



Department of Energy

Washington, DC 20585

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Mr. Joseph J. Holonich, Director
Repository Licensing & Quality
Assurance Project Directorate
Division of High-Level
Waste Management
Office of Nuclear Material
Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Holonich:

This letter is in response to the U.S. Nuclear Regulatory Commission (NRC) letter to the U.S. Department of Energy (DOE), dated May 13, 1993. In this letter, the NRC forwarded a letter to DOE that was addressed from the State of Nevada to NRC management, dated February 4, 1993. In the February 4, 1993, letter, the state raised two concerns regarding site characterization at Yucca Mountain: (1) further surface-based characterization of pneumatic pathways is likely to be precluded by excavating the Exploratory Studies Facility (ESF), and (2) assuming this concern is accurate, the NRC would be prevented from making findings on regulatory issues related to fluid pathways.

The state made observations about the potential for interference between ESF excavation and surface-based characterization that have been previously raised by both the NRC and the State of Nevada. Comment 123 in NRC's Site Characterization Analysis (NUREG 1347, 1989) and comments on Site Characterization Progress Reports 6 and 7 question the potential for ESF ventilation to induce irreversible geochemical effects. Similarly, comments on several study plans (i.e., Study Plans 8.3.1.2.2.6, Unsaturated Zone Gaseous Phase Movement; 8.3.1.2.2.3, Percolation in the Unsaturated Zone--Surface-Based Studies; 8.3.1.2.2.5, Diffusion Tests in the ESF; 8.3.1.2.2.7, Hydrochemical Characterization of the Unsaturated Zone; and 8.3.1.2.2.8, Fluid Flow in Unsaturated, Fractured Rock) by both the NRC and the State of Nevada have focused on the adequacy of the DOE's program to characterize and model the effects of unsaturated zone gaseous movement. A number of study plans have already been modified to respond to these concerns. DOE will continue to use the established process for responding to comments on the site characterization program.

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From a technical perspective, we acknowledge the state's concerns and agree that a technical issue needing resolution has been raised. We disagree, however, with specific regulatory interpretations made in the state's letter. In response to the technical argument, a careful review is now underway of the sequencing of ESF and surface-based testing activities in order to optimize the information obtained from surface-based tests of unsaturated zone gaseous circulation prior to ESF development. We do believe, however, that the larger-scale testing to be conducted in the ESF will greatly enhance our understanding of gaseous movement in the unsaturated zone (UZ), and that the type and quality of information to be gathered underground must not be overlooked.

The U.S. Geological Survey (USGS) evaluated the technical concerns contained in the state's letter and those concerns that have been expressed in prior comments from the NRC and state. Recommended actions to optimize the sequencing of surface-based testing and ESF excavation that are under consideration in this review include:

1. Complete presently planned testing and monitoring of gas chemistry, gas flow, and shut-in pressures in UZ16 and UZ14 using currently available packer systems, prior to stemming; same testing, using SEAMIST systems and prior to stemming where appropriate, in UZ6, UZ6s, UZ7, and SRG5/SD11; possibly same testing with SEAMIST system in more distant holes UZ4, UZ5, and UZ13.
2. Monitor gas pressure in UE25a4 to overlap and continue beyond gas pressure (after stemming) in NRG6.
3. Develop and implement new plans as in 1. for boreholes NRG2A, NRG5, NRG6, SRG4, and SD12.
4. Develop and implement new plan to drill and test as above UZ7a in the Ghost Dance fault and a new hole closer to the ESF location.
5. Develop and implement new plans to pull casing and perform pneumatic tests in selected WT holes (e.g., WT2) near the planned ESF excavation.

Those USGS recommendations that are feasible for action have been identified in the Yucca Mountain Project Office review and a preliminary implementation and test schedule has been developed. It will be available for examination by the NRC On-site Representatives upon their request.

Although data are not yet available to show how ESF construction will affect existing pneumatic conditions, extensive data about ambient conditions may prove to be of limited value for long-term performance modeling. Predicting repository-scale performance will largely depend on conditions in the postclosure period when radionuclides are present and capable of being released from the

repository. Site conditions prior to characterization represent a temporal snapshot in the range of conditions that are anticipated over the period of regulatory concern. Seasonal and topographic variations in gas circulation that have been observed are likely to be overshadowed by repository heat effects at any foreseeable thermal load.

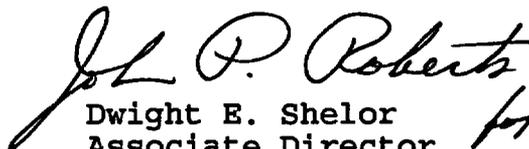
From a regulatory perspective, we believe the State of Nevada incorrectly interpreted the favorable and potentially adverse conditions contained in NRC's Siting Criteria (10 Code of Federal Regulations (CFR) 60.122) as requirements. According to Part 60.122(a)(1), these conditions are to be present in an "appropriate combination" so that "together with the engineered barriers system, the favorable conditions present are sufficient to provide reasonable assurance that the performance objective relating to isolation of the waste will be met." It does not appear that the NRC intended these conditions to be stand-alone requirements.

We further believe the State of Nevada reached an incorrect conclusion regarding the intent of the NRC performance objective for the geologic setting (10 CFR 60.113). We do not believe the NRC intended this requirement to apply to transport of water vapor. The DOE's approach for characterizing and modeling aqueous flow to evaluate this performance objective was clearly presented in the Site Characterization Plan (Section 8.3.5.12). The NRC did not raise the issue of predicting travel time for the aqueous phase versus water vapor in their comments about the DOE's approach (Comments 92-94, NUREG 1347, 1989).

In summary, the DOE, 1) acknowledges the state's letter, 2) understands the State of Nevada's technical concerns, but notes that these are not new or previously unrecognized concerns, 3) accepts the technical arguments as needing resolution, 4) intends to carry out the sequencing evaluation noted above to ensure that data on ambient gaseous circulation in the UZ are collected prior to ESF excavation, and that construction effects will be monitored.

If you have any questions, contact Corinne Macaluso of my staff at (202) 586-2837.

Sincerely,



Dwight E. Shelor
Associate Director
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cc;

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