

Sandia National Laboratories

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Leslie A. Peeters
Repository Projects Branch
Division of Waste Management
U.S. Nuclear Regulatory Commission
7915 Eastern Avenue
Silver Spring, MD 20910

WM-RES
WM Record File
A-1165
SNL

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

Distribution:
LPeters _____

(Return to WM, 623-SS) _____ C2

Dear Ms. Peeters:

Enclosed are the final program plans for FIN A-1165, Tasks 1, "Assisting in the Development of the Licensing Assessment Methodology," and 3, "Identifying Techniques for Probability Assignment." I have incorporated the changes that we discussed in your office on November 15.

Please feel free to call me or Bob Cranwell if you have any questions.

Sincerely,

Regina L. Hunter
Waste Management Systems
Division 6431

Enc.

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PDR WMRES EXISANL
A-1165 PDR

Program Plan for FIN A-1165, Task 1
Assisting in the Development
of the Licensing Assessment Methodology

Background

The NRC is working to develop tools and techniques, called a "licensing assessment methodology," for use in assessing the licensing documents to be submitted by the Department of Energy for mined geologic nuclear-waste repositories. The NRC has a number of contractors working on various specific aspects of the licensing assessment methodology. Aerospace, Inc., is developing a method for assessing the compliance of the waste package. Golder Associates has worked on aspects of the problem dealing with engineered barriers. Sandia National Laboratories (SNLA) is developing tools and techniques for far-field performance assessment, called the performance assessment methodology. It has become increasingly clear that a separate task is needed to examine the licensing assessment methodology as a whole for completeness, compatibility of the parts, and redundancy and to evaluate the reasons for any such flaws. This task is named "Assisting in the Development of the Licensing Assessment Methodology," or simply, "Integration." This program plan describes FIN A-1165, Task 1, Integration. The program has been funded by the NRC at Sandia National Laboratories at a level of \$150K per year for three years. Only the first two years of the program are described in this program plan. A demonstration of the entire methodology, to be carried out in a third year, will be described in a later program plan.

Purpose

The Integration task will examine the various component methodologies thus far developed by NRC contractors for the purpose of assessing DOE licensing documents. The Integration task will determine whether the component methodologies are complete and compatible or to some extent incomplete, incompatible, or redundant. If such flaws are found in the existing or developing component methodologies, recommendations for course corrections will be made. The entire task will be carried out by one or a few SNLA staff and on-site contractors, so that a true "integration" of the components will be possible; however, the SNLA staff will work with Aerospace and other NRC contractors and staff to ensure that all viewpoints are represented. Although a primary purpose of this Task is to provide advice to the NRC regarding any necessary changes in the licensing assessment methodology, SNLA will not give direction to the other NRC contractors.

Subtask 1. Obtain and Read Published Documentation

At the present time, no one person is familiar with all aspects of the component methodologies. Under Task 1, one or at most two persons will obtain and read all SOW's for the NRC contractors and all published methodology documentation. It will not be necessary under this task to become capable of using the tools, such as codes, that are available, but only to be familiar with the capabilities of the codes and their required input and projected output.

This subtask is expected to require 6 man-months and to cost \$64K.

Subtask 2. Prepare a Status Report on the Existing Methodologies

Subtask 2 will entail the preparation of a status report that briefly describes the existing component methodologies. The status report will include a brief overview description of each component methodology and an annotated bibliography of the published documentation. The results of this subtask will be used to reevaluate and possibly redirect the work done under the subsequent subtasks.

Subtask 2 is expected to require 6 man-months and to cost \$64K.

Subtask 3. Obtain and Read Unpublished Documentation; Discuss Undocumented Results with Project Participants

Not all of the component methodologies have been documented. In order to make the integration as up-to-date as possible, it will also be necessary to read drafts of documents that are not yet final and to discuss with the project participants work which is not yet even in draft form. This task will require some travel.

This subtask is expected to require 2 man-months in reading unpublished documentation, costing \$22K, and travel taking up to .75 man-month and costing \$20K.

Subtask 4. Present Interim Results to NRC Staff

In order to provide information and advice to the NRC in as timely a fashion as possible, SNLA staff will give presentations to the NRC as required, but at least semi-annually. The presentations will be given in the NRC offices and will include a summary of accomplishments to date, an evaluation of the portions of the methodology investigated to date, and any

suggestions for redirection of the methodology-development program.

The cost of this subtask is included in the other subtasks.

