RAIO-0518-60039

May 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 Supplemental Response to NRC Request for Additional Information No. 358 (eRAI No. 9335) on the NuScale Design Certification Application

REFERENCES:
1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 358 (eRAI No. 9335)," dated February 02, 2018
2. NuScale Power, LLC Response to NRC "Request for Additional Information No. 358 (eRAI No.9335)," dated April 02, 2018

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

The Enclosure to this letter contains NuScale's supplemental response to the following RAI Question from NRC eRAI No. 9335:

- 05.02.01.01-7

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,

Zackary W. Rad
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Enclosure 1: NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 9335

Enclosure 1:

NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 9335

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

eRAI No.: 9335
Date of RAI Issue: 02/02/2018

NRC Question No.: 05.02.01.01-7

In accordance with Title 10 of the Code of Federal Regulations (10 CFR) Section 50.55a, certain systems and components of the NuScale Small Modular Reactor (SMR) design are to meet the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) as well as additional conditions promulgated in 10 CFR 50.55a. These requirements help ensure that facilities will also meet the requirements of 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 1 such that structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety function to be performed.

During a clarification call on September 15, 2017, NuScale and the NRC staff discussed the information requests in RAIs 8914 and 8917, which involved compliance with the Codes and Standards Rule and the use of ASME Code Cases. Part of this discussion pertained to the need for NuScale to provide sufficient information to make the necessary safety findings for all components within the scope of SRP 5.2.1.1.

At this time, the NRC staff has not received adequate information to address the full scope of components subject to the Codes and Standards Rule, 10 CFR 50.55a. Specifically, NuScale has discussed the components of the reactor coolant pressure boundary in their responses to RAI 8914, but has not adequately described the requirements for non-RCPB components, which is necessary to make the necessary safety findings for SRP 5.2.1.1. This follow-up RAI is issued to request a supplement to certain topics discussed in RAI 8914 that require additional information to fully address the scope of components subject to the Codes and Standards Rule, 10 CFR 50.55a.

The response to Question 30096 (05.02.01.01-5) requires additional information, as there is no statement in the DCD indicating that Quality Group B and C components meet the applicable conditions promulgated in 10 CFR 50.55a(b). Section 3.2.2.2 and 3.2.2.3 of the DCD indicate that Quality Group B and C SSCs meet the requirements for Class 2 and Class 3 components in Section III, Division 1 of the ASME B&PV Code, respectively, but is silent on meeting the applicable conditions promulgated in 10 CFR 50.55a(b), which is a regulatory requirement. The applicant is requested to confirm within the DCD that Quality Group B and C components are designed, fabricated, constructed, tested, and inspected as Class 2 and 3 (respectively) in

accordance with Section III, of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPVC) and meet the applicable conditions promulgated in 10 CFR 50.55a(b).

The response to Question 30098 (05.02.01.01-6) requires additional information, as there is no affirmative confirmation that there are no proposed alternatives to compliance with 10 CFR 50.55a with regards to Quality Group B and C components. NuScale's RAI response only discussed RCPB components. Staff must confirm that there are no proposed alternatives to 10 CFR 50.55a for Quality Group B and C components in order to make a finding regarding the acceptability of proposed alternatives to compliance with 10 CFR 50.55a. The applicant is requested to confirm within the DCD that there are no proposed alternatives to compliance with 10 CFR 50.55a for Quality Group B and C components in the NuScale design.

