



February 16, 2018

Docket No. 52-048

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

SUBJECT: NuScale Power, LLC Supplemental Response to NRC Request for Additional Information No. 67 (eRAI No. 8883) on the NuScale Design Certification Application

REFERENCES: 1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 67 (eRAI No. 8883)," dated June 20, 2017
2. NuScale Power, LLC Response to NRC "Request for Additional Information No. 67 (eRAI No.8883)," dated August 17, 2017

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. 8883:

- 03.11-14

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 Marty Bryan at 541-452-7172 or at mbryan@nuscalepower.com.

Sincerely,



Zackary W. Rad
Director, Regulatory Affairs
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Enclosure 1: NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 8883



Enclosure 1:

NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 8883

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

eRAI No.: 8883

Date of RAI Issue: 06/20/2017

NRC Question No.: 03.11-14

NRC regulations in GDC 4 require that components important to safety be designed to accommodate the effect of, and be compatible with, the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including LOCAs. DSRS 3.11, "Design-specific Review Standard for NuScale SMR Design," specifies the following acceptance criteria for the environmental qualification of mechanical equipment:

A well-supported maintenance/surveillance program, in conjunction with a good preventive maintenance program, is needed to provide assurance that the environmental design and qualification status of equipment in both mild and harsh environments will be maintained during the operational life of the plant.

The applicant should specify in its DCD/FSAR that the EQ operational program shall contain the following aspects specific to the EQ of mechanical and electrical equipment: (1) evaluation of EQ results to establish activities to support continued EQ for the entire time an item is installed in the plant, (2) determination of surveillance and preventive maintenance activities based on EQ results, (3) consideration of EQ maintenance recommendations from equipment vendors, (4) evaluation of operating experience in developing surveillance and preventive maintenance activities for specific equipment, (5) development of plant procedures that specify individual equipment identification, appropriate references, installation requirements, surveillance and maintenance requirements, post-maintenance testing requirements, condition monitoring requirements, replacement part identification, and applicable design changes and modifications, (6) development of plant procedures for reviewing equipment performance and EQ operational activities, and for trending the results to incorporate lessons learned through appropriate modifications to the EQ operational program, and (7) development of plant procedures for the control and maintenance of EQ records.

To support a finding under GDC 4, the NRC staff request the applicant to address in its DCD/FSAR that the EQ operational program should contain the above aspects specific to the EQ of mechanical and electrical equipment and the applicant is requested add a COL item to specify that a COL applicant that references the NuScale Power Plant design certification will



address operational aspects for maintaining the environmental qualification status of components after initial qualification.

NuScale Response:

COL Item 3.11-3 was added to the FSAR by the response to eRAI 8883, Question 3.11-14 transmitted to the NRC by NuScale letter RAIO-0817-55491, dated August 17, 2017. The attached FSAR update addresses a subsequent staff comment to clarify the language of COL Item 3.11-3.

Impact on DCA:

FSAR Section 3.11 and Table 1.8-2 have been revised as described in the response above and as shown in the markup provided in this response.

RAI 01-61, RAI 02.04.13-1, RAI 03.04.02-1, RAI 03.04.02-2, RAI 03.04.02-3, RAI 03.05.01.04-1, RAI 03.05.02-2, RAI 03.06.02-15, RAI 03.06.03-11, RAI 03.07.01-2, RAI 03.07.01-3, RAI 03.07.02-8, RAI 03.07.02-12, RAI 03.09.02-15, RAI 03.09.02-48, RAI 03.09.03-12, RAI 03.09.06-5, RAI 03.09.06-6, RAI 03.09.06-16, RAI 03.09.06-16S1, RAI 03.09.06-27, RAI 03.11-8, RAI 03.11-14, RAI 03.11-14S1, RAI 03.13-3, RAI 05.04.02.01-13, RAI 05.04.02.01-14, RAI 06.04-1, RAI 09.01.02-4, RAI 09.01.05-3, RAI 09.01.05-6, RAI 09.03.02-3, RAI 09.03.02-4, RAI 09.03.02-5, RAI 09.03.02-6, RAI 09.03.02-8, RAI 10.02-1, RAI 10.02-2, RAI 10.03.06-1, RAI 10.04.06-1, RAI 10.04.06-2, RAI 10.04.06-3, RAI 10.04.10-2, RAI 13.01.01-1, RAI 13.01.01-1S1, RAI 13.02.02-1, RAI 13.03-4, RAI 13.05.02.01-2, RAI 13.05.02.01-2S1, RAI 13.05.02.01-3, RAI 13.05.02.01-3S1, RAI 13.05.02.01-4, RAI 13.05.02.01-4S1, RAI 19-31

