

PROJECT ~~WM-10~~/LFH/83/04/28/0

- 1 -

JUN 15 1983

DISTRIBUTION

106  
~~WM-10 (101.2)~~ ✓  
 WMHT r/f  
 NMSS r/f  
 CF  
 REBROWNING  
 MBELL  
 PALTOMARE  
 HJMILLER  
 JTGREEVES  
 LHARTUNG & r/f  
 JRHODERICK  
 RJOHNSON  
 LCHASE  
 PDR

106  
PROJECT ~~WM-10~~

Mr. J. O. Neff  
 Salt Repository Program Manager  
 U. S. Department of Energy  
 National Waste Terminal Storage  
 Program Office  
 505 King Ave.  
 Columbus, OH 43201

WM Record File  
106

WM Project 16  
Docket No. \_\_\_\_\_

PDR ✓  
LPDR ✓

Distribution:


Dear Mr. Neff:

(Return to WM, 623-SS)

Present schedules indicate that the Department of Energy (DOE) will nominate a salt repository site(s) and submit a Site Characterization Plan (SCP) for the Salt Repository program to the Nuclear Regulatory Commission (NRC) for review in calendar year 1984. In view of this schedule, it will be prudent to complete and document the review of certain issues regarding exploratory shaft construction and sealing issues judged to be common to any salt site and that might require long lead times for data collection and analysis. This should be done prior to start of shaft construction.

Two broad areas of concern are: (1) that the site characterization activities (e.g., constructing an exploratory shaft) will not compromise subsequent long term isolation and containment capabilities of the repository and (2) that plans for construction of the exploratory shaft will not preclude the acquisition of adequate information for site characterization. With these broad concerns in mind, a series of activities were initiated by NRC to identify and resolve issues concerning the exploratory shaft. First, the NRC evaluated alternative shaft construction techniques (Attachment No. 1 is our contractor's report on this subject.) Second, the NRC/DOE/NPO meeting April 19-20, 1983 provided the opportunity for a very preliminary discussion concerning exploratory shaft construction and sealing, more detailed interactions are now in order.

With regard to the first of the two broad concerns mentioned above, 10 CFR 60.11(a)(6)(iii) calls for a description of "provisions to control any adverse safety-related effects from site characterization including appropriate quality assurance programs." Similar language is included in

8401270161 830615  
 PDR WASTE  
 WM-16 PDR

00085





JUN 15 1983

PROJECT WM-10/LFH/83/04/28/0

- 3 -

Please contact me at your earliest convenience to establish a mutually agreeable schedule to work toward the interactions which are necessary prior to exploratory shaft construction and sealing.

Sincerely,

"ORIGINAL SIGNED BY"

Lawrence Chase, Project Manager  
High-Level Waste Technical  
Development Branch  
Division of Waste Management

Attachment:

1. Golder Associates, Evaluation of Alternative Shaft Sinking Technologies for High Level Waste (HLW) Deep Geologic Repositories, USNRC NUREG/CR-2854, 1983
2. Information considered necessary regarding exploratory shaft construction and sealing.

DesireeM 83/05/20

OFC :	WMHT <i>MA</i> :	WMHT <i>JR</i> :	WMHT <i>RL</i> :	WMHT <i>J</i> :	WMHT <i>L</i> :	WMHT <i>H</i> :
NAME :	LHartung:dm :	JRhoderick :	RJohnson :	JWareeves :	LChase :	HJMiller :
DATE :	05/24/83 :	05/26/83 :	05/24/83 :	05/19/83 :	06/13/83 :	05/13/83 :

6/13/83

JUN 15 1983

INFORMATION CONSIDERED NECESSARY REGARDING  
EXPLORATORY SHAFT CONSTRUCTION AND SEALING

## I. Shaft and Seal Design Considerations

- Provide an analysis of the potential effects of construction of the exploratory shaft on long-term sealing capabilities of rock mass and identify factors that determine the nature and extent of such effects.
- Describe how the selected excavation technique and shaft design accounts for limitations and uncertainties in long term sealing considerations.
- Provide design specifications for the shaft construction and show how they deal with the factors affecting sealing.
- Describe the seal design and materials.
- Discuss the selected locations of any planned explorations or testing to be performed along the length of the shaft. Include discussion of data on sealing characteristics to be gathered and the limitations and uncertainties associated with the data.

## II. Construction Plans and Procedures

- Identify the acceptance criteria for construction of exploratory shafts.
- Identify procedures used to minimize damage to the rock mass penetrated and specific plans to mitigate these effects if applicable to a proposed site.
- If a liner is used, identify liner construction and placement techniques. This information needs to be fully considered in application of any permanent sealing program.

## III. Sealing and Grouting Plans and Procedures

- Describe how the seals are expected to perform in sealing exploratory shafts. Describe tests done, both laboratory and field, to determine their long-term durability and their compatibility, both chemical and physical, to the host rock environment.
- Describe the placement methods, including the limitations and uncertainties of the methods.

- Describe remedial methods to be used if sealing methods are found to be inadequate.

#### IV. Construction Testing and Inspection Plans and Procedures

- Describe test and inspection procedures to be used during excavation to determine acceptability of the shaft as constructed.
- Describe test and inspection procedures to be used during shaft liner construction. Include information such as grout injection rates, grout bond logs, thermal measurements of grout during curing, and liner instrumentation to be used.
- Describe test and inspection procedures to be used after sealing of the shaft to assess the results of the sealing effort in controlling adverse effects. Include information such as grout strength tests, visual identification of seal conditions, records of water inflow, assessment of seal bond to host rock, and logging of drill holes.
- Describe plans to document the above construction activities.

#### V. Plans and Procedures for Gathering Specific Information Related to Site Characterization

- Describe test plans and procedures used to obtain adequate data on site characteristics that can be measured either directly or indirectly during construction of the exploratory shaft. For example:
  - o Geologic mapping and rock mass characterization of the shaft walls
  - o Measurements of rates and quantities of groundwater inflow and collection of groundwater samples for testing
  - o Measurement of mud loss and control of zones of high mud loss
  - o Measurements of overbreakage during blasting
  - o Rock mechanics testing of samples obtained during drill and blast operations

#### VI. Quality Assurance (QA)

- Identify the line of responsibility for implementing QA procedures down to and including the Construction Contractor (10 CFR 50 Appendix B. Criteria I requires that "organizations

performing quality assurance functions shall report to a management level such that this required authority and organizational freedom, including sufficient independence from cost and schedule when opposed to safety consideration, are provided").

- Identify the procedures to be used by the Quality Assurance organization for implementing and monitoring the QA program for exploratory shaft design, construction and testing.