

Sandia National Laboratories

Albuquerque, New Mexico 87185

June 15, 1988

Dr. Daniel Galson
Operations Branch
Division of High-Level Waste Management
Office of Nuclear Materials Safety
and Safeguards
U.S. Nuclear Regulatory Commission
Mail Stop 4D16
Washington, DC 20555

Dear Dr. Galson:

Enclosed is the May 1988 monthly report for FIN A1165. If you have any questions or comments, please feel free to contact me at (FTS) 844-5644, E. J. Bonano at (FTS)844-5303, or P. A. Davis at (FTS)846-5421.

Sincerely,

Robert M. Cranwell for NRO

Nestor R. Ortiz, Acting Supervisor
Waste Management Systems
Division 6416

NRO:6416

Enclosure

Copy to:

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
John Randall
Division of Engineering
6410 N. R. Ortiz
6415 R. M. Cranwell
6416 E. J. Bonano
6416 P. A. Davis

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PROGRAM: Licensing-Methodology Assistance

FIN A1165
Task I

CONTRACTOR: Sandia National
 Laboratories

BUDGET PERIOD: 10/87 -
 9/88

NMSS PROGRAM MANAGER: D. Galson

BUDGET AMOUNT: \$248K

CONTRACT PROGRAM MANAGER: N. R. Ortiz

FTS PHONE: 844-5644

PRINCIPAL INVESTIGATORS: E. J. Bonano
 P. A. Davis

FTS PHONE: 844-5303
FTS PHONE: 846-5421

PROJECT OBJECTIVE

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

ACTIVITIES DURING MAY 1988

E. Bonano gave a presentation on the demonstration of the basalt performance assessment methodology developed under FIN A1266 to NMSS staff on May 23. The presentation included discussions on the SNLA/NRC methodologies, the differences between the bedded salt and basalt methodologies, the models and computer codes available, the scenarios analyzed, the approach for uncertainty and sensitivity analyses, and the capabilities for assessing compliance with the ground-water travel time requirement in 10 CFR Part 60 and the containment requirement in 40 CFR Part 191.

On May 24 - 25, a program review was held at NRC. SNLA staff and contractors attending the meeting were N. Ortiz, E. Bonano, D. Gallegos, L. Paul, I. Hall, K. Wahi, M. Goodrich, and J. Sellards. All the deliverables under FIN A1165 were discussed. As a follow-up to the request for a 3-month extension on the deadlines for all deliverables, SNLA suggested new due dates for all reports. Preliminary indications are that these new due dates are acceptable to NRC. There was some discussion regarding a possible change in the order in which the deliverables will be completed; however, no definite agreement was reached. Below, under each deliverable, the actions taken are summarized. In the afternoon of May 25, SNLA staff and contractors met with NRC staff in groups separated by disciplines to discuss more in detail the NRC needs.

Subtask 1.1

I. Interim report: compilation of parameters and components of an overall licensing assessment methodology and development of a tracking scheme.

Sandia is waiting for NRC comments on this report. P. Brooks (NRC) will collect all NRC comments and will forward them to SNLA. As a result of responses to these comments the final report discussed below will be prepared.

II. Critical parameters and components for licensing assessment

Following the response to the comments on the interim report above, this formal report will be a revised version of the former. SNLA expects to submit the draft of this report to NRC within 2 months following the receipt of NRC comments on the interim report. There was a long discussion regarding whether or not the tracking scheme for codes and parameters should be part of this report. In this issue, SNLA was following instructions in the current Statement of Work. SNLA has found that the Center for Nuclear Waste Regulatory Analysis (CNWRA) has developed a computerized tracking system that is more comprehensive than the one proposed by SNLA. It may be possible to amend the Statement of Work for FIN A1165 so that the implementation of the tracking scheme is done by CNWRA. At present this report is about 75% complete. The expected due date for the draft of this report is 9/30/88.

Subtask 1.2

I. Compilation, comparison, and evaluation of computer codes for licensing assessment

It was decided that the codes examined under this subtask should include any data management, and pre- and post-processor codes available. It was suggested that there should be a separate chapter/section for geochemical codes. It was also agreed that there must be a clear statement of the purpose and objectives of the report as well as an explicit description of the criteria used to evaluate the codes. The new due date for this report is 4/30/89.

Subtask 1.3

I. Modeling efforts needed to support a HLW repository license application

This report has been merged with the formal report in subtask 1.1.

