



26 January 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 meeting from 12 to 15 January 1987 to discuss thermomechanical modeling (Task Order No. 802-002-02, Subtask 1). The computer codes FLAC and MUDEC, which were verified for thermomechanical modeling (Task Order No. 802-002-02, Subtask 2), were delivered to the NRC at this meeting. Please call me if you have any questions.

Sincerely,

Roger D. Hart
Roger D. Hart
Project Manager

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

Encl.
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x Tiktinsky

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ITASCA TRIP REPORT

DATES: 12-15 January 1987

LOCATION: U.S. Nuclear Regulatory Commission (Silver Spring, Maryland)

PURPOSE: Meeting on Thermomechanical Modeling

ATTENDEES: R. Hart and M. Mack (Itasca)
J. Buckley, N. Tanious, and D. Tiktinsky (NRC)

PREPARED BY: R. Hart

SUMMARY

The purpose of this meeting was to review the thermomechanical modeling capabilities available in the microcomputer codes FLAC and MUDEC. These codes have been verified by Itasca for use by the NRC in its review of thermomechanical analyses presented by DOE. The verified codes were delivered to the NRC at this meeting.

The focus of this meeting was on the discussion of the various aspects of thermomechanical modeling specifically for hard rock (i.e., basalt and tuff). A subsequent meeting will be concerned with the modeling of thermomechanical behavior of salt.

The following discussion topics were addressed at this meeting:

- (1) the basic elements of heat transfer and their incorporation into thermomechanical computer codes;
- (2) the methods of coupling thermal and mechanical processes in thermomechanical codes;
- (3) the simulation of the effect of room ventilation in thermomechanical codes;
- (4) the simulation of heat-generating canisters in thermomechanical codes; and
- (5) methods for addressing the influence of model conditions (e.g., boundary conditions and initial conditions) on the model results.

Example problems were run with the two codes on two IBM-XT computers made available at the NRC for this meeting. A typical room-scale problem based on conditions assumed representative for basalt was set up for modeling with FLAC. Two simulations of one year of heating were conducted to compare the effects of different modeling assumptions. The emphasis of these discussions and example problems was to provide a better understanding of the effort required and limitations of thermomechanical analyses.

Respectfully submitted,


Roger D. Hart

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COST BREAK-OUT

Labor

Roger Hart	36 hrs @ \$24.04/hr	\$ 865.44
Mark Mack	36 hrs @ \$12.50/hr	450.00

TOTAL LABOR \$ 1,315.44

Actual Expenses

Travel

Airfare (Mpls-WDC-Mpls)		
Hart		\$ 318.00
Mack		318.00

Miscellaneous Travel Expenses		
Hart (car rental, parking)		\$ 229.55
Mack (parking)		5.50

Lodging

Hart		
(5 nights @ \$66.00/night)		\$ 330.00

Mack		
(5 nights @ \$66.00/night)		330.00

Meals

Hart		\$ 131.74
Mack		126.41

Miscellaneous Expenses

Hart (telephone)		\$ 4.44
Mack (telephone)		5.94

TOTAL EXPENSES: \$ 1,799.58