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January 14, 1985

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

WM-RES  
WM Record File  
B0287  
ORNL

WM Project 10, 11, 16  
Docket No. \_\_\_\_\_  
PDR ✓  
\*LPDR (B, N, S)

Distribution:  
x Brooks  
x Still  
(Return to WM, 623-SS)  
Joan - ticket  
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Dear Dave:

Enclosed is the progress report for the month of December 1984 for B0287,  
"Technical Assistance in Geochemistry."

Sincerely,

Susan K. Whatley, Manager  
Repository Licensing Analysis  
and Support  
Chemical Technology Division

SKW:kk

Enclosure

cc: Office of the Director, NMSS (Attn: Program Support Branch)  
Division Director, NMSS Division of Waste Management (2)  
M. R. Knapp, Chief, Geotechnical Branch  
R. J. Starmer, Geochemistry Section, Geotechnical Branch  
Branch Chief, Waste Management Branch, RES  
W. D. Arnold  
J. T. Bell  
J. G. Blencoe  
N. H. Cutshall  
L. M. Ferris  
J. R. Hightower  
G. K. Jacobs  
A. D. Kelmers  
D. C. Kocher  
A. P. Malinauskas  
R. E. Meyer  
F. G. Seeley  
R. G. Wymer  
SKW File

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B-0287 PDR

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MONTHLY PROGRESS REPORT FOR DECEMBER 1985

PROJECT TITLE: Technical Assistance in Geochemistry

PROJECT MANAGER: S. K. Whatley

ACTIVITY NUMBER: ORNL #41 37 54 92 4 (FIN No. B0287)/NRC #50 19 03 01

TECHNICAL HIGHLIGHTS:

Task 1 - BWIP Geochemical Technical Assistance

The topical report, "Review and Assessment of Information on Geochemical Conditions at the Hanford, Washington, Candidate HLW Repository Site," was completed and circulated for internal peer review. Since the technical staff is presently reviewing the draft Environmental Assessments, the anticipated January 1985 transmittal of this report to the NRC project manager may be delayed.

Task 2 - NNWSI Geochemical Technical Assistance

Two staff members, J. G. Blencoe and G. K. Jacobs attended the 1984 Geological Society of America (GSA) meeting in Reno, Nevada; Blencoe also attended the pre-meeting field trip to the Nevada Test Site (NTS) to examine the geology of the NTS and Jacobs attended the post-meeting field trip to review the regional flow systems, groundwater recharge, and unsaturated flow with the NTS and adjacent areas.

Although the half-day symposium on the geology, hydrology, and geochemistry of the NTS was directed toward the hydrology and geology of the entire NTS (i.e., very little was said about the "local" hydrology, geology, and geochemistry of Yucca Mountain), several other technical sessions did yield information of interest to the B0287 and B0290 project. Experimental data of G. Parks and D. Pohl, Stanford University, on the solubility of  $UO_2$  at high temperatures suggest that calculated solubilities of  $UO_2$  at 100-300°C obtained from the thermodynamic data that is currently available may be off by as much as 3-4 orders of magnitude. K. E. Bargar, USGS, presented evidence that some form of bacteria may have been found in fluid inclusions from a geothermal areas (temperatures up to 200°C); this is the first observation of this phenomena and it may have implications for evaluations of the significance of bacterial processes in the mobilization and retention of radionuclides released from a repository. In addition, it was learned that the Texas Bureau of Economic Geology is studying the deep water-bearing Wolfcamp Formation of the Palo Duro Basin site to determine: (1) the source(s) and age(s) of the fluids, and (2) the significance of brine chemistry for conceptual models of groundwater flow.

Task 3 - Salt Geochemical Technical Assistance

No activity this month.

Task 4 - Short-Term Geochemical Technical Assistance

No activity this month.

Task 5 - Project Management

Peer review of the draft summary of the workshop on "Application of Geochemical Models to High-Level Nuclear Waste Repository Assessment" was completed and the summary has been circulated for external review by the Session Chairs, the speakers, and the NRC project manager.

MEETINGS AND TRIPS:

J. G. Blencoe and G. K. Jacobs attended the 1984 GSA Annual Meeting at Reno, Nevada, November 5-8, 1984, and the pre-meeting (November 2-4) and post-meeting (November 8-10) field trips.

REPORTS AND PUBLICATIONS:

Meeting report, MR-287-1, entitled "Trip Report of Geological Society of America Meeting at Reno, Nevada."

PROBLEM AREAS: None

COST/BUDGET REPORT:

Expenditures were \$25.1K for December 1984 and \$89.1K for FY 1985. A detailed cost/budget report will be sent under separate cover.