



United States Department of the Interior

BUREAU OF MINES  
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WASHINGTON, D.C. 20241

January 24, 1984

U.S. Nuclear Regulatory Commission  
Division of Contracts  
Washington, D.C. 20555

ATTN: Cindy Fleenor  
Technical Assistance Contracts Branch

SUBJECT: Monthly Progress Report - December 1983 Interagency Agreement  
Number NRC-02-80-075, "State-of-the-Art Assessment for Large  
Diameter Horizontal Nuclear Waste Emplacement Holes"

Dear Mrs. Fleenor:

Enclosed is our fourth monthly progress report on the subject interagency  
agreement for December 1983. This is in accordance with Article I, Number  
3.1-Reporting Requirements.

*Earle B. Amey*

Earle B. Amey, Staff Engineer  
Division of Health and Safety  
Technology

Enclosures

WM Record File  
B-6934

WM Project 10, 11, 16  
Docket No. \_\_\_\_\_

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December 1983 Monthly  
STATE-OF-THE-ART ASSESSMENT  
OF  
LARGE DIAMETER HORIZONTAL  
NUCLEAR WASTE EMPLACEMENT HOLES

**1.0 Drilling of Emplacement Holes**

Principal Investigator - Gerald L. Finfinger

**Work Completed During Reporting Period**

Research this month was primarily centered on borehole surveying techniques. Since controlled directional drilling has application in the oil and gas industry a large variety of equipment has been developed and tested for borehole surveying. However, the degree of accuracy requested in this project proposal (hole deviation less than 12 inches from the starting point) is greater than is normally attempted in most drilling operations. Instrument accuracy, survey calculation method, survey interval and borehole geometry all contribute to the overall accuracy of the survey. Open-ended boreholes could be checked for total deviation since both ends of the borehole could be surveyed externally. However dead-ended holes would have to rely totally on the internal survey for deviation control. The proper combination of survey instrument, calculation method and most importantly the survey interval would have to be properly selected to obtain the desired borehole characteristics. Further investigations should reveal if any case histories exist which are similar to the nuclear waste emplacement holes. The preliminary draft on drilling and tunneling technology which has application to the nuclear waste emplacement holes has been completed.

**Work Completed to Date**

All computer implemented literature searches on drilling, tunnelling and surveying have been completed. Leading manufacturers have been contacted and product information has been obtained.

**2.0 Maintaining Integrity of Emplacement Holes**

Principal Investigator - Daniel R. Babich

**Work Completed During Reporting Period**

Research consisted of compiling the findings to date into three (3) preliminary drafts pertaining to:

1. General rock mechanics considerations and host rock characteristics of emplacement holes in basalt and tuff deposits.
2. The influence of discontinuities on nuclear waste repository stability.
3. Effects of temperature upon waste isolation hole stability.

In addition, results of research into methods of hole casing is being prepared as a preliminary draft.

### Work Completed to Date

Literature searches of rock mechanics and hole casing were completed. Literature search started for grouting techniques. Three (3) rock mechanics drafts completed. Preliminary draft on hole casing started.

### 3.0 Backfilling of Emplacement Holes

Principal Investigator - Robert Evans

#### Work Completed During Reporting Period

During this reporting period the use of sonic and gamma radiation detection devices for determining density of solids was discussed with a representative of the Schlumberger Company. Four additional articles including, "Assessment of Retrieval Alternatives for the Geologic Disposal of Nuclear Waste", were reviewed. An outline for "Backfilling of Emplacement Holes," was prepared. (Task 3.2). No significant findings for this period are presented.

During the next reporting period work will continue on preparing the first drafts for the sections, "Materials for Backfilling," (Task 3.3) and "Mechanical, Pneumatic and Hydraulic Systems for Backfilling" (Task 3.4).

### 4.0 Retrieving Waste Canisters from Emplacement Holes

Principal Investigator - Gerald L. Finfinger

#### Work Completed During Reporting Period

A computer implemented literature search has been conducted and pertinent information is being received. Both cased and noncased holes are being considered. Particular emphasis is being paid to overcoring technology since operations similar to the retrieval requirement have been conducted. Equipment needed for the overcoring operation has been designed and built for previous studies; however, the operation was conducted from a surface site. Drawings and equipment specifications are being obtained.

### Work Completed to Date

Same

Man-Effort

<u>Task</u>	<u>Man-Hours This Period</u>	<u>Total Man- Hours to Date</u>	<u>Percent of Available Hours</u>
1.0	111	372	33%
2.0	273	572	48%
3.0	20	268	43%
4.0	109	109	32%

*Edward D. Thimons*  
Edward D. Thimons

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