Subtask 5. Prepare a Report Documenting the Existing Methodology and Comparing It with an Idealized Methodology

After all aspects of the component methodologies, both documented and undocumented, have been reviewed, a draft report will be prepared. The draft report will describe a complete licensing assessment methodology that resembles as closely as possible the sum of the existing component methodologies. In addition, the existing component methodologies will be described and compared with the idealized methodology. This draft report will be discussed with project participants and NRC staff and management to ensure that there is consensus on the idealized methodology and that the existing component methodologies have been accurately described. The idealized methodology will also be evaluated in the light of NRC policy and resource limitations. A final report, adding any recommendations for additions to or alterations of the existing methodology necessary to bring it into line with the idealized methodology, will be prepared and submitted to NRC for review. The final report will also include a discussion of possible technical risks of not developing the complete idealized methodology because of NRC policy or resource limitations. This subtask will require some travel.

This subtask is expected to require 6 man-months for the preparation of the draft report, costing \$64K; travel taking up to .75 man-month and costing \$20K; and 4.5 man-months for the preparation of the final report, costing \$46K.

Work to be Performed

The bar chart below shows the scheduling for the various tasks described above. Each hyphen represents one man month.

Fiscal Years and Quarters
1985 1986

1 2 3 4 1 2 3 4

Subtask 1
Obtain and Read
Documents

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Subtask 2
Prepare Status Report

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Subtask 3
Obtain and Read
Documents
Discuss Unpublished
Results

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Subtask 4
Present Interim Results

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Subtask 5
Prepare Draft Report
Discuss Draft with
Project Participants
Prepare Final Report

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Personnel

Regina L. Hunter:

(Principal Investigator) Areas of
Expertise--Performance Assessment,
Scenario Development, Geology
Areas of Expertise--Performance
Assessment, Computer Modeling,
Chemistry

Margaret S. Y. Chu:

Areas of Expertise--Data-base
Management, Literature Review and
Abstracting, Mineralogy and Geochemistry

Pei-lin Tien:

Program Plan for FIN A-1165, Task 3
Identifying Techniques for Probability Assignment

Background

The EPA has developed a standard (40CFR191) for the performance of nuclear-waste repositories. The standard is probabilistic, in that releases of certain magnitudes may be permissible at low probabilities but not at higher probabilities. The NRC is responsible for licensing the nuclear-waste repositories proposed by DOE. Before licensing, NRC must assess the compliance of the proposed repositories with the applicable standards. NRC is now developing a licensing assessment methodology for use in assessing the compliance of the repositories. One of the tools needed in the methodology is a method or set of techniques for assigning probabilities to various geologic processes and events of interest in the licensing proceedings. The task described in this program plan, FIN A-1165, Task 3, "Identifying Techniques for Probability Assignment," (Probability task) is designed to begin the process of finding or developing the appropriate techniques. The task will require the assistance of up to ten experts in specific fields, whose services will be obtained by contracts to be let as a part of this task.

Purpose

In FY 85, the Probability task will assemble a panel of experts to examine the literature in several fields of interest to the NRC in licensing nuclear-waste repositories and will prepare a report documenting the status of the relevant probabilistic methods. The examination will determine whether there are existing methods for assigning probabilities to the geologic processes and events studied by each field. Existing methods will be documented. Recommendations for further study will be made for fields in which there are currently inadequate probabilistic methods.

Subtask 1. Prepare Lists of Geologic Processes and Events of Interest; Prepare List of Experts

Some geologic processes and events are of greater interest to nuclear-waste management than others. The first part of the Probability task will be to choose a preliminary list of those geologic processes and events that appear to be of greatest interest to the NRC. The preliminary list will be submitted to the NRC Program Manager (PM) for approval. The work of determining whether there are existing methods for assigning probabilities to the geologic processes and events of interest will be carried out in large part by experts in the

various fields of interest. A preliminary list of suggested experts will be submitted to the NRC PM for approval.

This subtask is expected to require 1 man-month and to cost \$11K.

Subtask 2. Prepare Contracts and Obtain the Services of Experts

The preparation of contracts at Sandia National Laboratories can be a time-consuming process, especially when a large number of contracts with specific individuals is required. In order to expedite the process to the greatest extent possible, the Sandia Principal Investigator (PI) for the Probability task will devote nearly full time to it from the time that the NRC PM approves the list of experts until all contracts are in place. A sample SOW will be submitted to the NRC PM for approval before the contracts are put in place.

This subtask is expected to require 1.5 man-months of the PI's time, costing \$16K.

Subtask 3. Meet with Experts and Present Program Requirements

Most of the work of literature review, evaluation, and documentation of existing techniques for assigning probabilities to geologic processes and events will be done by experts under contract. Before they begin, the Sandia staff will meet with them and describe the necessity for the techniques, the nature of techniques that might be of use, the reporting requirements, and the time schedule.

This subtask is expected to take 0.75 man-month, to require some travel, and to cost \$15K. The cost of the contracts to obtain the services of the expert panelists is included in Subtask 4.

Subtask 4. Review Literature and Document Existing Techniques

As mentioned above, the actual literature review, evaluation, and initial documentation will be carried out by the expert panelists. The Sandia staff will supervise the work to ensure that it meets the needs of the NRC and is completed in a timely fashion.

