

A1756

PDR - 1
LPDR - Wm-10 (2)
Wm-11 (2)
Wm-16 (2)

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April 15, 1987

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Mr. Walton Kelly
Geotechnical Branch
Division of Waste Management
U.S. Nuclear Regulatory Commission
7915 Eastern Avenue
Silver Spring, MD 20910

Dear Mr. Kelly:

Enclosed is the monthly report on FIN A-1756, Geochemistry Sensitivity Analysis for March 1987. Please feel free to contact me at (FTS) 844-8368 or Malcolm Siegel at (FTS) 864-5448 if you have any questions or comments.

Sincerely,

Robert M. Cranwell

Robert M. Cranwell, Supervisor
Waste Management Systems
Division 6416

RMC:6416

Enclosure

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WM Project 10, 11, 16
Docket No. _____
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PROGRAM: Geochemical Sensitivity Analysis FIN#: A-1756

CONTRACTOR: Sandia National Laboratories BUDGET PERIOD: 10/86 - 9/87

NMSS PROGRAM MANAGER: W. Kelly BUDGET AMOUNT: 200K

CONTRACT PROGRAM MANAGER: R. M. Cranwell FTS PHONE: 844-8368

PRINCIPAL INVESTIGATORS: M. D. Siegel FTS PHONE: 846-5448

PROJECT OBJECTIVE

The objective of this project is to provide technical assistance to the NRC in determining the sensitivity of performance assessment calculations to uncertainties in geochemical data and in the representation of geochemical processes in transport models. In Task I, the error in model calculations of integrated radionuclide discharge due to speciation, sorption and kinetic effects will be evaluated. In Task II, the potential importance of organic molecules and colloids will be examined. SNLA will assist the NRC in determining how geochemical processes should be represented in transport models in Task III. Short-term technical assistance will be carried out under Task IV and the codes and data bases developed under this project will be transferred to the NRC under Task V.

ACTIVITIES DURING MARCH 1987

Task I. Uncertainty in Integrated Radionuclide Discharge

Subtask 1A. Conceptual Models for Repository Sites.

During March, calculations of integrated radionuclide discharge using the LHS, NEFTRAN and EPACDF codes were continued on the VAX computer system. Scenarios in which the ground-water travel times were sampled from a distribution suggested by R. Codell of the NRC (Codell, 1985) were modeled. The total integrated radionuclide discharge for each radionuclide chain was calculated for the case where the K_d 's of all nuclides were equal to zero and compared to the EPA Standard (see Fig. 1 and 2). In these simulations, we have assumed that the travel time through the disturbed zone is equal to zero; hence these calculations represent a worst-case scenario for sites that comply with the Groundwater Travel Time Requirement of 10CFR60. Future calculations will assess the amount of protection that geochemical processes can provide.

Reference: Codell, R., 1985, Draft Generic Technical Position on Ground-water Travel Time (GWTT). U. S. N. R. C.

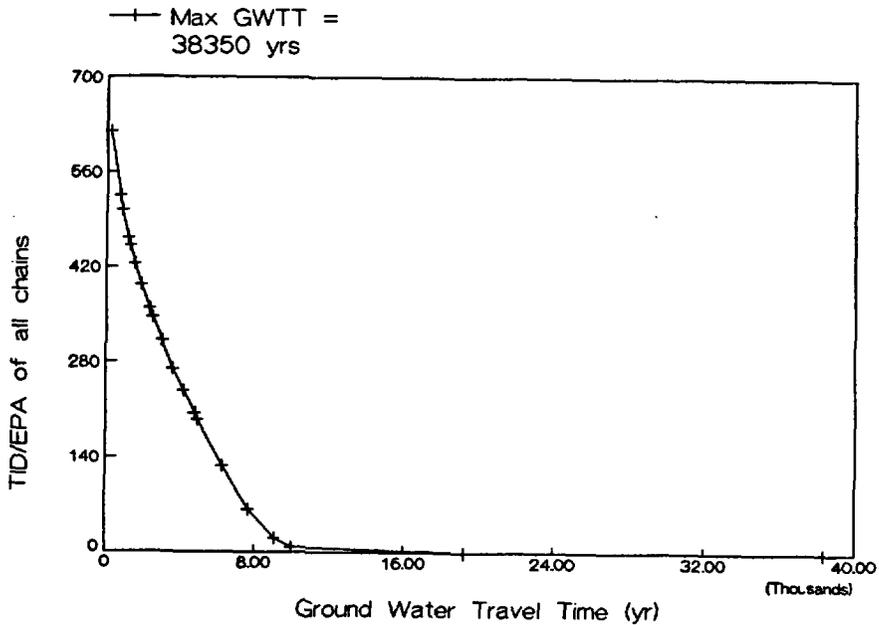


Figure 1. EPA Release Ratio (Total 10000yr Integrated Discharge/EPA Release Limit) for Distribution of Ground-water Travel Times Complying With 10CFR60 When K_d 's for All Nuclide Equal Zero.

