



**Department of Energy
National Waste Terminal
Storage Program Office
505 King Avenue
Columbus, Ohio 43201**

**WM DOCKET CONTROL
CENTER**

September 1, 1983

*See Vocket for
Enclosure*

Hubert Miller, Chief
HLW Technical Development Branch
Division of Waste Management
Nuclear Regulatory Commission
7915 Eastern Avenue
Silver Springs, MD 20910

WM Record File <u>106.1</u>	WM Project <u>16</u>
	Docket No. <u>✓</u>
	PDR <u>✓</u>
	LPDR <u>✓</u>
Distribution:	
<u>HM</u>	
<u>DMATSON</u>	
(Return to WM, 623-SS)	<u>15</u>
<u>cc: B. EDWARDS</u>	

Dear Mr. Miller:

NOTES SUMMARIZING AUGUST 22, 1983 MEETING WITH SALT STATE REPRESENTATIVES

A one-day meeting was held at Battelle in Columbus to discuss two EA related issues:

- o Siting Guidelines "Boundary" Terminology
- o Salt Management/Disposal

Due to the short notice for this meeting, representatives from Louisiana and Utah were unable to attend. It was agreed that these meetings (called Topical Meetings) should continue to take place every other month, so that, along with the scheduled bimonthly meetings, there will be an EA related meeting every month.

It was agreed that written material will be transmitted prior to the meetings which will outline our definition of issues to be discussed at the upcoming meeting and the treatment to be used in addressing these issues in the EA. Steve Frishman suggested that the states look at the ONWI Work Breakdown Structure (WBS) and together choose two topics for discussion at an October meeting. Decisions on topics and a date for the meeting should be agreed upon by early September.

Finally, it was recommended that NRC be invited to these Topical Meetings.

A brief discussion of the August 23 meeting follows:

Linda McClain opened the state meeting. A complete list of attendees is attached (Attachment 1).

Rick Moleski discussed the various types of interactions between the project and the salt states both pre-NWPA and post-NWPA. Meetings involving EA issues will be handled as follows:

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PDR WASTE
WM-16 PDR

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EA Concerns

Proposed Approach

- | | | |
|---|---------------------|--|
| o | Programmatic Issues | Bimonthly Consultation Meetings
in Columbus |
| o | Technical Issues | Topical Meetings in Columbus |
| | a. General | Meetings in the interested State |
| | b. State Specific | |

Bill Hewitt defined and discussed seven distinct "boundary" areas as they apply to a repository. They were:

- Restricted Area
- Operational Area
- Unrestricted Area
- Waste Emplacement Area
- Disturbed Zone
- Controlled Zone
- Accessible Environment

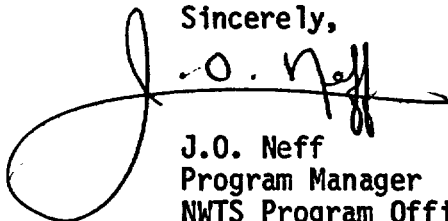
Tim Solack discussed quantities of salt and other mined material removed and stored on site during construction of the exploratory shaft and subsurface chambers. (Attachment 2)

Jim Gould discussed the above issues for repository construction, and salt pile management. (Attachment 3) Slides were shown of the salt pile from a potash mine in Canada.

Scott Smith presented various options for salt disposal. (Attachment 4)

If you have any questions concerning this meeting, please contact Gary Marmer at (614) 424-5916.

Sincerely,



J.O. Neff
Program Manager
NPTS Program Office

NPO:JON:kgh

- Attachments: 1) August 22, 1983 Meeting Attendees
2) Viewgraphs of Exploratory Shaft Salt Management
3) Viewgraphs of Repository Salt Management
4) Viewgraphs of Salt Disposal Options

- cc: D. Keller, ONWI, w/attachments
Meeting Attendees, w/attachments
S. Goldsmith, ONWI, w/attachments
G. Marmer, ANL-NPO, w/attachments
L. Casey, NPO, w/attachments
R. Wunderlich, NPO, w/attachments
T. Baillieu, NPO, w/attachments
R. Johnson, NRC, w/attachments

