

January 15, 1990

Mr. David H. Tiktinsky
Office of Nuclear Material Safety
and Safeguards
Division of High-Level Waste Management
U.S. Nuclear Regulatory Commission
Mail Stop 6A-4
Washington, DC 20555

Dear Mr. Tiktinsky:

Enclosed is the December 1989 monthly report for FIN A1165. If you have any questions or comments, please feel free to contact me at (FTS) 844-5303, P. A. Davis at (FTS) 846-5421, or L. L. Price at (FTS) 844-6206.

In addition, we have been offered the opportunity to renew our password to obtain access to INEL's CDC. We have decided not to renew this password because we have had no funding for computer code maintenance (Task 4) since FY88 and have not accessed this computer since April, 1988.

Sincerely,

Evaristo J. Bonano
Evaristo J. Bonano, Supervisor
Waste Management Systems
Division 6416

EJB:6416

Enclosure

Copy to:

- E. Davis
Office of the Director, NMSS
Attn: Program Support
- Robert Browning, Director
Division of High-Level Waste Management
- Seth Coplan
Division of High-Level Waste Management
- Pauline Brooks
Division of High-Level Waste Management
- John Randall
Division of Engineering
- 6410 D. A. Dahlgren
- 6416 E. J. Bonano
- 6416 P. A. Davis
- 6416 L. L. Price
- 6416 K. K. Wahi

9001190156 900115
PDR WASTE
WM-11 PDC

WM-11
A-1165
NHIS

6416 D. A. Zimmerman
6416 1183.000 File

SUMMARY SHEET

December 1989 Monthly Report for FIN A1165

<u>Task</u>	<u>Activity</u>	<u>Costs</u>
I	Licensing Methodology Assistance	\$ 0K
II	Uncertainty Identification and Analysis	\$ 22K
III	Probability Techniques	\$ 6K
IV	Maintenance and Management of PA Codes	\$ 0K
V	Technical Assistance for SCP Review	\$ 0K
VI	Short Term Technical Assistance	\$ 0K

PROGRAM: Licensing-Methodology Assistance FIN A1165
Task I

CONTRACTOR: Sandia National Laboratories BUDGET PERIOD: 10/89 -
9/90

NMSS PROGRAM MANAGER: P. Brooks BUDGET AMOUNT: \$1K

CONTRACT PROGRAM MANAGER: E. J. Bonano FTS PHONE: 844-5303

PRINCIPAL INVESTIGATORS: P. A. Davis FTS PHONE: 846-5421
L. L. Price FTS PHONE: 844-6206

PROJECT OBJECTIVE

To assist in the overall development and integration of the licensing assessment methodology.

ACTIVITIES DURING DECEMBER 1989

Subtask 1.1

I. Formal report: compilation of parameters and components of an overall performance assessment methodology.

A final copy of the report is currently in SNL management sign-off. All NRC comments have been addressed and all SNL reviews have been completed.

Subtask 1.3

V. A technical basis for NRC review of HLW repository modeling programs

A final copy of the report is currently in SNL management sign-off. All NRC comments have been addressed and all SNL reviews have been completed.

PROGRAM: Identification and Analysis of
Uncertainties

FIN A1165
Task II

CONTRACTOR: Sandia National
Laboratories

BUDGET PERIOD: 10/89 -
9/90

NMSS PROGRAM MANAGER: P. Brooks

BUDGET AMOUNT: \$37K

CONTRACT PROGRAM MANAGER: E. J. Bonano

FTS PHONE: 844-5303

PRINCIPAL INVESTIGATORS: P. A. Davis
L. L. Price

FTS PHONE: 846-5421
FTS PHONE: 844-6206

PROJECT OBJECTIVE

To identify, analyze, and recommend generic methodologies for treating uncertainties associated with performance assessments of HLW repositories.

