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Dr. Jerome Pearing
U.S. Nuclear Regulatory Commission
Division of Waste Management
Washington, D.C. 20555

"NRC Technical Assistance
for Design Reviews"
Contract No. NRC-02-85-002
FIN D1016

Dear Jerry:

As you requested during the NRC Planning Meeting for the Salt Repository Project, 2-3 April 1986, I am submitting this letter to describe our understanding of the work required and the level of effort for Itasca's participation in the DOE FEA reviews and initial preparation activities for the SCP review. It is our understanding that Itasca will provide the following four individuals for the work defined at the April 2-3 meeting:

- Jaak Daemen
- Ian Farmer
- Roger Hart
- Krishan Wahi

We recognize that Dr. Daemen in the Principal Investigator for Itasca in the NNWSI review effort and will not minimize his involvement in that review effort. However, Dr. Daemen has considerable experience in the Salt Program and, particularly, issues related to shafts and seals, which will greatly assist the review effort for salt.

We have identified four tasks based on our discussions with you and your staff. A description of our understanding of the scope of each task is given, along with our estimate of the required level of effort by Itasca personnel.

Task 1 — Preparation for FEA Review

The following subtasks were identified to be accomplished in preparation for technical review of the FEAs:

- (1) brief, scanning review of new references which may be significant to the FEA review (approximately 50 documents were identified);

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- (2) review of NRC comments on Draft EAs for Richton Dome, Deaf Smith and Davis Canyon; and
- (3) familiarization with review plan described in the NRC Standard Review Plan for Final Environmental Assessments dated March 18, 1986.

We estimate that each reviewer will require one week to complete Task 1; thus, the total level of effort for this task is four man-weeks.

Task 2 — FEA Review

It is our understanding that Drs. Farmer, Hart, and Wahi will assist the FEA Technical Review (Step 1), while Dr. Daemen may assist the Section/Technical Quality Review (Step 2). Based on the defined FEA review schedule, the scope of the assistance for FEA review will involve:

- 1 week — scanning/reading of FEA
- 1 week — meeting at NRC to prepare review comments
- 1 week — further review of applicable sections of FEA and key references
- 2-3 days — meeting at NRC to review the draft of comments

We estimate that up to 4 weeks' effort will be required of each individual involved in the FEA review for a total of 16 man-weeks.

Task 3 — Formal Salt Document Reviews

At present, 16 documents have been suggested for formal document review. These documents are among the approximately 50 documents which will receive a scanning review in preparation for the FEA review (Task 1). A list of the 16 documents and the assigned principal reviewers is attached. Review of these documents will begin after 1 June 1986, assuming that the FEA review by Itasca personnel will occur between the end of April and the end of May. If the FEA review is delayed, Task 3 may begin at an earlier date. Based on a level of effort for review of 3 man-days for each document, it is estimated that Task 3 will require 48 man-days.

Task 4 — Preparation for SCP Review

It is our opinion that the preparation for review of the DOE SCP can be accomplished best by first identifying key issues which are anticipated for assessment in the SCP. In order to perform this task, we propose to prepare a report entitled "Issues to be Identified and Detailed in Preparation of SCP Review". This report will provide a detailed list of issues based on the SCP Review Planning Outline dated 25 March 1986. The report will identify only the key issues from the outline for which Itasca personnel will provide technical assistance. In this way, we hope to avoid duplication of effort by other consultants or other project teams.

Because of the limited time frame until the SCP is planned to be released and the potentially large number of key issues, we have prepared two options for developing this report. Option 1 is to identify as many key issues as possible based on our professional judgement of NRC needs. However, an in-depth analysis of these issues will not be made. Option 2 is a more detailed analysis focusing on a limited number of topics which we believe are critical areas to NRC review efforts. The scope of each option is described below.

Option 1

For this option, critical issues will be identified for the following general subjects:

1. Regulatory Requirements
 - surface facilities
 - shafts, boreholes, seals
2. Design/Rock Mechanics Issues
 - criteria which need to be satisfied for demonstrating compliance with 10CFR60
 - data needs identified as critical for satisfying information requirements
3. Issue Resolution Methodology
 - numerical analysis
 - empirical analysis
 - demonstration analysis

4. Data Needs

- geomechanical
- thermomechanical
- seal materials
- backfill materials

5. Testing Programs

- surface-based test plan
- shaft test plan

Note: At present, we are preparing an evaluation of underground test plan issues under Task Order No. 002 of our contract.

6. Generic Data Programs:

- Avery Island
- Asse Mine
- WIPP
- Project Salt Vault
- Generic Testing

The discussion for each issue identified will be divided into three components:

1. The NRC regulatory issue impacted by this issue will be identified.
2. The present technical understanding, uncertainties, unresolved problems, etc., will be addressed.
3. The relationship of this issue to the SCP will be described.

We anticipate spending 2 man-days on each of the 18 subjects listed above, identifying and detailing the associated critical issues.

