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Oct. 9, 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

WM-RES
WM Record File
B0287
ORNL

WM Project 10, 11, 16
Docket No. _____
PDR
LPDR B, U, S

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D Brooks
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Man- ticket
A/

Dear Dave:

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

Sincerely,

Gary K. Jacobs

Gary K. Jacobs
Manager, NRC Waste Programs
Environmental Sciences Division
Building 1505, MS-038, FTS/626-0567

GKJ/

Enclosure: Monthly Progress Report for September 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

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10/07/86

MONTHLY PROGRESS REPORT FOR SEPTEMBER

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, Earth Sciences Section
Environmental Sciences Division
Oak Ridge National Laboratory

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.

TECHNICAL HIGHLIGHTS

Basalt:

Final revisions are being made to the topical report reviewing the information on radionuclide solubility for the basalt site. When the final revisions are completed, the report will be edited and prepared for printing.

As soon as we receive the NRC review comments on the topical review of geochemical conditions for basalt, we will prepare the final version for printing.

J. G. Blencoe reviewed the report, The Effect of Basalt on the Release of ^{99}Tc , ^{237}Np , and ^{239}Pu from Borosilicate Glass under Hydrothermal Conditions, by D. G. Coles, SD-BWI-TI-190, 1983. The objective of the tests was to obtain baseline data on tracer solubility and secondary mineral formation for comparison with data to be obtained later from tests with fully radioactive waste forms and various additional candidate waste-package materials (e.g., canister metal, cladding, etc.). The present document is the first in a series of reports, and is primarily concerned with initial data obtained on the radionuclide and

major-element geochemistries of the hydrothermal solutions sampled in the four tests. A detailed review and evaluation will be forwarded under separate cover as letter report LR-287-59.

Tuff:

G. D. O'Kelley reviewed the report, Effect of Host-Rock Dissolution and Precipitation on Permeability in a Nuclear Waste Repository in Tuff, by J. W. Braithwaite and F. B. Nimick, SAND84-0192, 1984. The report suggests that for unsaturated tuff, if porous flow dominates, no observable change in porosity is expected. On the other hand, if fracture flow dominates, large changes in fracture permeability may occur, but not enough to alter the overall hydrologic pattern anticipated for Yucca Mountain. Whether the results are truly representative of the actual behavior depends on the assumption of equilibrium, the identification of the controlling mineralogy, and the estimated temperature distributions. As in all models, validation is an important precursor to its ultimate acceptance. Details of the review are included in letter report LR-287-54, forwarded under separate cover.

General:

K. L. Von Damm reviewed the report, "Thorium adsorption in the ocean: Reversibility and distribution amongst particle sizes," by R. M Moore and K. A. Hunter, Geochimica et Cosmochimica Acta 49, 2253-2257, 1985. The report is a follow-up study to the work of Bacon and Anderson (1982) in which they proposed that thorium adsorption onto particles in the deep ocean is a reversible process. The results reported suggest that thorium adsorption cannot be assumed to be completely irreversible. Details are included in letter report LR-287-60, to be forwarded under separate cover.

PROJECT MANAGEMENT:

The subcontract to Dr. G. E. Grisak to complete several sections of the topical report on matrix diffusion is nearly in place. When the sections are complete, they will be forwarded to the NRC project manager for review. After review, final revisions to the report will be made and the report readied for printing.

MEETINGS AND TRIPS:

American Chemical Society National Meeting, September 9-11, 1986, Anaheim, California. The paper, "Performance Assessment of High-Level Nuclear Waste Repositories: Can Kds Represent Geochemical Reality?" by V. S. Tripathi, G. T. Yeh, G. K. Jacobs, and A. D. Kelmers, was presented at the symposium on the geochemistry of high-level nuclear waste repositories. V. S. Tripathi (presenter) and G. K. Jacobs attended the meeting. A summary of the paper, accomplished under project B0290, will be forwarded under separate cover.

REPORTS AND PUBLICATIONS:

LR-287-59, by J. G. Blencoe, "Review and Evaluation of: The Effect of Basalt on the Release of ^{99}Tc , ^{237}Np , and ^{239}Pu from Borosilicate Glass under Hydrothermal Conditions, by D. G. Coles, SD-BWI-TI-190, 1983."

LR-287-54, by G. D. O'Kelley, "Review of: Effect of Host-Rock Dissolution and Precipitation on Permeability in a Nuclear Waste Repository in Tuff, by J. W. Braithwaite and F. B. Nimick, SAND84-0192, 1984."

LR-287-60, by K. L. Von Damm, "Review of: "Thorium adsorption in the ocean: Reversibility and distribution amongst particle sizes," by R. M. Moore and K. A. Hunter, Geochimica et Cosmochimica Acta 49, 2253-2257, 1985."

PROBLEM AREAS:

None.

COST/BUDGET REPORT:

Expenditures were approximately \$49.9K for the month of September and \$472K for the year to date. A final cost/budget report for FY 1986 will be sent under separate cover.