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EI

WM Project 10,11,16  
Docket No. \_\_\_\_\_  
PDR   
LPDR B.N.S

10 April 1986  
Ref. No. 1148-07  
Letter No. 068

Distribution:  
Buckley  
(Return to WM, 623-SS) *st*

U.S. Nuclear Regulatory Commission  
7915 Eastern Avenue  
Silver Spring, MD 20910

Attention: Mr. John T. Buckley

Subject: Meeting Report for Salt Group on 02-03 April 1986.

Ladies and Gentlemen:

Please find enclosed the subject meeting report. We hope this agrees with your own record of the meeting. Should you have any comments or corrections, please contact me.

You will note that Bob Cummings' expense report is not included and will follow later, within a day or two.

Sincerely,

ENGINEERS INTERNATIONAL, INC.

*Madan M. Singh*  
Madan M. Singh  
Program Manager

MMS/bt

Enclosure

cc: Dr. Jerome R. Pearring

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# ENGINEERS INTERNATIONAL, INC.

## MEETING REPORT

Contract No. NRC-02-84-002

Task Order No. 007

### TECHNICAL ASSISTANCE FOR IN SITU TESTING

DATE: 02-03 April 1986

PLACE: U.S. Nuclear Regulatory Commission  
7915 Eastern Avenue  
Silver Spring, MD 20910

PURPOSE: Review planning activities for DOE FEA and SCP  
submittals for a geologic repository in salt.

PARTICIPANTS: U.S. Nuclear Regulatory Commission (NRC)

J. Pearring  
B. Jagannath  
S. Smykowski  
N. Tanious  
L. Yang

Engineers International, Inc. (EI)

R. Cummings  
C. Baker

U.S. Bureau of Mines (USBM)

M. DeMarco  
R. Kneisley

Itasca

R. Hart  
J. Daemen  
I. Farmer  
K. Wahi

### DISCUSSION:

1. A copy of the agenda is attached; changes to the agenda are indicated thereon.
2. Guidance was provided to the consultants (EI, Itasca, USBM) on the review and review preparations for the Final Environmental Assessments (FEA), and a review plan (schedules, responsibilities, and preparations) was provided by means of handouts and ensuing discussion. It was empha-

sized that schedules could slip due to potential late EA delivery. In particular, the consultants were provided with cartons containing copies of reference materials provided by the DOE and screened by the NRC Salt Team staff.

The scanning examination of the reference material will require several days' time, apart from the FEA scanning or actual review and preceding it. Although it is not clear how the material is being used in the FEA, we have attempted to surmise which should be examined for familiarity or formally reviewed prior to FEA receipt and which can wait until later, as well as which will necessitate careful reading, scanning, or formal review. The criterion for pre-FEA review was degree of relevance to NRC's Major Comments.

EI was assigned the following reports for formal review. Those for which the formal review should at least be initiated prior to FEA receipt are highlighted with an asterisk (\*) (see attached list).

Other reference material will need to be examined; that marked with an asterisk (\*) should be done prior to FEA receipt. Some of these are more important, time consuming, or familiar than others. These should be examined for general familiarity only, until the contexts of the references in the FEA is known.

The complete references appear on the DOE reference lists, photocopies of which were provided at the meeting.

3. FEA may contain a new appendix giving the specific comments and responses by the DOE. The team will review this. Also, Chapter 7 could be greatly expanded.

4. Comment packages from affected States on the draft EA will be sent to individual consultants prior to FEA scanning.

5. For those documents on the DOE reference list that have been formally reviewed, NRC will provide copies of the reviews for the consultants' use in reviewing the FEAs.

6. The consultants attended a meeting chaired by John J. Linehan, RP, to discuss the FEA Review Plan and clarify the intent of NRC Management that the FEA be a level-of-effort review minimally sufficient to establish and support a NRC position regarding the conclusions for the sites.

7. The Salt Team FEA review exercise will serve the dual purpose of a preliminary step in the SCP preparation activities.

8. J. Kennedy (NRC) gave a presentation at the outset of the meeting on the status and objectives of the NRC QA review activities.

9. Guidance on the standards and format of comments are forthcoming from RP.

10. Attention was turned toward the SCP review planning for the afternoon session on April 2.

11. J. Pearring presented a summary of SCP preparation concerns in terms of regulatory requirements for repository features and design/rock mechanics issues. The issue resolution methodology framework was introduced. Attention to be paid to data needs, testing programs, and generic data programs.

12. J. Pearring then briefed the group on the present DOE thinking on conceptual design for surface facilities, shafts, underground layout, retrieval, waste package, design data bases, and miscellaneous repository features.