Option 2

For this option, an in-depth study will be performed on the following topics which we perceive to be of utmost concern at present:

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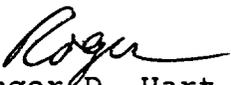
1. surface facilities (including surface-based test plan);
2. numerical analysis (e.g., model validation and conservative analysis);
3. geomechanical/thermomechanical data needs (including sensitivity analyses); and
4. generic data.

We envision that each topic will be reviewed and evaluated for a period of two weeks. Under Task Order No. 002 of our NRC contract, we have already begun an assessment of issues pertaining to thermomechanical analysis. Under Option 2, we would extend this work by performing computer-based sensitivity analysis to identify geomechanical/thermomechanical data needs.

For either Option 1 or Option 2, we estimate that 8 man-weeks' effort will be required to complete Task 4. If the FEA reviews begin near the end of April, we anticipate work on this task will begin on 1 June 1986. Based on our current level of effort scheduled for Task Orders No. 001 and 002, of our contract, we will be able to complete the report for this task by 31 August 1986. If NRC information needs require an earlier response, we are willing to discuss other options to accelerate this effort.

I hope I have addressed all the areas of concern raised at our meeting. I have hurriedly prepared this letter because of your need to have this information as soon as possible and so apologize for any incoherencies. Please feel free to call me if you have any questions.

Sincerely,


Roger D. Hart
Project Manager

cc: D. Tiktinsky

attach.
rdh/ks

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PROPOSED SALT DOCUMENTS FOR FORMAL REVIEW

<u>DOCUMENT</u>	<u>REVIEWER</u>
1. "Schematic Design for Penetration Seals for a Repository in the Permian Basin" by Kelsall et al, ONWI-564, 1985.	Daemen & Farmer
2. "Schematic Design for Penetration Seals for a Repository in the Paradox Basin" by Kelsall et al, ONWI-563, 1985.	Daemen & Farmer
3. "Schematic Design for Penetration Seals for a Repository in the Richton Dome" by Kelsall et al, ONWI-562, 1985.	Daemen & Farmer
4. "Composition of Fluid Inclusions in Permian Salt Beds, Palo Duro Basin, Texas" by Roedder et al, U.S.G.S. Report 85-11-3196, July 1985.	Daemen
5. "Potential for Dissolution at Richton Dome, Mississippi" by Peter J. Murphy, 85-11-3117.	Daemen
6. "Laboratory Investigation of Water Content Within Rock Salt and Its Behavior in a Temperature Field of Disposed High-Leve Waste" by Norbert Jockwer, in <u>Scientific Basis for Nuclear Waste Management</u> , Vol. 3, pp. 35-42. New York: Plenum Press, 1981.	Daemen
7. "Determination of a Constitutive Law for Salt at Elevated Temperature and Pressure" by Paul E. Senseny, Special Technical Publication 869, Am. Soc. Testing & Materials, 1985.	Hart
8. "Expected Near Field Thermal Performance for Nuclear Waste Repositories at Potential Salt Sites" by E. Gregory McNulty, 85-09-2371, ONWI, July 1985.	Hart

<u>DOCUMENT</u>	<u>REVIEWER</u>
9. "A Review of the Effects of Earthquakes on Underground Mines" by Peter R. Stevens, U.S.G.S. Open-File Report 77-313, April 1977.	Wahi
10. "Response of Rock Tunnels to Earthquake Shaking" by Charles W. Dowding, in <u>Earthquake Engineering and Soil Dynamics</u> , Vol. III, pp. 1347-1351. New York: ASCE, 1978.	Wahi
11. "Techniques for Determining Probabilities of Events and Processes Affecting the Performance of Geologic Repositories" edited by Regina L. Hunter and C. John Mann, NUREG/CR-3964, March 1986.	Wahi
12. "Room and Canister Scale Thermal-Mechanical Benchmarks Between STEALTH 2D and SPECTROM-41/21" by B. W. Dial, D. E. Maxwell and W. Yeung. ONWI Library No. 2964.	Wahi
13. "Locations and Times for 100°C Isotherms at Seven Potential Salt Sites" by E. G. McNulty, ONWI Library No. 2962.	Wahi
14. "Salt Pressures on Defense High-Level Waste Packages" by D. P. Nelson and A. F. Fossum, in <u>Research and Engineering Applications in Rock Masses (Proc. 26th U.S. Symposium on Rock Mechanics)</u> .	Hart
15. "Plugging and Sealing Program for the Waste Isolation Pilot Plant (WIPP)" by J. C. Stormont, SAND84-1057, 1984.	Farmer
16. "Experimental Study of Rocksalt for Compressed Air Energy Storage" by R. L. Thoms and R. M. Gehle, in <u>Rock Mechanics: Caverns and Pressure Shafts (Proc. Int. Soc. Rock Mechanics Symposium (May 1982))</u> , pp. 991-1002.	Wahi