ACTIVITIES DURING DECEMBER 1989

Subtask 2.1

I. Recommended techniques for assessing compliance with the EPA's HLW repository containment requirement (40CFR191.13)

A draft of this report has been completed and reviewed by a member of the SNL staff. It should be received by the NRC on time.

Subtask 2.2/2.6c

I. Identification, evaluation, quantification, and reduction of uncertainty in HLW repository performance assessments.

No activity this month.

Subtask 2.3

I. Elicitation and use of expert judgement in dealing with uncertainty in HLW repository performance assessments.

NRC comments on this report were received December 19, 1989. The authors will be meeting at the end of January to address these comments and prepare a final copy of the report. It should be completed on time.

Subtask 2.4

I. Methods for analyzing uncertainty in HLW repository performance assessment models.

This report is currently in progress and is expected to be delivered on time.

Subtask 2.5

All of the NRC comments on this report have been addressed and the report has been sent out for typing. A final copy of it should be ready soon for SNL management sign-off.

Subtask 2.6

I. Recommended methodologies for the analysis of data and parameter uncertainty in HLW repository performance assessment.

All SNL reviews of this report have been completed, and all NRC comments have been addressed. The final draft of this report is currently in SNL management sign-off.

IV. Uncertainty and sensitivity analysis in ground-water flow modeling.

Progress in December included performing an unconstrained run of the model to produce a CCDF of ground-water travel time. The run was unconstrained in that all 1000 of the LHS-generated transmissivity fields were used. In previous runs, each sample was checked to be sure that the pressure heads did not result in the water table being above the ground surface and that the pressure heads were consistent with known heads. Samples that did not meet these criteria were not used in the model run. Running the unconstrained model resulted in a greater spread in the CCDF of GWTT and in a greater mean GWTT. The draft form of this report is currently in final preparation, although it will be about two weeks late. It should be completed by January 31, 1990.

PROGRAM: Probability Techniques

FIN A1165
Task III

CONTRACTOR: Sandia National
Laboratories

BUDGET PERIOD: 10/89 -
9/90

NMSS PROGRAM MANAGER: P. Brooks

BUDGET AMOUNT: \$16K

CONTRACT PROGRAM MANAGER: E. J. Bonano

FTS PHONE: 844-5303

PRINCIPAL INVESTIGATORS: P. A. Davis
L. L. Price

FTS PHONE: 846-5421
FTS PHONE: 844-6206

PROJECT OBJECTIVE

To identify techniques for assigning probabilities to geologic processes and events.

ACTIVITIES DURING DECEMBER 1989

Subtask 3.2

I. Recommended techniques for estimating probabilities of events and processes affecting the performance of geologic repositories: assessing compliance with the EPA's containment requirements (40 CFR 191.13).

All sections of this report have been written. The contributions of the different authors (G. Apostolakis, UCLA; R. Bras, MIT; J. Gibbons, Applied Research; L. Price, SNL; and K. Wahi, GRAM, Inc.) are currently being converted into a single word-processor format and the various sections are being synthesized to form a cohesive report. Because of backlogs in typing, this report will be approximately one week late. It will be sent to the NRC on January 23, 1990.

PROGRAM: Short-Term Technical Assistance

FIN A1165
Task VI

BUDGET AMOUNT: \$3K

PROGRAM OBJECTIVE

To provide, on short notice, general technical assistance on HLW matters related to Tasks 1 through 5 that would not be provided in the normal course of the work in these tasks.

