



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

October 19, 2016

Mr. Benjamin C. Waldrep,
Site Vice President
Shearon Harris Nuclear Power Plant
5413 Shearon Harris Road
M/C HNP01
New Hill, NC 27562-0165

**SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 – STAFF REVIEW OF
MITIGATION STRATEGIES ASSESSMENT REPORT OF THE IMPACT OF THE
REEVALUATED SEISMIC HAZARD DEVELOPED IN RESPONSE TO THE
MARCH 12, 2012, 50.54(f) LETTER**

Dear Mr. Waldrep:

The purpose of this letter is to provide the U.S. Nuclear Regulatory Commission's (NRC) assessment of the seismic hazard mitigation strategies assessment (MSA), as described in the October 13, 2016, letter (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16287A166), submitted by Duke Energy Progress, LLC, (Duke, the licensee) for Shearon Harris Nuclear Power Plant, Unit 1 (Harris). The mitigation strategies assessment confirms that the licensee has adequately addressed the reevaluated seismic hazard within its mitigating strategies for beyond-design-basis external events.

BACKGROUND

By letter dated March 12, 2012 (ADAMS Accession No. ML12053A340), the NRC issued a request for information pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(f) (hereafter referred to as the 50.54(f) letter). The 50.54(f) letter was issued as part of implementing lessons learned from the accident at the Fukushima Dai-ichi nuclear power plant. Enclosure 1 to the 50.54(f) letter requested licensees reevaluate the seismic hazard using present-day methodologies and guidance. Concurrent with the reevaluation of seismic hazards, the NRC issued Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML12054A736). The order requires holders of operating power reactor licenses and construction permits issued under 10 CFR Part 50 to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling following a beyond-design-basis external event.

By letter dated March 27, 2014 (ADAMS Accession No. ML14090A441), the licensee provided its reevaluated seismic hazard for Harris in response to the 50.54(f) letter.

On December 10, 2015 (ADAMS Accession No. ML16005A621), the Nuclear Energy Institute (NEI) submitted Revision 2 to NEI 12-06, including guidance for conducting MSAs using the reevaluated hazard information. The NRC subsequently endorsed NEI 12-06, Revision 2, with exceptions, clarifications, and additions, in Japan Lessons-Learned Division (JLD) interim staff guidance (ISG) JLD-ISG-2012-01, Revision 1, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML15357A163).

MITIGATION STRATEGIES ASSESSMENT

By letter dated December 18, 2015 (ADAMS Accession No. ML15349A149), the NRC staff documented its review of the licensee's reevaluated seismic hazard, also referred to as the mitigating strategies seismic hazard information. The staff confirmed the licensee's conclusion that its reevaluated seismic hazard is bounded by the safe shutdown earthquake (SSE) in the 1 to 15 Hertz (Hz) range and above the 40 Hz range, but exceeds the SSE in a portion of the frequency range from approximately 15 Hz to 40 Hz, meriting a high frequency confirmation. In addition, the staff concluded that the ground motion response spectrum (GMRS) determined by the licensee adequately characterizes the reevaluated seismic hazard for the Harris site.

By letter dated December 17, 2015 (ADAMS Accession No. ML15351A170), Duke submitted a High Frequency Confirmation Report for Harris. By letter dated February 18, 2016 (ADAMS Accession No. ML15364A544), the NRC staff confirmed the Harris GMRS exceedance above the current design basis is on the order of 10 percent or less of the area under the SSE curve over the frequency range of exceedance and met the criterion described in Section 3.1.2, "Limited High Frequency Exceedance Screening," in Electric Power Research Institute (EPRI) Report 3002004396. The EPRI report concluded, and the staff agreed, that these types of minor exceedances over limited frequency ranges do not represent a significant high frequency concern. Therefore, the methodology used by the licensee is appropriate to disposition the GMRS exceedance above the current design basis.

The licensee stated that the Harris MSA was performed consistent with NEI 12-06, Revision 2. Appendix H of NEI 12-06, Revision 2, describes acceptable methods for demonstrating that the reevaluated seismic hazard is addressed within the Harris mitigation strategies for beyond-design-basis external events. The NRC staff confirmed that the licensee's seismic hazard MSA is consistent with the guidance in Appendix H.4.2 of NEI 12-06, Revision 2, as endorsed, by JLD-ISG-2012-01, Revision 1. Therefore, the methodology used by the licensee is appropriate to perform an assessment of the mitigation strategies that addresses the reevaluated seismic hazard.

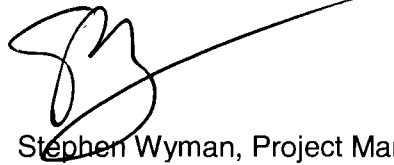
The NRC staff has reviewed the seismic hazard MSA for Harris. The NRC staff concludes that sufficient information has been provided to demonstrate that the licensee's plans for the development and implementation of guidance and strategies under Order EA-12-049 appropriately address the reevaluated seismic hazard information stemming from the 50.54(f) letter.

B. Waldrep

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If you have any questions, please contact me at (301) 415-3041 or via e-mail at Stephen.Wyman@nrc.gov.

Sincerely,

A handwritten signature in black ink, consisting of a stylized 'S' followed by a long horizontal line extending to the right.

Stephen Wyman, Project Manager
Hazards Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket No. 50-400

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B. Waldrep

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Sincerely,

/RA/

Stephen Wyman, Project Manager
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Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket No. 50-400

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ADAMS Accession No. ML16291A158

* via e-mail

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