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PDR
LPDR B, N, S

Waste Management Engineering Branch
Division of Waste Management
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Distribution:

Buckley | TECHNICAL
NOTE |

Attention: Mr. John Buckley, Mail Stop 623-SS, Project Officer 15

Subject: NRC Contract No. NRC-02-84-002 (EI Project No. 1148)
"Technical Assistance for "In Situ Testing"
Letter Progress Report Covering the Period of
20 December 1983 to 31 March 1984

Ladies and Gentlemen:

Enclosed please find one (1) copy of the subject report as required by the contract. As required, the following persons are being sent copies:

- Office of the Director, NMSS
- Director, Division of Waste Management
- Contracting Officer
- Chief, High-Level Waste Technical Development Branch

Should you have any questions, please do not hesitate to contact the undersigned.

Sincerely,

ENGINEERS INTERNATIONAL, INC.

Robert A. Cummings

Robert A. Cummings
Project Engineer

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Enclosure

- cc: Office of the Director, NMSS
 (ATTN: Program Support Branch) - 1
 Director, Division of Waste Management - 2
 Contracting Officer - 1
 High-Level Waste Technical Development Branch - 1
 (ATTN: Branch Chief)

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ENGINEERS INTERNATIONAL, INC.

EI Project No. 1148

NRC Contract No. NRC-02-84-002

TECHNICAL ASSISTANCE FOR DESIGN REVIEWS

First Monthly Report - 20 December 1983 to 31 March 1984

1.0 INTRODUCTION

This report covers the activities of Engineers International, Inc. (EI) during the period 20 December 1983 (date of contract award) to 31 March 1984. Professional personnel involved were Messrs. Kendorski, Cummings, Singh, Bhattacharya, Wilkey, Dunn, Jennings, Rajaram, and Laurito.

2.0 PROJECT OBJECTIVE

This contract is intended to provide technical assistance to the NRC in reviewing plans and procedures for in situ testing that may be carried out in support of the siting and design of a geologic HLW repository. Assistance is to be focused on underground stress, rock mass strength, geotechnical instrumentation of test areas, hydrologic instrumentation of test areas, thermomechanical effects, excavation methods, and quality assurance for bulk measurements of geologic properties, as these relate to in situ testing.

Ultimately, these efforts are to aid NRC in its responsibility for ensuring the proper siting, design, construction, operation, and decommissioning of geologic HLW disposal facilities, such that the EPA limits for radionuclide release will not be exceeded.

3.0 ACTIVITIES DURING THE REPORTING PERIOD

3.1 Summary of Activities

There was no technical activity on the contract until the issuance of Task Order 001 on 13 January 1984. This Task Order consisted of attendance by the EI Project Manager and Project Engineer at a kick-off meeting in Silver Spring to discuss the pursuit of future efforts under the contract.

The one-day meeting took place on 18 January 1984. A meeting report was sent on 16 February 1984, summarizing the discussions, and completing the requirements of the Task Order.

On 17 February, EI suggested a change of Project Manager from F. S. Kendorski to Dr. M. M. Singh. This was further clarified by telephone and letter on 26 and 27 March, respectively. As of the

close of the reporting period, no final decision on this change had been received by EI.

On 07 March, NRC issued Task Orders 002, 003, and 004. These are discussed separately, as follows.

Task Order 002

This Task Order consists of review of a document entitled "Investigation of Equivalent Porous Medium Permeability in Networks of Discontinuous Fractures", by J. C. S. Long of the Earth Sciences Division of Lawrence Berkeley Laboratory. The document reports upon an investigation to determine under what conditions of fracturing a fractured rock mass can approximate a porous medium. It may become a significant reference work in seal performance verification and design.

EI prepared a Task Order budget estimate which was not received by NRC. A second budget estimate was prepared and sent on 28 March. This Task Order had not been definitized as of the close of the reporting period, and the effort expended under this Task Order has been minimal during the reporting period.

Task Orders 003 and 004

In this report, these two Task Orders are discussed together because of their great similarity.

Task Orders 003 and 004 are document review and data inventory efforts in preparation for the review of the Environmental Assessments (EAs) scheduled to be released this summer. Task Order 003 deals with salt media and Task Order 004 with tuff. Each carried a ceiling authorization prior to definitization, to enable immediate planning and commencement of effort.

Considerable planning took place prior to preparing cost proposals on these two Task Orders, since it is critical that a consistent and workable screening system be implemented to identify key documents.

Technical and cost proposals were submitted to the NRC on 19 March. As of the end of the reporting period, definitization had not yet taken place.

Along with cost proposal preparation, the procurement of documents, and the screening process, were begun. On Task Order 003, document sources are chiefly the ONWI library listing, ONWI publications list, Oak Ridge National Laboratory listing, the EA reference lists from NRC, and the computer search service DIALOG. For Task Order 004, reliance was placed on DIALOG, Sandia bibliographic listings, and the NNWSI bibliographic listing. DIALOG was especially useful to locate references that postdate the bibliographic listings.

Examination of these lists revealed over 500 documents considered to be "relevant" in some tangible sense to an EA for salt, and approximately 200 for tuff. While this is not a complete listing, it still is too large to be useful in rapid review of an EA. Accordingly, criteria were developed under one or more of which a document is "directly relevant" to an EA; these are:

- most recent, thorough compendium of data
- singular document (only treatise on a critical subject)
- specific to a given site or siting area,
- key document attributes (as described in the Task Order.

