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LPDR- Wm-10 (2)
Wm-11 (2)
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OAK RIDGE NATIONAL LABORATORY
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July 16, 1987

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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:

Enclosed is the June 1987 progress report for B0287, Technical Assistance in Geochemistry.

Sincerely,

A. D. Kelmers

A. D. Kelmers, Project Manager
B0287 Technical Assistance in Geochemistry
Chemical Technology Division
Bldg. 4500N, MS-268; FTS 624-6870

ADK:jts

cc/encl: Office of the Director, NMSS (Attn: Program Support Branch)
Division Director, Division of High-Level Waste Management,
NMSS, NRC (2)
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J. W. Bradbury, Technical Review Branch, NMSS, NRC
G. F. Birchard, Waste Management Branch, RES, NRC
A. P. Malinauskas, Director, NRC Programs, ORNL

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PROGRESS REPORT FOR JUNE 1987

PROJECT TITLE: Technical Assistance in Geochemistry

PROJECT STAFF: J. G. Blencoe, R. M. Gove, G. K. Jacobs, R. E. Meyer,
V. S. Tripathi, and K. L. Von Damm

PROJECT MANAGER: A. D. Kelmers
Chemical Development Section
Chemical Technology Division
OAK RIDGE NATIONAL LABORATORY, Operated by
MARTIN MARIETTA ENERGY SYSTEMS, INC.

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 the candidate high-level-waste geologic repository sites. The project emphasizes the collection and review of key information to provide input to the NRC analysis of technical issues regarding the geochemical aspects of high-level-waste geologic isolation, and review of site selection and repository licensing documentation.

TECHNICAL HIGHLIGHTS:

Geochemistry Issues:

Draft Letter Reports analyzing the geochemistry issues for the Yucca Mountain site and the Hanford Site are being prepared. Six issues have been defined that cover all regulatory aspects of site characterization and selection, and of repository construction, operation, and closure. The six issues are:

- (1) What are the ambient geochemical conditions and processes in the geologic setting?
- (2) What are the geochemical conditions of the engineering materials (packing, backfill, and seals) that may be utilized in repository construction, operation, and closure?
- (3) What are the changes in the geochemical conditions and processes in the disturbed zone that may occur over time as the result of repository construction, operation, and closure, and how

may these changes affect the anticipated repository performance?

(4) How will the changes in the geochemical conditions and processes that may occur over time as a result of repository construction, operation, and closure affect the anticipated performance of the engineering materials (packing, backfill, and seals) utilized in the repository?

(5) What are the geochemical conditions and processes that may affect the radionuclide source term at the boundaries of (1) the waste packages during the containment period and (2) from the engineered barrier system in the post containment period, and how may the anticipated repository performance be influenced?

(6) What geochemical conditions and processes affect the transport of mobilized radionuclides through the geologic setting and the release of radionuclides to the accessible environment after disposal, and how may the anticipated repository performance be influenced?

Major report sections for the six issues at each site are:

- (1) Regulatory Rationale,
- (2) Data and Information Needed to Analyze the Issue,
- (3) Methods, Strategies, and Approaches Available to Acquire the Needed Data and Information, and
- (4) Precision and Accuracy Necessary, or Uncertainty Acceptable, for the Data and Information Needed to Analyze the Issue.

We are now working on the draft Letter Reports for both sites to add the sections n.n.3, Methods, Strategies, and Approaches Available to Acquire the Needed Data and Information. The schedule for completion of these sections have been impacted by activities related to preparation for the hydrazine data review, reported in the May progress report, and by staff vacation schedules. We plan to transmit revised versions of the draft Letter Reports for both sites containing sections n.n.3 with the July progress report. Draft Letter Reports for both sites containing sections n.n.1 and n.n.2 have been previously transmitted.

Hydrazine Data Review at BWIP:

Preparation for the data review meeting is on hold pending resolution of a meeting schedule between NRC and DOE.

General:

The topical review on the solubility of radionuclides (NUREG/CR-4024) was transmitted in final form on mats with the May progress report. The topical

review on matrix diffusion, being prepared in conjunction with Jerry Grisak of Intera Technologies Inc., is being revised and expanded to include a discussion of the relationship between performance measurement and matrix diffusion parameters. We are awaiting revised text from Dr. Grisak. The topical review on the geochemical conditions at the Hanford Site will be revised when the NRC review of the draft manuscript is received.

MEETINGS AND TRIPS:

K. L. Von Damm attended the NRC QA review of Yucca Mountain mineralogy and petrology at Los Alamos National Laboratory.

REPORTS AND PUBLICATIONS:

None

PROBLEM AREAS:

None

COST/BUDGET REPORT:

Expenditures for June were not available at this time. A detailed cost/budget report will be forwarded under separate cover.