



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 12, 1995

MEMORANDUM TO: Barbara D. Meehan
Contracting Officer
Technical Acquisition Branch No. 1
Division of Contracts and Property
Management, ADM

THRU: Shirley L. Fortuna *ST*
CNWRA Deputy Program Manager
Program Management, Policy Development
and Analysis Staff, NMSS

FROM: Philip Justus, Sr. Geologist
Program Element Manager
Engineering and Geosciences Branch
Division of Waste Management, NMSS

SUBJECT: ACCEPTANCE OF MAJOR MILESTONE 20-5702-425-503, "FINITE ELEMENT
MODELING OF LISTRIC NORMAL FAULTING"

Major milestone, "Finite Element Modeling of Listric Normal Faulting" by G.I. Ofoegbu and D.A. Ferrill, April 1995, has been reviewed by J.S. Trapp, S.M. McDuffie and myself and found to be programmatically and technically acceptable. The report can be placed in the PDR. The report was on time, though too few copies were transmitted for review--this was quickly remedied.

The Report (CNWRA 95-008) is in compliance with OPS PLAN requirement to examine listric effects of fault shape on hanging wall deformation using ABAQUS code. A principal result is the indication of the need for DOE to establish a more complete dataset of deep in situ stress measurements in order to understand the potential for future movement in the Yucca Mountain area of upper crustal faults that are listric.

The following are comments from reviewers: The model emphasizes mechanics of listric faulting and includes an assumption of activity of a fault at Forty-mile Wash that is a boundary condition for the computer simulation. However, field evidence indicates that at least some detachment faults may be benign because they appear to be cut by steeply dipping normal faults. Considering the Little Skull earthquake series depth (about 12 km), detachments shallower than 8km, or so, in this study may not be terribly relevant to repository design or performance. If ABAQUS could generate explanations of current focal plane solutions, that would be relevant. The significance of direction and magnitude of the displacement vectors, such as in Figs. 3-14, 3-17, may need to be explained later. Some staff want to exert caution on pursuing details

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B. Meehan

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of the subject model until they get more confident that it is "correct." These staff would like studies of alternate conceptual models that incorporate certain characteristics of faults in the geologic setting, such as oblique slip and non-listric normal faults, to be done in the future.

This task was successful from at least these points of view: 1) key parameter of in situ stress was uncovered, for the assumptions made; 2) listric faulting model assessment capability was developed; and 3) results stimulated consideration of alternative model simulations. We will consider these matters when we deliberate future Geology and Geophysics Element tectonic modeling work. Dr. Ferrill is on the agenda to discuss this work at the May 17-18 DOE/NRC Site Visit to Yucca Mountain for tectonic observations, and we are glad to support that presentation and the presentation at the upcoming FOCUS95 meeting.

cc: J. Linehan, PMDA
B. Stiltenpole, PMDA

Ticket #: C-95-064

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