



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

April 24, 2018

Mr. Bryan C. Hanson  
Senior Vice President  
Exelon Generation Company, LLC  
President and Chief Nuclear Officer  
Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

**SUBJECT: PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3 – RESPONSE  
TO REQUEST FOR EXTENSION OF SEISMIC PROBABILISTIC RISK  
ASSESSMENT SUBMITTAL**

Dear Mr. Hanson:

The purpose of this letter is to provide the U.S. Nuclear Regulatory Commission (NRC) staff's response to the letter received from Exelon Generation Company, LLC (the licensee), on March 15, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18074A303), 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 Peach Bottom Atomic Power Station (Peach Bottom), Units 2 and 3, to September 28, 2018. The request was made in order to fully address a peer review finding that necessitates updating relay chatter fragility calculations and re-baselining the SPRA to ensure realistic SPRA results for Peach Bottom. The NRC staff has determined that extending the submittal date of the SPRA is acceptable.

**BACKGROUND**

By letter dated March 12, 2012, 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 (ADAMS Accession No. ML12053A340). 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 then 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, Peach Bottom 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 Peach Bottom was submitted by letter dated December 15, 2017 (ADAMS Accession No. ML17349A096), and is under review by the NRC staff. The SPRA was expected to be submitted to the NRC by March 31, 2018.

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.

By letter dated March 15, 2018, the licensee requested an extension of the submittal date for the SPRA and corresponding MSA until September 28, 2018.

## 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 Peach Bottom 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); (3) the seismic design margin currently existing in nuclear power plants; and (4) the documented ability of Peach Bottom, 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. Peach Bottom 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 Peach Bottom 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, letter (ADAMS Accession No. ML14111A147), 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 Peach Bottom's compliance with Orders EA-12-049 and EA-12-051. The NRC staff received Peach

Bottom's compliance letter regarding implementation of these mitigating strategies and reliable spent fuel pool instrumentation on January 5, 2018, and December 15, 2015, respectively (ADAMS Accession Nos. ML18005A701 and ML15352A135). The completion of this work results in a safety benefit and an enhanced ability to mitigate beyond-design-basis events, including seismic events, at Peach Bottom during the period of extension.

During its evaluation, the NRC staff considered information regarding the seismic design margin inherent in nuclear plants, including NRC and industry studies summarized in the NRC's May 9, 2014, letter, which outlines a number of reasons for continued operation while more seismic reevaluations are being performed. 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 does not pose a concern regarding adequate protection.

Another consideration of the NRC staff was the licensee's December 19, 2014 (ADAMS Accession No. ML14353A333), Expedited Seismic Evaluation Process (ESEP) report. As described in the preceding paragraph, there is inherent seismic margin in the design of nuclear power plants, and Peach Bottom performed site-specific analyses demonstrating that safe shutdown equipment at the plant can cope with an earthquake at least two times the safe shutdown earthquake (SSE) as described below.

The staff's assessment of the licensee's ESEP report can be found in a letter dated June 30, 2015 (ADAMS Accession No. ML15173A385). 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 functions, has additional safety margin such that this equipment can cope with an earthquake at least two times the SSE for Peach Bottom. The licensee stated in its March 15, 2018, SPRA extension request letter, and clarified in a subsequent letter dated March 28, 2018 (ADAMS Accession No. ML18088A020), that all actions necessary to meet the ESEP beyond-design-basis seismic criteria for the credited plant equipment have been completed with the exception of a modification to increase the high confidence of a low probability of failure capacity of a Unit 2 relay. This modification is planned to be completed during the fall of 2018, a date that was established independent of the SPRA submittal date. Details of the commitment action are listed in Enclosure 2 of the ESEP report submittal (ADAMS Accession No. ML15173A385) and the aforementioned clarification supplement dated March 28, 2018.

In summary, Peach Bottom'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 and EA-12-051 has provided a safety benefit and an enhanced ability to mitigate beyond-design-basis events, including a seismic event, at Peach Bottom during the period of extension. The combination of the seismic capacity inherent in the design of nuclear power plants and the Peach Bottom-specific evaluation of the seismic capacity of safe-shutdown equipment as documented by the ESEP report provides additional assurance that Peach Bottom 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 update relay chatter fragility calculations and re-baseline the SPRA results in order to more realistically quantify the seismic risk at Peach Bottom is acceptable.

CONCLUSION

Based on the staff's evaluation, and after consultation with the Acting 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 information 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 28, 2018.

If you have any questions, please contact Brett Titus, Senior Project Manager, at (301) 415-3075 or via e-mail at [Brett.Titus@nrc.gov](mailto:Brett.Titus@nrc.gov).

Sincerely,

A handwritten signature in cursive script that reads "Louise Lund".

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

Docket Nos. 50-277 and 50-278

cc: Distribution via Listserv

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**ADAMS Accession No. ML18093B511**

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