ACTIVITIES DURING DECEMBER 1989

No activity this month

FIN A1165
 Total for Case 1183.000
 December 1989

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)	0.1 -----	1.9 -----
II. Direct Loaded Labor Costs	1	18
Materials and Services	0	0
ADP Support (computer)	0	0
Subcontracts	23	33
Travel	0	1
General and Administrative	3	6
Other (computer round-off)	1	0
TOTAL COSTS	----- 28	----- 58

III. Funding Status

Prior FY Carryover -----	FY 90 Projected Funding Level -----	FY 90 Funds Received to Date -----	FY 90 Funding Balance Needed -----
\$57K	\$57K	\$0K	None

FIN A1165, Task I - Licensing Methodology Assistance
 Subcase 1183.010
 December 1989

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 -----	0.3 -----
II. Direct Loaded Labor Costs	0	3
Materials and Services	0	0
ADP Support (computer)	0	0
Subcontracts	0	0
Travel	0	0
General and Administrative	0	0
Other (computer roundoff)	0	0
TOTAL COSTS	----- 0	----- 3

III. Funding Status

Prior FY Carryover -----	FY 90 Projected Funding Level -----	FY 90 Funds Received to Date -----	FY 90 Funding Balance Needed -----
\$1K	\$1K	None	None

FIN A1165, Task II - Identification and Analysis of Uncertainties
 Subcase 1183.020
 December 1989

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 ---	0.7 ---
II. Direct Loaded Labor Costs	0	8
Materials and Services	0	0
ADP Support (computer)	0	0
Subcontracts	19	15
Travel	0	0
General and Administrative	2	3
Other (computer round-off)	1	0
TOTAL COSTS	22 ---	26 ---

III. Funding Status

Prior FY Carryover -----	FY 90 Projected Funding Level -----	FY 90 Funds Received to Date -----	FY 90 Funding Balance Needed -----
\$37K	\$37K	None	None

FIN A1165, Task III - Probability Techniques
 Subcase 1183.030
 December 1989

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)	0.1 ---	0.9 ---
II. Direct Loaded Labor Costs	1	7
Materials and Services	0	0
ADP Support (computer)	0	0
Subcontracts	4	18
Travel	0	1
General and Administrative	1	3
Other (computer round-off)	0	0
TOTAL COSTS	----- 6	----- 29

III. Funding Status

Prior FY Carryover -----	FY 90 Projected Funding Level -----	FY 90 Funds Received to Date -----	FY 90 Funding Balance Needed -----
\$16K	\$16K	None	None

FIN A1165, Task VI - Short Term Technical Assistance
 Subcase 1183.060
 December 1989

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
General and Administrative	0	0
Other (computer round-off)	0	0
TOTAL COSTS	0 -----	0 -----

III. Funding Status

Prior FY Carryover -----	FY 90 Projected Funding Level -----	FY 90 Funds Received to Date -----	FY 90 Funding Balance Needed -----
\$3K	\$3K	None	None

Deliverables and Due Dates
FIN A1165

Task 1

Subtask 1.1 - Components of an Overall Performance Assessment Methodology

Due Date - 12/1/89 Key Individuals - **L. Price**** and **K. Wahi**

Estimated Cost* - \$0K Status - SNL management sign-off

Subtask 1.3e - Technical Basis for Review of HLW Modeling Programs (Includes Subtasks 1.3b, 1.3c, and 1.3d)

Due Date - 12/1/89 Key Individuals - **L. Price** and **K. Wahi****

Estimated Cost - \$0K Status - SNL management sign-off

Task 2

Subtask 2.1 - Recommended Techniques for Assessing Compliance with the EPA's HLW Repository Containment Requirement

Due Date - 1/15/90 Key Individuals - **E. Bonano**, **K. Wahi**
Estimated Cost - \$1K Status - 95% complete.

Subtask 2.2/2.6c - SNLA's Approach to Assessing Compliance with Addressing EPA's Containment Requirements Including Addressing Uncertainties

Due Date - 2/28/90 Key Individuals - **E. Bonano** and **P. Davis**

Estimated Cost - \$14K Status - 20% complete

Subtask 2.3 - Elicitation and Use of Expert Judgment in HLW PA (Includes a portion of subtask 2.6e)

Due Date - 2/15/90 Key Individuals - **E. Bonano**, **R. Keeney**, **D. von Winterfeldt**, and **S. Hora**