It was decided to limit the subject of matter of "relevant" documents to areas of relevance to in situ testing within EI's expertise that may be touched upon in the EA. Accordingly, documents not considered in our screening process even though they will probably appear in the EAs, are as follows:

- socioeconomic
- legal aspects, for example, land ownership and water rights
- geochemical aspects of radionuclide decay and migration
- basic research not specific to a given site or not specific to repository design
- meteorologic/atmospheric effects and data
- details of waste form and waste package design
- health physics aspects of radionuclide exposure
- natural resource assessments (parks, wildlife, etc.)
- defense implications.

Documents we are considering for their relevance to EAs are in the areas of:

- geologic characterization
- hydrologic characterization
- summaries pertaining to natural or induced seismicity
- surface and subsurface geophysical exploration
- properties of geologic materials in situ and in the laboratory
- engineering design, construction, and behavior of repository openings; coupled effects
- policies, plans, and schedules pertaining to site characterization, design, and construction
- occurrence and nature of natural or man-induced preferential pathways
- summaries of subsidence and tectonics
- modeling and simulation techniques related to site characterization and geotechnical repository design.

In addition to this, a file index and flowheet were developed to guide project staff on the pursuit of the work. This information will be provided to the NRC at the Document Review Meeting. Documents thought to be relevant as per the above criteria are listed bibliographically on a form. Areas of utility to an EA, and the inclusion of hard data, are noted on the form. If directly relevant, an abstract is made on the form to give the casual reviewer an idea as to the content of the document. This activity corresponds to Subtask 2, Familiarization. Relevant document sheets may or may not be accompanied by DIALOG abstracts, paper copies, or reference to microfiche. Directly relevant documents will be filed along with paper copies.

Suggested key documents are being identified and will be discussed with the NRC at the Document Review Meeting.

All documents are being assessed for their content of raw data. Raw data is identified by category code and source description (major or minor source) on the document review sheets.

Task Order 005

Task Order 005 was issued to EI by NRC on 30 March. This is a data/document review task order for a basalt repository.

3.2 Results

Task Order 001 is complete. The staff professional hours are:

<u>Name</u>	<u>Title</u>	<u>Total hours</u>
F. S. Kendorski	Project Manager	14
R. A. Cummings	Project Engineer	<u>26</u>
	TOTAL	<u>40</u>

Task Order 002 is about 10 percent complete. The staff professional hours are:

<u>Name</u>	<u>Title</u>	<u>Total hours</u>
R. A. Cummings	Project Engineer	3½

In Task Order 003, Task 1 is about 20 percent complete; work has mainly been carried out in Subtask 1, Data and Document Procurement, Subtask 2, Data and Document Familiarization, and Subtask 3, Data Inventory. No work has been done on Task 2. The manpower expenditure to March 31 on Task Order 003 is as follows:

<u>Name</u>	<u>Title</u>	<u>Total hours</u>
M. M. Singh	Principal (Project Manager)	2
R. A. Cummings	Project Engineer	19½
M. F. Dunn	Senior Mining Engineer	32
P. L. Wilkey	Principal Civil Engineer	81
A. W. Laurito	Mining Engineer	11
S. Bhattacharya	Senior Mining Engineer	3
V. Rajaram	Assistant Project Manager	14
R. L. Jennings	Senior Geologist	32½
	TOTAL	<u>195</u>

Work on Task Order 004 has dealt with the same 3 subtasks and the percentage completion for Task 1 of Task Order 004 is about 35 percent. The manpower expenditures to 31 March are:

<u>Name</u>	<u>Title</u>	<u>Total hours</u>
M. M. Singh	Principal (Project Manager)	9
R. A. Cummings	Project Engineer	23
M. F. Dunn	Senior Mining Engineer	71
A. W. Laurito	Mining Engineer	37
S. Bhattacharya	Senior Mining Engineer	52
V. Rajaram	Assistant Project Manager	16
	TOTAL	<u>208</u>

4.0 QUALITY ASSURANCE

There have been no Quality Assurance efforts expended to March 31. EI, as discussed in the Proposal, has a full Quality Assurance program, and applies it as appropriate.

5.0 DIFFICULTIES

It has become clear that the number of "relevant" documents for an EA in salt is very large, inasmuch as there are 7 sites or site areas under consideration. In order to reduce this to a workable number of key documents for detailed review and minimize losses of critical information, it has been necessary to stringently control the screening process on Task Order 003. This and the sheer volume of material to be sifted through have slowed progress.

6.0 ACTIVITIES PLANNED FOR THE NEXT REPORTING PERIOD

During April 1984, work on Task Order 003 will accelerate upon Task Order definitization, in preparation for the Document Review Meeting and unscheduled Data Review Meeting. It is hoped that key document reviews can begin during April, based on NRC approval of the suggested key document list. Work on Task Order 004 will be at a lower level of effort but will be directed at having the bulk of the documents procured and classified for the anticipated May meetings. A cost and technical proposal on Task Order 005 will be submitted and work on this Task Order is also expected to begin. Task Order 002 will be completed early in the reporting period.

Documents on Task Orders 003, 004, and 005 are expected to be coming in to the EI library for some time, so the completion schedule for the document procurement and initial review activities is uncertain.

7.0 MEETINGS/TRIPS DURING THE REPORTING PERIOD

The only meeting was the kickoff meeting, January 18, as described previously.

8.0 SCHEDULE AND COST PROJECTIONS

The present cost status is attached.

Respectfully submitted,

ENGINEERS INTERNATIONAL, INC.



Robert A. Cummings
Project Engineer

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