RAIO-0218-58574

February 08, 2018

Docket No. 52-048

U.S. Nuclear Regulatory Commission
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SUBJECT: NuScale Power, LLC Response to NRC Request for Additional Information No. 334 (eRAI No. 9209) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 334 (eRAI No. 9209)," dated January 10, 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. 9209:

- 20.01-11

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 Steven Mirsky at 240-833-3001 or at smirsky@nuscalepower.com.

Sincerely,

Zackary W. Rad
Director, Regulatory Affairs
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Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9209

Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9209

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

eRAI No.: 9209
Date of RAI Issue: 01/10/2018

NRC Question No.: 20.01-11

10 CFR 52.47(a)(2) requires that a standard design certification applicant provide a description and analysis of the structures, systems, and components (SSCs) of the facility, with emphasis upon performance requirements, the bases, with technical justification upon which these requirements have been established, and the evaluations required to show that safety functions will be accomplished. Additionally, the staff's guidance in Section 1.1, Establishment of Baseline Coping Capability, of JLD-ISG-2012- 01 (ADAMS Accession Number ML15357A163) states: Section 3.2.1.7 of NEI 12-06, Revision 2, specifies that "[s]trategies that have a time constraint to be successful should be identified and a basis provided that the time can reasonably be met."

NuScale Technical Report TR-0816-50797-NP, Mitigation Strategies for Extended Loss of AC Power Event (ADAMS Accession Number ML17005A148 for non-public and ML17005A120 for publicly available), is, in part, intended to provide an assessment of the NuScale Power Plant response to an extended loss of AC power (ELAP) event. The document discusses the sequence of events and responses of the plant to provide long-term cooling for an ELAP event, such as the cumulative time necessary for the Ultimate Heat Sink (UHS) water level to boil off to specific heights.

NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Section 3.2.1, "General Criteria and Baseline Assumptions," outlines the general criteria and assumptions to be used in establishing the baseline coping strategy. Subsection 3.2.1.10 discusses instrumentation and controls and states:

> The parameters selected must be able to demonstrate the success of the strategies at maintaining the key safety functions as well as indicate imminent or actual core damage to facilitate a decision to manage the response to the event within the Emergency Operating Procedures and FLEX Support Guidelines or within the SAMGs.

Additionally, NEI 12-06 Subsection 3.2.1.10 lists typical parameters that are monitored, such as reactor coolant system (RCS) pressure, temperature, and associated levels.

NuScale's strategy regarding electrical power during an ELAP uses installed plant equipment (batteries). Batteries are limited in duration to roughly 72 hours (see Technical Report

TR-0816-50797-P Section 5.6.3). After 72 hours, NuScale does not include a strategy to charge batteries and typical parameters (e.g., RCS pressure and temperature) are no longer available for monitoring expected plant performance. NuScale justifies not having these parameters available after roughly 72 hours based on the long-term cooling evaluation results that indicate safety functions (e.g., core cooling) are established and maintained for 30 days with no operator actions. With no need to take operator actions based on a specific RCS parameter, the post 72 hour mitigative strategy does not consider the parameter necessary. In lieu of a specific RCS parameter, NuScale intends to monitor UHS level to ensure core cooling. However, the staff endorsed guidance (NEI 12-06) takes a position that parameters selected must be able to demonstrate the success of the strategies at maintaining the key safety functions as well as indicate imminent or actual core damage.

NuScale's strategy for monitoring only one parameter (i.e., UHS level) after plant installed batteries (highly reliable…) are exhausted does not conform with past regulatory precedence (other passive designs) in order to demonstrate the success of the strategies or include the ability to indicate core conditions. Therefore, the staff requests NuScale to provide a COL action item that requires developing a strategy to maintain monitoring capability of the key safety functions beyond 72 hours, or include this strategy as part of the NuScale DCA/FSAR.

NuScale Response:

The Mitigation of Beyond-Design-Basis Events (MBDBE) rule was developed considering the design features of current operating reactors. A future reactor design, like that of NuScale, may greatly differ from current certified designs and operating reactors, and may address, at least in part, the provisions of the MBDBE rule in the the design certification application. If a design includes such design features in the design certification, a COL applicant referencing that design would have a standardized basis for complying with certain requirements of this rule, possibly including issue resolution and issue finality (although that would be decided under a design certification rulemaking).

While the final MBDBE rule does not apply to new reactor design certifications, the NRC would nonetheless consider reviewing design certification applications that voluntarily address portions of the MBDBE rule, including requesting additional information, if needed, to reach a safety conclusion. (NRC Response to Comments Mitigation of Beyond-Design-Basis Events Rule, ADAMS Accession No. ML 16271A063, December 2016, p. 26).

The key safety functions of the NuScale Power Plant in an extended loss of AC power (ELAP) are containment integrity, spent fuel pool cooling, and core cooling. Once emergency core cooling system actuation has been confirmed with its concomitant equilibrium containment vessel (CNV) and reactor pressure vessel (RPV) levels and conduction-convection heat transfer of all core decay heat to the ultimate heat sink (UHS), the NuScale power plant design monitors all of these key safety functions with installed plant equipment: the UHS level indicator instruments. The only strategy needed to maintain monitoring capability of the key safety

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functions beyond 72 hours is to ensure that the UHS level instruments remain functional. The NuScale design ensures that UHS level instruments will remain functional during an ELAP by requiring battery power that is reliable and replaceable. Additional monitoring parameters or operator action are not necessary or required to monitor the key safety functions during an ELAP. In the NuScale design, with the confirmed flooded power module CNV and RPV, monitoring the UHS level provides the same indication of core cooling, containment integrity, and spent fuel pool cooling as monitoring other parameters in current operating large light water reactors and currently certified passive designs.

Based on the operating strategy described above, no COL action item is needed to develop a strategy to maintain monitoring capability of the key safety functions beyond 72 hours because the strategy of using replaceable batteries is included in the NuScale FSAR.

Impact on DCA:

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