RAIO-1017-56905

October 31, 2017

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. 211 (eRAI No. 8961) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 211 (eRAI No. 8961)," dated September 01, 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 Questions from NRC eRAI No. 8961:

- 20.01-2
- 20.01-3
- 20.01-4

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
NuScale Power, LLC

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Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 8961

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NuScale Response to NRC Request for Additional Information eRAI No. 8961

Response to Request for Additional Information
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eRAI No.: 8961
Date of RAI Issue: 09/01/2017

NRC Question No.: 20.01-2

NRC Commission paper SECY-12-0025 (February 17, 2012), "Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami," stated that the NRC staff expected new reactor design certification or license applications (e.g., construction permit, operating license, and combined license) not yet then-submitted to address the Commission-approved Fukushima actions in their applications, prior to submittal, to the fullest extent practicable. In SECY-12-0025, the NRC staff outlined a three-phase approach regarding mitigation strategies to respond to beyond-design-basis external events (BDBEEs). The initial phase involved the use of installed equipment and resources to maintain or restore core cooling, containment, and spent fuel pool (SFP) cooling without alternating current power. The transition phase involved providing sufficient, portable, onsite equipment and consumables to maintain or restore these functions until they can be accomplished with resources brought from offsite. The final phase involved obtaining sufficient offsite resources to sustain those functions indefinitely.

The NRC staff provided guidance for satisfying the Commission directives regarding BDBEE mitigation strategies in Japan Lesson-Learned Project Directorate (JLD)-ISG-2012-01, Revision 1, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events." JLD-ISG-2012-01 endorsed with clarification the methodologies described in the industry guidance document Nuclear Energy Institute (NEI) 12–06, Revision 2, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide." The guidance in JLD-ISG-2012-01 describes one acceptable approach for satisfying the Commission directives regarding BDBEE mitigation strategies.

NuScale DCD Tier 2, Section 20.1, "Mitigating Strategies for Beyond Design-Basis External Events," discusses the mitigating strategies that address ELAP and LUHS resulting from a BDBEE. The NuScale mitigating strategies utilize installed valves but does not utilize installed pumps or dynamic restraints.

As specified in NRC Commission paper SECY-12-0025, the NRC staff expects new reactor design certification to address the Commission-approved Fukushima actions in their application. DCD Tier 2, Section 20.1 states that various valves in safety-related systems are credited in the mitigating strategies but does not identify the specific valves or provisions to ensure the capability of these valves to perform their mitigation function. Therefore, identify all safety-

related installed valves and describe the provisions for design, manufacture, testing, installation, and surveillance to provide assurance of the seismic, environmental, and functional capability of the safety-related installed valves to perform their intended functions as part of the mitigation strategies (including hot shutdown, safe shutdown, transition, and refueling conditions) to ensure core cooling, containment function, and spent fuel pool cooling capabilities during an extended loss of ac power event at a NuScale nuclear power plant. As part of this request, indicate whether any safety-related valves (including appurtenances) used as part of the mitigation strategies for an extended loss of ac power event will have performance requirements that exceed their original safety-related design and performance specification. In addition, indicate where the NuScale DCD Tier 2 specifies the provisions for the design, manufacture, testing, installation, and surveillance for the safety-related valves that perform functions as part of the mitigation strategies, or provide proposed modifications to the NuScale DCD Tier 2 to incorporate these provisions.

NuScale Response:

DCD Tier 2 Section 20.1 credits valves in the containment system (CNTS), the decay heat removal system (DHRS), and the emergency core cooling system (ECCS) for mitigation strategies required by SECY-12-0025. Specifically, Tier 2 Section 5.4.3.2.1 discusses DHRS valves and Table 5.4-8 lists the DHRS valves and the main steam isolation valves and feedwater isolation valves that support the DHRS. Tier 2 Section 6.2.4 describes containment isolation valves and Table 6.2.5 lists the valves for the CNTS. Tier 2 Section 6.3 describes functions and qualification for ECCS valves; Table 6.3-3 lists the ECCS valves. Table 3.2-1, for each of the systems described above, provides information on classification, seismic category, and quality group for system valves. Table 3.2-1 also identifies applicable augmented design requirements and the applicable quality assurance program requirements. Systems are listed in Table 3.2-1 alpha-numerically by system codes. Within a given system, the SSC are listed, generally, in the order of the SSC classification (i.e., A1, A2, B1, and B2 where A indicates safety-related and B indicates nonsafety-related).

