



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

November 10, 2016

Mr. Thomas A. Vehec
Site Vice President
Next Era Energy
Duane Arnold Energy Center
3277 DAEC Road
Palo, IA 52324-9785

SUBJECT: DUANE ARNOLD ENERGY CENTER – 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. Vehec:

The purpose of this letter is to provide the U.S. Nuclear Regulatory Commission's (NRC's) assessment of the seismic hazard mitigation strategies assessment (MSA), as described in the October 31, 2016, letter (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16306A406), submitted by NextEra Energy Duane Arnold, LLC (NextEra, the licensee) for Duane Arnold Energy Center (Duane Arnold). The MSA confirms that the licensee has adequately addressed the reevaluated seismic hazard within its mitigation 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, "Order Modifying 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 28, 2014 (ADAMS Accession No. ML14092A331), the licensee provided its reevaluated seismic hazard for Duane Arnold 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 regarding 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 15, 2015 (ADAMS Accession No. ML15324A176), the NRC staff documented its review of the licensee's reevaluated seismic hazard, also referred to as the mitigation strategies seismic hazard information. The staff confirmed the licensee's conclusion that the ground motion response spectrum (GMRS) for the Duane Arnold site is bounded by the safe shutdown earthquake (SSE), except at frequencies above 10 Hertz, meriting a high frequency confirmation. In addition, the staff concluded that the GMRS determined by the licensee adequately characterizes the reevaluated seismic hazard for the Duane Arnold site.

By letter dated December 15, 2015 (ADAMS Accession No. ML15352A114), NextEra submitted a High Frequency Confirmation Report for Duane Arnold. By letter dated February 18, 2016 (ADAMS Accession No. ML15364A544), the NRC staff confirmed the Duane Arnold GMRS exceedance above the current design basis has peak spectral accelerations less than 0.2g and met the criterion described in Section 3.1.1, "Low Spectral Acceleration Screening," in Electric Power Research Institute (EPRI) Report 3002004396. The EPRI report concluded, and the staff agreed, that peak accelerations below 0.2g do not represent a 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 Duane Arnold 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 Duane Arnold 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 Duane Arnold. 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.

T. Vehec

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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, appearing to be 'SW', with 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. 50-331

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T. Vehec

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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,

/RA/

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

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*** via e-mail**

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NAME	SWyman	SLent	GBowman	SWyman
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