



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

January 10, 2019

Mr. Ernest J. Kapopoulos, Jr.
Site Vice President
H. B. Robinson Steam Electric Plant
Duke Energy Progress, LLC
3581 West Entrance Road, RNPA01
Hartsville, SC 29550

SUBJECT: H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2 – RESPONSE TO
REQUEST FOR EXTENSION OF SEISMIC PROBABILISTIC RISK
ASSESSMENT SUBMITTAL (EPID NO. L-2018-JLD-0017)

Dear Mr. Kapopoulos:

The purpose of this letter is to provide the U.S. Nuclear Regulatory Commission (NRC) staff's response to the letter dated November 29, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18337A159), submitted by Duke Energy Progress, LLC (Duke, the licensee), related to post-Fukushima seismic hazard reevaluations at H. B. Robinson Steam Electric Plant, Unit No. 2 (Robinson). The letter submitted by Duke requests an extension of the submittal date of the seismic probabilistic risk assessment (SPRA), associated with the seismic hazard reevaluation for Robinson, to October 31, 2019. According to the licensee, the request was made in order to perform additional analyses of the dominant SPRA functional/systemic sequences; establish a better understanding of the uncertainties and how they might affect the final results; and undertake an effort to optimize actions to address identified plant-specific vulnerabilities. In addition, the licensee indicated that a peer review was performed the week of November 12, 2018, and more time is necessary to determine resolutions for the findings and observations of the peer review team. 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, Duke is expected to complete an SPRA for Robinson which will also assess high frequency ground motion effects. 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).

In its letter dated November 29, 2018, the licensee requested that the submittal date for the SPRA be moved to October 31, 2019. The licensee's letter also stated that the corresponding MSA will be submitted by January 31, 2020.

In addition to the SPRA, a limited-scope evaluation for the spent fuel pool (SFP) at Robinson was expected to be performed. This evaluation was completed by the licensee and the NRC issued a corresponding staff assessment by letter dated September 30, 2016 (ADAMS Accession No. ML16230A535).

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 Robinson submittal, including the extension, as it relates to the NRC's overall SPRA submittal schedule; (2) the additional defense-in-depth capabilities achieved through compliance with Order EA-12-049 and Order EA-12-051, "Reliable Spent Fuel Pool Instrumentation" (ADAMS Accession No. ML12054A679); (3) the seismic design margin currently existing in nuclear power plants; and (4) the documented ability of Robinson, specifically, to cope with earthquakes larger than the design-basis earthquake.

As shown in the NRC's letter dated October 27, 2015, 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 plants, which included Robinson, were requested to perform SPRAs. 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. Thus, the plants were not graded within this submittal date range in order of increasing or decreasing seismic risk. The Robinson 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 documented by letter dated May 9, 2014 (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 Robinson's

compliance with Orders EA-12-049 and EA-12-051. The NRC staff issued Robinson's safety evaluation regarding implementation of these mitigating strategies and reliable SFP instrumentation on March 31, 2016 (ADAMS Accession No. ML16075A377). The NRC inspection staff also verified the appropriate implementation of these two orders at Robinson and documented this inspection by letter dated May 26, 2016 (ADAMS Accession No. ML16147A118). The completion of this work results in a safety benefit and an enhanced ability to mitigate beyond-design-basis events, including seismic events, at Robinson 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 letter dated May 9, 2014, outlines a number of reasons that support 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 reevaluated hazard did not pose a concern regarding adequate protection.

The ability of Robinson, 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 Robinson ESEP report can be found in a letter dated October 6, 2015 (ADAMS Accession No. ML15201A602). The assessment concluded that the licensee had 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 safe shutdown earthquake for Robinson.

Additionally, the limited-scope SFP seismic integrity evaluation performed by the licensee 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 spectrum peak spectral acceleration documented in the licensee's Seismic Hazard Evaluation (ADAMS Accession No. ML15201A006). 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, the licensee'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 at Robinson during the period of extension. The combination of the seismic capacity inherent in the design of nuclear power plants and the Robinson-specific evaluations of the seismic capacity of safe-shutdown equipment and the SFP, as documented by the ESEP and the SFP seismic integrity evaluations, respectively, provides additional assurance that Robinson 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 at Robinson 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

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events is acceptable. Accordingly, the required response date for the SPRA submittal is extended until October 31, 2019.

If you have any questions, please contact Peter Bamford, Project Manager, at (301) 415-2833 or via e-mail at Peter.Bamford@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. 50-261

cc: Distribution via Listserv

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