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Dr. D. J. Brooks
Geotechnical Branch
Office of Nuclear Material
Safety and Safeguards
U.S. Nuclear Regulatory Commission
Room 623-SS
Washington, D.C. 20555

Dear Dave:

Please find enclosed the meeting report for the SRP/NRC Waste Package Workshop.

Sincerely,



Gary K. Jacobs
Environmental Sciences Division

GKJ/

Enclosure:

Meeting Report, MR-287-7

cc:

Office of the Director, NMSS (Attn: Program Support Branch)
Division Director, NMSS Division of Waste Management (2)
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MR-287-7
02/07/86

MEETING REPORT

AUTHORS: G. K. Jacobs and K. L. Von Damm
LOCATION: Columbus, Ohio
DATE: January 22-24, 1986
PURPOSE: SRP/NRC Waste Package Workshop for Salt Sites
PROJECT TITLE: Technical Assistance in Geochemistry
PROJECT MANAGER: G. K. Jacobs
ACTIVITY NUMBER: ORNL #41 88 54 92 4 (FIN No. B0287)
NRC #50 19 03 01

A workshop related to waste package issues for a repository in salt was held in Columbus, Ohio during January 22-24, 1986. Attendees (see Attachment #1) included representatives from the Salt Repository Project (SRP/DOE) and its contractors, NRC staff and contractors, DOE-HQ and support staff, and the states of Mississippi and Louisiana. The purpose of the workshop (see Attachments #2 and #3) was to discuss the status and approach to waste package design, testing, and modeling for a representative salt site. The basis for discussion was the Deaf Smith County Site in Texas, but much of the data and analyses were "generic" in nature and applicable to other candidate salt sites.

From our perspective, the workshop was extremely valuable. A significant amount of technical information was presented clearly and supported by handouts and draft reports made available to the workshop attendees (these materials have been entered into our data base). Plans for the next 12-15 months were discussed, but without much detail. Therefore, it was difficult to determine from the workshop alone if the plans of SRP will be adequate to resolve all important issues related to the waste package. However, the workshop provided an excellent basis for future discussions in more detailed subject areas. Specific observations related to geochemical issues with the waste package are discussed below.

OBSERVATIONS

1. SRP is emphasizing "expected" conditions in their testing and modeling analyses. We agree with this approach as a means of beginning to obtain some basic data and to begin to develop an understanding of the important processes involved. However, we feel that broadening the range of some key parameters in the testing program may be desirable -- especially until such time as significant site-specific data can be obtained. Examples include the chemistry of brines for waste form and corrosion testing and the quantity of brine assumed to reach waste packages for performance assessment analyses (see also observations #2 & #3).

2. Brine migration continues to be an issue. SRP will attempt to validate the Jenks model, which is assumed to give conservative results, using laboratory and field tests (Asse Mine and site-specific when available). Although we have some concerns that the Asse Mine may not be a good analogy for the candidate salt sites in the U.S., we urge that this activity be continued. We also have some concern about other potential sources of water within the repository horizon. For example, SRP has given little thought to possible scenarios involving the water-bearing carbonate zones directly above and below the Unit 4 horizon. Brines have been pumped from some wells within the Palo Duro Basin from the basal carbonate of the Unit 4 salt horizon. In addition, the clay interbeds remain a potential source of fluids that SRP has not adequately addressed.

3. Some uncertainty remains over the chemistry of brines that may contact the waste packages. Brine resulting from the thermal migration of fluid inclusions will obviously be a high-Mg brine. However, new work by PNL for the SRP has shown that brines resulting from a dissolution scenario may also attain high levels of magnesium. The tests, which involved contacting a saturated brine with crushed, whole-rock salt from the Palo Duro Basin, resulted in high-Mg brines. The kinetics of this exchange process in salt that has not been crushed may be somewhat slower and the generation of a high-Mg brine is not certain. Further work on this subject seems appropriate in light of the sensitivity of canister corrosion to the magnesium content of brines.

4. The modeling of results from earlier waste form tests at PNL has produced some excellent results. Many of the earlier results pertaining to glass dissolution coupled with solubility controls can be interpreted in a mechanistic sense with some confidence. Although the model developed by PNL may not be used for final waste package performance assessment because of a lack of data on the surface area-to-volume of waste forms in an actual waste package, the model provides an excellent foundation to build more empirical, but defensible models for actual performance assessment calculations. The effect of the presence of canister materials on waste form behavior is not yet well understood. PNL is making significant strides, but additional testing and model development is required (see also observation # 5).

5. The waste form testing program for actual spent fuel is in the early stages of development. The program appears to be addressing the major issues but, as with other portions of the SRP program, is emphasizing expected conditions only. The workshop did not allow us to adequately discuss the actual details of the test philosophy and procedures of waste form testing. Therefore, specific technical concerns about the testing program will have to be addressed through a more detailed meeting.