13. Presentations were given by K. Wahi on thermomechanical modeling data needs, by J. Daemen on sealing data needs, by R. Hart on underground opening designs data developments, and by R. Cummings on retrievability data needs. All presentations were supported by handouts and generated in-depth discussion to clarify the concerns, and expand upon them.

14. The consultants were requested to identify specific data needs for the SCP and the tests needed to satisfy them, prior to the next SCP group meeting and to develop specific review plans for assessing the data. EI was given responsibility for retrievability and surface facilities data assessment planning/preparation. R. Cummings and C. Baker will participate for EI.

15. There may be consultant participation on upcoming NRC delegations to observe Fluor contractor coordination meetings, as part of the SCP review preparation activities. The consultant contractors (EI and Itasca) are to make an assessment of near-term activity requirements associated with salt SCP planning as soon as practicable so that consultant/NRC congruence on these activities can be reached and appropriate contract authorizations made. Required additional support for FEA activities also needs to be estimated. USBM representatives were also asked to appraise their ceiling levels of effort.

EI will provide these estimates to the NRC PM under separate cover, as soon as possible.

#### TRAVEL COST BREAKOUT

The travel cost breakout for Mr. Baker is attached. Mr. Cumming's will be forthcoming shortly.

MEETING NOTICE

U.S. Nuclear Regulatory Commission meeting with Contractor Personnel  
under NRC Contracts Nos. D-1004-5; D-1010; and D-1016

SPONSOR: U.S. Nuclear Regulatory Commission (NRC) Engineering Branch,  
Division of Waste Management

CHAIRMAN: Jerome R. Pearring, WMEG

DATE/TIME: April 2-3, 1986 - 8:30AM

LOCATION: 8th Floor Conference room  
Willste Building  
Silver Spring, Maryland

PURPOSE: Review Planning Activities for DOE FEA and SCP Submittals  
for a Geologic Repository in Salt

PARTICIPANTS:

<u>NRC</u>	<u>EI</u>	<u>ITASCA</u>	<u>BOM</u>
J. Pearring	R. Cummings	R. Hart	R. Kneisley
B. Jagannath	C. Baker	I. Farmer	M. Demarco
S. Smykowski		K. Wahi	
N. Tanious		J. Daemen	
L. Yang			

AGENDA ITEMS:

April 2, 1986, Wednesday

8:30AM Introduction

QA REVIEW

8:35AM QA Programs Review

J. Kennedy

FEA REVIEW

8:50AM FEA Review Plan  
a) Site Assignments  
b) Review Schedule  
c) Review Preparations

J. Pearring

9:10AM	FEA Review Tasks a) Major Comments Review b) Revision Review c) Chapter 7 Review d) Reference Review	J. Pearring/Team Members
10:15AM	Break	
10:30AM	Deaf Smith FEA a) Major Comments b) Detailed Comments	N. Tanious
11:00AM	Davis Canyon FEA a) Major Comments b) Detailed Comments	L. Yang
11:30AM	Richton Dome FEA a) Major Comments b) Detailed Comments	B. Jagannath
12:00PM	Lunch	

SCP Design/Rock Mechanics Review Items

*Branch Chief  
Meeting*

SURFACE FACILITIES

*→ J. Lenihan*

1:00PM	Discussion of Potential Surface Facilities Issues	-J. Pearring/Group
2:00PM	a) Surface Facility Layout b) Surface Facility Design Considerations c) Site Characterization Data Needs d) SCP Review Considerations e) Issue Review Planning	
3:00PM	Break	

SHAFTS

3:15PM	Discussion of Potential Shaft Issues	- J. Pearring/Group
	a) Layout of Shaft Facilities b) Shaft Design/Construction Considerations	
4:30PM	Adjourn	

April 3, 1986, Thursday

SHAFTS - (CONTINUED)

- 8:30AM Discussion of Potential Shaft Issues (Cont.) - Group  
a) Site Characterization Data Needs  
b) SCP Review Considerations  
c) Issue Review Planning
- 10:00AM Break

UNDERGROUND FACILITIES

- 10:15AM Discussion of Potential Subsurface Repository Design/Rock Mechanics Considerations - J. Pearring  
a) Waste Package Configuration  
b) Waste Package Impacement Modes  
c) Repository Underground Layout
- 11:00AM Repository Thermal Mechanical Considerations - K. Wahi
- omitted* ~~11:30AM Subsurface HVAC Considerations~~ - J. Pearring
- 12:00PM Lunch
- 1:00PM Subsurface Openings Stability Considerations - R. Hart
- 1:30PM Retrievability Considerations - R. Cummings
- 2:15PM Decommissioning Seal Considerations - I. Farmer
- 2:45PM Break
- 3:00PM Discussion of Potential Underground Facility Issues - Group  
a) Site Characterization Data Needs  
b) SCP Review Considerations  
c) Issue Review Planning
- 4:30PM Adjourn