II. Processes for which validated models will not exist at the time of a HLW repository license application.

It was agreed that this report should address those processes whose models are expected to be highly uncertain, and consequently, represent areas in which the NRC needs to have tools for independent assessments and evaluations.

III. Recommended approaches for evaluating the application of HLW disposal system models

This report will provide a set of guidelines to NRC staff to follow in the evaluation of models used by DOE. The expected due date is 11/30/88.

IV. Review of the NRC's modeling strategy document for HLW performance assessment

The only discussion regarding this report was with respect to the due date. It was proposed that this review should be done earlier than is currently planned; however, no definite decision was reached. The review is expected to be completed by 1/31/89.

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

There was no discussion regarding this report. The expected due date is 3/31/89.

Subtask 1.4

I. Performance assessment program reviews

No activity this month.

Management Issues

The \$5K correction needed on staff charges for this task was done; however, it was not shown in the budget report for May. It should be reflected in the June figures.

FIN A1165, Task I - Licensing Methodology Assistance
 Subcase 1183.010
 May 1988

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)	2.7 ---	17.1 ---
II. Direct Loaded Labor Costs	23	154
Materials and Services	7	9
ADP Support (computer)	0	0
Subcontracts	-5	48
Travel	6	9
G&A	3	23
Other (computer roundoff)	-1	1
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TOTAL COSTS	33*	244

III. Funding Status

Prior FY Carryover -----	FY 88 Projected Funding Level -----	FY 88 Funds Received to Date -----	FY 88 Funding Balance Needed -----
\$68K	\$248K	\$180K	None

*Includes \$5K of staff-time charges that have been corrected but
 not yet reflected in the budget reports.

PROGRAM: Identification and Analysis of
Uncertainties

FIN A1165
Task II

CONTRACTOR: Sandia National
Laboratories

BUDGET PERIOD: 10/87 -
9/88

NMSS PROGRAM MANAGER: D. Galson

BUDGET AMOUNT: \$495K

CONTRACT PROGRAM MANAGER: N. R. Ortiz

FTS PHONE: 844-5644

PRINCIPAL INVESTIGATORS: E. J. Bonano
P. A. Davis

FTS PHONE: 844-5303
FTS PHONE: 846-5421

PROJECT OBJECTIVE

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

ACTIVITIES DURING MAY 1988

Subtask 2.1

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

It was suggested that the outline for this report be modified to include a section on sensitivity analysis as Section 2.3.5. It was also discussed that the report should make mention of other approaches, if available, to generate the CCDF or assess compliance with the requirement. The expected due date for the draft of this report is 12/31/88.

Subtask 2.2

I. Identification, evaluation, quantification, and reduction of uncertainty in HLW repository performance assessments: a preliminary report.

SNLA has received NRC comments on this report and will begin to address these comments shortly. It was suggested during the program review that there is a need to make a clear distinction between the definition of the terms "data" and "parameters." The expected due date for this report is 9/30/88.

Subtask 2.3

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

There was much discussion on this report with respect to the section entitled "Interpretation of Reasonable Assurance." NRC staff stated that the task of interpreting reasonable assurance is the

responsibility of the commission, and therefore, it would not be appropriate for the report to contain such a section. It was finally decided that for the time being the section will be included in the report with the possibility that it could be removed at a later date. Several references were suggested including generic technical positions on "Peer Review" and "Qualification of Existing Data" as well as a textbook on the "Method of Endorsements." It was also agreed that "expert judgment" will replace "expert opinion" in the report. The expected due date for the draft of this report is 1/31/89.

Subtask 2.4

S. Coplan (NRC) and E. Bonano (SNLA) agreed to schedule a meeting for mid July to discuss further the two reports under this subtask. The reason for the meeting is that there seems to be a discrepancy with respect to the intent and purpose of these reports between NRC and SNLA.

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

There was little discussion with respect to this report except for a suggestion to include a discussion on "Parameter Uncertainty." The new due date for this report is 2/28/89.

II. Approaches to building confidence in HLW repository performance assessment models.

It was agreed that the current Chapter 5 in the outline will be moved to the end and become Chapter 7. The new title of the chapter should be "Integration of Confidence Building Methods Through Expert Judgment." It was also suggested that the report should clearly state the basis for confidence building and discuss "informal" vs. "formal" use of expert judgment. The new due date for this report is 12/31/89.