ST# 520-83

*Enclosure to 9/1/83
press from Huff
to Miller*

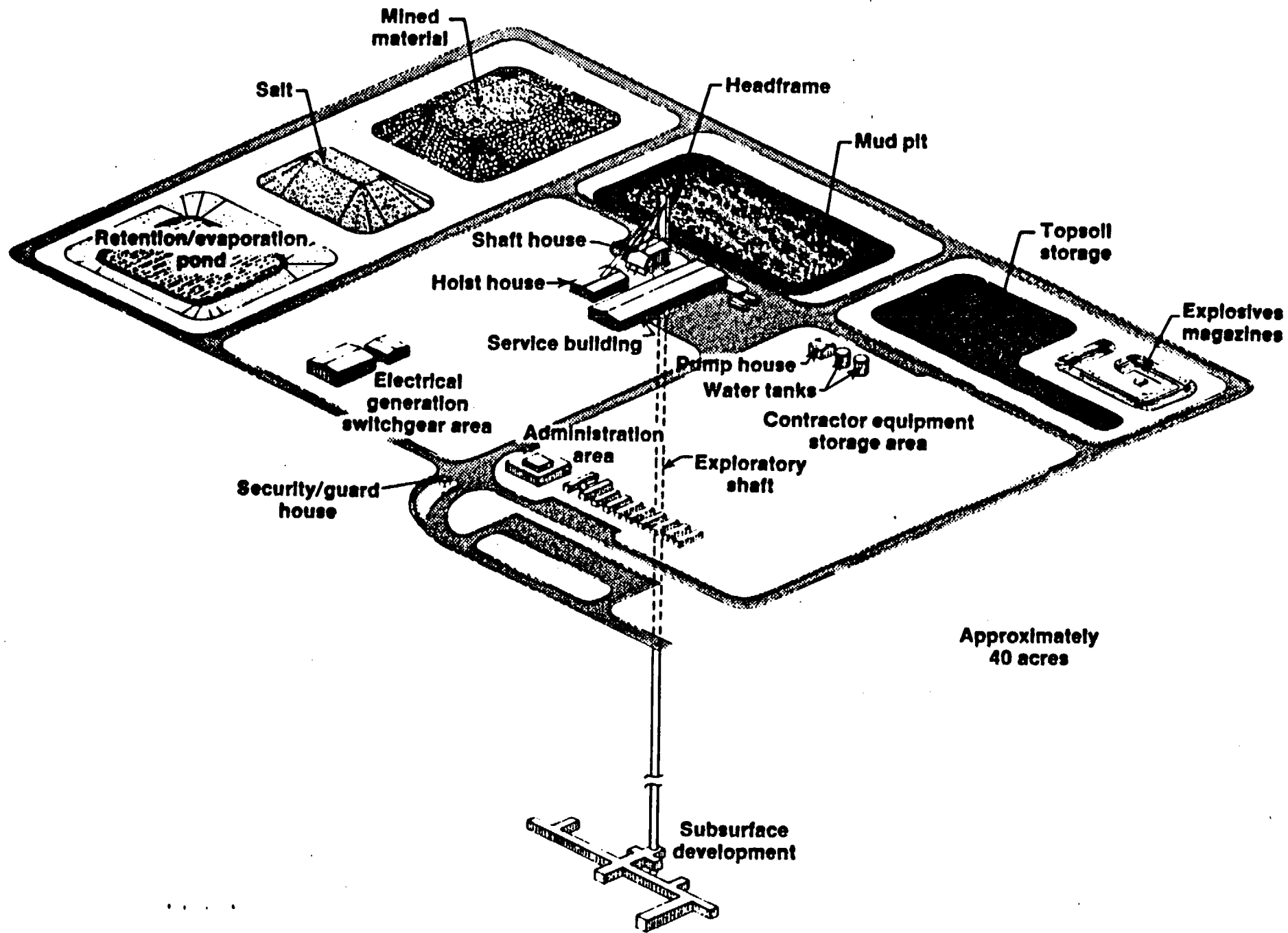
ATTACHMENT 1

MEETING ATTENDEES
AUGUST 22, 1983

<u>NAME</u>	<u>AFFILIATION</u>	<u>ADDRESS</u>	<u>PHONE #</u>
Linda McClain	DOE-NPO	505 King Avenue Columbus, OH 43201	(614) 424-5916
Steve Frishman	State of TX Governor's Off.	Box 12428 Austin TX 78711	(512) 475-4444
Ted Thomas	ONWI	505 King Avenue Cols., OH 43201	(614) 424-4687
Don Keller	ONWI	505 King Avenue Cols., OH 43201	(614) 424-7676
Gary Marmer	ANL/NPO	505 King Avenue Cols, OH 43201	(614) 424-5916
Scott S. Smith	ONWI	505 King Avenue Cols, OH 43201	(614) 424-4956
Frederick Moleski	ONWI	505 King Avenue Cols., OH 43201	(614) 424-7288
Mary Lou Brown	ONWI	505 King Avenue Cols., OH 43201	(614) 424-4799
Curtis W. Stover	MS.Bu/Geol.	P.O. Box 5348 Jackson, MS	(601) 354-6228
Kelly A. Haggard	MS Dept. of Energy & Trans.	510 George St. Jackson, MS	(601) 961-4733
Bill McIntosh	ONWI	505 King Avenue Cols., OH 43201	(614) 424-5797
Bill Hewitt	ONWI	505 King Avenue Cols., OH 43201	(614) 424-5473
Jim Gould	ONWI	505 King Avenue Cols., OH 43201	(614) 424-4842
Tim Solack	ONWI	505 King Avenue Cols, OH 43201	(614) 424-7186
Ron Zussman	DOE-CH	9800 S. Cass Ave. Argonne, IL 60439	(312) 972-2096

