

A-1158

LPDR (6)
WM-10(2) WM-11(2)
WM-16 (2)

Sandia National Laboratories
Albuquerque, New Mexico 87185 PDR-11)

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Neil M. Coleman
Hydrology Section
Geotechnical Branch
Division of Waste Management
U.S. Nuclear Regulatory Commission
7915 Eastern Avenue
Silver Spring, MD 20910

Dear Mr. Coleman:

Enclosed is the monthly report on FIN A-1158, Repository Site Definition and Technology Transfer for December 1986. Please feel free to contact me at FTS 844-8368 or Charlene Harlan at FTS 844-8164 if you have any questions or comments.

Sincerely,

Robert M. Cranwell

Robert M. Cranwell, Supervisor
Waste Management Systems
Division 6431

RMC:6431

Enclosures

Copy to:
Office of the Director, NMSS
Attn: Program Support
Robert Browning, Director
Division of Waste Management
Philip Justus
Division of Waste Management
Enrico Conti, Branch Chief
Health Siting & Waste Management Division
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6431 R. M. Cranwell
6431 C. P. Harlan
6431 G. F. Wilkinson

WM-RES
WM Record File
A1158
SNL

WM Project 10, 11, 16
Docket No. _____

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Distribution:
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PROGRAM: Task I, Repository Site Definitions

FIN#: A-1158

CONTRACTOR: Sandia National Laboratories

BUDGET PERIOD: 10/86 -
9/87

NMSS PROGRAM MANAGER: N. M. Coleman

BUDGET AMOUNT: - 0 -

CONTRACT PROGRAM MANAGER: R. M. Cranwell

FTS PHONE: 844-8368

PRINCIPAL INVESTIGATOR: C. P. Harlan

FTS PHONE: 844-8164

PROJECT OBJECTIVE

To develop RSDs for candidate host media and provide data for use in developing and testing performance assessment methodologies for the various media.

ACTIVITIES DURING DECEMBER 1986

No activity.

PROGRAM: Task II, Technology Transfer

FIN#: A-1158

CONTRACTOR: Sandia National Laboratories

BUDGET PERIOD: 10/86 -
9/87

NMSS PROGRAM MANAGER: N. M. Coleman

BUDGET AMOUNT: \$135K

CONTRACT PROGRAM MANAGER: R. M. Cranwell

FTS PHONE: 844-8368

PRINCIPAL INVESTIGATOR: C. P. Harlan

FTS PHONE: 844-8164

PROJECT OBJECTIVE

To provide technical support for the transfer of the capability to use the information, analytical techniques, and tools developed for the NRC under the Performance Assessment Methodology program (FIN A-1266).

ACTIVITIES DURING DECEMBER 1986

TOUGH User's Guide

During December 1986, the TOUGH User's Guide went through formal review. The report was reviewed by a Sandia staff member in Organization 6431, and refereed by a Sandia staff member outside Organization 6431. The reviewer and referee comments have been attached to this report for your information. Although the User's Guide is judged to be good in most respects, there is a need for expansion in the sample problem section. The additions should provide a new user of the code with a better understanding of the physical problems being described. In addition, minor comments have been made on the draft of the report for consideration by the author, Karsten Pruess. In January 1987, this information will be mailed to LBL for final incorporation into the report before the formal Sandia management sign-off procedures are begun.

In a separate matter, Karsten Pruess has expressed a wish to also print the User's Guide at LBL as an LBL-report. He wants to know if it is sufficient to just remove the NUREG and SAND numbers from the report. What is your position on this?

NEFTRAN User's Manual

During December 1986, the current draft of the report was reviewed by the authors for corrections, and more sections added. The overall structure of the report is as follows:

Abstract

1. Introduction
2. Mathematical Description
3. Structure of the Code
4. Input to the Code
5. Sample Problems
6. References
7. Notation

Appendix A. Distribution of Source into Migration Path Using Mixing Cell Model

Appendix B. Output from the Sample Problems
Appendix C. Ordered Error Stops

The report is entitled "User's Manual For The NEFTRAN Computer Code", NUREG/CR-4766, SAND86-2405, RW. Please inform us of the number of distribution copies you would like. This work is being funded jointly by FIN A1266 and A1158, and both divisions of NRC will appear on the title page.

During January 1987, all of the sample problems will be re-run and work begun on generating report quality figures. Work will continue to develop the references and notations sections, and current drafts reviewed for errors.

PROGRAM: Task V, Short-term Technical Assistance

FIN#: A-1158

CONTRACTOR: Sandia National Laboratories

BUDGET PERIOD: 10/86 -
9/87

NMSS PROGRAM MANAGER: N. M. Coleman

BUDGET AMOUNT: \$20K

CONTRACT PROGRAM MANAGER: R. M. Cranwell

FTS PHONE: 844-8368

PRINCIPAL INVESTIGATOR: C. P. Harlan

FTS PHONE: 844-8164

PROJECT OBJECTIVE

To provide general technical assistance on waste management matters relating to Tasks I-IV.