Subtask 2.5

I. Methodology for scenario development and screening.

There was much discussion on this report regarding the approach for scenario development in Chapter 2. It was suggested that as a result of the activities of the Nuclear Energy Agency's Scenario Working Group, some changes are necessary. SNLA will study the changes and submit to the NRC PM how new developments in scenario selection can be incorporated into the report. At present, the report is scheduled to be completed by 9/30/88.

Subtask 2.6

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

It was suggested that this report should include a section on sensitivity analysis. The new due date for this report is 9/30/88.

II. The use of expert judgement to estimate data and parameter uncertainty.

This report has been merged with the formal report on Subtask 2.3.

III. Identification, analysis, quantification, and reduction of data and parameter uncertainty in HLW repository performance assessment.

The due date of 9/30/89 for this report was questioned because it coincides with the termination of the contract. SNLA assured NRC that, if the revisions to the report are not extensive, they will be completed.

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

It was suggested that the adjective "saturated" precede "ground-water flow." It was also suggested that the description of the conceptual model should be moved to the beginning of the report. The due date for this report is 6/30/89.

V. Recommended procedures for obtaining data and parameter uncertainty from site characterization data.

SNLA will prepare a new outline for this report and suggest a due date. There was much discussion along the lines that the report should discuss how probability distribution functions for parameters can be obtained from collected data, but that the outline presented was not consistent with this objective.

FIN A1165, Task II - Identification and Analysis of Uncertainties
 Subcase 1183.020
 May 1988

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)	.7 -----	3.5 -----
II. Direct Loaded Labor Costs	6	39
Materials and Services	0	1
ADP Support (computer)	0	0
Subcontracts	14	33
Travel	0	8
G&A	2	9
Other (computer roundoff)	1	1
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TOTAL COSTS	23*	91

III. Funding Status

Prior FY Carryover -----	FY 88 Projected Funding Level -----	FY 88 Funds Received to Date -----	FY 88 Funding Balance Needed -----
\$60K	\$495K	\$435K	None

*Investigating subcontractor charges.

PROGRAM: Probability Techniques

FIN A1165
Task III

CONTRACTOR: Sandia National
Laboratories

BUDGET PERIOD: 10/87 -
9/88

NMSS PROGRAM MANAGER: D. Galson

BUDGET AMOUNT: \$240K

CONTRACT PROGRAM MANAGER: N. R. Ortiz

FTS PHONE: 844-5644

PRINCIPAL INVESTIGATORS: E. J. Bonano
P. A. Davis

FTS PHONE: 844-5303
FTS PHONE: 846-5421

PROJECT OBJECTIVE

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

ACTIVITIES DURING MAY 1988

Subtask 3.1

I. Techniques for estimating probabilities of events and processes affecting the performance of geologic repositories: a literature review.

The necessary changes to this report are being made. They are expected to be completed by the end of June and a draft copy ready by the end of July.

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 (40CFR191.13).

The only discussion with respect to this report was a suggestion that Chapter 4 be reorganized to be consistent with the topics discussed in the report under Subtask 3.1. The expected due date for this report is 1/31/89.

FIN A1165, Task III - Probability Techniques
 Subcase 1183.030
 May 1988

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 -----	1.0 -----
II. Direct Loaded Labor Costs	1	11
Materials and Services	0	0
ADP Support (computer)	0	0
Subcontracts	17	41
Travel	0	0
G&A	2	5
Other (computer roundoff)	-1	0
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TOTAL COSTS	19*	57

III. Funding Status

Prior FY Carryover -----	FY 88 Projected Funding Level -----	FY 88 Funds Received to Date -----	FY 88 Funding Balance Needed -----
\$120K	\$190K	\$70K	None

* Investigating subcontractor charges.

PROGRAM: Maintenance and Management
of PA Codes

FIN A1165
Task IV

CONTRACTOR: Sandia National
Laboratories

BUDGET PERIOD: 10/87 -
9/88

NMSS PROGRAM MANAGER: D. Galson

BUDGET AMOUNT: \$5K

CONTRACT PROGRAM MANAGER: N. R. Ortiz

FTS PHONE: 844-5644

PRINCIPAL INVESTIGATORS: E. J. Bonano
P. A. Davis

FTS PHONE: 844-5303
FTS PJONE: 846-5421

PROJECT OBJECTIVE

To provide for a program of computer code maintenance and configuration management for codes developed for the NRC's HLW performance assessment program.

