



February 02, 2018

Docket No. 52-048

U.S. Nuclear Regulatory Commission
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11555 Rockville Pike
Rockville, MD 20852-2738

SUBJECT: NuScale Power, LLC Response to NRC Request for Additional Information No. 315 (eRAI No. 9237) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 315 (eRAI No. 9237)," dated December 29, 2017

The purpose of this letter is to provide the NuScale Power, LLC (NuScale) response to the referenced NRC Request for Additional Information (RAI).

The Enclosure to this letter contains NuScale's response to the following RAI Question from NRC eRAI No. 9237:

- 15.06.03-3

This letter and the enclosed response make no new regulatory commitments and no revisions to any existing regulatory commitments.

If you have any questions on this response, please contact Darrell Gardner at 980-349-4829 or at dgardner@nuscalepower.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Zackary W. Rad".

Zackary W. Rad
Director, Regulatory Affairs
NuScale Power, LLC

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Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9237



Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9237

Response to Request for Additional Information Docket No. 52-048

eRAI No.: 9237

Date of RAI Issue: 12/29/2017

NRC Question No.: 15.06.03-3

GDC 1 requires structures, systems, and components important to safety to be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. In addition, 10 CFR 50.2 defines safety-related as structures, systems and components that are relied upon to remain functional during and following design basis events to assure: (1) the integrity of the reactor coolant pressure boundary; (2) the capability to shut down the reactor and maintain it in a safe shutdown condition; or (3) the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the applicable guideline exposures set forth in § 50.34(a)(1) or § 100.11 of this chapter, as applicable.

FSAR Tier 2, Section 15.6.3, “Steam Generator Tube Failure (Thermal Hydraulic),” credits the nonsafety-related secondary main steam isolation valve (MSIV) to provide isolation of the faulted steam generator when single failure criteria is applied (i.e. MSIV fails to close). FSAR Tier 2, Section 10.3.3 states:

“The nonsafety-related secondary MSIVs downstream of the MSIVs are credited as backup isolation components in the event that an MSIV fails to close. Although not safety-related, the secondary MSIVs are designed to close under postulated worst-case conditions and are included in technical specification surveillance requirements to ensure their reliability and operability. Thus, consistent with the position established in NUREG-0138, Issue Number 1, the secondary MSIVs ensure that the blowdown is limited if a steamline were to break upstream of the MSIV.”

NUREG-0138, Issue Number 1, states that GDC 1 permits flexibility in the acceptance level for safety-related equipment. NUREG-0138, Issue Number 1 also fully documents that its position is only applicable to spontaneous failures of secondary system piping not part of the primary system boundary, and where the potential for a release of fission products is significantly lower compared to a breach of the primary system boundary. As a steam generator tube rupture is a breach of the primary system boundary which bypasses multiple fission product barriers, provide additional justification as to why NUREG-0138, Issue Number 1 applies and/or provide a dose analysis which demonstrates the applicable accident dose limits are met with the single

failure of the MSIV and the failure of the secondary, non-safety-related MSIV to close.

NuScale Response:

FSAR Section 15.6.3 provides the event progression for a steam generator tube failure (SGTF) in a NuScale Power Module. The limiting mass release scenario of a SGTF initiates with a tube failure at the top of the steam generator. After the reactor trip, depressurization results in the actuation of the decay heat removal system (DHRS) and a closure signal of the main steam isolation valves (MSIVs), secondary MSIVs, feedwater isolation valves (FWIVs), and the feedwater regulating valves (FWRVs). As explained in FSAR Section 15.6.3, the limiting single failure for this scenario is for the MSIV on the faulted steam generator failing open. In this scenario, the secondary MSIV is credited with isolating the faulted steam generator. Both sets of MSIVs and bypass valves are designed for reactor coolant system (RCS) pressure for mitigation of SGTF events.

As explained in the NuScale response to eRAI 9205, Question 15-3, the NuScale Power Module Chapter 15 safety analyses credit several nonsafety-related components as backup protection, consistent with regulatory guidance and requirements. The secondary MSIVs meet GDC 1 due to the augmented design, surveillance and operability requirements. The safety-related MSIVs, nonsafety-related MSIVs and the associated bypass valves all have limiting conditions for operation and surveillance requirements in Technical Specification 3.7.1, in accordance with 10 CFR 50.36(c)(2)(ii). The surveillance requirements in the technical specifications ensure operability, while the frequency is controlled in accordance with the in-service inspection and testing (IST) program. The secondary MSIVs have augmented design requirements, including being designed to Seismic Category I requirements and having leak detection.

Regulatory Guide 1.206, states that “Only safety-related systems or components should be used to mitigate transient or accident conditions. However, analyses may assume that nonsafety-related systems or components are operable for the following cases:

1. when a detectable and nonconsequential random and independent failure must occur in order to disable the system,
2. when nonsafety-related components are used as backup protection.”

The second criterion is applicable to the NPM. The nonsafety-related secondary MSIVs are only utilized for backup protection and only for a very small subset of possible SGTFs.

In addition to the guidance in Regulatory Guide 1.206 discussed above, the NRC has approved the use of nonsafety-related components as backup protection in the final safety evaluation reports (FSERs) for the Westinghouse AP600 (NUREG-1512 - ML081160453) and AP1000



(NUREG-1793 - ML043570339) based on the staff position in NUREG-0138. The NRC also indicated that the use of a nonsafety-related turbine trip and closure of the turbine stop valves was acceptable in the Chapter 15.0 Safety Evaluation with Open Items for the U.S. EPR design certification (ML090900096). These functions served as backup function for isolating the steam system based on the staff position in NUREG-0138.

NuScale considers the use of Seismic Category I components with augmented quality and testing for backup to safety-related components appropriate, per the available regulatory guidance and as has been approved for other nuclear plant designs.

Impact on DCA:

There are no impacts to the DCA as a result of this response.