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

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Dear John:

Enclosed is the progress report for the month of July 1985 for B0290,
"Laboratory Evaluation of DOE Radionuclide Solubility Data and Selected
Retardation Parameters, Experimental Strategies, Laboratory Techniques and
Procedures."

Sincerely,

Susan

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

SKW:bek

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
K. C. Jackson, Geotechnical Branch
D. J. Brooks, Geotechnical Branch
Branch Chief, Waste Management Branch, RES
C. Hackworth, Waste Management Branch, RES

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J. R. Hightower

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D. C. Kocher
A. P. Malinauskas
R. E. Meyer
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PDR WMRES EXIORNL
B-0290 PDR

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MONTHLY PROGRESS REPORT FOR JULY 1985

PROJECT TITLE: Laboratory Evaluation of DOE Radionuclide Solubility Data and Selected Retardation Parameters, Experimental Strategies, Laboratory Techniques, and Procedures

PROJECT MANAGER: S. K. Whatley

TASK LEADER: A. D. Kelmers

SCIENTIFIC STAFF: W. D. Arnold, J. G. Blencoe, G. K. Jacobs, and R. E. Meyer

ACTIVITY NUMBER: ORNL #41 37 54 92 6 (FIN No. B0290)
NRC #50 19 03 1

PROGRESS HIGHLIGHTS:

HANFORD SITE INFORMATION EVALUATION

Radionuclide Sorption/Solubility Values:

In June, we reported that we had started measurement of sorption isotherms for Np(V) with three basalt/groundwater systems (Cohasset basalt with synthetic groundwater GR-4, and Umtanum and McCoy Canyon basalts with synthetic groundwater GR-2) to compare the effectiveness of different basalt/groundwater combinations in retarding migration of neptunium in the site far field. The experiments are at 60°C under anoxic conditions for 14 d. The start of these experiments had been delayed because we thought that we were experiencing difficulty in the preparation of neptunium-groundwater solutions which contained essentially 100% Np(V); the solvent extraction analytical procedures seemed to indicate that the starting solutions contained substantial percentages of Np(IV) and Np(VI) in addition to Np(V). However, as reported last month, we discovered that the apparent problem with multiple valences of neptunium was an artifact due to the presence of ^{233}Pa , a decay product of ^{237}Np , in the solutions. We had actually prepared neptunium-groundwater solutions in which almost all of the neptunium was present as Np(V), but were getting a spurious valence state analysis due to the presence of the ^{233}Pa which led us to erroneously believe that there was Np(IV) and Np(VI) present. After we resolved this analytical problem, we proceeded with the isotherm determinations. We have now completed the batch contact experiments for all but the Cohasset isotherm. The results will be presented when all three isotherms are completed and analyzed.

YUCCA MOUNTAIN INFORMATION EVALUATION

Materials and Methods:

Preparation of a controlled atmosphere glove box for work with Yucca Mountain samples continues. We have received our CO₂ monitor, a PIR-2000 Process Gas Analyzer from Horiba Instruments, Inc. This instrument is capable of monitoring carbon dioxide in the concentration range of 1-10% in the atmosphere of one or more of our glove boxes. The necessary valves, flowmeters, etc., have been installed in one of our glove boxes, and we have begun experiments to determine the percentage of CO₂ necessary to maintain the appropriate pH in the J-13 groundwater.

Radionuclide Sorption/Solubility Values:

No progress to report this month.

Geochemical Modeling:

No progress to report this month.

GENERAL ASPECTS

None

MEETINGS AND TRIPS

None

REPORTS AND PUBLICATIONS

The quarterly progress reports for September-December 1984 and January-March 1985 are being revised after receipt of the NRC Project Manager's comments and will be forwarded to NRC for publication in final form.

PROBLEM AREAS

None

COST/BUDGET REPORT

Expenditures were \$35.9K for the month of July and \$411.2K for the fiscal year to date. A detailed cost/budget report will be sent under separate cover.

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NCRM 3201

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4. AUTHORS (If more than three, name first author followed by "and others")

A. D. Kelmers, and others

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6. DATE MANUSCRIPT
COMPLETED

August 1985

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427-4055

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J.O. Younghanse

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