Estimated Cost - \$1K Status - Addressing NRC comments

* - All costs are as of January 1, 1990

** - Lead individual for a given report is in bold letters

Subtask 2.4a - Treating Uncertainties in PA Models

Due Date - 1/31/90 Key Individuals - P. Davis, K. Wahi,
and G. Apostolakis
Estimated Cost - \$2K Status - 90% complete

Subtask 2.5a - Scenario Development Methodology

Due Date - 1/31/90 Key Individuals - R. Cranwell and
L. Price
Estimated Cost - \$1K Status - Addressing NRC comments

Subtask 2.6a - Methodologies for Data and Parameter Uncertainty

Due Date - 12/1/89 Key Individuals - P. Davis, K. Wahi,
J. Helton, T. Zimmerman, and A.
Gutjahr
Estimated Cost - \$0K Status - SNL management sign-off

**Subtask 2.6d - Comparison of Uncertainty and Sensitivity Analysis
Techniques (Includes Subtask 2.6e)**

Due Date - 1/15/90 Key Individuals - P. Davis and
T. Zimmerman
Estimated Cost - \$2K Status - 90% complete

Task 3

**Subtask 3.2 - Estimating Probabilities for Initiating Events and
Processes**

Due Date - 1/15/90 Key Individuals - G. Apostolakis,
R. Bras, J. Gibbons,
K. Wahi
Estimated Cost - \$3K Status - 85% complete

Task 6

Short Term Technical Assistance

Funds Remaining - \$5K

DELIVERABLES SUBMITTED DURING THE CURRENT REPORTING PERIOD

<u>SUBTASK NUMBER</u>	<u>DELIVERABLE TITLE</u>	<u>DATE</u>	<u>STATUS</u>
-----------------------	--------------------------	-------------	---------------

None			
------	--	--	--

SCHEDULE OF MILESTONES AND DELIVERABLES

SUBTASK NUMBER	DELIVERABLE TITLE	DRAFT DUE	FINAL DUE	STATUS
1.1	Components of an Overall Performance Assessment Methodology	Submitted Dec. 1, 1988	Dec. 1, 1989	In SNL management sign-off.
1.3e	Technical Basis for NRC Review of HLW Repository Modeling	Submitted June 14, 1989	Dec. 1, 1989	In SNL management sign-off.
2.1	Techniques for Assessing Compliance with the EPA's HLW Repository Containment Requirement	Jan. 15, 1990	60 days after receipt of NRC comments	In progress
2.2/2.6c	Identification, Evaluation, Quantification, and Reduction of Uncertainty in HLW Repository Performance Assessments: A Preliminary Report	Feb. 28, 1990	60 days after receipt of NRC comments	In progress
2.3	Elicitation and Use of Expert Judgment in Performance Assessment for HLW Repositories	Submitted July 26, 1989	Feb. 15, 1990	Addressing NRC comments.
2.4a	Criteria for Judging the Validity of Models	Jan. 31, 1990	60 days after receipt of NRC comments	In progress

<u>SUBTASK NUMBER</u>	<u>DELIVERABLE TITLE</u>	<u>DRAFT DUE</u>	<u>FINAL DUE</u>	<u>STATUS</u>
2.5	Risk Methodology for Geologic Disposal of Radioactive Waste: Scenario Selection Procedure	Submitted June 27, 1989	Jan. 31, 1990	Addressing NRC comments
2.6a	Methodologies for Analyzing Data and Parameter Uncertainty	Submitted May 31, 1989	Dec. 1, 1989	In SNL management sign-off.
2.6d	Comparison of Uncertainty and Sensitivity Analysis Techniques for Saturated Ground Water Flow and Transport Models	Jan. 15, 1990	60 days after receipt of NRC comments	In progress
3.2	Techniques for Determining Probabilities of Events Affecting the Performance of Geologic Repositories: Volume 2 -- Demonstration of Techniques	Jan. 15, 1990	60 days after receipt of NRC comments	In progress