The valves credited in Section 20.1 are included in the NuScale inservice testing plan. Tier 2 Section 3.9.6 and 3.9.6.3 describe functional design, qualification, and inservice testing of valves that provide a safety-related function; Table 3.9-16 summarizes the inservice testing plan, including the method and frequency of inservice testing. COL Items 3.9-4 and 3.9-5 include requirements for the COL applicant that reference the NuScale design certification to establish a preservice testing program and inservice testing program, respectively. In addition, as described in 20.1.2, the valves used as part of the mitigation strategy in an extended loss of AC power fail to their safe position on a loss of power (the safe position for the DHRS actuation and ECCS valves is open, all other valves' safe position is closed); none have performance requirements that exceed their safety-related design and performance specifications.

Impact on DCA:

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

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NRC Question No.: 20.01-3

As specified in NRC Commission paper SECY-12-0025, the NRC staff expects new reactor design certification to address the Commission-approved Fukushima actions in their application. DCD Tier 2, Section 20.1 states that various valves in nonsafety-related systems are credited in the mitigating strategies but does not identify the specific valves or provisions to ensure the capability of these valves to perform their mitigation function. Therefore, identify all nonsafety-related installed valves and describe the provisions for design, manufacture, testing, installation, and surveillance to provide assurance of the seismic, environmental, and functional capability of the nonsafety-related installed valves to perform their intended functions as part of the mitigation strategies (including hot shutdown, safe shutdown, transition, and refueling conditions) to ensure core cooling, containment function, and spent fuel pool cooling capabilities during an extended loss of ac power event at a NuScale nuclear power plant. In addition, indicate where the NuScale DCD Tier 2 specifies the provisions for the design, manufacture, testing, installation, and surveillance for the nonsafety-related installed valves that perform functions as part of the mitigation strategies, or provide proposed modifications to the NuScale DCD Tier 2 to incorporate these provisions.

NuScale Response:

DCD Tier 2 Section 20.1 credits safety-related valves in the containment system (CNTS), the decay heat removal system (DHRS), and the emergency core cooling system (ECCS) for mitigation strategies required by SECY-12-0025. Nonsafety-related valves are not relied upon to maintain the key safety functions following an extended loss of AC power.

Impact on DCA:

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

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Date of RAI Issue: 09/01/2017

NRC Question No.: 20.01-4

As specified in NRC Commission paper SECY-12-0025, the NRC staff expects new reactor design certification to address the Commission-approved Fukushima actions in their applications. Establish a COL item for a COL applicant to propose a License Condition to verify the development and implementation of the guidance, strategies, and programs for the mitigation strategies (including hot shutdown, safe shutdown, transition, and refueling conditions) for ensuring core cooling, containment function, and spent fuel pool cooling capabilities during an extended loss of ac power event at an NuScale nuclear power plant. Provide a model license condition in the NuScale DCD with key elements for the implementation of mitigation strategies for extended loss of ac power events, such as found in other design certification and COL applications with the applicable NRC safety evaluations.

NuScale Response:

The NRC amended 10 CFR Parts 50 and 52 to establish generically applicable regulatory requirements to mitigate beyond-design-basis events. The amended regulations incorporate requirements of Order EA-12-0149, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events and Order EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation. The regulations also establish requirements for integrated response capability, including supporting requirements for staffing, command and control, drills, training, and documentation of changes.

The NuScale FSAR Chapter 20 includes several COL items related to mitigation strategies. Specifically, COL Items 20.1-6 (ELAP event using FLEX equipment) and 20.1-7 (training), directly respond to development and implementation of mitigation strategies to ensure cooling, containment function, and spent fuel pool cooling capabilities during an extended loss of power event at a NuScale Power Plant. In addition, FSAR Chapter 18.2.2.4 affirms that the NuScale Power Plant design incorporates lessons learned from the seismic and tsunami events at the Fukushima Daiichi power station.

The amended NRC regulations, existing COL Items, and Chapter 18.2.2.4 renders a new COL

Item specifically requiring development and implementation of guidance, strategies, and programs for mitigation strategies unnecessary.

Impact on DCA:

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