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16 March 1987

David Tiktinsky - SS623
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 David:

Enclosed is Itasca's trip report for the 23 February - 5 March 1987 Appendix 7 Site Visit and the meeting to review the draft of the Repository Conceptual Design in Support of Site Characterization Plan for NNWSI. Please call me if you have any questions.

Sincerely,

Roger D. Hart for RDH

Roger D. Hart
Project Manager

cc: J. Greeves, Engineering Branch
Office of the Director, NMSS
E. Wiggins, Division of Contracts
DWM Document Control Room

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ITASCA TRIP REPORT

DATES: 23 February - 5 March 1987

LOCATION: U.S. Nuclear Regulatory Commission, NNWSIP Site Office (Las Vegas, Nevada) and Nevada Test Site

PURPOSE: Appendix 7 Site Visit, Review Draft of Repository Conceptual Design in Support of Site Characterization Plan for NNWSI

ATTENDEES: J. Daemen and L. Lorig

PREPARED BY: L. Lorig and J. Daemen

SUMMARY

An Appendix 7 site assignment to the NRC site office was conducted from 23 February to 5 March 1987. A site visit to the Nevada Test Site was made on 2 March. Members of the group conducting the visit were D. Gupta and J. Peshel (NRC), D. Conover and K. Hanna (Bureau of Mines), S. Battacharya (Engineers International), and J. Daemen and L. Lorig (Itasca). A representative of the State of Nevada joined the group on 26 and 27 February. Two members of the group (J. Daemen and S. Battacharya) attended meetings only until 1 March. The visit to the Nevada Test Site was conducted by Larry McKague (LLNL geologist). Three additional NRC personnel—(Charlotte Abrams and Keith McConnel (geologists) and Bill Ford (hydrologist)—accompanied the group on the NTS visit. D. Gupta, J. Peshel and J. Daemen attended a 6 March Appendix 7 visit at SNL (Albuquerque) with various authors of the conceptual design report.

Purpose

The purpose of this trip was to review the current status of the NNWSI conceptual repository design in support of the site characterization plan (SCP).

Accomplishments

The review focused on the chapters on Performance Objectives, Design Issues, and Design Analysis. In addition, the following appendices were available for review:

- (1) Expected Temperature for Borehole Walls and Drifts After Spent Fuel Emplacement;
- (2) Preliminary Liner Stress Analyses
- (3) Ventilation Cooling Analyses;
- (4) Equipment List for Surface Facilities;
- (5) An Assessment of the Feasibility of Disposing of Nuclear Waste in a Horizontal Configuration;
- (6) Pre-closure Radiation Safety Analysis Study;
- (7) Equivalent Energy Density Study;
- (8) Surface Elements Design Analysis Studies;
- (9) Effect of Porosity on Emplacement Drift Stability;
- (10) Cove III Temperature Calculations;
- (11) Items Important to Safety, Waste Isolation, and Retrievability at Yucca Mountain;
- (12) Capacity of Yucca Mountain Compared to the Size of the Underground 6 Facility (not available for review; under revision); and
- (13) Thermomechanical Analyses.

Time limitations precluded a detailed study of all of the appendices. Primary topics focused on by L. Lorig included underground opening design, temperature distribution calculation results, and results of thermomechanical analyses.

The visit to the Nevada Test Site included Stops at Carpet Bag Fault, Yucca Fault, and P-Tunnel. The tour of P-Tunnel was conducted by an Air Force representative. The group was able to enter both the LOS (Line of Sight) drift and the Bypass drift and to observe rock (mainly, unwelded tuff) and support (steel-fiber shotcrete and rockbolt). Very little water (occasional damp

spots) was observed. Tunnel depth ranged from zero at the portal to about 1300 feet at the working point.

Primary topics discussed during the 6 March Albuquerque meeting included: Design Basis; Stability of Openings; Sealing, Systems, Structure and Components Important to Safety; Thermal Analysis; and Ventilation. Considerable clarification has been obtained on numerous items. Some potential problem areas have been identified. A strong impression is that a voluminous amount of material (reports) might become available within the relatively near future (e.g., shortly before or together with the SCP).

Problems Encountered

The Appendix 7 Site Visit was extremely worthwhile and provided an improved understanding of the NNWSI conceptual design. A potential problem for reviewing the Final CDR and SCP relates to the status of thermomechanical calculations. A consistent set of material properties and thermal loading has not been used in the studies reported. Consequently, it is extremely difficult to obtain a clear understanding of likely thermomechanical behavior or relative importance of input parameters. A related difficulty results from many of the supporting documents detailing results and analyses not being available.

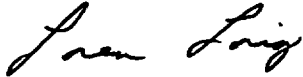
Recommendations

The Reference Information Base referred to in the text but not contained in the appendices should be reviewed as soon as possible. NRC should perform independent thermomechanical calculations using a consistent set of material properties and the latest thermal loadings. With this as a base case, sensitivity studies should be made to assess the relative importance of input parameters and assumptions inherent in other analyses.

In preparation for the SCP review, it would be highly desirable to have the means for checking thermomechanical analyses (e.g., programs and data files) readily available. This probably also holds true for ventilation computations. Review preparation also might include review of documents identified earlier for review (e.g., during EA review as well as a refresher EA and supporting document review). The latter might be particularly true with regard to the Climax emplaced waste experiments, as it appears that some NNWSI

analyses might have been impacted significantly by the Climax experience. Similarly, a number of already published Los Alamos documents have been noted that have been prepared in direct support of the NNWSI repository sealing program.

Respectfully submitted,



Loren J. Lorig

ljl/ks

COST BREAK-OUT

Labor

Jaak Daemen	48 hrs @ \$57.75/hr	\$ 2,772.00
Loren Lorig	76 hrs @ \$21.15/hr	1,607.40
		<hr/>
	TOTAL LABOR	\$ 4,379.40

Actual Expenses

Travel

Airfare

Daemen	\$ 124.00
Lorig	733.00

Miscellaneous Travel Expenses

Daemen (car rental, gas, taxi)	\$ 205.31
Lorig (car rental, taxi)	176.83

Lodging

Daemen (7 nights @ \$47.84/night)	\$ 334.88
Lorig (4 nights @ \$84.53/night)	338.12
(1 night @ \$77.04)	77.04
(4 nights @ \$66.34)	265.36

Meals

Daemen	\$ 230.13
Lorig	185.58

Miscellaneous Expenses

Daemen (phone)	\$ 1.25
Lorig (phone, laundry)	22.58

TOTAL EXPENSES: \$ 2,694.08