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7-10-84

MEETING REPORT

U.S. NUCLEAR REGULATORY COMMISSION MEETING WITH
ENGINEERS INTERNATIONAL (EI)
AND THE
U.S. BUREAU OF MINES (USBM)

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

CHAIRMAN: Piyush K. Dutta *RKD 7/25/84*

DATE/TIME: Tuesday, July 10, 1984

LOCATION: NRC Willste Building
Silver Spring, Maryland
Conference Room No. 130

PURPOSE: To prepare for NNWSI repository design data review scheduled
for the week July 16-20, 1984.

PARTICIPANTS:

NRC
John Greeves-WMEG
Piyush Dutta-WMEG
Naiem Tanious-WMEG
Jerome Pearing-WMEG
David Tiktinsky-WMEG
John Buckley-WMEG
Steve Smykowski-WMEG
Banad Jagannath-WMEG
Thomas Schmitt-RES
Dinesh Gupta-WMEG
Robert Johnson-WMRP
Larry Pittiglio-WMRP

EI
Jaak Daemen
Swapan Bhattacharya
Mark Christianson

USRM
Lindsay Mundell

WM Record File
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WM Project 11
Docket No. _____
PDR _____
LPDR _____

Distribution:

(Return to WM, 623-SS)

- Attachment 1 - Proposed Agenda for NRC Data Review
- Attachment 2 - NRC Design/Rockmechanics Data Review Schedule
- Attachment 3 - Draft Rock Mechanics Data Review Checklist

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AGENDA ITEMS:

1. General Overview of EA process and experience from the salt projects data review.
2. NNWSI data review purpose, policy, program, and procedure.
3. Discuss and identify NNWSI Design/Rock Mechanics issues in the EA draft.
4. Identify key data for review at Sandia.
5. Assignment of reviewer for each data type.
6. Discuss data review checklist and data gathering procedure.

SUMMARY OF COMMITMENT, CONCLUSIONS, AND AGREEMENTS

1. The salient points made by the RP are:
 - a) Objectives of NRC's EA review are to examine the findings, and conclusions presented and, independently determine if they are substantiated, and identify issues,
 - b) NRC's review criteria will consist of carefully checking for adequate substantiation of assessment, interpretation, and conclusions,
 - c) RP Branch will incorporate the comments made by technical staff and the NRC contractors into a package of about 100 pages for each site which will be attached to the transmittal letter to DOE,
 - d) In the data review meetings with DOE contractors - if the data has not been documented yet, we (NRC) should approach DOE and try to get them to get it,
 - e) It is important that the Sandia technical people understand what data review is and not just their top management,
 - f) Anything that we carry away with us from the data review sessions will be placed in the PDR of NRC, and

- g) The most important requirement that we should always bear in mind is that there can be no consultation, debate, or discussion with DOE or their contractors on validity of the data, its adequacy or interpretation. This is accomplished at workshops which are scheduled separately.
2. The schedule for the visit was discussed and agreed upon: visit the Yucca Mountain site, the Rock Core library, and the G-tunnel, then fly to Albuquerque to conduct the data review at Sandia on Wednesday, Thursday, Friday, July 18-20, 1984.
 3. Prior to this meeting, Sandia has proposed an agenda (see Attachment #1) for the data review, this agenda was discussed. Essentially the review is broken into three small groups which conducted the review simultaneously. Assignment of individuals to the smaller review groups is shown in Attachment #2 and was based on technical knowledge of the individual in that particular area as well as balancing NRC personnel with EI and USBM.
 4. In deciding how many tests should be reviewed in detail in a given technical area, the groups realized that time limitation prevents reviewing data from all the tests, especially when there are several properties, each determined through many tests. For example under group I Rock Mechanics test data there are: compressive strength, static moduli, poisson's ratio, creep, tensile strength, coefficient of friction, shear strength...etc. Instead it was agreed that an overall review should be conducted to assess the test objectives, parameters, standard or non-standard procedure, instrumentation, any gross or obvious errors,...etc. (See Attachment #3 - Draft Rock Mechanics Data Review Checklist), then a random selection of few tests should be made, these are reviewed in detail. The data review checklist for Rock Mechanics (Attachment #3) has been reviewed and agreed upon. It was also decided that test identification numbers provided by Sandia (item #1 on the checklist) should be supplemented by name of person in charge to facilitate traceability.
 5. EI was asked to provide comments about technical concerns/issues they found in the EA draft. The following are their comments:
 - a) They found from lab tests conducted on tuff specimens that tuff exhibits extreme variability.
 - b) Variability reduces: 1) our ability to scale up from the lab to the field because of size effects, and 2) extrapolate results from G-Tunnel to Yucca Mountain.
 - c) Constructability of a repository in tuff can be assessed in a more definite way by making use of experience and data on excavations made in tuff for the weapons testing program.

