

From: Shea, James
Sent: Monday, July 26, 2021 12:17 PM
To: GEH-BWRX-300RAIsPEm Resource
Cc: Schiller, Alina
Subject: FW: GEH BWRX-300 LTR NEDO-33914, Revision 0, Advanced Civil Construction and Design Approach, Final Approved RAI Letter 15
Attachments: GEH BWRX-300 RAI 9849 Letter No. 15 Advanced Civil Construction and Design Approach LTR Non-Proprietary Final.pdf

James Shea
NRR/DNRL/NRLB
BWRX-300 PM

From: Shea, James
Sent: Monday, July 26, 2021 12:10 PM
To: Schichlein, Lisa (GE Power Portfolio) <lisa.schichlein@ge.com>
Cc: 'Wadkins, George (GE Power Portfolio)' <George.Wadkins@ge.com>; Schiller, Alina <Alina.Schiller@nrc.gov>; Dudek, Michael <Michael.Dudek@nrc.gov>; Tesfaye, Getachew <Getachew.Tesfaye@nrc.gov>; Stubbs, Angelo <Angelo.Stubbs@nrc.gov>; Wittick, Brian <Brian.Wittick@nrc.gov>; Stutzcage, Edward <Edward.Stutzcage@nrc.gov>; GEH-BWRX-300DocsPEm Resource <GEH-BWRX-300DocsPEm.Resource@usnrc.onmicrosoft.com>
Subject: GEH BWRX-300 LTR NEDO-33914, Revision 0, Advanced Civil Construction and Design Approach, Final Approved RAI Letter 15

Lisa,

By letter dated January 20, 2021 (Agencywide Documents Access and Management System Accession No. ML21020A135), GE-Hitachi Nuclear Energy Americas, LLC (GEH) submitted Licensing Topical Report NEDO-33914, Revision 0, "BWRX-300 Advanced Civil Construction and Design Approach," to the U.S. Nuclear Regulatory Commission (NRC) staff for its BWRX-300 small modular reactor (SMR) Pre-Application key licensing topics review.

The NRC staff has reviewed the information provided in your application and identified areas where it needs additional information to support its review. The enclosed request for additional information (RAI)¹ is attached and was emailed to GEH in draft form on July 19, 2020 and a clarification call was held on July 20, 2021. The NRC staff requests your response to the RAI 01.05-01, related to the classification and design, of the BWRX-300 Turbine Building, by September 2, 2021 (45 days after the draft copy of the RAI was provided to GEH).

During the July 19, 2020 draft RAI discussion for clarity, and understanding you confirmed that the RAI contained no GEH proprietary information.

¹Note: NRC RAI approvals are captured electronically in the electronic RAI system.

James Shea

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U.S. Nuclear Regulatory Commission

Office of Nuclear Reactor Regulation

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Options

Priority: Normal

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Request for Additional Information Letter No. 15 (eRAI 9849)

Issue Date: 07/19/2021

Application Title: GEH BWRX-300 Pre-Application Licensing Topical Reports (LTRs)
GEH BWRX-300 LTR NEDO-33914, Advanced Civil Construction and Design Approach

Operating Company: GE Hitachi Nuclear Energy (Wilmington, NC)

Docket No. 99900003

QUESTION:

SRP-Review Section: 01.05 - Other Regulatory Considerations

LTR Application Section: TR NEDO-33914 Sections 1.3 and 6.1.2

01.05-01

Requirement

General Design Criterion (GDC) 2 requires that structures, systems, and components (SSCs) important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety function. GDC 2 also specifies that the design bases for these SSCs shall reflect the importance of the safety functions to be performed.

Regulatory Guide (RG) 1.143, "Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed In Light-Water-Cooled Nuclear Power Plants," provides the guidance to licensees and applicants in the design, construction, installation, and testing the SSCs of radioactive waste management facilities in light-water-reactor nuclear power plants.

Issue

Sections 1.3 and 6.1 of GE-Hitachi Nuclear Energy Americas, LLC (GEH) Pre-Application Submittal of NEDO-33914, BWRX-300 Advanced Civil Construction and Design Approach Licensing Topical Report (LTR), submitted to the NRC on January 20, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21020A136) state that the portions of the turbine building structure and foundation that support and enclose the main steam piping are designed as RG 1.143, class RW-IIa. They also state that RG 1.143 is used because the building contain SSCs used for management and containment of highly radioactive gas, liquid, and solid materials whose failure, considering the maximum inventory, would result in a potential unmitigated radiological release levels that may be higher than those specified in RG 1.143, Section 5.1.

RG 1.143 provides guidance for the classification and design of radwaste management systems and steam generator blowdown systems. RG 1.143 does not provide guidance for the classification or design of the main steam piping or surrounding structures. While the offgas system is used for management of radioactive gas, other SSCs in the turbine building, like the main steam piping and the main condenser are credited for main steam line fission product holdup and retention in the analysis of design-basis accident radiological consequences for boiling water reactor plants with no main steam isolation valve leakage control system. In this way, the main steam piping and condenser are used to mitigate the consequences of an accident. Appendix A to 10 CFR Part 100 requires that SSCs necessary to ensure the

capability to mitigate the consequences of accidents remain functional during and after a safe-shutdown earthquake (SSE).

RG 1.143 seismic classification of RW-IIa, specifies $\frac{1}{2}$ (SSE) as the earthquake design criteria for radwaste management SSCs. If the $\frac{1}{2}$ SSE design requirement is applied to the condenser and portions of the main steam piping in the turbine building, the capability for those systems to mitigate the consequences of accidents and remain functional during and after an SSE would not be ensured.

Request

The staff requests GEH to clearly identify the applicability of RG 1.143 to the turbine building design. The response should also address any limitations on the applicability of RG 1.143 and clarify how the design will ensure SSCs in the turbine building that are used to mitigate the consequences of an accident be designed to remain functional during and after an SSE.