Committee on Nuclear Waste's (ACNW's) and the Nuclear Waste Technical Review Board's (NWTRB's) concerns about the process used in selecting the recommended design (EDA-II) among the five alternate designs considered in the LADS. Because the DOE has not yet accepted the M&O's recommendation, it is possible that the DOE may address the NWTRB's and the ACNW's concerns in the LADS report that will be submitted to the NRC. We will know that when the DOE determines how it will address the M&O's recommendation, and submits a design to the NRC as part of the SR or in the LA.

Independent of the DOE's efforts on the design, the staff is currently developing the Yucca Mountain Review Plan (YMRP). In the YMRP, the staff will include criteria it will use to determine if DOE has acceptably demonstrated compliance with the applicable regulatory requirements. The development of the YMRP will be essential in allowing the staff to conduct an efficient and sound review of any design that the DOE ultimately selects. Thus, regardless of what process the DOE undergoes today to select a design, the staff, by having the YMRP ready, will be in a position to judge the acceptability of that design.

Recommendation 1A: The NRC should expect the repository design to change until the LA and, if needed, in the Preclosure period. The NRC should develop a license review strategy that allows the DOE maximum flexibility to implement beneficial design changes during the preclosure period.

Response: The staff clearly recognizes that the repository design may evolve until the LA. As part of the pre-licensing consultation process, the NRC reviews and comments on design documents that the DOE submits. However, as noted above, independent of any DOE activities, the staff is developing the YMRP which will contain the guidance staff will use to determine the acceptability of the DOE design. Because of this guidance, the DOE will have available to it a level of information the Department can use for a final design as the repository evolves. This process of having the YMRP available allows the staff to conduct pre-licensing consultation with the DOE with a focus on what ultimately will be acceptable in a final LA design for the repository. Thus, the NRC staff's initiative

of developing the YMRP today for use in both pre-licensing consultation, and during the LA review, will provide the flexibility the ACNW recommends. The YMRP could be changed by the staff as it also gains experience from DOE repository operations.

During the pre-closure phase of the repository, the staff fully expects that the DOE will propose design changes as it gains operational experience. This is not inconsistent with what happens at all types of facilities that the NRC regulates such as reactors and fuel-cycle facilities. The process requires the licensee for the facility to determine whether it needs to file an application for an amendment to its license in order to make the change. As part of the amendment process, the staff would evaluate the proposed design change, and if the change were found acceptable, modify the license accordingly.

Recommendation 1B: The NRC should not constrain the DOE from proposing revisions to the approved design during the pre-closure period of the repository, and the NRC should conduct independent evaluations of alternate, cost-effective, and innovative designs.

Response: The NRC staff agrees with the first part of the recommendation that it should not constrain the DOE from proposing revisions to any repository design found acceptable. As discussed in the response to Recommendation 1A, there is a process in place that allows the DOE to propose changes to the repository during pre-closure activities, both construction and operation. If the DOE finds that repository-horizon conditions or operational experience justify changes, the Department has the flexibility to propose such changes. For those changes requiring an NRC review, the NRC staff will evaluate the merits of the changes, and determine if they are acceptable. The options available to the staff in conducting such reviews, or for the entire LA, are discussed later.

It is important to note, however, that the NRC will not advocate nor work with the DOE to develop any design changes. Rather, as reflected in the "Statement of Considerations" (SOC) for revisions for 10 CFR Part 51, the Commission has stated that as an independent regulatory agency, the NRC does not select designs nor participate with an applicant in selecting proposed designs. Relevant portions of the SOC are provided in an Appendix for the convenience of the Advisory Committee on Nuclear Waste (ACNW). Consistent with this Commission policy, the staff would not recommend any design changes that the DOE could make. Rather, the staff would review those design changes proposed by the DOE to determine if they meet the applicable regulatory requirements.