EI Formal Review Requested

- Preliminary Design Validation Report, Waste Isolation Pilot Plant, 1983
- Braun and Nash, Ground Freezing for Construction, 1985
- \*Ground freezing, H.L. Jessberger, 1979
- (?) Preliminary Assessment of the healing of fractures in salt, ONWI-363, SWEC, 1983
- \*Compressional wave velocity data, SWEC, 1985
- \*Amount and nature of included water on Permian Basin salt strata, TBEG
- \*Construction of a watertight deep shaft in the unstable and water bearing strata of the Saskatchewan potash field, E.K. Roesner, 1980

Familiarity Review Requested

(Does not include 13 formal reviews by others on references that should be reviewed for familiarity also)

- \*Shaft locations for ESF, letter report by R.B. Lahoti, 1985
- \*Shaft freezing history memorandum, F. Djahanguiri, 1984
- \*Response of rock tunnels to earth shaking, C. Dowding, 1978
- \*Evaluation of ESF impacts on repository, Fluor Technology, 1985
- \*Assessment of character and extent of mechanical disturbance for underground openings in salt, Golder Associates, 1985
- Radiation Damage on Natural rock salt, P.W. Levy, 1983
- ONWI-250, Avery Island quasi-static strength and creep characteristics
- \*Salt pressures on DHLW packages, D.P. Nelson and A.F. Fossum, 1985
- \*Seismic design criteria considerations, G.N. Owen, P.I. Yaney, and R.E. Scholl, 1980
- \*Expected environment for waste packages in a salt repository, L.R. Pederson, et. al., 1984
- \*TPR for 01 July - 30 September 1982, ONWI-9(82-4), P.E. Senseny, 1982
- Controlled freezing for ground support, J.A. Schuster, 1972

\*Compilation of data for thermomechanical analyses, ONWI-364, Tammemagl, et. al., 1985

THAC-SIP-3D, 3-D transient heat analysis code, W.D. Turner, 1978

\*Summary of the SPDV results at WIPP, WIPP-DOE 161, 1983

\*Permian Location Study, NUS, 1985

Conduct of Site Characterization Plan reviews, Argonne National Laboratory

Effect of earthquakes on underground mines, USGS

\*Mineralogy and water content of Paradox Basin evaporite deposits, GA Inst. Tech., 1983

\*General reviews of gassy conditions in evaporites...F. Djahanguiri and A. Mahtab, 1985

\*Seismic stability of underground openings, C. Dowding, 1977

\*Scale effects in the determination of rock mass strength and deformability, F.E. Heuze, 1980

Genetic and geometric relations between structures in basement and overlying sedimentary rocks, R.A. Hodgson, 1965

\*ONWI-563, Schematic designs for penetration seals... Kelsall, et. al, 1985

\*Fluid inclusion in brine compositions from Palo Doro salt sties, J. Moody, 1985

Clay mineralogy of the bedded salt deposits in the Paradox Basin, A. Padan, et. al., 1984

\*Design parameters for a two-phase repository in salt, V. 1, Stearns Catalytic Corp., 1985

\*ONWI-512, Preliminary thermomechanical analyses of a conceptual nuclear waste repository in salt, R.A. Wagner, et. al., 1984

Properties of salt important in radioactive waste disposal, R.L. Bradshaw, et. al., 1968

\*Cote Blanche gas occurrence

Case history rock mechanics evaluation, Jefferson Island salt mine, V. II, F.D. Hansen, 1978

The internal structure of model and natural salt domes, M.P.A. Jackson and C.J. Talbot, 1985

Schematic designs for penetration seals for a repository in Richton Dome, P.C. Kelsall, et. al., 1985

Shear zones inside Gulf Coast salt stocks help to delineate zones of movement, D.H. Kupfer, 1976

Potential for dissolution at Richton Dome, P.J. Murphy, 1985

\*In situ determination of stress in rocks, L. Obert, 1962

\*Determination of a constitutive law at elevated temperature and pressure, P. Senseny, 1985

Dome outline revision for Richton Dome, C. Sneed, 1985

\*Alternate methods of salt disposal at the seven candidate salt sites, Stearns Catalytic, 1984

\*Experimental study of rocksalt for compressed air energy storage, R.L. Thoms and R.M. Gehle, 1982

ONWI-190(5), Avery Island Heater testing

ONWI-529, Avery Island Site C Heater test, 1984

Evaluation of the structure and stratigraphy over Richton Dome, Earth Tech, 1985

Structure and mineralization of Richton Dome caprock, MRIG-9, Earth Tech, 1985

Thermophysical properties, NBS, 1981

HEATING 6, Elrod, et. al., ORNL, 1981

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\*Reference appears to be a high priority for EI examination prior to FEA review.