ACTIVITIES DURING MAY 1988

Subtask 4.5

SNLA presented a list of the activities that were originally planned under this subtask along with estimated costs for several of these activities per the request of the NRC PM. No definite agreement was reached regarding whether all or any of these activities will be carried out. SNLA expressed concern that several of these activities are extremely important and that they should be undertaken, but that due to shortage of manpower a decision on NRC's part must be made soon to allow scheduling that will not impact the ongoing work.

FIN A1165, Task IV - Maintenance and Management of PA Codes
 Subcase 1183.040
 May 1988

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 —
II. Direct Loaded Labor Costs	0	2
Materials and Services	0	0
ADP Support (computer)	0	0
Subcontracts	19	24
Travel	0	0
G&A	2	2
Other (computer roundoff)	<u>1</u>	<u>0</u>
TOTAL COSTS	22*	28

III. Funding Status

Prior FY Carryover -----	FY 88 Projected Funding Level -----	FY 88 Funds Received to Date -----	FY 88 Funding Balance Needed -----
None	\$5K	\$5K	None

*Investigating subcontractor charges.

PROGRAM: Technical Assistance for SCP Review

FIN A1165
Task V

CONTRACTOR: Sandia National
Laboratories

BUDGET PERIOD: 10/87 -
9/88

NMSS PROGRAM MANAGER: D. Galson

BUDGET AMOUNT: \$45K

CONTRACT PROGRAM MANAGER: N. R. Ortiz

FTS PHONE: 844-5644

PRINCIPAL INVESTIGATORS: E. J. Bonano
P. A. Davis

FTS PHONE: 844-5303
FTS PHONE: 846-5421

PROJECT OBJECTIVE

To develop internal staff guidance for review of the draft consultation SCP's and final SCP's in the area of performance assessment, to review selected parts of the draft and final SCP's, and to review NRC staff comments on selected parts of the draft and final SCP's.

ACTIVITIES DURING MAY 1988

No activity this month.

FIN A1165, Task V - Technical Assistance for SCP Review
 Subcase 1183.050
 May 1988

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 ---	3.6 ---
II. Direct Loaded Labor Costs	0	33
Materials and Services	0	0
ADP Support (computer)	0	0
Subcontracts	16	46
Travel	0	2
G&A	2	10
Other (computer roundoff)	-1	-1
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TOTAL COSTS	17*	90

III. Funding Status

Prior FY Carryover -----	FY 88 Projected Funding Level -----	FY 88 Funds Received to Date -----	FY 88 Funding Balance Needed -----
None	\$90K	\$90K	\$None

*Investigating subcontractor charges.

PROGRAM: Short-Term Technical Assistance

FIN A1165
Task VI

CONTRACTOR: Sandia National
Laboratories

BUDGET PERIOD: 10/87 -
9/88

NMSS PROGRAM MANAGER: D. Galson

BUDGET AMOUNT: \$64K

CONTRACT PROGRAM MANAGER: Nr. R. Ortiz

FTS PHONE: 844-5644

PRINCIPAL INVESTIGATORS: E. J. Bonano
P. A. Davis

FTS PHONE: 844-5303
FTS PHONE: 846-5421

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 MAY 1988

No activity this month.

FIN A1165, Task VI - Short Term Technical Assistance
 Subcase 1183.060
 April 1988

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
G&A	0	0
Other (computer roundoff)	0	0
TOTAL COSTS	0 ---	0 ---

III. Funding Status

Prior FY Carryover -----	FY 88 Projected Funding Level -----	FY 88 Funds Received to Date -----	FY 88 Funding Balance Needed -----
\$19K	\$39K	\$20K	None

FIN A1165
 Total for Case 1183.000
 May 1988

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)	3.5 -----	24.5 -----
II. Direct Loaded Labor Costs	30	239
Materials and Services	7	10
ADP Support (computer)	0	0
Subcontracts	61	192
Travel	6	20
G&A	11	48
Other (computer roundoff)	-1	1
	-----	-----
TOTAL COSTS	114*	510

III. Funding Status

Prior FY Carryover -----	FY 88 Projected Funding Level -----	FY 88 Funds Received to Date -----	FY 88 Funding Balance Needed -----
\$267K	\$1067K	\$800K	None

* Includes \$5K of staff-time charges that have been corrected but not yet reflected in report and subcontractor charges that are being investigated.