

A1158 PDR-1
LPDR- Wm-10 (2)
Wm-11 (2)
Wm-16 (2)

Sandia National Laboratories
Albuquerque, New Mexico 87185

WM DOCKET CONTROL
CENTER

June 15, 1987

'87 JUN 23 P4:42

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 May 1987. 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 6416

RMC:6416

Enclosures

- Copy to:
- Office of the Director, NMSS
 - Attn: Program Support
 - Robert Browning, Director
 - Division of Waste Management
 - Philip Justus
 - Division of Waste Management
 - Ronald L. Ballard, Branch Chief
 - Division of High-Waste Management
 - John Randall
 - Division of Radiation Programs and Earth Sciences
 - 6400 R. C. Cochrell
 - 6410 N. R. Ortiz
 - 6416 R. M. Cranwell
 - 6416 P. A. Davis
 - 6416 C. P. Harlan
 - 6416 G. F. Wilkinson

WM-RES
WM Record File
A1158
SNL

WM Project 10, 11, 16
Docket No. _____
PDR
XLPDR (B, N, S)

Distribution:
Coleman Joan-ticket
(Return to WM, 623-SS) Sac

87225729
WM Project: WM-10, 11, 16 WM Record File: A1158
PDR yes LPDR yes
(Return to WM, 623-SS)

8709080104 870615
PDR WMRES EXISANL
A-1158 PDR

3902

MANAGEMENT ISSUES:

During May 1987, the 189 was completed and submitted for management approval. At the request of the NRC PM for A1158 during a telephone conversation 6/10/87, a new paragraph will be added to the section titled "NRC Furnished Materials" authorizing Sandia to use the INEL computer system for performance of work under this project. It was agreed that authorization for this statement will come to Sandia in the form of a modified SOW.

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 MAY 1987

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: \$150K

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 MAY 1987

During May review comments were received from the A1158 NRC PM on the NEFTRAN User's Manual, NUREG/CR-4766. These comments were addressed and the report submitted for final typing. Additional and correction figures were generated for the final draft.

The Tough User's Manual, NUREG/CR-4645 completed Sandia management sign-off June 9. It is anticipated that the camera-ready copy will be available in the next few weeks for transmission to NRC for publication.

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: \$174K

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 MAY 1987

During May the INEL computer storage was reorganized to improve the storage costs. All files small enough (less than 784 PRU's) were moved to Indirect Access (IA), leaving only the largest files as Direct Access (DA). All files needed by the Sandia systems manager but not needed by the user community were removed from disk storage. These files are stored on backup tapes and are available at any time to the systems manager. A second area used as a work area by the Sandia systems manager has been and in the future will be purged of all files when the application or QA task has been completed. A magnetic tape contains all files for system backup. The on-line help system was modified to reflect these changes. This resulted in a reduction from 101 IA plus 53 DA files under the old system to 58 IA plus 6 DA files under the new system. Enclosed are the current INEL directories for the QA user area (CRH) and the work area (GFW).

The GENNET on-line documentation was expanded to instruct the user in entering the generalized network into the data set. All other input to GENNET (the generalized network version) is identical to NWFTDVM (the fixed network version) for which there is documentation. Enclosed is a copy of the current documentation for GENNET.

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: \$50K

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 MAY 1987

No activity.

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, II, III, IV, and VI

ACTIVITIES DURING MAY 1987

No activity.

PROGRAM: Task VI, T. A. in Numerical Modeling

FIN#: A-1158

CONTRACTOR: Sandia National Laboratories

BUDGET PERIOD: 10/86 -
9/87

NMSS PROGRAM MANAGER: N. M. Coleman

BUDGET AMOUNT: \$70K

CONTRACT PROGRAM MANAGER: R. M. Cranwell

FTS PHONE: 844-8368

PRINCIPAL INVESTIGATOR: C. P. Harlan

FTS PHONE: 844-8164

PROJECT OBJECTIVE

Provide expert opinion input to NRC reviews of DOE site screening, site characterization, and technical development programs. Work includes numerical modeling assessments and participation in technical meetings, site visits and workshops.

