July 29, 1999

MEMORANDUM TO: Sher Bahadur, Chief
Engineering Research Application Branch
Division of Engineering Technology
Office of Nuclear Regulatory Research

FROM: C. William Reamer, Chief
High-Level Waste and Performance
Assessment Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

SUBJECT: REVIEW OF DRAFT FINAL REPORT "TECHNICAL BASIS FOR REVISION OF REGULATORY GUIDANCE ON DESIGN GROUND MOTION"

In accordance with your June 4, 1999, request for assistance in reviewing the above subject matter, we have completed our review of the material provided to us and have several observations regarding the revision of the regulatory guide that may require further clarification. These observations are described in the attachment. We conclude that the procedures for the development of a risk-consistent spectra and the technical bases mentioned in the draft report for the revision of the regulatory guidance are adequate and appropriate.

The staff will be looking forward to the results from the trial application of this procedure to the Western and the Eastern sites.

The review was performed by Bakr Ibrahim, If you have any questions, please contact him at 415-6651.

Attachment: As stated

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COMMENTS ON DRAFT REPORT

TECHNICAL BASIS FOR REVISION OF REGULATORY GUIDANCE ON DESIGN GROUND MOTION

- Section 1, p. 1: Provide what additional improvement could be made with respect to site-specific spectral shape estimation.
- Section 2, p. 11: If Kappa is a frequency independent parameter, explain why beyond 5Hz, the differences in kappa values (0.04 sec compared to 0.006 sec) produce differences in high frequency spectral estimates.
- Section 3, p. 3-3: It is stated "..near-source effects are not considered significant for M=5 to 6 earthquakes," while in Section 1, p. 4, it is stated "..., near-fault effects can dramatically influence spectral content." Elaborate on these two statements.
- Section 4, p. 4-3: Define what is meant by "...a robust weighting scheme..." and what are its criteria.
- Section 4, p. 4-12: Since the "L" and "T" weights produce very similar spectral shape, discuss what is the advantage of averaging them.
- Section 6, p. 6-22, Table 6-2: If $Q=1/2\eta$, discuss what is the basis for assuming $\eta=0.6$ given $Q= 275$.
- Section 6, p. 6-64: The central plot in Fig. 6-46 does not represent the mean disaggregation of magnitude, also the figure represents 0.1 Hz while the text refers to 10 Hz. Figure 6-50 does not represent spectra as stated on p. 6-65. Make the necessary corrections.
- Section 6, Figure 6-113: The trough in the figure at 4 sec. and its significance to the analysis needs to be explained.
- Appendix K, Figure K-2: Identify the value of $\sigma\pm1$ used at 150 ft depth. Also, ensure that the median $\pm$ 1σ velocity at that depth is correct.
- Appendix K, Figure k-4: Explain under what conditions you expect the Poisson's Ratio to be greater than 0.5.
- Appendix K, p. K-11: If Kappa is a frequency independent parameter, explain why it controls the shift in the spectral shape?
- Appendix K, p. K-20: Explain the ratio between horizontal and vertical Kappa and whether this ratio is constant for a rock and soil sites.
- Appendix K, Figure K-32: Explain the increase in spectral ratio (V/H) beyond 2 sec.

Attachment

- General Comments: The report would be improved if all the references were located at the end of the report. Also, the curves in the figures are sometimes hard to associate with the associated legend (unless it is intended to have color figures in the final report).

The following references and figures are missing or need corrections:

Section 1: Silva et al (1997), referenced in another Section but not in Section 1.

Section 2: Figure 2-1, correct the legend.
Correct the date for the Saguenay Earthquake to 1988 instead of 1998.
Figure 2-13 is missing.

Section 4: On p, 4-13, change Fig. 4-3 to Fig. 4-16.
In Fig. 4-20, replace Equation (8) by (4-8).
On p. 4-14, replace Figure 4-7 by Figure 4-20.

Section 6: Silva and Darragh (1995), referenced in another Section but not in Section 6.

Appendix J: All references are missing in this Appendix.