



November 14, 2017

Docket No. 52-048

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

**SUBJECT:** NuScale Power, LLC Response to NRC Request for Additional Information No. 242 (eRAI No. 9155) on the NuScale Design Certification Application

**REFERENCE:** U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 242 (eRAI No. 9155)," dated September 27, 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. 9155:

- 08.04-2

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](mailto: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. 9155



**Enclosure 1:**

NuScale Response to NRC Request for Additional Information eRAI No. 9155

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

**eRAI No.:** 9155

**Date of RAI Issue:** 09/27/2017

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**NRC Question No.:** 08.04-2

The staff reviewed NuScale's June 28, 2017 response to RAI 8824 regarding compliance with 10 CFR 50.63 and requests the following additional information in order to complete its review:

- A. In its response to RAI 8824, Question 1, NuScale stated that "the coping analysis did not identify any responsibilities for the COL applicant." In the same RAI response, Part 3.2.4, NuScale further states, "An evaluation of the environmental conditions for the actual installed SBO support equipment in its final configuration will be done as part of the detailed design phase using the guidance of NUMARC 87-00 Revision 1, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors."

Based on the previous statement, the staff believes that site-specific details including offsite power configuration and weather information are needed to complete the evaluation of the environmental conditions for installed SBO equipment in accordance with the guidance in NUMARC 87-00.

QUESTION: Please provide the evaluation of the environmental conditions for installed SBO equipment, or provide a COL item that will require the COL applicant to complete the evaluation.

- B. In its response to RAI 8824, Question 1, Part 3.2.4, Subpart 2, and Part 3.2.5, NuScale invokes Topical Report (TR) 0815-16497, "Safety Classification of Passive Nuclear Power Plant Electrical Systems," Rev 0, regarding conformance to RG 1.155, Section C.3.2 on Station Blackout. However, FSAR Section 8.4 does not reference the TR.

QUESTION: Since NuScale is relying on the TR to support conformance to RG 1.155, please add the TR as a reference in Chapter 8.4 of the FSAR.

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### **NuScale Response:**

#### Question A

The scope of the NuScale SBO coping assessment includes assurance that the design

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requirements for SBO equipment adequately account for SBO environmental temperatures in accordance with the applicable parts of Section 3.2.4 of RG 1.155.

The scope of the NuScale assessment does not include verification of those design requirements via the procurement and construction phases such as an examination or confirmation of vendor documentation as described by Appendix F of NUMARC 87-00 R1. Table 1 of RG 1.155 indicates that Appendix F of NUMARC 87-00 provides guidance acceptable to the staff for meeting Section 3.2.4 of the regulatory guide. Part 3 under Question I.2 in Appendix I of NUMARC 87-00 indicates that SBO supporting information needs to be documented and available for NRC review. NuScale addressed this aspect of the guidance for completeness in the prior RAI response. NuScale does not believe the results of this guidance step should be included in the FSAR, but rather confirmed as part of a COL holder's normal procurement and construction activities. Specifically, the vendor documentation that would provide temperature specifications for installed equipment is not available to NuScale nor the COL applicant, but would be available to the COL holder during the procurement and construction phase and available for NRC inspection as part of normal construction inspection programs.

Note that the SBO mitigation equipment that is relied on to meet 10 CFR 50.63 (e.g. DHRS, ECCS) is passive, safety-related, and already required to be environmentally qualified (as described in FSAR Section 3.11) to Chapter 15 design basis accident conditions that bound the SBO environment. Additional support equipment that may also be operated during an SBO, but which is not required or relied on to meet 10 CFR 50.63, is also either environmentally qualified (e.g. certain post-accident monitoring equipment) to bounding conditions or was determined to have reasonable assurance of operability under SBO environmental conditions using other assessment methods that are fully consistent with the guidance of RG 1.155.

With respect to the offsite power and weather portions of this question, the SBO environmental conditions would not change for a site-specific offsite power configuration or a site-specific weather condition. The NuScale design does not rely on a functioning offsite power system to provide power to SBO mitigation or SBO monitoring equipment or to provide power to systems to control SBO equipment ambient temperatures. The reactor building and control building that contain SBO equipment are required to remain operable for the design basis parameters specified in FSAR Table 2.0-1, which includes confirmation that site meteorological conditions are bounded as described by COL Item 2.0-1. Therefore, while the design of a site-specific offsite power system or the presence of a site-specific weather condition may affect the likelihood of an SBO event, it would not affect the ambient environmental conditions that were used in the design of the SBO mitigation equipment used to satisfy the requirements of 10 CFR 50.63.

Given the above, NuScale believes that the design evaluation of SBO environmental conditions satisfies the applicable parts of Section 3.2.4 of RG 1.155. Because of the uniqueness of the NuScale design, the SBO design evaluation is not dependent on site-specific details such as weather, offsite power configuration, or the final specifications and locations of installed



equipment. Consequently a COL item that would require the applicant to consider such items to complete the design evaluation is not necessary. Consistent with standard practice at existing plants and procurement program execution, the license holder's SBO program would confirm that the installed equipment meets specified environmental design requirements.

#### Question B

As described by FSAR Section 8.4:

The EDSS batteries have sufficient capacity to provide power to post-accident monitoring and main control room emergency lighting loads for the 72-hour duration without charging. The EDSS design description, which includes testing and design criteria, is provided in Section 8.3.2.

As described by FSAR Section 8.3.2.1.1:

The EDSS is a non-Class1E DC power system to which augmented design, qualification, and quality assurance (QA) provisions are applied as described in Reference 8.3-1. (Reference 8.3-1 is the subject topical report in Question B.)

NuScale believes the FSAR sections cited above combined with the scope of the coping assessment described in FSAR Section 8.4.3 adequately document the EDSS design requirements with respect to the system's operation during Station Blackout, and a separate item to explicitly include the topical report in FSAR Section 8.4 is not consistent with the underlying basis of the report. As described in Section 3.2 of the report, the augmented provisions for EDSS support post-accident monitoring equipment and emergency lighting, but consistent with the passive NuScale design, do not support safety-related functions during design basis events. As can be seen in Section 2.0 of the report, the augmented provisions are not relied upon to meet 10 CFR 50.63 requirements. This includes the graded Quality Assurance (QA) requirements of Table 3-2 (RG 1.155 Appendix A), which provide for an acceptable QA program, but are not intended to demonstrate compliance with 10 CFR 50.63 requirements.

It is a fundamental design attribute of the NuScale Power Plant that it can be safely shutdown following a complete loss of all onsite and offsite power systems (including DC systems). As indicated by the sensitivity study included in FSAR Section 8.4, ac and dc electrical power systems are not needed to mitigate an SBO, which can be readily accomplished by the completely passive DHRS and ECCS without reliance on electric power. The use of the term *mitigate* in this context is to demonstrate that the reactor and containment acceptance criteria included in 10 CFR 50.63 are met.

As part of the coping assessment, NuScale demonstrated that additional support equipment (e.g., PAM, emergency lighting, CRHS) would be available during an SBO. None of this equipment is necessary to mitigate an SBO, and the inclusion of this additional equipment



(including the EDSS) in the coping assessment is considered as beyond the scope necessary to demonstrate conformance to the rule. The availability of this additional equipment was, however, conservatively considered in the SBO coping assessment using the guidance of RG 1.155 and intentionally addressed in FSAR Section 8.4.3. This additional equipment would help to facilitate power restoration during the 72 hour period following an SBO event (although power restoration is not required for safety).

**Impact on DCA:**

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