RAIO-1018-62173



October 17, 2018

Docket No. 52-048

U.S. Nuclear Regulatory Commission ATTN: Document Control Desk One White Flint North 11555 Rockville Pike Rockville, MD 20852-2738

SUBJECT: NuScale Power, LLC Response to NRC Request for Additional Information No. 498 (eRAI No. 9572) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 498 (eRAI No. 9572)," dated August 21, 2018

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. 9572:

• 05.04.02.02-1

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 Carrie Fosaaen at 541-452-7126 or at cfosaaen@nuscalepower.com.

Sincerely,

11

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

Distribution: Gregory Cranston, NRC, OWFN-8G9A Samuel Lee, NRC, OWFN-8G9A Bruce Bavol, NRC, OWFN-8G9A

Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9572

RAIO-1018-62173



Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9572



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

eRAI No.: 9572 Date of RAI Issue: 08/21/2018

NRC Question No.: 05.04.02.02-1

NuScale steam generator (SG) design includes a 40 percent through-wall plugging criterion for meeting the structural integrity performance criterion with a safety factor of 3 for the normal operating pressure differential (NOPD) of 1350 psi. The plugging criterion and performance criteria are included as requirements in Technical Specification (TS) 5.5.4, "Steam Generator (SG) Program." The plugging criterion is used to determine if tube integrity was maintained, in accordance with the TSs, over the most recent operating cycle (condition monitoring), and whether tubes need to be plugged in order to maintain integrity over the next operating cycle (operational assessment). As stated in the response to Question 05.04.02.01-1.e in Request for Additional Information (RAI) 9273 (ADAMS Accession No. ML18093B542), the 40 percent plugging criterion is intended to be bounding, but it is currently enclosed within brackets in the TSs. Enclosing a value in brackets in the TSs means a combined license applicant must provide a plant-specific value (confirm 40 percent or justify an alternative).

The proposed 40 percent through-wall plugging limit is based on degradation from wear, with a length of degradation equivalent to the length of a tube support tab (0.5 inch).

The NRC staff has the following observations based on its independent calculations to evaluate the proposed plugging limit:

- For the 0.5 inch long wear flaw, the safety factor against collapse for NOPD is approximately 3.1.
- To maintain the safety factor of 3 for NOPD, the maximum allowable length of a 40 percent deep wear flaw would be approximately 0.7 inch.
- To maintain the safety factor of 3 for NOPD for a wear flaw of any length, the maximum allowable depth of the flaw would be approximately 24 percent.



• The NRC staff's safety factor calculations as a function of flaw depth and length do not include nondestructive examination uncertainty.

To conform to Regulatory Position C.2.b in Regulatory Guide (RG) 1.121, "Bases for Plugging Degraded PWR Steam Generator Tubes," the plugging criteria should include a thickness allowance for degradation. To conform to Regulatory Position C.3.f in RG 1.121, this operational degradation allowance should identify the method and data used to predict degradation and the measurement error in the eddy current tube inspections.

The response to Questions 05.04.02.01-1.b and e in RAI 9273 indicates that industry guidance was used to determine the uncertainty from eddy current testing and flaw sizing uncertainty.

The NRC staff observations listed above indicate that a plugging criterion of 40 percent throughwall may be adequate only if the length is limited, and it may not include a realistic assumption about the degradation rate since there is no operating experience. In addition, the response to Question 05.04.02.01-1.e in RAI 9273 states that when eddy current systems are qualified for NuScale tube inspections, the measurement uncertainties may be different than what was assumed based on the systems used for the current fleet.

In order to ensure that the site-specific SG tube plugging criterion submitted by a combined license (COL) applicant is determined according to RG 1.121, including margin for operational degradation and measurement uncertainty, the NRC staff requests that a COL item be added to Chapter 5 of the Final Safety Analysis Report specifically for resolving the bracketed plugging criterion in the TS. The COL item should state that the SG tube plugging criterion submitted by the COL applicant for review will be determined according to the guidance in RG 1.121 at the time of the application.

NuScale Response:

NuScale FSAR Section 5.4.1.1 states that the SG program is based on NEI 97-06 and Regulatory Guide (RG) 1.121. This includes the SG tube plugging critierion specified by RG 1.121, Regulatory Positions C.2.b and C.3.f.

FSAR Table 1.9-2 also states that the NuScale design conforms with RG 1.121.

RG 1.121 conformance is also described in the Bases for LCO 3.4.9, SG Tube Integrity of DCA Part 4, Technical Specifications. The discussion in the LCO Bases is not enclosed in brackets



and therefore not expected to be modified when the generic Technical Specifications (GTS) are adopted by COL applicants.

As noted, Steam Generator (SG) tube plugging criteria is enclosed in brackets in NuScale GTS, section 5.5.4, Steam Generator (SG) Program, indicating that the final value must be finalized and included by a COL Applicant. Note that bracketing of the 40% value was also discussed in an SG Audit question in September 2017.

FSAR Chapter 16, Technical Specifications, Combined License (COL) Item 16.1-1 states: "A COL applicant that references the NuScale Power Plant design certification will provide the final plant-specific information identified by [] in the generic Technical Specifications..."

The NuScale Final Safety Analysis Report (FSAR) Table 1.8-2 reiterates this COL Item 16.1-1.

Based on COL item 16.1-1 requiring GTS bracketed items to be assessed and included by the COL applicant, and the description of conformance with RG 1.121 provided in FSAR section 5.4.1.1, FSAR Table 1.9-2, and GTS Bases section 3.4.9, NuScale has determined that no further changes to the Design Certification Application are required to ensure that the site-specific SG tube plugging criterion submitted by a combined license (COL) applicant will be determined according to RG 1.121, including margin for operational degradation and measurement uncertainty.

Impact on DCA:

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