The RAI response for RAI 8914, Question 30093 (05.02.01.01-2) indicated that adding statements regarding compliance of ASME Code Section II, Section V, and Section IX to 10 CFR 50.55a is not appropriate because 10 CFR 50.55a does not address these ASME Code Sections. Staff agrees that 10 CFR 50.55a does not directly mention these sections. However, 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. Furthermore, the ASME Code is an integrated set of requirements, with references to other sections interwoven into each section. These references are not incorporated by reference in 10 CFR 50.55a. Therefore, to make a safety finding under 10 CFR 50 Appendix A, GDC 1, the standards used for material selection, examination, and welding need to be established within the DCD. The applicant is requested to identify within the DCD what Codes will be used for construction base materials and welding materials, inspection of structures, systems, and components constructed in accordance with ASME Code Section III, and qualification of welding procedures and welding operators (such as ASME Code Section II, V, and IX, respectively). Staff notes that the response to RAI 8914, Question 30093 (05.02.01.01-2) identified that 'qualification of welding procedures and welding operators to be in accordance with ASME BPVC Code Section IX, "Welding and Brazing Qualifications."' and "the materials selected for fabrication of the RCPB comply with the requirements of ASME BPVC, Section II," so identification of these Codes in the DCD maintains consistency with the original RAI response, but properly expands them to also include non- RCPB components still subject to ASME Code requirements.

NuScale Response:

In a public meeting held on May 2, 2018, NuScale agreed to supplement RAI 9335 by adding reference to 10 CFR 50.55a(b) when discussing American Society of Mechanical Engineers (ASME) Boiler Pressure Vessel Code (BPVC) compliance in FSAR section 3.2.2. The agreed to changes to FSAR section 3.2.2 for quality groups A, B and C are provided with this response.

Impact on DCA:

FSAR Section 3.2.2 has been revised as described in the response above and as shown in the markup provided in this response.

Identifiers A - C correspond to ASME Class 1 through 3 and align with quality groups A - C. Code identifier D corresponds to Quality Group D as described in RG 1.26.

Safety-related instrument sensing lines are designed and constructed in accordance with ANSI/ISA-67.02.01-1999 (Reference 3.2-2) as described in RG 1.151. The standard ANSI/ISA-67.02.01-1999 establishes the applicable code requirements and code boundaries for the design and installation of instrument sensing lines interconnecting safety-related piping and vessels with both safety-related and nonsafety-related instrumentation. This is further discussed in Section 7.2.2.

RAI 03.02.01-2, RAI 03.02.02-3, RAI 05.04.02.01-6

The following subsections also describe the codes and standards applicable to supports for Quality Group A, B, C, and D components. The reactor vessel internals (see Section 3.9.5) and steam generator supports and tube supports (see Section 5.4.1.5) comply with the design and construction requirements of Subsection NG of Section III, Division 1 of the ASME B&PV Code (Reference 3.2-1).

3.2.2.1 Quality Group A

RAI 03.02.02-3

Quality Group A applies to pressure-retaining components that form part of the reactor coolant pressure boundary, except those that can be isolated from the reactor coolant system by two automatically-closed or normally-closed valves in series.

RAI 03.02.02-3, RAI 05.02.01.01-7S1, RAI 05.04.02.01-6

Quality Group A SSC meet the requirements for Class 1 components in Section III, Division 1 of the ASME B&PV Code (Reference 3.2-1) and applicable conditions promulgated in 10 CFR 50.55a(b). Supports for Quality Group A SSC meet the requirements for Class 1 supports in Section III, Division 1, Subsection NF of the ASME B&PV Code and are not separately listed in Table 3.2-1. Exceptions exist for supports within the pressure retaining boundary of the RPV. See Section 3.2.2 and Section 5.4.1.5 for additional information.

The remaining portions of the reactor coolant pressure boundary are in Quality Group B.

3.2.2.2 Quality Group B

Quality Group B applies to water- and steam-containing pressure vessels, heat exchangers (other than turbines and condensers), storage tanks, piping, pumps, and valves that are:

- part of the reactor coolant pressure boundary but are excluded from Quality Group A.
- safety-related or risk-significant systems or portions of systems that are designed for (i) emergency core cooling, (ii) post-accident containment heat removal, or (iii) post-accident fission product removal.

- safety-related or risk-significant systems or portions of systems that are designed for (i) reactor shutdown or (ii) residual heat removal.
- portions of the steam and feedwater systems extending from and including the secondary side of steam generators up to and including the outermost containment isolation valves, and connected piping up to and including the first valve (including a safety or relief valve) that is either normally closed or capable of automatic closure during all modes of normal reactor operation.
- systems or portions of systems connected to the reactor coolant pressure boundary that cannot be isolated from that boundary during all modes of operation by two normally closed or automatically closable valves.