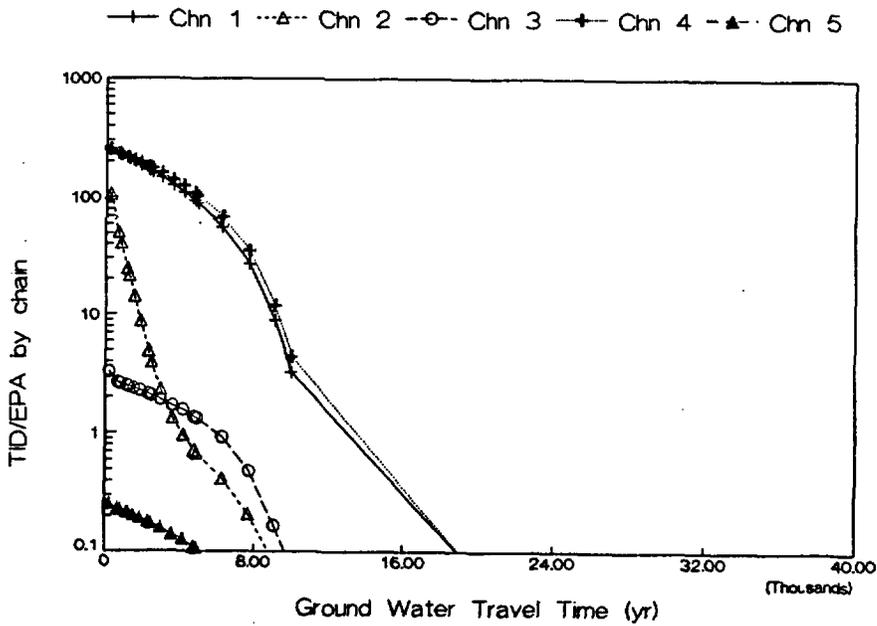


Figure 2. EPA Release Ratios of Individual Chains for Scenario Described in Figure 1.

Subtask 1B. Solubility/Speciation Effects.

The third draft of "Thermodynamic Tables for Use in Performance Assessment of High-Level Waste Repositories. Volume 1. Aqueous Solutions Data Base," NUREG/CR-4864, SAND87-0323 was prepared during March.

A paper entitled 'Development of an Integrated Geochemical Data Base for Modeling and Sensitivity Analysis in Nuclear Waste Repository Performance Assessment Studies' will be presented at the 'International Conference on Thermodynamics of Aqueous Systems With Industrial Applications' on May 12. Preparation for the conference started this month.

Subtask 1C. Sorption Effects.

Critical evaluation of the empirical sorption data in the dBase III+ data base was completed during March. A revised draft of the users' manual for the data management system was completed and is under review. Additional calculations of the variation of the degree of sorption of uranium and neptunium onto hydrous oxides in oxic waters were carried out during this month.

Subtask 1E. Coupled/Dynamic Effects

No activity to report.

4. Short-Term Technical Assistance.

No activity to report.

Allocation of Resources

Task 1.....100%

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 1646.010
 March 1987

THIS IS AN ESTIMATE ONLY AND MAY NOT MATCH THE INVOICES SENT TO NRC BY SANDIA'S ACCOUNTING DEPARTMENT.

	Current Month -----	Year -to- Date ----
I. Direct Manpower (man-months of charged effort)	0.8 ---	3.3 ---
II. Direct Loaded Labor Costs	6	26
Materials and Services	0	7
ADP Support (computer)	0	5
Subcontracts	42	118
Travel	0	1
G & A	-16	-2
Other (computer roundoff)	0	0
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TOTAL COSTS	32	155

III. Funding Status

<u>Prior FY Carryover</u>	<u>FY 87 Projected Funding Level</u>	<u>FY 87 Funds Received to Date</u>	<u>FY 87 Funding Balance Needed</u>
29K	229K	200K	None