- d) Tuff permeability and porosity values provided by DOE appears low.
 - e) There were statements made by DOE in the EA draft that faults do not necessarily affect the repository performance. This statement needs clarification.
6. On identification of key rock mechanics data for review, the following points were discussed:
- a) How Sandia selects rock pieces for lab testing, the process of sampling and sample representativeness should be reviewed.
 - b) The mechanical properties of joints are important as well as those of the rock mass.
 - c) Tuff permeability data should receive adequate attention as enormous losses of drilling fluids are reported.
 - d) Sealing data are critical to the repository performance - there may be proprietary problems with releasing this data from the organizations that conducted these tests.
 - e) Heat damage into the tuff rock surrounding the waste package.
7. Only insitu stress data from the overcoring test will be reviewed at Sandia. In situ stress data from hydraulic fracture tests were run by USGS and may be reviewed at the Geology data review.
8. EI have experienced tremendous problems in obtaining recent (1983,84) references listed in the EA draft. WMEG and WMRP will assist in securing these references in time for the formal EA review. WMRP had received both WMEG-NTS team reference list and EI list and will incorporate them into their letter to DOE.

NOTE: These commitments, conclusions, and agreements were read and agreed to by Jaak Daemen, Swapan Bhattacharya, Mark Christianson, and Lindsay Mundell prior to adjournment.

MTG RPT: US NRC MTG WITH EI & USBM

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PROPOSED AGENDA FOR NRC DATA REVIEW

Wednesday, July 18, 1984

Morning - Travel from Las Vegas to Albuquerque

Bldg. 822 - Conference Room - Sandia National Laboratories

1:00 pm	Introductory Remarks	Jerry Szymanski King Stablein	DOR NRC
1:30 pm	Synopsis of Data and Records Available (Identify Areas, Status and Responsible Parties)	Tom Hunter Joe Tillerson	SNL SNL

2:30 pm Detailed Scheduling and Badging for Small Group Discussions

3:00 Small Group Discussions

Group 1 - Tour of Rock Mechanics Testing Laboratory with Demonstration Film

SNL Personnel - Joe Tillerson
Ron Price
Bill Olsson

Group 2 & 3 - Tour of Core Storage Facility and Lab for Thermal and Bulk Properties Measurements

SNL Personnel - F. Nimick
B. Schwartz

Group 4 - Field Test - CTUF Characterization Data (in situ stress, permeability, borehole modulus)

SNL Personnel - R. Zimmerman

4:30 Adjourn

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PROPOSED AGENDA FOR NRC DATA REVIEW (continued)

Thursday, July 19, 1984

- 8:00 am Badging (Bldg. 822 entrance) F
- 8:30 am Small Group Discussions
- Group 1 - Review of Mechanical Properties Data from Laboratory Tests
- SNL Personnel - Joe Tillerson
Ron Price
Bill Olsson
- Group 2 - Review of Bulk Properties Data from Laboratory Tests
- SNL Personnel - Fran Nimick
Barry Schwartz
- Group 5 - Review of Data from Small Diameter Heater Tests and Rocha Slot
- SNL Personnel - Roger Zimmerman
- 11:30 am LUNCH
- 12:30 pm Small Group Discussions
- Group 1 - Continue Discussions and Tour Core Storage Facility^a
- SNL Personnel - Joe Tillerson
Ron Price
Bill Olsson
- Group 3 - Review of Thermal Properties Data from Laboratory Tests
- SNL Personnel - Fran Nimick
Barry Schwartz
- Group 6 - Review of Data from Heated Block Test
- SNL Personnel - Roger Zimmerman
- 4:30 pm Adjourn

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PROPOSED AGENDA FOR NRC DATA REVIEW (continued)

Friday, July 20, 1984

- 8:00 am** Badging (Bldg. 822 entrance)
- 8:30 am** Small Group Discussion
- Group 7 - Sealing Data Review
- SNL Personnel - Joe Tillerson
Joe Fernandez
- Group 8 - Seismic Data Review
- SNL Personnel - Hugh MacDougall
Luke Vortman
- Group 9 - Rock Classification Data Review
- SNL Personnel - Brenda Langkopf
- 10:00 am** NRC Reviewers Conference Session
- 11:30 am** Wrap-up Discussions for Data Review
- King Stablein NRC
Jerry Szymanski DOE
- 12:00 pm** Adjourn

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NRC DESIGN/ROCKMECHANICS DATA REVIEW SCHEDULE
AT SANDIA NATIONAL LABORATORY
(July 18-20, 1984)