ACTIVITIES DURING MAY 1987

During May Sandia began to respond to comments received on the report "Numerical Modeling of Ground-Water Flow Systems in the Vicinity of the Reference Repository Location, Hanford Site, Washington". These comments were received from the NRC A1158 PM and Roy Williams and Associates. Figures for the report were submitted for camera-ready quality. It is estimated that this report will be available mid-July for transmission to NRC unless the PM determines that a Sandia review and management sign-off will be required. Please inform Sandia of your position on this matter.

UN=CRH

UI=3114 FAMILY=INEL 87/05/22. 11.40.38.

*A42292	DNETCMP	DNETDOC	DNETLGO	DNET01	DNET02	DNET03
DNET04	DNET05	FLECSLG	GENCMP	GENDOC	GENLGO	GEN01
GEN02	GEN03	GEN04	*LHSCMP	LHSDOC	LHSLGO	LHS01
LHS02	NWFTCMP	NWFTDOC	NWFTLGO	NWFT01	NWFT02	NWFT03
NWFT04	QUAHEL	QUAHELP	QUAHEL	*SWIFTII	*SWIICMP	SWIIDIB
SWIIDIM	SWIIDOC	*SWIILGO	SWII01	SWII02	SWII03	SWII04
SWII05	SWII06	SWII07	SWII08	TOUGDOC	TOUGH	TOUGHB
TOUGH01	TOUGH02	TOUGH03	TOUGH04	TOUGH05	TOUGH06	*USGS
USGSDOC	USGSLGO	USGSUPD	USGS01	USGS02	USGS03	USGS04
OBIN						

58 IND.
6 (*)DIR.

4441 PRUS.
7313 PRUS.

4441 ALLOCATED. \$2.46+/DAY.
9600 ALLOCATED. \$6.34+/DAY.

UN=GFW UI=3113 FAMILY=INEL 87/05/22. 11.48.56.

NO SUCH FILES

GENNET INTERNAL DOCUMENTATION:

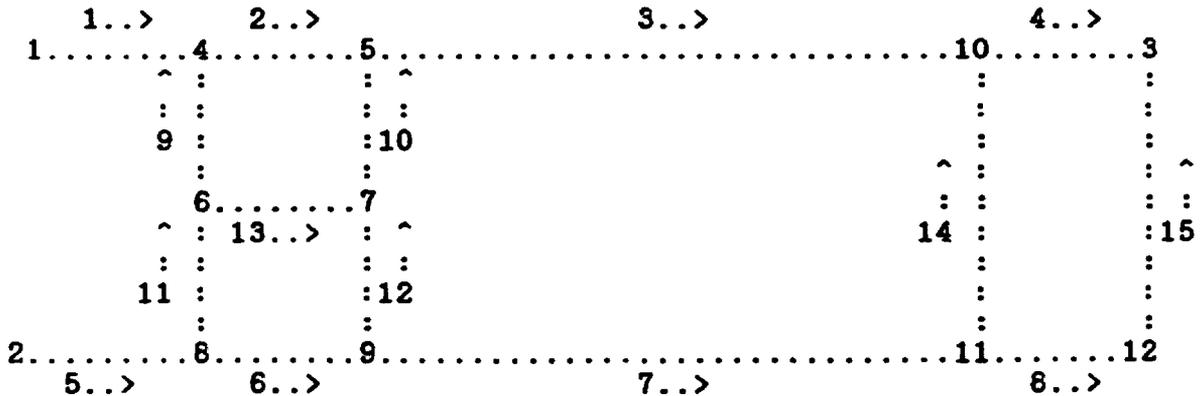
```
*****
*
*   CODE NAME       -   GENNET
*
*   VERSION        -   RELEASE JULY 1984
*
*   DESCRIPTION    -   THIS CODE IS A MODIFIED VERSION OF THE
*                       NETWORK FLOW AND TRANSPORT/DISTRIBUTED
*                       VELOCITY METHOD (NWFTDVM) MODEL DOCU-
*                       MENTED IN NUREG/CR-2081.  NWFTDVM SIMU-
*                       LATES GROUND WATER FLOW AND CONTAMINANT
*                       (RADIONUCLIDE) TRANSPORT.  THE DISTRIBUTED
*                       VELOCITY METHOD (DVM) PROVIDES FLEXI-
*                       BILITY AND EFFICIENCY IN SOLVING THE
*                       RADIONUCLIDE TRANSPORT PROBLEM.  IT
*                       ALLOWS FOR THE TRANSPORT OF DECAY CHAINS
*                       OF ANY LENGTH, WITH ISOTOPES HAVING
*                       DIFFERENT RETARDATIONS, AND WITH SOURCE
*                       RATES BEING LEACH- OR SOLUBILITY-LIMITED.
*                       THIS MODIFIED VERSION (GENNET) PROVIDES
*                       FOR A GENERALIZED NETWORK TO DESCRIBE THE
*                       FLOW FIELD AND TRANSPORT PATH FOR RADIO-
*                       NUCLIDES.  GENNET HAS THE SAME CAPABILI-
*                       TIES AS NWFTDVM WITH THE ADDED FEATURE
*                       OF A USER SUPPLIED FLOW NETWORK.  FOR A
*                       DESCRIPTION OF THE NEW INPUT, REFER TO
*                       INPUT SUBROUTINE FLOWIN, AND FIND THE
*                       COMMENTS ON READING THE NETWORK AND
*                       BOUNDARY CONDITIONS.
*
*   LANGUAGE       -   ANSI STANDARD FORTRAN, VERSION 66
*
*   HARDWARE      -   CDC CYBER 76 SERIES MACHINES
*
*   LIBRARIES     -   SUBROUTINE LEQT1B FROM THE INTERNATIONAL
*                       MATHEMATICAL AND STATISTICAL LIBRARIES
*                       (IMSL)
*
*   EVOLUTION     -   THE NETWORK FLOW AND TRANSPORT (NWFT)
*                       MODEL, SANDIA NATIONAL LABORATORIES,
*                       1978-1979
*                       NWFTDVM MODEL, SANDIA NATIONAL LABORA-
*                       TORIES, 1979-1981
*                       GENNET, SANDIA NATIONAL LABORATORIES,
*                       JULY 1984
*
*   DOCUMENTATION -   (1) NWFTDVM USER'S MANUAL
*                       NUREG/CR-2081, SAND81-0886
*                       (2) NWFTDVM VERIFICATION
*                       NUREG/CR-3378, SAND83-1466
*
*   SANDIA CONTACTS - ROBERT M. CRANWELL
*                       CHARLENE L. HARLAN
*                       GINGER F. WILKINSON
*
*****
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GENNET FILES:

- GENCMP - GENNET COMPILE FILE
- GENLGO - GENNET COMPILED BINARIES
- GENO1 - GENNET USER'S GUIDE PROBLEM 1
- GENO2 - GENNET USER'S GUIDE PROBLEM 2
- GENO3 - GENNET USER'S GUIDE PROBLEM 3
- GENO4 - GENNET USER'S GUIDE PROBLEM 4
- GENDOC - FILE CONTAINING DOCUMENTATION ON GENNET

THE FOLLOWING SECTION DESCRIBES INPUT REQUIRED BY GENNET THAT IS NOT REQUIRED BY NWFTDVM:

- (1) BELOW ARE SEVEN RECORDS THAT DESCRIBE THE USER'S NETWORK AND ARE INSERTED INTO THE INPUT FILE FOLLOWING THE 'IOPT' RECORD. ALL OTHER INPUT TO GENNET IS AS DESCRIBED IN THE NWFTDVM (FIXED NETWORK) USER'S MANUAL, NUREG/CR-2081, SAND81-0886, NOV 1981. EXAMPLES OF THIS CAN BE FOUND IN THE SAMPLE PROBLEMS PROVIDED FOR GENNET.
 - (A) THE FIRST RECORD CONTAINS THE NUMBER OF LEGS (NLEG) AND NUMBER OF JUNCTIONS (NJCT) IN A (2I5) FORMAT. THE EXAMPLE NETWORK HAS 15 LEGS AND 12 JUNCTIONS. ARROWS ON THE FIGURE SHOW THE DIRECTION OF FLOW.
 - (B) THE NEXT FOUR RECORDS CONTAIN THE LEG/JCT DESCRIPTION IN A 4(3I5,5X) FORMAT. EACH SET OF THREE DIGITS FOLLOWED BY FIVE SPACES REPRESENTS ONE LEG AND ITS INLET JUNCTION NUMBER FOLLOWED BY ITS OUTLET JUNCTION NUMBER. FOR EXAMPLE, LEG 1 HAS INLET JUNCTION 1 AND OUTLET JUNCTION 4. NOTE THE DIRECTION OF FLOW IN LEG 1 OF THE FIGURE BELOW IS FROM JUNCTION 1 TO 4. SINCE THERE ARE FOUR LEGS DESCRIBED ON EACH RECORD, THE NUMBER OF RECORDS REQUIRED IS NLEGS/4. THE LEG AND JUNCTION NUMBERING SCHEME IS THE RESPONSIBILITY OF THE USER. THE DIFFERENCE BETWEEN ANY TWO JUNCTION NUMBERS THAT ARE CONNECTED BY A SINGLE LEG MUST BE ≤ 5 IN ORDER TO NOT EXCEED DIMENSIONS IN THE BANDED MATRIX 'AW'. IF PRESSURES ARE KNOWN AT THOSE JUNCTIONS (IE., A BOUNDARY CONDITION), THIS RESTRICTION DOES NOT APPLY. LEGS IN THE MIGRATION PATH MUST BE CONNECTED THRU JUNCTIONS.
 - (C) THE NEXT RECORD CONTAINS THE NUMBER OF BOUNDARY CONDITIONS (NB) - THAT IS, THE NUMBER OF JUNCTIONS FOR WHICH THE PRESSURE IS KNOWN - FOLLOWED BY THOSE JUNCTION NUMBERS, IN A (16I5) FORMAT.
 - (D) THE LAST RECORD CONTAINS 'NB' BOUNDARY PRESSURES CORRESPONDING TO THE JUNCTION NUMBERS LISTED IN (C) ABOVE IN A (8E10.3) FORMAT. INPUT UNITS ARE IN PSI AND ARE CONVERTED BY THE CODE TO LBS/FT**2.
- (2) THE FLOW NETWORK
 THIS NETWORK IS HARDWIRED INTO NWFTDVM AND IS DESCRIBED IN THE NWFTDVM USER'S MANUAL, NUREG/CR-2081, SAND81-0886, NOV 1981, FIGURE 5.3 ON PAGE 113.



(3) THESE SEVEN RECORDS DESCRIBE THE NETWORK:

15	12													
1	1	4		2	4	5		3	5	10		4	10	3
5	2	8		6	8	9		7	9	11		8	11	12
9	4	6		10	7	5		11	8	6		12	7	9
13	6	7		14	11	10		15	12	3				
3	1	2	3											
432.7E00	646.1E00	432.7E00												

GENNET INTERACTIVE PROCEDURE:

GET, GENLGO/UN=CRH
GET, TAPE5=GENO1/UN=CRH
ATTACH, IMSL/UN=LIBRARY
LIBRARY, IMSL
GENLGO, TAPE5, TAPE6

.

RETURN, *, TAPE6

(EXAMPLE USING GENO1)

(GET THE EXECUTABLE BINARIES)

(EQUIVALENCE GENO1 TO TAPE5)

(ATTACH THE IMSL LIBRARY)

(PREPARE THE IMSL LIBRARY)

(LOAD AND EXECUTE THE BINARIES)

(EXECUTION IN PROGRESS)

(RELEASE ALL FILES EXCEPT OUTPUT TAPE6)

PROCEDURE TO GET A HARDCOPY OF THIS DOCUMENTATION:

GET, GENDOC/UN=CRH
(SEND THIS FILE TO YOUR PRINTER)

A-1158, Task I, Repository Site Definition
 0976.010
 MAY 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)	0.0 -----	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
G & A	0	0
	-----	-----
TOTAL COSTS	0	0

III. Funding Status