ATTACHMENT 2

VIEWGRAPHS OF EXPLORATORY SHAFT SALT MANAGEMENT



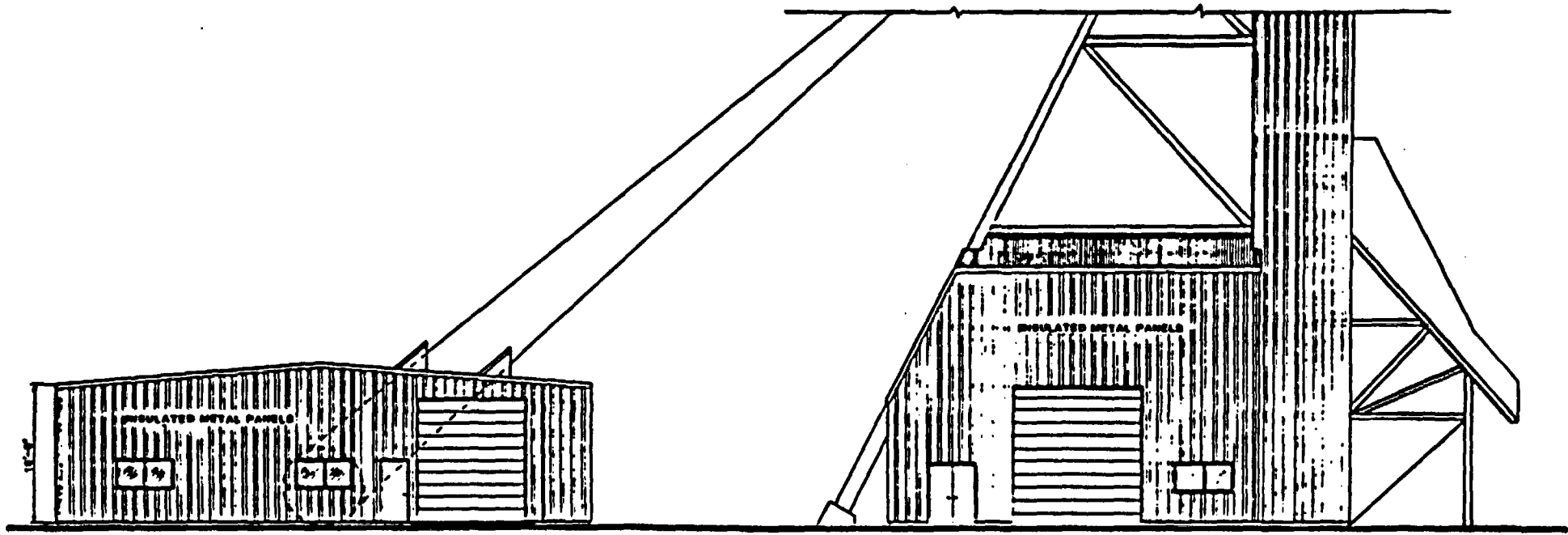
Exploratory Shaft Facility

EXPLORATORY SHAFT SALT STORAGE AREA CAPACITIES

	<u>PERMIAN</u>	<u>PARADOX</u>	<u>GULE</u>
STOCKPILE TOTAL ACREAGE	6.5 ACRES	8.0 ACRES	8.0 ACRES
SALT STOCKPILE	16,500 cy ACTUAL-9,200 cy*	12,000 cy ACTUAL-8,800 cy**	25,000 cy ACTUAL-22,600 cy***
MINED MATERIAL	46,500 cy ACTUAL-32,200 cy	44,000 cy ACTUAL-31,600 cy	22,800 cy ACTUAL-11,400 cy
EVAPORATION PONDS	2.5 MILLION GALS	3.6 MILLION GALS	3.9 MILLION GALS
EXCESS SALT FOR DISPOSAL	700 cy	750 cy	700 cy

- APPROXIMATELY 1,000 cy FROM SHAFT AND 8,200 cy FROM DRIFTS
- APPROXIMATELY 1,300 cy FROM SHAFT AND 7,500 cy FROM DRIFTS
- APPROXIMATELY 15,200 cy FROM SHAFT AND 7,500 cy FROM DRIFTS

