

Sandia National Laboratories

Albuquerque, New Mexico 87185

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December 15, 1986

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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 November 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

Enclosure

Copy to:  
Office of the Director, NMSS  
Attn: Program Support  
Robert Browning, Director  
Division of Waste Management  
Philip Justus  
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Enrico Conti, Branch Chief  
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6400 R. C. Cochrell  
6430 N. R. Ortiz  
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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LPDR ✓ (B, N, S)

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A-1158 PDR

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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 NOVEMBER 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: \$165K

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 NOVEMBER 1986

##### SWIFT II Self-Teaching Curriculum (STC)

A camera-ready copy of the revised SWIFT II Self-Teaching Curriculum was sent to NRC along with the new fiche of input/output problems, a set of mailing labels for distribution and a copy of the report. The revised report incorporates corrections to the original report and an added comparison of SWIFT II to an analytical solution.

##### TOUGH User's Guide

November 11, 1986, the TOUGH User's Guide arrived from Karsten Pruess of LBL. We verified that the last set of review comments had been incorporated into the current draft. Two Sandia staff members have been asked to review the report within the next few weeks.

##### NEFTRAN User's Manual

Work continued on the User's Manual for the dual-porosity NEFTRAN computer code. This code is an extension of the NWFT/DVM code with new capabilities added (generalized flow network, leg-transfer capability, new source term, and matrix diffusion). This report is being funded jointly by FIN A1266 and A1158. Sample problems were developed that successfully demonstrate and verify the new capabilities of NEFTRAN. Future effort will involve documenting these results in a sample problem section of the report, generating associated appendices for mathematical symbols and sample problem output, and verifying that the overall report format complies with NRC's guidelines for documentation of computer codes (NUREG-0856 and (NUREG/CR-4369)).

PROGRAM: Task III, Maintenance of Computer Codes FIN#: A-1158

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

NMSS PROGRAM MANAGER: N. M. Coleman BUDGET AMOUNT: \$180K

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

PRINCIPAL INVESTIGATOR: C. P. Harlan FTS PHONE: 844-8164

PROJECT OBJECTIVE

To implement a quality assurance program to maintain computer codes, report errors, document changes, and inform the NRC staff.

ACTIVITIES DURING NOVEMBER 1986

Three codes were sent to the Idaho National Engineering Laboratory (INEL) for installation and QA on the INEL Cyber76 computer system. The tape contained LHS, DNET, and USGS, plus associated data files and on-line help files - 30 files in all. Unfortunately, it was determined by the INEL consultants that the tape was physically damaged at some point and unusable. A second tape was generated at Sandia, mailed to INEL and all 30 files successfully moved from tape to disk. At this time, QA of DNET and USGS have been completed but LHS has not since there are differences in the amount of central memory available at Sandia and at INEL. The current on-line help menu has been expanded to:

- 1 - SWIFT II
- 2 - NWFTDVM
- 3 - GENNET
- 4 - DNET
- 5 - LHS
- 6 - USGS
- 10 - Exit Menu

(If '5 - LHS' is selected for on-line documentation, currently a message appears stating that LHS has not yet been implemented.)

A copy of the final TOUGH code and sample problems arrived from LBL late in November. The code has been implemented on the Sandia computer system and all sample problems run, reproducing the report results. As soon as the QA procedure is finalized, TOUGH is available for transmitting to INEL. Please advise us whether to continue with the transmittal or wait until the final User's Guide sign-off has been completed.

PROGRAM: Task IV, Code Validation and Verification FIN#: A-1158

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

NMSS PROGRAM MANAGER: N. M. Coleman BUDGET AMOUNT: \$25K

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

PRINCIPAL INVESTIGATOR: C. P. Harlan FTS PHONE: 844-8164

#### PROJECT OBJECTIVE

To assemble the various tests that have been performed to help validate and verify various portions of relevant codes and recommend any additional feasible tests.

#### ACTIVITIES DURING NOVEMBER 1986

##### SWIFT II Verification/Validation

The letter report containing existing verification/validation tests for SWIFT II and recommendations for areas needing additional effort is near completion. Existing problems described in the report are:

- Fully penetrating well with constant discharge
- Fully penetrating well with constant drawdown
- Fully penetrating well in a horizontal anisotropic aquifer
- Fully penetrating well in a leaky aquifer for small values of time
- One-dimensional convective-dispersive heat transport
- Linear heat transport during injection
- Radial heat transport during injection
- One-dimensional transport with chain decay and equal retardation parameters
- One-dimensional transport with chain decay and unequal retardation parameters
- Drawdown in a fully penetrating well in a leaky aquifer
- Radial heat transport with loss to confining beds
- Transport of a decaying radionuclide in a fractured porous medium
- The Dupuit-Forcheimer steady-state problem
- The Boussinesq transient-state problem
- Transport of a decaying radionuclide in a fractured porous medium
- Analysis of well test-data for a dolomite formation

We anticipate that the final letter report will be transmitted to NRC during January 1987.



A-1158, Task I, Repository Site Definition  
0976.010  
November 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  
November 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)	0.3 ---	0.8 ---
II. Direct Loaded Labor Costs	1	4
Materials and Services	0	0
ADP Support (computer)	0	0
Subcontracts	11	35
Travel	0	0
Other (computer roundoff)	0	0
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TOTAL COSTS	12	39

A-1158, Task III, Maintenance of Computer Codes  
0976.030  
November 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)	2.2 ---	4.2 ---
II. Direct Loaded Labor Costs	16	32
Materials and Services	0	0
ADP Support (computer)	1	5
Subcontracts	27	66
Travel	0	0
Other (computer roundoff)	0	0
	---	---
TOTAL COSTS	44	103

A-1158, Task IV, Code Validation and Verification  
0976.040  
November 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 ---	0.1 ---
II. Direct Loaded Labor Costs	0	1
Materials and Services	0	0
ADP Support (computer)	0	0
Subcontracts	14	46
Travel	0	0
Other (computer roundoff)	0	0
	---	---
TOTAL COSTS	14	47

A-1158, Task V, Short-term Technical Assistance  
0976.050  
November 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
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TOTAL COSTS	0	0

A-1158

Total for 0976.010, 0976.020, 0976.030, 0976.040 and 0976.050  
November 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)	2.5 ---	5.1 ---
II. Direct Loaded Labor Costs	17	37
Materials and Services	0	0
ADP Support (computer)	1	5
Subcontracts	52 **	146
Travel	0	0
Other (computer roundoff)	0	0
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TOTAL COSTS	70	188

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.

\*\*Subcontract charges that are costed this month consist of \$28K  
SAIC charges through October 3, \$5K INTERA charges during  
November, \$7K purchase of computer equipment and software  
and \$12K in taxes.