Prior FY Carryover -----	FY 87 Projected Funding Level -----	FY 87 Funds Received to Date -----	FY 87 Funding Balance Needed -----
\$ OK	\$ OK	\$ OK	\$ OK

A-1158, Task II, Technology Transfer
 0976.020
 MAY 1987

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

	<u>Current Month</u>	<u>Year -to- Date</u>
I. Direct Manpower (man-months of charged effort)	0.2	3.5
II. Direct Loaded Labor Costs	1	28
Materials and Services	0	0
ADP Support (computer)	0	0
Subcontracts	-22	109
Travel	0	0
Other (computer roundoff)	1	2
G & A	-2	-5
	—	—
TOTAL COSTS	-22	134

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>
\$ 46K	\$150K	\$104K	\$ 0K

A-1158, Task III, Maintenance of Computer Codes
 0976.030
 MAY 1987

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

	<u>Current Month</u>	<u>Year -to- Date</u>
I. Direct Manpower (man-months of charged effort)	0.6 —	7.3 —
II. Direct Loaded Labor Costs	5	57
Materials and Services	0	0
ADP Support (computer)	1	10
Subcontracts	-2	31
Travel	0	0
Other (computer roundoff)	0	0
G & A	0	13
	—	—
TOTAL COSTS	4	111

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>
\$108K	\$174K	\$ 66K	\$ 0K

A-1158, Task IV, Code Validation and Verification
 0976.040
 MAY 1987

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

	<u>Current Month</u>	<u>Year -to- Date</u>
I. Direct Manpower (man-months of charged effort)	0.0 —	0.3 —
II. Direct Loaded Labor Costs	0	3
Materials and Services	0	0
ADP Support (computer)	0	0
Subcontracts	0	39
Travel	0	0
Other (computer roundoff)	0	1
G & A	0	6
	—	—
TOTAL COSTS	0	49

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>
\$ 50K	\$ 50K	\$ OK	\$ OK

A-1158, Task V, Short-term Technical Assistance
 0976.050
 MAY 1987

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

	<u>Current Month</u>	<u>Year -to- Date</u>
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
G & A	0	0
	---	---
TOTAL COSTS	0	0

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>
\$ 20K	\$ 20K	\$ 0K	\$ 0K

A-1158, Task VI, T. A. in Numerical Modeling
 0976.060
 MAY 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)	0.0 ---	0.0 ---
II. Direct Loaded Labor Costs	0	0
Materials and Services	0	0
ADP Support (computer)	0	0
Subcontracts	1	23
Travel	0	0
Other (computer roundoff)	0	-1
G & A	0	2
	-----	-----
TOTAL COSTS	1	24

III. Funding Status

Prior FY Carryover -----	FY 87 Projected Funding Level -----	FY 87 Funds Received to Date -----	FY 87 Funding Balance Needed -----
\$ OK	\$ 70K	\$ 70K	\$ OK

A-1158
 Total for Case 0976
 MAY 1987

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

	<u>Current Month</u>	<u>Year -to- Date</u>
I. Direct Manpower (man-months of charged effort)	0.8	11.1
II. Direct Loaded Labor Costs	6	88
Materials and Services	0	0
ADP Support (computer)	1	10
Subcontracts	-23	202
Travel	0	0
Other (computer roundoff)	1	2
G & A	-2	16
	<u> </u>	<u> </u>
TOTAL COSTS	-17	318

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>
\$224K	\$464K	\$240K	\$0K