



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

November 20, 2018

Mr. Bradley J. Sawatzke  
Chief Executive Officer  
Energy Northwest  
MD 1023  
76 North Power Plant Loop  
P.O. Box 968  
Richland, WA 99352

SUBJECT: COLUMBIA GENERATING STATION – RESPONSE TO REQUEST FOR  
EXTENSION OF SEISMIC PROBABILISTIC RISK ASSESSMENT SUBMITTAL

Dear Mr. Sawatzke:

The purpose of this letter is to provide the U.S. Nuclear Regulatory Commission (NRC) staff's response to the letter received from Energy Northwest (the licensee), on September 6, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18249A360), related to post-Fukushima seismic hazard reevaluations. The letter requests an extension of the submittal date of the seismic probabilistic risk assessment (SPRA) associated with the seismic hazard reevaluation for Columbia Generating Station (Columbia) to September 30, 2019. The request was made in order to fully complete SPRA modeling refinements and analysis in order to more realistically quantify the seismic risk at Columbia. Specifically, since it was determined that seismic fragilities of plant structures are dominant risk contributors that drive the SPRA results, detailed seismic fragilities of plant structures using more advanced analytical methods will be needed. The NRC staff has determined that extending the submittal date of the SPRA is acceptable.

**BACKGROUND**

By letter dated March 12, 2012 (ADAMS Accession No. ML12053A340), the NRC issued a request for information under Title 10 of the *Code of Federal Regulations*, Section 50.54(f) (hereafter referred to as the 50.54(f) letter), to all nuclear power reactor licensees and construction permit holders in response to lessons learned from the March 2011 accident at Japan's Fukushima Dai-ichi nuclear power plant. Enclosure 1 of the 50.54(f) letter requested that licensees perform seismic hazard reevaluations using present-day methodologies and guidance, and then assess the impact of the reevaluated hazard on the plant (e.g., through an SPRA). The NRC staff would review the completed responses to these assessments to determine if there is a need for any additional regulatory actions, such as a plant-specific backfit.

Concurrent with the reevaluation of seismic hazards, licensees were required to develop and implement mitigating strategies under NRC Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML12054A735). In order to proceed with the implementation of Order EA-12-049, licensees used the current design basis seismic hazard or the most recent seismic

hazard information, which may not be based on present-day methodologies and guidance, in developing their mitigation strategies.

By letter dated October 27, 2015 (ADAMS Accession No. ML15194A015), the NRC determined which licensees (1) should perform an SPRA; (2) should perform limited scope evaluations; or (3) had no further actions to perform based on a comparison of the reevaluated seismic hazard and the site's design-basis earthquake. As documented in that letter, Columbia is expected to complete an SPRA, which will also assess high frequency ground motion effects, and a limited-scope evaluation for the spent fuel pool (SFP).

The limited-scope evaluation for the SFP at Columbia was completed, and the NRC issued a corresponding staff assessment by letter dated April 17, 2018 (ADAMS Accession No. ML18106B119). The SPRA was expected to be submitted to the NRC by March 31, 2019.

The SPRA results may also be used to develop an assessment of whether the mitigation strategies of NRC Order EA-12-049 (or an alternate mitigation strategy) are acceptable as designed or need to be revised given the potential effects of the reevaluated seismic hazard. This assessment is called the seismic Mitigation Strategies Assessment (MSA). The seismic MSA was also due at the time of the SPRA submittal.

In its letter dated September 6, 2018, the licensee requested an extension of the submittal date for the SPRA and corresponding MSA until September 30, 2019.

## EVALUATION

The staff's evaluation of the licensee's request for extension of the seismic reevaluations considered several factors including: (1) the schedule of the Columbia submittal, including the extension, as it relates to the NRC's overall SPRA submittal schedule; (2) the additional defense-in-depth capabilities achieved through Order EA-12-049 and Order EA-12-051, "Reliable Spent Fuel Pool Instrumentation" (ADAMS Accession No. ML12056A044) and Phase 1 of Order EA-13-109 "Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions" (ADAMS Accession No. ML13143A334); (3) the seismic design margin currently existing in nuclear power plants; and (4) the documented ability of Columbia, specifically, to cope with earthquakes larger than the design-basis earthquake.

As shown in the NRC's October 27, 2015, letter, licensees were requested to perform specific evaluations based on a number of criteria associated with the magnitude of their reevaluated seismic hazard and how it compared to their design basis seismic hazard. A subset of licensees were requested to perform SPRAs. Columbia was one of the sites requested to perform an SPRA. Within this subset, there is a range of dates by which licensees are to submit their SPRA reports. The range of dates begins in March 2017 and continues through December 2019. The ordering of licensee submittals within this range of dates was not based on safety or seismic risk concerns. That is to say, the plants are not graded within this submittal date range in order of increasing or decreasing seismic risk. The Columbia extension request moves the SPRA submittal within the existing date range and not beyond the last date in the range. Therefore, the NRC staff's basis for continued safe operation, which is stated in a May 9, 2014 (ADAMS Accession No. ML14111A147), letter, is still applicable.