TMS: 8/23/83

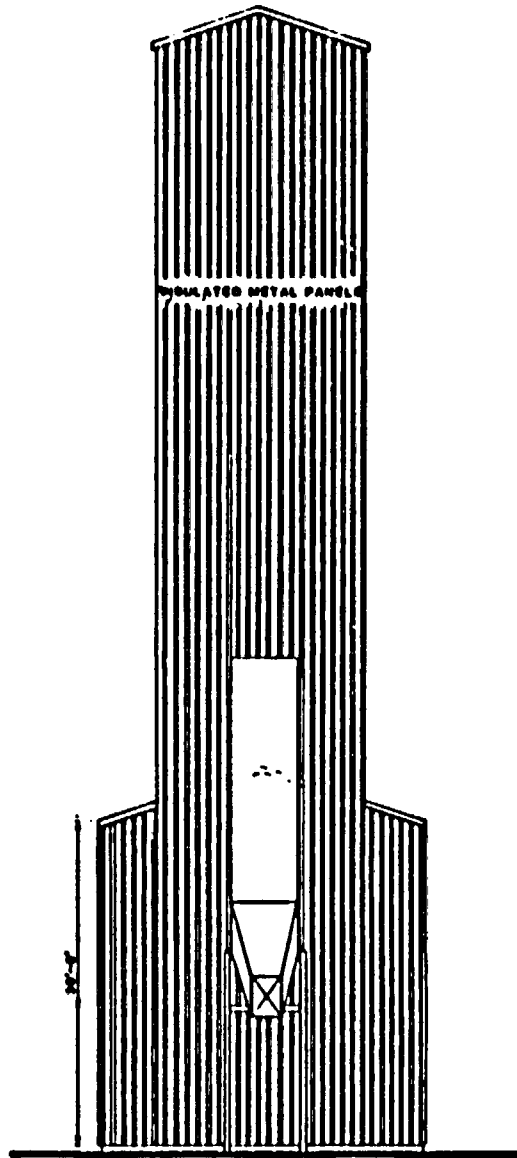


ENTRANCE ELEVATION

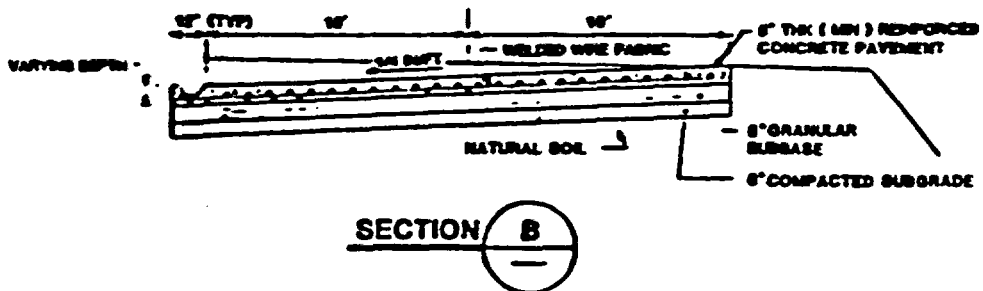
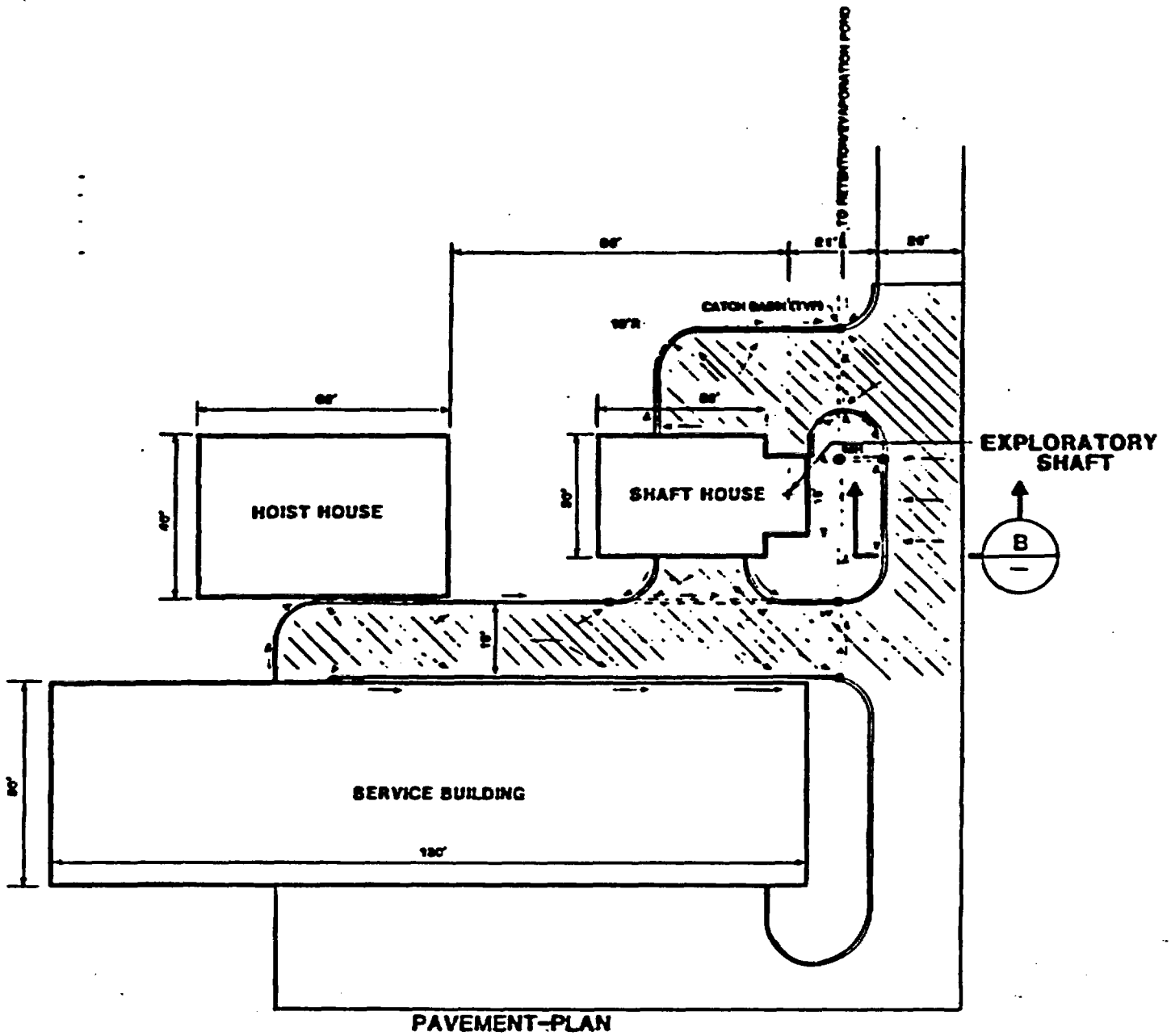
HOIST HOUSE