RAI 03.02.02-3, RAI 05.02.01.01-7S1

Quality Group B SSC meet the requirements for Class 2 components in Section III, Division 1 of the ASME B&PV Code and applicable conditions promulgated in 10 CFR 50.55a(b). Supports for Quality Group B SSC meet the requirements for Class 2 supports in Section III, Division 1, Subsection NF of the ASME B&PV Code and are not separately listed in Table 3.2-1.

3.2.2.3 Quality Group C

Quality Group C applies to water-, steam-, and radioactive-waste-containing pressure vessels; heat exchangers (other than turbines and condensers); storage tanks; piping; pumps; and valves that are not part of the reactor coolant pressure boundary or included in Quality Group B but part of the following:

- safety-related or risk-significant portions of cooling water and auxiliary feedwater systems that are designed for (i) emergency core cooling, (ii) postaccident containment heat removal, (iii) postaccident containment atmosphere cleanup, or (iv) residual heat removal from the reactor and spent fuel storage pool that (i) do not operate during any mode of normal reactor operation and (ii) cannot be tested adequately
- safety-related or risk-significant portions of cooling water and seal water systems that are designed to support the functioning of other safety-related or risk-significant systems and components
- portions of systems that are connected to the reactor coolant pressure boundary and capable of being isolated from that boundary by two valves during all modes of normal reactor operation
- systems other than radioactive waste management systems that may contain radioactive material and whose postulated failure would result in conservatively calculated potential off-site doses that exceed 0.5 rem to the whole body or its equivalent to any part of the body

RAI 03.02.02-3, RAI 05.02.01.01-7S1

Quality Group C SSC meet the requirements for Class 3 components in Section III, Division 1 of the ASME B&PV Code and applicable conditions promulgated in 10 CFR 50.55a(b). Supports for Quality Group C SSC meet the requirements for Class 3

supports in Section III, Division 1, Subsection NF of the ASME B&PV Code and are not separately listed in Table 3.2-1.

3.2.2.4 Quality Group D

Quality Group D applies to water and steam-containing components that are not part of the reactor coolant pressure boundary or included in Quality Groups B or C, but are part of systems or portions of systems that contain or may contain radioactive material (and are not radioactive waste management systems).

RAI 03.02.02-2, RAI 03.02.02-3

SSC determined to be Quality Group D in accordance with guidance of RG 1.26 are listed in Table 3.2-1. SSC designated as Quality Group D meet the codes and standards for components identified as applicable for Quality Group D in Table 1 of RG 1.26. Codes and standards for Quality Group D SSC and their supports are as follows:

- Pressure Vessels – ASME B&PV Code, Section VIII (Reference 3.2-3)
- Piping and Valves – ASME B31.1, Power Piping (Reference 3.2-4)
- Pumps – Manufacturers' standards
- Atmospheric Storage Tanks – API-650 (Reference 3.2-5) or AWWA D-100 (Reference 3.2-6)
- 0-15 psig Storage Tanks – API-620 (Reference 3.2-7)

3.2.3 References

3.2-1 American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, 2013 Edition, Section III, "Rules for Construction of Nuclear Facility Components," no addenda, New York, NY.

3.2-2 American National Standards Institute/Instrument Society of America (ANSI/ ISA)-67.02.01-1999, "Nuclear Safety-Related Instrument-Sensing Line Piping and Tubing Standard for Use in Nuclear Power Plants," November 1999.

RAI 03.02.02-3

3.2-3 American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, Section VIII, Division 1, "Rules for Construction of Pressure Vessels," New York, NY.

RAI 03.02.02-3

3.2-4 American Society of Mechanical Engineers, ASME Code for Pressure Piping, B31, ASME B31.1, "Power Piping," New York, NY.

RAI 03.02.02-3

3.2-5 American Petroleum Institute, Welded Steel Tanks for Oil Storage, API-650, Washington, DC.

RAI 03.02.02-3

3.2-6 American Water Works Association, Welded Steel Tanks for Water Storage, AWWA D-100, Denver, Colorado.