The subtask is expected to take 1 man-month of staff time, costing \$11K. In addition, contracts with 8 to 10 experts, at \$8K to \$10K each, will cost \$75K.

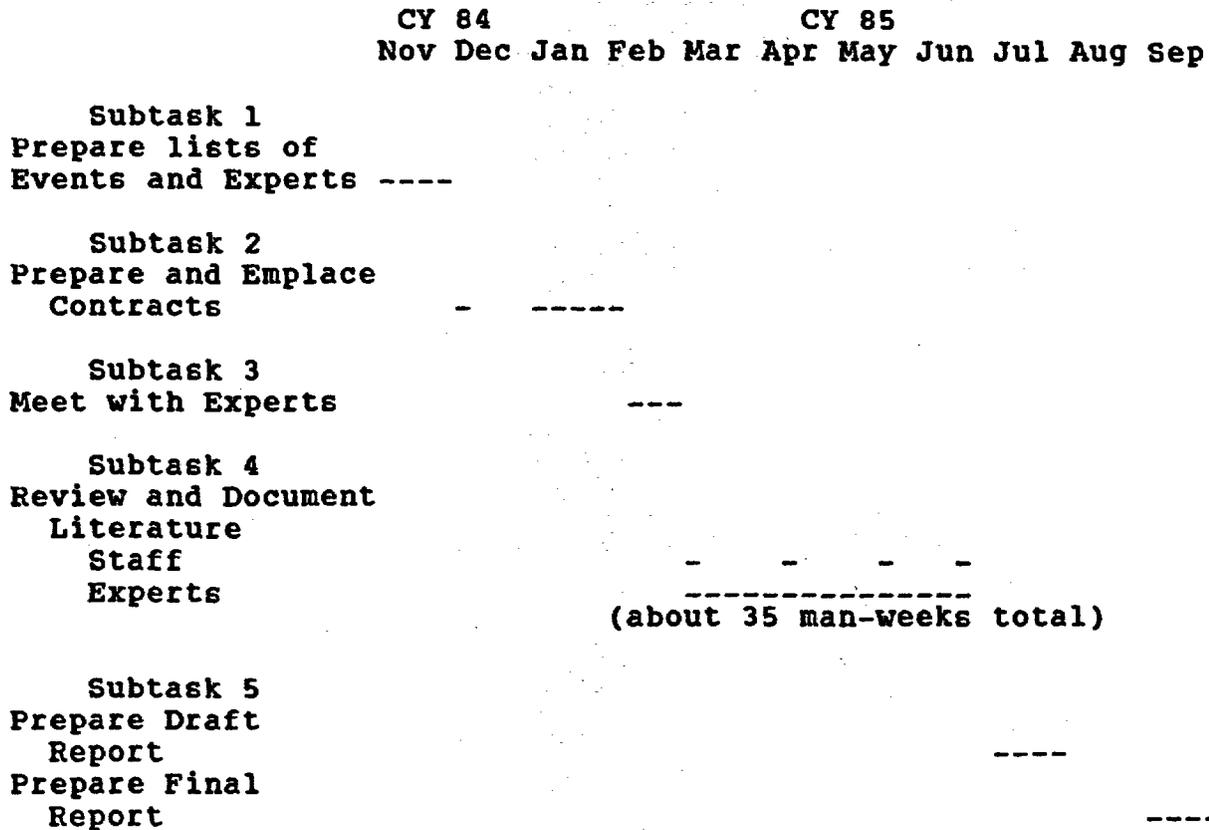
Subtask 5. Prepare Final Report Documenting Existing Techniques

After the experts submit drafts of their initial documentation of the existing techniques, the Sandia staff will review and evaluate the reports for completeness and usefulness to the NRC. The PI will work with the experts to prepare final drafts of their reports. The PI will prepare a draft of a summary report, which will probably incorporate the texts of the expert's final drafts, that describes all existing techniques for assigning probabilities to the geologic processes and events of interest. Events and processes for which there are no existing techniques will also be discussed. Recommendations for future work to develop techniques for dealing with these events and processes will be included. The draft report will be submitted to the NRC PM for comment. After receipt of the NRC comments, the final report will be prepared.

Preparation of the draft report is expected to take 1 man-month of Sandia staff time and to cost \$11K. Preparation of the final report is also expected to take 1 man-month of Sandia staff time and to cost \$11K.

Work to be Performed

The bar chart below shows the scheduling for the tasks described above. Each hyphen represents one man week.



Personnel

Regina L. Hunter:

(Principal Investigator) Areas of
Expertise--Performance Assessment,
Scenario Development, Geology

Robert M. Cranwell:

Areas of Expertise--Probabilistic Risk
Assessment; Mathematics; Probabilistic
Techniques