

June 27, 2001

Asadul H. Chowdhury,
Manager, Mining, Geotechnical, and Facility Engineering
Center For nuclear Waste Regulatory Analyses
6220 Culebra Road P.O. Drawer 28510
San Antonio Texas 78228-5166

SUBJECT: REPOSITORY DESIGN THERMAL-MECHANICAL EFFECTS KEY
TECHNICAL ISSUE INTERMEDIATE MILESTONE NO.20-01402.671.145:
PROGRESS REPORT FOR DECOVALEX III TASK 2

Dear Dr. Chowdhury,

I have reviewed the Center report entitled: "Numerical Simulation of the Drift-Scale Heater Test at Yucca Mountain" which is a progress report summarizing the thermal-hydrological (TH) modeling using the MULTIFLO code. The results of this TH modeling will be used to perform thermal-hydrological-mechanical analyses of the Drift-Scale Test (DST). This report fulfills the Center's contractual obligations for this Intermediate Milestone.

I do not have any major comments on the technical contents of this report, however, I have the following recommendations for your consideration before finalizing the report for submitting to the DECOVALEX Secretariat:

- (1) The report has two sets of references, one at the end of the abstract and another at the end of the report. There should be one set of references at the end of the report unless there is a specific requirement for this format. To the best of my knowledge, there is no such requirement from DECOVALEX Secretariat.
- (2) Many subscripts, superscripts and parameters used in the various equations in Section 2 of the report have been either not defined or poorly defined. For example, superscript/subscript "res" and "o" referred to on the top line of page 2-4 do not appear in any equation whereas the term ∞ used in the equation 2-24 has not been defined. A thorough check should be made of all the equations in Section 2 of the report to make sure that all terms are clearly defined and/or explained when they first appear.
- (3) The statement in the third paragraph of page 4-11 (Section 4.5) "Given that the source of reduction may be from either ----- somewhat more likely" does not seem to convey clearly the basis for the reduction of permeability values. Some clarification and explanation is warranted.
- (4) Several figures (for example, 4-7a and 7b, 4-8a and 8b, and 4-11a and 11b) are difficult to interpret because of superposition of symbols. Many of the points represented by symbols of the same size fall on each other. Thus, an open triangle under a solid triangle or an open circle under a solid circle at the same spot are indistinguishable. Either the symbols need to be changed, or their sizes need to be changed or some sort of an explanation will have to be provided.

(5) Finally, the last section (Section 5, Discussion and Summary) can be strengthened in many ways: a) stress the fact that this modeling exercise is an independent activity and the objective is to examine how well the MULTIFLO code can simulate the DST given certain parameters and measurements; b) explain clearly why certain parameters had to be kept as given (saturation, fracture size/spacing, and temperature values) while other parameters (infiltration rate, block size and thermal conductivity) were manipulated; and finally, c) minimize discussion of DOE model and results and avoid any comparison of the results of this study with those of DOE modeling studies. (A comparative evaluation of various model studies will eventually result when DECOVALEX Secretariat prepares the final report.) Similar changes are suggested in the abstract and body of the text (specially in Section 4.3).

I have discussed the above points and couple of minor points with Ronald Green of your staff and I look forward to further discussions on this study with the authors of the report. If there are any additional comments on the subject report from other KTI teams, they will be communicated to you through informal discussions or e-mails. If you have any questions on the contents of this letter, please contact me at (301) 415-6695 or via e-mail (msn1@nrc.gov). No written response to this letter is required and as stated earlier, the subject report is considered to fulfill the Center's contractual obligations for this Intermediate Milestone. Please send a copy of the revised report to DECOVALEX Secretariat to fulfill our commitment made at the last Workshop in Japan.

Sincerely,

/RA/

Mysore Nataraja,
Program Element Manager

cc: J. Linehan
B. Meehan
B. Sagar, CNWRA

Either the symbols need to be changed, or their sizes need to be changed or some sort of an explanation will have to be provided.

(5) Finally, the last section (Section 5, Discussion and Summary) can be strengthened in many ways: a) stress the fact that this modeling exercise is an independent activity and the objective is to examine how well the MULTIFLO code can simulate the DST given certain parameters and measurements; b) explain clearly why certain parameters had to be kept as given (saturation, fracture size/spacing, and temperature values) while other parameters (infiltration rate, block size and thermal conductivity) were manipulated; and finally, c) minimize discussion of DOE model and results and avoid any comparison of the results of this study with those of DOE modeling studies. (A comparative evaluation of various model studies will eventually result when DECOVALEX Secretariat prepares the final report.) Similar changes are suggested in the abstract and body of the text (specially in Section 4.3).

I have discussed the above points and couple of minor points with Ronald Green of your staff and I look forward to further discussions on this study with the authors of the report. If there are any additional comments on the subject report from other KTI teams, they will be communicated to you through informal discussions or e-mails. If you have any questions on the contents of this letter, please contact me at (301) 415-6695 or via e-mail (msn1@nrc.gov). No written response to this letter is required and as stated earlier, the subject report is considered to fulfill the Center's contractual obligations for this Intermediate Milestone. Please send a copy of the revised report to DECOVALEX Secretariat to fulfill our commitment made at the last Workshop in Japan.

Sincerely,

/RA/

Mysore Nataraja,
Program Element Manager

cc: J. Linehan
B. Meehan
B. Sagar, CNWRA

DISTRIBUTION: Ticket: CNWRA 2001 0092

Central File NMSS r/f HLWB r/f DDeMarco DTurner (CNWRA)
NKStablein LHamdan HARlt BLeslie JBradbury
PJustus WDam EWhitt

ADAMS Accession Number: ML011780440

File Name: S:\DWM\HLWB\msn\IM1-2001.wpd

OFC	HLWB	HLWB
NAME :BB	M. Nataraja mn	K. Stablein nks
DATE	06/27/01	06/27/01

OFFICIAL RECORD COPY

ACNW: YES NO Delete file after distribution: Yes No

1) This document should be made available to the PUBLIC NO

2) This document is related to the HLW program - place in the LSS NO