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> September 29, 2011 Contract No. NRC-02-07-006 Account No. 20.14002.01.441 06300001

Attn: Document Control Desk U.S. Nuclear Regulatory Commission Dr. King Stablein Office of Nuclear Material Safety and Safeguards Division of High-Level Waste Repository Safety Mail Stop EBB–2–BO2 Washington, DC 20555

Subject: Site Seismic Response—Final Report (IM 14002.01.441.160)

Dear Dr. Stablein:

This letter retransmits the subject report, incorporating the comments provided by the U.S. Nuclear Regulatory Commission (NRC) on the original report transmitted on July 29, 2011. Please note that the title of the report has been changed to "Effects of Tilted and Faulted Strata on Seismic Ground Motion."

The Center for Nuclear Waste Regulatory Analyses (CNWRA[®]) received NRC comments on the original draft report in an email dated August 22, 2011 (attached). The changes made by CNWRA staff in response to those comments may be seen in Version 19.0 (dated September 22, 2011) of the following SharePoint document:

YM Licensing Review > Knowledge Management > Knowledge Capture Reports > Ghosh_Site Seismic Response_160 > 160_Ghosh_Site Seismic Response

The NRC staff indicated in an email dated September 26, 2011, that the revised report was acceptable. The final formatted version of the report is preserved at the SharePoint location shown above.



Dr. King Stablein September 29, 2011 Page 2

Please contact Jude McMurry at (210) 522-6935 or me at (210) 522-5582 if you have any questions regarding this report.

Sincerely yours,

Stail A. Pekett

David Pickett Senior Program Manager Integrated Spent Fuel Regulatory Program—Geologic Disposal

DP/ar

Enclosure

cc: <u>NRC</u> D. DeMarco R. Jackson V. Whipple L. Kokajko A. Mohseni J. Davis J. Rubenstone J. Guttmann Y. Kim T. McCartin B. Hill P. Hall M. Nataraja

R. Fedors

<u>CNWRA</u> W. Patrick B. Sagar J. McMurry Program Managers Group Managers A. Ghosh S. Hsiung M. Padilla SwRI Record Copy B—IQS

David Pickett

From:	Nataraja, Mysore [Mysore.Nataraja@nrc.gov]
Sent:	Monday, August 22, 2011 3:31 PM
То:	David Pickett
Cc:	Amitava Ghosh; Simon; Guttmann, Jack; Jackson, Rolonda; Stablein, King
Subject:	KC reportIM-14002.01.441.160

David,

I have completed the review of the subject report—"Effects of Tilted and faulted Strata on Seismic Ground Motion." Please see the comments below for consideration by the authors.

- (1) Page 2-1, (Dynamic Soil/Rock Behavior), para-2, line-4: ---loading cycle, **is** average etc. This should be "---**its** average--- ."
- (2) Page 4-1 (Analysis of Surface Response), para-2, line-8: Remove the comma after "As the,---."
- (3) Page 4-3 (Figure 4-3): Key (explaining the various terms for the corresponding layers/geologic formations) is missing.
- (4) Page 4-5 (Figure 4-4): Nomenclature for the various units/formations is missing. Also, key for the various points, 1-9 may be helpful.
- (5) Page 4-8 (Figure 4-5): Key for the two curves (blue and red) is missing.
- (6) Page 4-10 (Figure 4-7): Indicate the input point (Point 6) in the caption.
- (7) Page 4-11 (Figure 4-8): Same as above in # 6.
- (8) Page 4-11 (Figure-4-9): The caption and content of the figure do not match. The figure should show the UDEC model (not the results).
- (9) Page 4-12 (Section 4.2): Delete the space between lines 2 and 3.

General comments on Section 5:

- (1) It would be more useful if the conclusions are either numbered or given as bullets so that they can be separated. As presented, many conclusions are bundled together and they seem to be lost.
- (2) Many statements are qualitative in nature, it would be helpful to present some quantitative conclusions (there are a few quantitative conclusions, but not nearly enough).
- (3) It would be better to separate the conclusions resulting from UDEC and FLAC analyses under subheadings so that they stand out.
- (4) Some discussion on when a 2-D analysis becomes inevitable would be useful. For example, at what inclinations of layers must we employ a 2-D analysis?

I am available for discussion if the authors find it necessary. Otherwise, please address the comments and let me know when a revised version becomes available so that we can close the ticket.

Raj