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Dr. Colin Heath, Director
 Division of Waste Isolation
 Mail Stop B-107
 U.S. Department of Energy
 Washington, DC 20545

WM Record File

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Docket No.

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Dear Dr. Heath:

Enclosed please find two copies of the trip report prepared by the U.S. Nuclear Regulatory Commission (NRC) staff following its May 11-20 visit to review the current status of DOE site screening studies in bedded salt in the Paradox Basin, Utah, and the Palo Duro Basin, Texas.

I would like to bring to your attention the following points concerning the site screening investigations in the Paradox and Palo Duro Basins:

1. As we understand the May 1981 plans, DOE expects to select a site in salt where shaft sinking for underground testing will begin in CY 1983. This site will be selected by a choice between the Palo Duro Basin and Paradox Basin by the end of CY 1981, to be followed in 1982 by a choice between the selected basin and dome salt. From a technical standpoint, it is difficult to envisage a selection procedure for choosing between two basins, or between a basin and dome salt. This approach focuses on regional features, whereas many applicable criteria of proposed 10 CFR 60 are based on individual characteristics of the site. Thus, an individual site may be either selected or rejected inappropriately. It appears preferable to consider all sites at one time and choose from all possibilities in both bedded salt and dome salt.

2. Greater use of the technical criteria of proposed 10 CFR 60 would sharpen the standards used in future site screening and help ensure that the investigations are developing the kinds of information that will be necessary for licensing. For example, hydrogeologic studies to date in the Palo Duro Basin have not addressed groundwater flow paths and discharge points for radionuclide release.

3. The reference conceptual design used in bedded salt studies was developed for a depth of 2,000 feet. Under the current screening criteria, however, a maximum depth of 3,000 feet is considered to be

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acceptable, from the standpoint of maintenance of an underground opening without collapse due to lithostatic loading. The effect of the 3,000 feet depth on such design matters as ground support, size of opening, extraction ratio, the useful life of openings and the approach to retrieval needs clarification. It is not likely that a repository design suitable for a depth of 2,000 feet would be similar to one at 3,000 feet. Therefore, until conservative engineering analysis demonstrates the feasibility of a repository at 3,000 feet, the 3,000 foot siting criterion can not be considered as demonstrably valid.

4. More coordination is needed between design studies and siting studies. For example, the Salt Valley and Lisbon Valley study areas (Paradox Basin) can not be adequately evaluated, in site screening, without an engineering analysis of the effect of interbeds on repository design. Due to folding, the salt units and the interbeds are contorted. Normal room and pillar layout would result in openings that are mostly in salt but partly in interbeds (black shale, dolomite, anhydrite). Past experience in the Paradox Basin indicates that the interbeds present several engineering problems, such as (1) the presence of natural gas in the workings and (2) ground support in the weaker beds.

5. Drill core management in the Paradox and Palo Duro Basins would benefit from some changes in approach. All core should be logged geologically, especially with respect to fractures, immediately upon recovery from the core barrel. This is important for two reasons: (1) fractures that develop during transport can be identified only if the core is first logged at the drill site and (2) logging at the drill site is a standard quality assurance safeguard against loss or mix-up of core during handling and transport. There are some additional information needs in both basins: a) an integrated testing program to satisfy the information needs of both geology and engineering and to ensure proper controlled sequencing of nondestructive and destructive testing; b) controlled distribution of core in keeping with the testing program; c) parallelism between the Palo Duro Basin and Paradox Basin test activities so that comparable information is collected; and d) a policy to ensure that a portion of the entire core from key holes is held for future review.

6. In the Paradox Basin, hydrologic studies are focused on regional flow systems above and below the salt. In the Palo Duro Basin, hydrologic studies are focused on modeling the upper aquifer system in the area of the Caprock Escarpment to aid in the analysis of regional dissolution. This variance in the approach of the hydrologic studies in the two basins

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may pose a problem during the site screening process because comparable information may not exist.

7. The NRC needs to be informed of codes planned for use in hydrologic modeling during site characterization so that benchmarking can be done. In addition, investigators in the two basins are using codes different from those of ONWI. The relationship between modeling efforts by contractors and by ONWI should be clarified so there can be a clear understanding of the planned use of modeling to support geologic conclusions and performance assessment.

The visit provided the NRC staff with an excellent opportunity to appreciate the broad range of the bedded salt investigations in the Paradox and Palo Duro Basins. Considerable amounts of technical information were gained, which will be beneficial in developing regulatory and guidance documents. Hopefully, the Observations in the enclosed report will also be of use to the DOE and its contractors.

On behalf of the visit team, I would like to thank your organization for its time and attention in making the necessary arrangements. The staffs of DOE (Columbus), ONWI, and various ONWI subcontractors were especially helpful, and the trip was well organized.

We will be pleased to discuss your comments or to enlarge on details of the trip report. We look forward to subsequent trips to the Paradox and Palo Duro Basins to maintain cognizance of DOE site screening activities.

Sincerely,

ORIGINAL SIGNED BY

Hubert J. Miller

Hubert J. Miller, Chief
High-Level Waste Technical
Development Branch
Division of Waste Management

Enclosure:
As stated

cc: J. Neff, DOE

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