	July 18 Wednesday 3-5:30	July 19 Thursday 8-11:30 12:30-5:30	July 20 Friday 8:30-10:00
GRI	Rock Mechanics Testing. Lab tour & data (SB)(LM)(PD)	Mech. Prop. Data (SB)(LM)(TS)	Mech. Prop. Data (SB)(TS)(PP)
			Rock classifi- cation Data (SB)(MC)(EH)
GRII	Core handling & Storage facility lab tour & thermal prop.data (MC)(NT)(PP)	Bulk Prop. Data Review, thermal prop. data (EH)(NT)(PP)	Thermal Prop. Data (LM)(EH)(NT)
			Seismic Data (LM)(TS)(PP)
GR III	G-Tunnel Rock Characterization Data, Insitu Stress Data, Borehole Modules Data (JD)(TS)(EH)	Small Diameter Heater Test Data (JD)(PD)(MC)	Heated Block Test Data (JD)(MC)(PD)
			(1) Sealing Test Data (8:30- 9:30) (2) Overflow data from any other area (9:30-10) (JD)(NT)(PD)

NOTE: ● Participants:

Paul Prestholt (PP), Thomas Schmitt (TS), Ed Hollop (EH),
Lindsey Mundell (LM), Mark Christianson (MC), Swapan Bhattacharya (SB),
Jaak Daeman (JD), Naiem Tanious (NT), Piyush Dutta (PD)

Reviewer

Date

- Draft Rock Mechanics Data Review Checklist
(Revision No. 0, January 18, 1984)

1. Name/type, identification number, and date of test.
 - 1a. What is the overall objective of the test?
 - 1b. What specific parameters are to be determined by the test?
 - 1c. Is there redundancy in the test concept?
 - 1d. What criteria were used for test site (or sample) selection?
 - 1e. How is the rock at the test site characterized?
 - 1f. How was the test designed?
 - 1g. Comments.

Reviewer

Date

2. Is the procedure documented and complete, and is it in written form?

2a. Is it a standard (ASTM) procedure? If yes, provide reference.

2b. If non-"standard", how was the procedure developed, reviewed, documented, and approved? For example, COE, USBM, USBR, USGS, NBS, or other (internal) processes.

2c. Have there been revisions and how and when were the revisions reviewed, documented, approved, and implemented?

2d. Comments.

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3. How many of these tests have been performed?

3a. According to what procedure revisions?

3b. How may test results, obtained under different revisions, be compared?

3c. How many tests are in progress and which revision is in use?

3d. How many tests are planned?

3e. Comments.

Reviewer _____

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4. What instrumentation is used for the test?

4a. How were the reliabilities* of the instruments specified?

4b. Is there a calibration system and were calibrations systematically carried out according to approved procedure?

4c. Are the calibrations traceable to national or industrial standards?

4d. Comments.

* Reliability is defined as the probability of an instrument to perform a stated function under a stated environment for a stated time.

Reviewer

Date

5. What are the data collection, reduction, and presentation techniques?

5a. How can the raw numerical data be retrieved?

5b. How can all data reduction steps prior to data storage be independently checked and/or duplicated?

5c. Are the data presented in a complete and clear format?
(Comment also on the utility of the presentation.)

5d. Are the data keyed to geological, environmental, and other experimental conditions?

5e. Are the data traceable to a written procedure?

5f. Comments.

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Date

6. What techniques are involved in analyzing and interpreting the data?

6a. What empirical techniques?

6b. What analytical techniques?

6c. What numerical techniques?

6d. Comments.

Reviewer _____

Date _____

7. What computer programs are used in collecting, reducing, storing, presenting, and analyzing the data?

7a. How are these programs verified, validated, documented, and controlled?

7b. Comments (for example, implicit assumptions, sensitivities, other comments).

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8. What are the acceptance/rejection criteria for the test data?

8a. Were these criteria established prior to test development?

8b. What is the logic behind the criteria?

8c. How are the criteria implemented? (Data handling, review procedure, corrective action.)

- Data Handling
- Review Procedure
- Corrective Action

8d. Comments.

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9. How are deviations from established procedures documented?

9a. What is the cause of the deviation?

9b. How are deviations considered in data reduction and/or analyses?

9c. Is the use of deviated data controlled? (For example, not used without approval of system designer or authorized project manager.)

9d. Comments. (For example, equipment performance and its effect on test validity, other comments.)

Reviewer

Date

10. General comments (such as, relationship among different tests, impacts on interpretation, instrument redundancy, factors resulting in test closure, accuracy of measurements, limitations, additional uses of data, and other miscellaneous comments).