



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

August 18, 2015

Mr. Mark E. Reddemann
Chief Executive Officer
Energy Northwest
MD 1023
76 North Power Plant Loop
P.O. Box 968
Richland, WA 99352

SUBJECT: COLUMBIA GENERATING STATION - REQUEST FOR ADDITIONAL
INFORMATION ASSOCIATED WITH NEAR-TERM TASK FORCE
RECOMMENDATION 2.1, SEISMIC REEVALUATIONS (TAC NO. MF5274)

Dear Mr. Reddemann:

By letter dated March 12, 2015¹, to the U. S. Nuclear Regulatory Commission (NRC), Energy Northwest, submitted for NRC review its Seismic Hazard and Screening Report, Pursuant to Title 10 of the *Code of Federal Regulations* Part 50, Section 50.54(f), Response for Information Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident for Columbia Generating Station (Columbia).

The NRC staff has reviewed the information provided for Columbia and has determined that additional information is required to complete its review. Enclosed is a request for additional information (RAI) related to the seismic source characterization and site response evaluation performed for the Columbia site. As discussed with your staff on August 12, 2015, it was agreed that a response to the RAI would be provided no later than September 24, 2015.

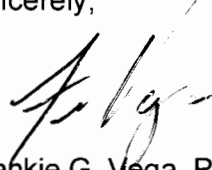
¹ The letter can be found under Agencywide Documents Access and Management System (ADAMS) Accession No. ML15078A243.

M. Reddemann

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If you have any questions related to the enclosed RAIs or the requested submission date, please contact me at 301-415-1617 or via e-mail at Frankie.Vega@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read 'F. Vega', is positioned above the printed name.

Frankie G. Vega, Project Manager
Hazards Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket No. 50-397

Enclosure:
Request for Additional Information

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION
NEAR-TERM TASK FORCE RECOMMENDATION 2.1
SEISMIC HAZARD AND SCREENING REPORT
FOR COLUMBIA GENERATING STATION

By letter dated March 12, 2015, to the U. S. Nuclear Regulatory Commission (NRC)¹, Energy Northwest (the licensee), submitted for NRC review its Seismic Hazard and Screening Report (SHSR), Pursuant to Title 10 of the *Code of Federal Regulations* Part 50, Section 50.54(f) (hereafter referred to as the 50.54(f) letter), Response for Information Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident for the Columbia Generating Station (Columbia).

RAI #1 - Review of seismic sources for the Columbia site

The Hanford sitewide Senior Seismic Hazard Analysis Committee (SSHAC) Report describes the local seismic sources' (both areal and faults) maximum magnitude (Mmax) values to be used in the Probabilistic Seismic Hazard Analysis (PSHA) calculations. The distribution of Mmax for Zone B was developed considering the largest observed magnitudes within the zone and ranges from 6.5 to 7.5.

Given the limited knowledge regarding the seismic history of the region and observational evidence that at least one historical earthquake occurred in Zone B with possibly a magnitude larger than 7.0 (i.e. the 1872 Lake Chelan Earthquake) and consistent with the 50.54(f) letter and the Screening, Prioritization and Implementation Details (SPID)² guidance, please provide the following information:

- a. Additional detail for your basis that the lower weights for Mmax values of 7.25 [0.09] and 7.5 [0.01] are appropriate for your site and, in general, whether this distribution of Mmax adequately captures the potential for large earthquakes in Zone B.

RAI # 2 - Review of seismic sources for the Columbia site

The SSHAC report discusses the process used to estimate slip rates for mapped active faults, but the information provided does not provide sufficient detail for the staff to relate subsurface geometry of faults in the Yakima Fold and Thrust Belt to their surficial topographic expression or to confirm the slip rate estimates for individual faults.

¹ The letter can be found under Agencywide Documents Access and Management System (ADAMS) Accession No. ML15078A243.

² The SPID guidance document is found in ADAMS under Accession No. ML12333A170.

Enclosure

Consistent with the 50.54(f) letter and the SPID guidance, please provide the following information:

- a. Discuss how changes in fault dip with depth, tapered slip, and variation in fault geometries were represented in the final models for determination of slip rates in SSHAC Report Section 8.4.3.4
- b. clarify how the results of advanced elastic dislocation models were used to constrain the slip rates
- c. Provide a quantitative comparison of the differences between the modeled topographic profiles resulting from the structural relief to net slip conversions with observed topographic profiles transecting the fault(s) being analyzed
- d. Discuss in more detail the steps followed to estimate slip rates specifically for the Rattlesnake Mountain, Saddle Mountain, Umtanum Ridge, and Yakima Ridge faults.

RAI # 3 - Review of seismic sources for the Columbia site

The recent paper by Casale and Pratt (2015) uses seismic reflection data to interpret faults in the subsurface in terms of a thin-skinned fault model that results in relatively high slip rates on the faults that comprise the Yakima Fold and Thrust Belt. Although the thin-skinned model was considered during the SSHAC process for the Columbia site, it was not adopted in the PSHA (SSHAC Report Section 4.1).

Consistent with the 50.54(f) letter and the SPID guidance, please provide the following information:

Discuss the potential significance to the PSHA at the Columbia site of any new information in Casale and Pratt (2015) that was not considered in the SSHAC process, especially with regard to the proposed range of slip rates presented in the paper.

RAI # 4 – Review of the site response analysis for the Columbia site

The SHSR describes the process used in site response calculations. The response states that “At some frequencies, the calculated site amplification for high base rock amplitudes is less than the minimum value of 0.5 recommended by the SPID (EPRI, 2013a). The 0.5 limit is not imposed here in the calculation of the surface hazard because the intended purpose of this report is to obtain the best estimate of the mean and fractile levels of the seismic response for plant risk assessment with no added conservatism.” The SHSR states that mean amplification values for a frequency of 100 Hertz that range from 0.339 at a rock spectral acceleration corresponding to an annual exceedance frequency of 1E-4 per year to 0.179 at an annual exceedance frequency of 1E-5 per year.

Consistent with the 50.54(f) letter and the SPID guidance, please provide the following information:

- a. Additional detail to describe your basis, including historical records from sites with reasonably analogous characteristics, that such de-amplification is plausible.
- b. Further justification for not implementing the 0.5 limit, and demonstrate the impacts of not implementing the 0.5 limit on the final ground motion response spectra values and the control point hazard curves, which will be used for the seismic risk evaluation.

M. Reddemann

- 2 -

If you have any questions related to the enclosed RAIs or the requested submission date, please contact me at 301-415-1617 or via e-mail at Frankie.Vega@nrc.gov.

Sincerely,

/RA/

Frankie G. Vega, Project Manager
Hazards Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

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