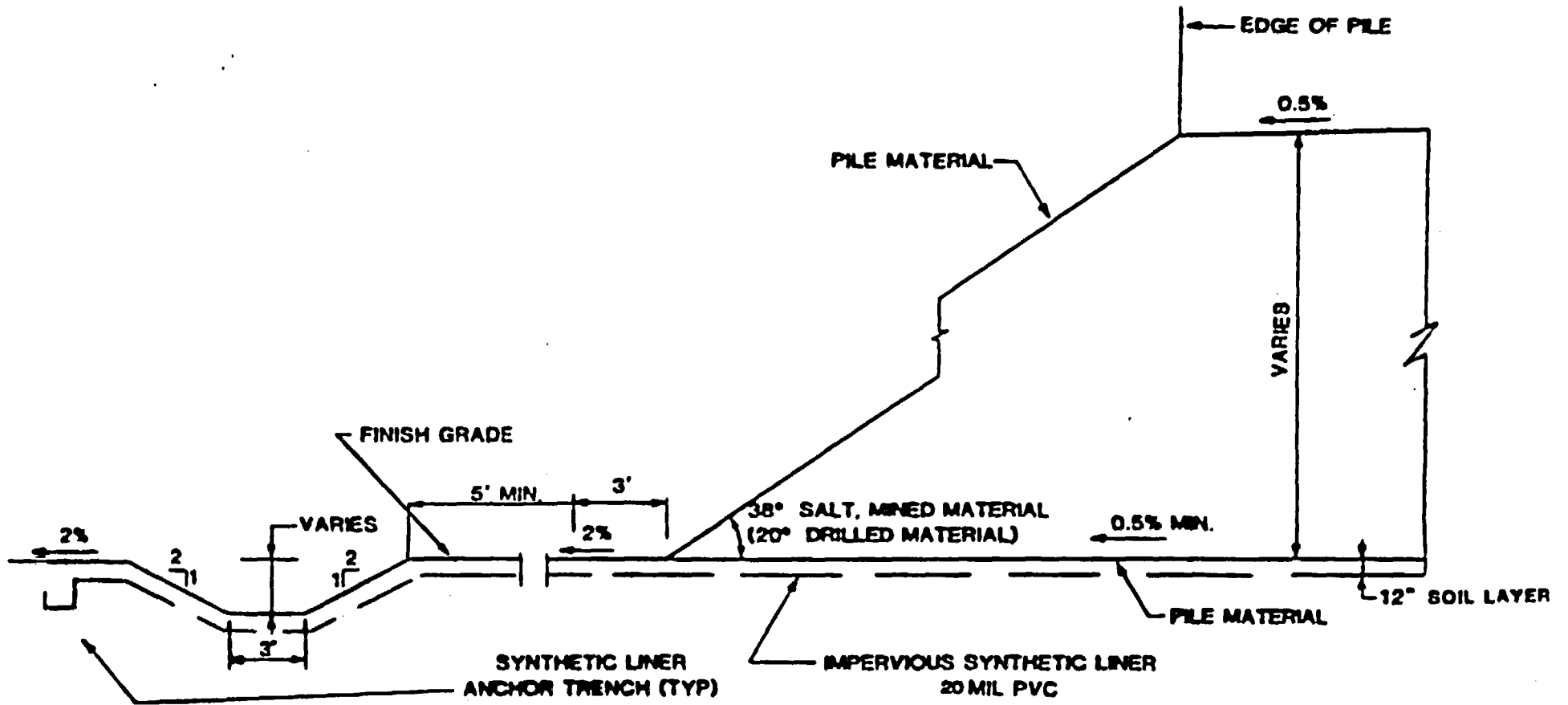
ENTRANCE ELEVATION

SHAFT HOUSE

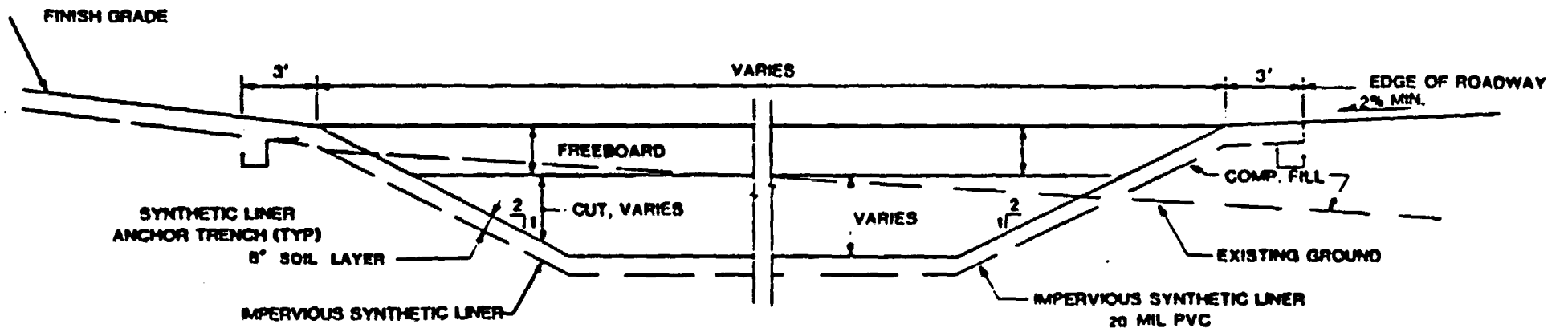


SHAFT SIDE ELEVATION

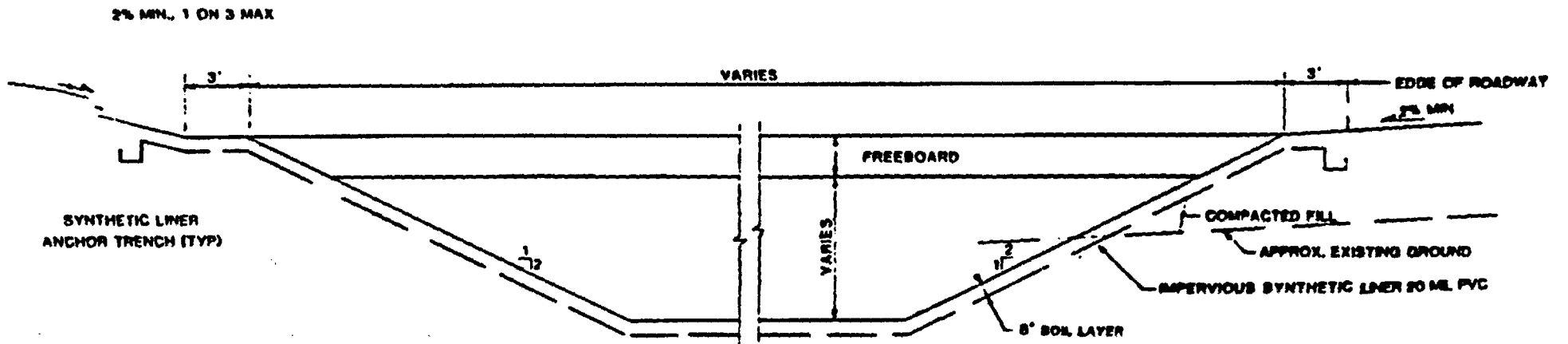




TYPICAL PILE CROSS SECTION



TYPICAL RETENTION/EVAPORATION POND CROSS SECTION



MUDPIT CROSS SECTION (DRILL METHOD)