The options available to the NRC in conducting reviews of the DOE LA or any proposed changes once the site is licensed are to either: (1) accept the proposal; (2) accept the proposal with conditions; or (3) deny the proposal. These options were identified by the Commission in the SOC for the Part 51 revisions. Given this Commission direction, the NRC staff cannot develop any independent design or propose any solutions to applicants/licensees as that

would compromise the Agency's ability to perform its independent regulatory mission. To this end, the NRC and the Center for Nuclear Waste Regulatory Analyses (CNWRA) staffs are developing the review capabilities in the YMRP needed to independently evaluate the DOE application. However, the NRC staff, working within the framework established by the Commission for all NRC, cannot conduct independent evaluations of alternative, cost-effective, and innovative designs for the repository. It is the DOE's responsibility to propose a design in the LA. The NRC can only evaluate the proposal made by the DOE, and determine if it complies with the applicable regulations, and adequately protects public health and safety.

Observation 2: The preclosure period is likely to be 50 to 300 years, and it presents an opportunity to establish the validity of the design assumptions via performance confirmation (PC) monitoring. In the design option suggested in the white paper, it is suggested that the PC monitoring drifts may be used for diverting infiltration in the post-closure phase.

Response: The NRC staff is aware of the possibility that the preclosure period may extend 50 to 300 years, and agrees that it presents an opportunity to collect data to confirm the design assumptions made by the DOE in the LA. The PC monitoring during preclosure was seen as an important way for verifying design parameters and design assumptions, and for comparing the monitored performance with the assessed performance of the design. The current regulations as well as those in the proposed 10 CFR Part 63 include requirements for a PC program. This requirement was intended to ensure that the data available from the operating repository would be collected, and used to confirm the LA design. In the YMRP, the staff is developing criteria to review a DOE license application which will include the DOE's PC program. These criteria will allow the NRC staff to determine if the DOE's PC monitoring will obtain the data needed to verify the design assumptions, and thus comply with the applicable regulations.

With respect to the second part of the recommendation, the NRC is not in a position to propose the design concepts recommended in the white paper; namely that the design option suggested in the white paper would use PC monitoring drifts for diverting infiltration in the post-closure phase. As noted in the response to Recommendation 1B, the Commission's view of the NRC's role is that of an independent regulatory Agency that is not involved in the selection or development of designs. Rather, if the DOE LA design or subsequent design change contained a design incorporating the white paper recommendation, the NRC staff would evaluate that design, to determine its acceptability, using the YMRP.

Recommendation 2: The ACNW endorses the U.S. Geological Survey's (USGS's) view that monitoring program details should be carefully developed, and suggests that the NRC staff consider how long-term monitoring may be factored into the design.

Response: The NRC staff agrees with the USGS views on PC monitoring. As mentioned above, the NRC staff is currently developing a review plan for reviewing the LA, including the PC program. In developing the review plan for the DOE's PC program, the staff will consider the USGS's views and will prepare a plan that ensures an adequate review of DOE's PC program. The NRC will also enforce any PC commitments that are in the license as individual conditions.

Observation 3: Reiterate the NWTRB's comments on the DOE's LADS process.

Response: The NRC staff is aware of, and agrees with, the NWTRB's and the ACNW's concerns about the lack of quantitative evaluation of the several alternate designs considered in the LADS process. The NRC staff will review the LADS report when the DOE submits it to NRC. In conducting its review of the LADS report, the staff will use to the extent practical, those portions of the YMRP that are available.

Recommendation 3: Encourage the NRC to make sure that the rationale, approach, and assumptions used in the evaluations and in comparisons of alternatives are appropriate. It recommends that the NRC and the CNWRA conduct their own independent evaluations of alternative, cost-effective designs similar to the innovative design described in the white paper.

Response: The staff will consider the ACNW's concerns during review of the LADS report as well as other DOE design documents up to and including the LA. The development of the YMRP is an essential component in establishing the criteria the NRC staff will use to judge the acceptability of the DOE's analysis of alternatives. With respect to the NRC and the CNWRA staff conducting independent evaluations of alternative designs, the Commission has stated that the NRC, as an independent regulatory Agency, does not become involved in the selection or development of designs. As such, the NRC staff's role would be to evaluate whether the DOE has proposed an acceptable design. However, the NRC does not undertake the development nor evaluation of innovative, cost-effective designs similar to the one presented in the white paper.