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Sept. 8, 1986

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

Dear Dave:

Please find enclosed the progress report for the month of August for B0287, "Technical Assistance in Geochemistry."

Sincerely,

*Gary K. Jacobs*  
Gary K. Jacobs  
Manager, NRC Waste Programs  
Environmental Sciences Division  
Building 1505, MS-3, FTS/626-0567

GKJ/

Enclosure: Monthly Progress Report for August 1986

cc: Office of the Director, NMSS (Attn: Program Support Branch)  
Division Director, NMSS Division of Waste Management (2)  
Branch Chief, Waste Management Branch, RES  
P. S. Justus, Chief, Geotechnical Branch, NMSS  
K. C. Jackson, Geotechnical Branch, NMSS  
J. W. Bradbury, Geotechnical Branch, NMSS  
G. F. Birchard, Waste Management Branch, RES  
L. A. Kovach, Waste Management Branch, RES  
M. Siegel, Sandia National Laboratory  
A. D. Kelmers                      A. P. Malinauskas  
R. E. Meyer                         GKJ File

WM-RES  
WM Record File  
B0287  
ORNL

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

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PDR WMRES EXIORNL  
B-0287 PDR

Distribution:

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MONTHLY PROGRESS REPORT FOR AUGUST 1986

PROJECT TITLE: Technical Assistance in Geochemistry

PROJECT STAFF: J. G. Blencoe, R. M. Gove, A. D. Kelmers, R. E. Meyer, G. D. O'Kelley, and K. L. Von Damm

PROJECT MANAGER: G. K. Jacobs

ACTIVITY NUMBER: ORNL #41 88 54 92 4 (FIN No. B0287)/NRC #50 19 03 01

OBJECTIVE:

The objective of this project is to provide technical assistance to the NRC in the evaluation of geochemical information pertinent to candidate HLW repository sites. The project emphasizes the collection and review of key information in order to provide input to the NRC analysis of technical issues regarding the geochemical aspects of HLW isolation.

BASALT:

J. G. Blencoe review the report, Icelandic basaltic geothermal field: A natural analog for nuclear waste isolation in basalt, SD-BWI-TI-257, 1984, by G. C. Ulmer and G. E. Grandstaff. The report promotes the Icelandic geothermal systems as a natural analog to assess the geochemical conditions around a repository in basalt during the thermal period of repository history. There are many similarities between the two systems and preliminary results suggest that the geothermal field has groundwater characteristics not unlike those found during hydrothermal experiments using basalt and groundwaters from the Hanford Site. A detailed review will be forwarded under separate cover as letter report LR-287-57.

TUFF:

K. L. Von Damm reviewed the report, The organic geochemistry of deep ground waters and radionuclide partitioning experiments under hydrothermal conditions, ONWI-448, 1983, by J. L. Means, A. S. Maest, and D. A. Crerar. The report documents two sets of experiments pertinent to the occurrence, stability, and complexing potential of various kinds of organic matter which are found, or are expected to be found, in groundwaters around repositories. The groundwaters investigated include those from the Nevada Test Site and the Palo Duro Basin so that the study is pertinent to sites in both tuff and salt. Details of the review and evaluation of the report are included in letter report LR-287-56 to be forwarded under separate cover.

SALT:

See discussion under tuff.

SHORT-TERM TECHNICAL ASSISTANCE:

G. D. O'Kelley reviewed the report, Actinide solubility in deep groundwaters — Estimates for upper limits based on chemical equilibrium calculations, EIR Report No. 507, 1983, by M. Schweingruber. The report presents a relatively conventional treatment of equilibrium actinide solubility and speciation, although the extensive presentations of data in tabular and graphic form may be somewhat useful for future comparisons of various data bases for such calculations. A detailed review of the report will be forwarded under separate cover (LR-287-55).

A. D. Kelmers reviewed the report, "Actinide carbonate complexes in aqueous solutions," by T. W. Newton and J. C. Sullivan, in Handbook on the Physics and Chemistry of the Actinides, Vol. 3, edited by A. J. Freeman and C. Keller, North-Holland, 1985, pp. 387-406. The chapter by Newton and Sullivan contains a useful and thorough review of the published information on actinide complexes in carbonate solutions. Information on these complexes will be important in understanding the geochemical behavior of uranium, neptunium, plutonium, and americium under conditions relevant to most candidate rock types.

The final letter report on the proceedings from the sorption workshop was distributed to all participants of the workshop.

PROJECT MANAGEMENT:

Nothing to report.

MEETINGS AND TRIPS:

None.

REPORTS AND PUBLICATIONS:

LR-287-55, by G. D. O'Kelley, "Review of: Actinide solubility in deep groundwaters — Estimates for upper limits based on chemical equilibrium calculations, EIR Report No. 507, 1983, by M. Schweingruber."

LR-287-56, by K. L. Von Damm, "Review of: The organic geochemistry of deep ground waters and radionuclide partitioning experiments under hydrothermal conditions, ONWI-448, 1983, by J. L. Means, A. S. Maest, and D. A. Crerar."

LR-287-57, by J. G. Blencoe, "Review of: Icelandic basaltic geothermal field: A natural analog for nuclear waste isolation in basalt, SD-BWI-TI-257, 1984, by G. C. Ulmer and G. E. Grandstaff."

LR-287-58, by A. D. Kelmers, "Review of "Actinide carbonate complexes in aqueous solutions," by T. W. Newton and J. C. Sullivan, in Handbook on the Physics and Chemistry of the Actinides Vol. 3, edited by A. J. Freeman and C. Keller, North-Holland, 1985, pp. 387-406"

PROBLEM AREAS:

None.

COST/BUDGET REPORT:

Expenditures were \$34.8K for the month of August and \$422K for the year to date. A detailed cost/budget report will sent under separate cover.