ACTIVITIES DURING DECEMBER 1986

No activity.

**SWIFT II Verification and Validation:
A Survey of Previous Tests and
Recommendations for Future Work**

CONTENTS

1. INTRODUCTION
2. EXISTING VERIFICATION TESTS
 - 2.1 VERIFICATION OF FLOW
 - 2.1.1 Fully Penetrating Well with Constant Discharge
 - 2.1.2 Fully Penetrating Well with Constant Drawdown
 - 2.1.3 Fully Penetrating Well in a Horizontal Anisotropic Aquifer
 - 2.1.4 Fully Penetrating Well in a Leaky Aquifer, Small Values of Time
 - 2.1.5 Drawdown in a Fully Penetrating Well in a Leaky Aquifer
 - 2.1.6 The Dupuit-Forcheimer Steady-State Problem
 - 2.1.7 The Boussinesq Transient-State Problem
 - 2.2 VERIFICATION OF TRANSPORT
 - 2.2.1 One-Dimensional Transport with Chain Decay and Equal Retardation Parameters
 - 2.2.2 One-Dimensional Transport with Chain Decay and Unequal Retardation Parameters
 - 2.2.3 Transport of a Decaying Radionuclide in a Fractured Porous Medium (Prismatic Representation of Matrix)
 - 2.2.4 Transport of a Decaying Radionuclide in a Fractured Porous Medium (Spherical Representation of Matrix)
 - 2.3 VERIFICATION OF HEAT TRANSPORT
 - 2.3.1 One-Dimensional Convective-Dispersive Heat Transport
 - 2.3.2 Linear Heat Transport During Injection
 - 2.3.3 Radial Heat Transport During Injection
 - 2.3.4 Radial Heat Transport with Loss to Confining Beds
3. EXISTING VALIDATION TESTS
 - 3.1 VALIDATION OF FLOW
 - 3.1.1 Analysis of Well Test-Data for a Dolomite Formation
 - 3.1.2 Hydraulic Testing for Thermal-Energy Storage in an Aquifer
 - 3.2 VALIDATION OF MASS TRANSPORT - Contaminant Migration from a Landfill
 - 3.3 VALIDATION OF HEAT TRANSPORT - Thermal Energy Storage in an Aquifer
4. SUMMARY AND RECOMMENDATIONS
5. REFERENCES

A-1158, Task I, Repository Site Definition
0976.010
December 1986

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)	0.0 ---	0.0 ---
II. Direct Loaded Labor Costs	0	0
Materials and Services	0	0
ADP Support (computer)	0	0
Subcontracts	0	0
Travel	0	0
Other (computer roundoff)	0	0
	---	---
TOTAL COSTS	0	0

A-1158, Task II, Technology Transfer
0976.020
December 1986

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)	0.4 -----	1.2 -----
II. Direct Loaded Labor Costs	3	7
Materials and Services	0	0
ADP Support (computer)	0	0
Subcontracts	0	35
Travel	0	0
Other (computer roundoff)	0	0
	-----	-----
TOTAL COSTS	3	42

A-1158, Task III, Maintenance of Computer Codes
0976.030
December 1986

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)	1.0 ---	5.2 ---
II. Direct Loaded Labor Costs	8	40
Materials and Services	0	0
ADP Support (computer)	3	8
Subcontracts	1	67
Travel	0	0
Other (computer roundoff)	1	0
	---	---
TOTAL COSTS	13	115

A-1158, Task IV, Code Validation and Verification
0976.040
December 1986

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)	0.2 ---	0.3 ---
II. Direct Loaded Labor Costs	1	2
Materials and Services	0	0
ADP Support (computer)	0	0
Subcontracts	0	46
Travel	0	0
Other (computer roundoff)	1	0
	---	---
TOTAL COSTS	2	48

A-1158, Task V, Short-term Technical Assistance
0976.050
December 1986

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)	0.0 ---	0.0 ---
II. Direct Loaded Labor Costs	0	0
Materials and Services	0	0
ADP Support (computer)	0	0
Subcontracts	0	0
Travel	0	0
Other (computer roundoff)	0	0
	---	---
TOTAL COSTS	0	0

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Total for 0976.010, 0976.020, 0976.030, 0976.040 and 0976.050
December 1986

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)	1.6 ---	6.7 ---
II. Direct Loaded Labor Costs	12	49
Materials and Services	0	0
ADP Support (computer)	3	8
Subcontracts	1	147
Travel	0	0
Other (computer roundoff)	2	1
	-----	-----
TOTAL COSTS	18	205

III. Funding Status

Prior FY Carryover -----	FY 87 Projected Funding Level -----	FY 87 Funds Received to Date -----	FY 87 Funding Balance Needed -----
\$224K *	\$377K	\$0K	\$266K

* \$224K carryover less approximately \$113K of FY86 expenses incurred
but not costed out of project in FY86 leaves a balance of \$111K.