ATTACHMENT 3

VIEWGRAPHS OF EXPLORATORY SALT MANAGEMENT

REPOSITORY CONCEPTUAL DESIGN

MANAGEMENT OBJECTIVES

- ESTABLISH A REASONABLE TECHNICAL BASIS TO AID THE SELECTION OF A FINAL SITE FOR A HIGH-LEVEL WASTE REPOSITORY
- IDENTIFY AND DEFINE TECHNICAL APPROACHES TO REPOSITORY DESIGN
- ESTABLISH THE TECHNICAL AND ENGINEERING DATA BASIS FOR REPOSITORY DETAILED DESIGN
- ESTABLISH THE ENGINEERING CONCEPTS TO BE USED IN REPOSITORY DESIGN
- PREPARE A DEFINITIVE CONCEPTUAL DESIGN REPORT FOR A HIGH-LEVEL WASTE REPOSITORY IN SALT
- ESTIMATE TITLE I, II, AND III ENGINEERING COSTS
- ESTIMATE REPOSITORY CAPITAL COSTS

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REPOSITORY CONCEPTUAL DESIGN

ELEMENTS OF WORK BREAKDOWN STRUCTURE

- REPOSITORY INTEGRATION
- REPOSITORY SITE
- WASTE HANDLING/PACKAGING FACILITIES
- REPOSITORY SHAFTS
- SUBSURFACE FACILITIES
- REPOSITORY SEALING SYSTEM
- BALANCE OF PLANT
- REPOSITORY OPERATIONS

JEG: 8/23/83

REPOSITORY CONCEPTUAL DESIGN

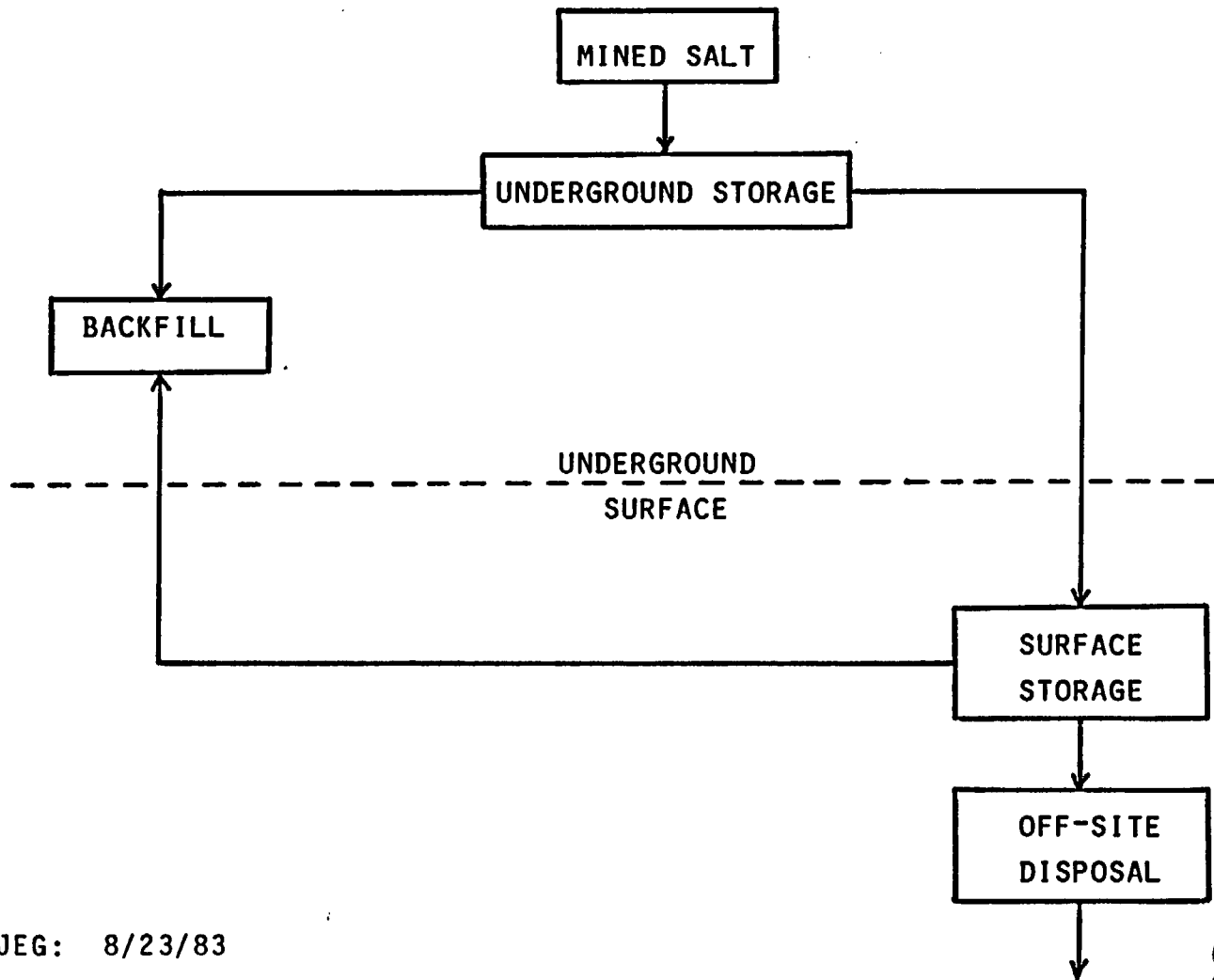
MINED SALT WASTE REMOVAL, STORAGE, AND DISPOSAL