The staff also considered the additional defense-in-depth that has been achieved for coping with an extended loss of alternating current power and loss of normal access to the ultimate heat sink due to external events, including those caused by seismic events, as a result of Columbia's

compliance with Orders EA-12-049, EA-12-051 and Phase 1 of EA-13-109. The NRC staff issued Columbia's safety evaluation regarding implementation of these mitigating strategies and reliable spent fuel pool instrumentation on February 22, 2018 (ADAMS Accession No. ML17333A888). By letter dated December 28, 2017 (ADAMS Accession No. ML18002A438), the licensee confirmed that Phase 1 of NRC Order EA-13-109 was completed. By letter dated August 06, 2018 (ADAMS Accession No. ML18215A204), the NRC staff issued an audit report documenting the closeout of open items identified in interim staff evaluations for Phase 1. Columbia is expected to be in compliance with Order EA-13-109 by June 2019.

The NRC inspectors verified implementation at Columbia on August 20, 2018 (ADAMS Accession No. ML18232A432). The completion of this work results in a safety benefit and an enhanced ability to mitigate beyond-design-basis events, including seismic events, at Columbia during the period of extension.

Information regarding the seismic design margin inherent in nuclear plants, including NRC and industry studies summarized in the NRC's May 9, 2014, letter, outlines a number of reasons for continued operation while seismic reevaluations are continuing. These reasons include a safety margin in the design such that plants can withstand potential earthquakes exceeding the original design-basis and that the fleet-wide seismic core damage risk as a result of the revaluated hazard did not pose a concern regarding adequate protection.

The ability of Columbia, specifically, to cope with earthquakes larger than the design-basis earthquake is documented in the Expedited Seismic Evaluation Process (ESEP) report. The staff's assessment of the ESEP report can be found in a letter dated June 7, 2016 (ADAMS Accession No. ML16154A016). The staff's assessment concluded that the licensee demonstrated that a set of mitigation strategies equipment, which could be used to maintain or restore core cooling and containment function, has additional safety margin such that this equipment can cope with an earthquake at least two times the SSE for Columbia.

Additionally, the limited-scope SFP seismic integrity evaluation referenced above has confirmed that the pool is seismically adequate and can retain the necessary water inventory in accordance with the NRC endorsed SFP Evaluation Guidance (ADAMS Accession No. ML17034A408). The SFP seismic evaluation was based on the reevaluated ground motion response spectra peak spectral acceleration documented in the Seismic Hazard and Screening Report (ADAMS Accession No. ML15078A243). The SFP seismic integrity evaluation provides assurance that the spent fuel will be adequately protected from the reevaluated seismic hazards during the requested extension period.

In summary, Columbia's extension request does not move the SPRA submittal outside the date range allotted to all plants who are to perform an SPRA. Compliance with NRC Orders EA-12-049, EA-12-051 and EA-13-109 has provided a safety benefit and an enhanced ability to mitigate beyond-design-basis events at Columbia during the period of extension. The combination of the seismic capacity inherent in the design of nuclear power plants and the Columbia-specific evaluations of the seismic capacity of safe-shutdown equipment and SFP as documented by the ESEP and the SFP seismic integrity evaluation, respectively, provides additional assurance that Columbia can cope with an earthquake larger than the design-basis earthquake while the longer-term seismic risk evaluations are ongoing. For these reasons, the staff finds that extension of the due date of the SPRA submittal to support SPRA modeling refinements and analyses, in order to more realistically quantify the seismic risk at Columbia, is acceptable.

CONCLUSION

Based on the staff's evaluation, and after consultation with the Director of the NRC's Office of Nuclear Reactor Regulation, the NRC concludes that the licensee's proposal to extend the due date of the submittal of the SPRA related to the 50.54(f) letter request for information for seismic events and the extension of the corresponding seismic MSA are acceptable. Accordingly, the required response date for the SPRA submittal and MSA submittal is extended until September 30, 2019.

If you have any questions, please contact Frankie Vega, Project Manager, at (301) 415-1617 or via e-mail at [Frankie.Vega@nrc.gov](mailto:Frankie.Vega@nrc.gov).

Sincerely,

A handwritten signature in cursive script, appearing to read "Louise Lund".

Louise Lund, Director  
Division of Licensing Projects  
Office of Nuclear Reactor Regulation

Docket No. 50-397

cc: Distribution via Listserv

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DATED November 20, 2018

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**ADAMS Accession No. ML18291A556**

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