- INVOLVES FIVE WBS ELEMENTS
- REPOSITORY A/E WILL DEVELOP FULLY INTEGRATED SYSTEM FOR STORAGE AND DISPOSAL

JEG: 8/23/83

REPOSITORY CONCEPTUAL DESIGN

ON-SITE SALT MANAGEMENT



JEG: 8/23/83

REPOSITORY CONCEPTUAL DESIGN

BACKFILLING OBJECTIVES

- REDUCE/RETARD CREEP
- MINIMIZE POSSIBLE ROOF AND/OR PILLAR STABILITY PROBLEMS
- REDUCE NEED FOR RE-EXCAVATION
- REDUCE POTENTIAL FOR SURFACE SUBSIDENCE
- EFFICIENT DISPOSAL OF MINED SALT
- AID IN SEALING AND ISOLATION OF EMPLACED WASTES
- REDUCE MINE VENTILATION COSTS AND POTENTIAL PROBLEMS

JEG: 8/23/83

ON-SITE SALT MANAGEMENT

PRIMARY ENVIRONMENTAL CONCERNS

- AIR QUALITY
- SURFACE WATER RUNOFF CONTROL
- GROUNDWATER QUALITY

JEG: 8/23/83

ON-SITE SALT MANAGEMENT

DESIGN APPROACH AND MITIGATION

- SITE PREPARATION
- LINER INSTALLATION
- RUNOFF CONTROL
- MONITORING PROGRAM

JEG: 8/23/83

REPOSITORY EXCAVATED SALT

SUMMARY OF QUANTITIES - RICHTON DOME

	<u>LINEAR FEET</u>	<u>TONS</u>
PASSAGEWAYS	368,600	9,570,000
STORAGE ROOMS	699,000	12,930,000
SHAFTS	9,954	550,000
MISCELLANEOUS	<u>N/A</u>	<u>70,000</u>
SUBTOTAL, INITIAL EXCAVATION	1,077,554	23,120,000
RE-EXCAVATION		<u>2,300,000</u>
TOTAL EXCAVATION.		25,420,000
TONS REQUIRED FOR BACKFILL		<u>13,400,000</u>
EXCESS MINED ROCK		12,020,000

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REPOSITORY EXCAVATED SALT

SUMMARY OF QUANTITIES - TEXAS

	<u>DEAF SMITH COUNTY</u>		<u>SWISHER COUNTY</u>	
	<u>FEET</u>	<u>TONS</u>	<u>FEET</u>	<u>TONS</u>
PASSAGEWAYS	379,500	9,973,000	378,000	9,930,000
STORAGE ROOMS	699,000	15,743,000	699,000	15,493,000
SHAFTS	12,374	764,000	13,899	858,000
MISCELLANEOUS	<u>N/A</u>	<u>69,000</u>	<u>N/A</u>	<u>69,000</u>
SUBTOTAL, INITIAL EXCAVATION		26,299,000		26,350,000
RE-EXCAVATION	<u>N/A</u>	<u>8,000,000</u>	<u>N/A</u>	<u>8,206,000</u>
TOTAL EXCAVATION		34,299,000		34,556,000
TONS REQUIRED FOR BACKFILL	<u>-</u>	<u>14,000,000</u>	<u>-</u>	<u>14,140,000</u>
EXCESS MINED ROCK	-	20,299,000	-	20,416,000

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REPOSITORY EXCAVATED SALT

SUMMARY OF QUANTITIES - PARADOX

	<u>FEET</u>	<u>TONS</u>
PASSAGEWAYS	385,000	10,000,000
STORAGE ROOMS	699,000	13,107,000
SHAFTS	15,400	714,000
MISCELLANEOUS	<u>N/A</u>	<u>69,000</u>
SUBTOTAL, INITIAL EXCAVATION	N/A	23,890,000
RE-EXCAVATION		<u>3,268,500</u>
TOTAL EXCAVATION		27,158,500
TONS REQUIRED FOR BACKFILL		<u>13,668,350</u>
EXCESS MINED ROCK		13,490,150

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ATTACHMENT 4

VIEWGRAPHS OF SALT DISPOSAL OPTIONS

REPOSITORY A/E SCOPE OF WORK FOR
SITE SPECIFIC CONCEPTUAL DESIGN

"DEVELOP AND EVALUATE ALTERNATIVE METHODS FOR THE ENVIRONMENTALLY SAFE DISPOSAL OF THE EXCESS MINED SALT WASTE AND RECOMMEND A REFERENCE DISPOSAL METHOD(S). ONCE THE DISPOSAL METHOD(S) IS APPROVED, THE A/E SHALL COMPLETE A CONCEPTUAL DESIGN OF THE MINE WASTE DISPOSAL SYSTEM."

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OBJECTIVE OF CURRENT EVALUATION
OF EXCESS SALT DISPOSAL OPTIONS

- EVALUATE ALTERNATE DISPOSAL OPTIONS AT THE THREE LOCATIONS
(SEVEN SITES)
- IDENTIFY THE MOST PROMISING METHOD(S) FOR EACH LOCATION BASED
UPON THE EXISTING SITE DATA BASES

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QUANTITY AND TIME PHASING OF EXCESS SALT

IS A FUNCTION OF SEVERAL FACTORS

● SITE SPECIFIC INFORMATION

- REPOSITORY DEPTH
- ROCK TEMPERATURE AT REPOSITORY HORIZON
- SALT CONSTITUTIVE PROPERTIES
- PURITY OF SALT



CREEP
CLOSURE
OF ROOMS

● DESIGN BASIS

- DESIGN WASTE CAPACITY
- WASTE FORMS STORED
- WASTE PACKAGE CAPACITY

● RETRIEVABILITY SCENARIO

- 10 CFR 60 REQUIRES UP TO 50 YEARS

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EXAMPLE OF POSSIBLE VARIATION IN EXCESS SALT
WITH CHANGE IN DESIGN BASIS

<u>DESIGN STUDY</u>	<u>TOTAL EXCESS SALT (M TONS)</u>	
CONCEPTUAL REFERENCE REPOSITORY DESIGN (1980)	8	
STEARNS-ROGER PRELIMINARY FEASIBILITY STUDIES	14	PARADOX
	21	PERMIAN
	12	GULF

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EXCESS SALT DISPOSAL OPTIONS

OCEAN DISPOSAL

ON SITE DISPOSAL

EXISTING EVAPORITE MINES

EXISTING POTASH TAILINGS PILE

UNDERGROUND INJECTION

COMMERCIAL USE

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ONWI
Office of Nuclear Waste Isolation

BATFEL Project Management Division

OCEAN DISPOSAL

- TRANSPORTATION
 - PIPELINE
 - TRAIN

- DISPOSAL TECHNIQUE
 - DIFFUSER
 - BOTTOM DUMP

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OCEAN DISPOSAL

- GULF

POSSIBLE METHOD DUE TO PROXIMITY TO COAST AND EXPERIENCE
WITH SPR PROJECT

- PERMIAN

OTHER METHODS MAY BE MORE COST EFFECTIVE BUT SHOULD BE
MAINTAINED AS AN OPTION

- PARADOX

EXCESSIVE TRANSPORT DISTANCE

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PERMANENT ON SITE DISPOSAL

- ESTIMATE 50 TO 100 ACRES, 100 FEET HIGH
- WOULD INCLUDE UNDERLINING AND SOME KIND OF NATURAL COVER (SOIL/CLAY)
- LECHATE COLLECTION SYSTEM
- MONITORING PROGRAM

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ONWI
Office of Nuclear Waste Isolation

BATTELLE Project Management Division

PERMANENT ON SITE DISPOSAL

- CONCERN FOR AESTHETIC IMPACT AT ALL SITES
- CONCERN FOR GROUND/SURFACE WATER IMPACTS AT ALL SITES

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EXISTING EVAPORITE MINES

- **ADVANTAGES**

- EXISTING SALINE ENVIRONMENT
- LACK OF FRESH GROUND WATER

- **PROBABLE LOCATIONS**

- **PARADOX**

"TRONA" MINES IN SWEETWATER COUNTY, WYOMING

DISTANCE APPROXIMATELY 300 MILES

- **PERMIAN**

"POTASH" MINES IN CARLSBAD, NEW MEXICO DISTRICT

DISTANCE APPROXIMATELY 200 MILES

- **GULF**

"SALT" MINES IN LOUISIANA

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ONWI
Office of Nuclear Waste Isolation

BAE11111 Project Management Division

EXISTING EVAPORITE MINES

- SHOULD BE MAINTAINED AS A VIABLE OPTION AT ALL SITES
- WILL REQUIRE FEASIBILITY STUDY FOR EACH MINE BEING CONSIDERED

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EXISTING POTASH TAILINGS PILE

- POTASH TAILINGS PILES ARE MAINLY SALT
- MOST PROBABLE LOCATION IS CARLSBAD, NEW MEXICO DISTRICT
- AS EXAMPLE, ONE TAILINGS PILE (POTASH CORP. OF AMERICA) CONTAINS APPROXIMATELY 60 MILLION TONS
- TAILINGS PILES ARE ON BLM LAND
- HAVE BEEN NO FORMAL PUBLIC/GOVERNMENT COMMENTS OR COMPLAINTS REGARDING ENVIRONMENTAL IMPACTS
- APPROXIMATE DISTANCES TO CARLSBAD, NEW MEXICO DISTRICT
 - GULF - 900 MILES
 - PARADOX - 500 MILES
 - PERMIAN - 200 MILES

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ONWI
OILFIELD NUCLEAR WASTE
INCORPORATED

BATTELLE Project Management Division

EXISTING POTASH TAILINGS PILE

- VIABLE OPTION FOR PERMIAN DUE TO MINIMAL IF ANY ENVIRONMENTAL IMPACT AND CLOSE PROXIMITY
- VIABLE OPTION FOR PARADOX
- VIABLE OPTION FOR GULF BUT LONG HAUL DISTANCE MAY MAKE ECONOMICALLY UNATTRACTIVE. MUST EVALUATE POSSIBLE CLOSER TAILINGS SITES

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UNDERGROUND INJECTION

- MIX SALT WITH WATER TO FORM A BRINE SOLUTION
- INJECT SOLUTION INTO A BRINE/BRACKISH AQUIFER
- PRELIMINARY ASSESSMENT INDICATES MAY REQUIRE APPROXIMATELY
15 INJECTION WELLS SPREAD OVER A 60 MILE AREA

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UNDERGROUND INJECTION

- PARADOX AND PERMIAN

WATER REQUIREMENTS PUT IN DIRECT CONFLICT WITH
REGIONAL NEEDS

- GULF

POSSIBLE DISPOSAL OPTION, BUT REQUIRES MORE
DETAILED ASSESSMENT (E.G., WATER SOURCES)

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COMMERCIAL USE

- INDUSTRIAL USE (PURITY 99%)
- ROAD SALT (PURITY 91-95%)
- NONE OF THE SITES HAVE 99% PURITY
- THEREFORE, GREATEST POTENTIAL IS ROAD SALT
- PROJECTED USE BY 2000 A.D. IS APPROXIMATELY 15 MILLION TONS PER YEAR
- ENVIRONMENTALLY ATTRACTIVE DISPOSAL OPTION

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COMMERCIAL USE

- VIABLE OPTION FOR ALL SITES
- WOULD HAVE TO TRAIN OR BARGE SALT TO MAJOR MIDWESTERN DISTRIBUTION CENTERS

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