Table 1.8-2: Combined License Information Items

Item No.	Description of COL Information Item	Section
COL Item 1.1-1:	A COL Applicant applicant that references the NuScale Power Plant design certification will identify the site-specific plant location.	1.1
COL Item 1.1-2:	A COL Applicant applicant that references the NuScale Power Plant design certification will provide the schedules for completion of construction and commercial operation of each power module.	1.1
COL Item 1.4-1:	A COL Applicant applicant that references the NuScale Power Plant design certification will identify the prime agents or contractors for the construction and operation of the nuclear power plant.	1.4
COL Item 1.7-1:	A COL Applicant applicant that references the NuScale Power Plant design certification will provide site-specific diagrams and legends, as applicable.	1.7
COL Item 1.7-2:	A COL Applicant applicant that references the NuScale Power Plant design certification will list additional site-specific piping and instrumentation diagrams P&IDs and legends as applicable.	1.7
COL Item 1.8-1:	A COL Applicant applicant that references the NuScale Power Plant design certification will provide a list of departures from the certified design.	1.8
COL Item 1.9-1:	A COL Applicant applicant that references the NuScale Power Plant design certification will review and address the conformance with regulatory criteria in effect six months before the docket date of the COL application for the site-specific portions and operational aspects of the facility design.	1.9
COL Item 1.10-1:	A COL Applicant applicant that references the NuScale Power Plant design certification will evaluate the potential hazards resulting from construction activities of the new NuScale facility to the safety-related and risk significant structures, systems, and components of existing operating unit(s) and newly constructed operating unit(s) at the co-located site per 10 CFR 52.79(a)(31). The evaluation will include identification of any management and administrative controls necessary to eliminate or mitigate the consequences of potential hazards and demonstration that the limiting conditions for operation of an operating unit would not be exceeded. This COL item is not applicable for construction activities (build-out of the facility) at an individual NuScale Power Plant with operating NuScale Power Modules.	1.10
COL Item 2.0-1:	A COL Applicant applicant that references the NuScale Power Plant design certification will demonstrate that site-specific characteristics are bounded by the design parameters specified in Table 2.0-1. If site-specific values are not bounded by the values in Table 2.0-1, the COL applicant will demonstrate the acceptability of the site-specific values in the appropriate sections of its combined license application.	2.0
COL Item 2.1-1:	A COL Applicant applicant that references the NuScale Power Plant design certification will describe the site geographic and demographic characteristics.	2.1
COL Item 2.2-1:	A COL Applicant applicant that references the NuScale Power Plant design certification will describe nearby industrial, transportation, and military facilities. The COL applicant will demonstrate that the design is acceptable for each potential accident, or provide site-specific design alternatives.	2.2
COL Item 2.3-1:	A COL Applicant applicant that references the NuScale Power Plant design certification will describe the site-specific meteorological characteristics for Section 2.3.1 through Section 2.3.5, as applicable.	2.3
COL Item 2.4-1:	A COL Applicant applicant that references the NuScale Power Plant design certification will investigate and describe the site-specific hydrologic characteristics for Section 2.4.1 through Section 2.4.14, as applicable.	2.4

Table 1.8-2: Combined License Information Items (Continued)

Item No.	Description of COL Information Item	Section
COL Item 3.10-3:	A COL Applicant applicant that references the NuScale Power Plant design certification will submit an implementation program for Nuclear Regulatory Commission approval prior to the installation of the equipment that requires seismic qualification.	3.10
COL Item 3.11-1:	A COL Applicant applicant that references the NuScale Power Plant design certification will submit a full description of the E environmental Q qualification P program and milestones and completion dates for program implementation.	3.11
COL Item 3.11-2:	A COL Applicant applicant that references the NuScale Power Plant design certification will develop the equipment qualification database and ensure equipment qualification record files are created for the structures, systems, and components that require environmental qualification.	3.11
<u>COL Item 3.11-3:</u>	<u>A COL applicant that references the NuScale Power Plant design certification will implement an equipment qualification operational program that incorporates the aspects in Section 3.11-7 specific to the environmental qualification of mechanical and electrical equipment.</u>	<u>3.11</u>
<u>COL Item 3.11-4:</u>	<u>A COL applicant that references the NuScale Power Plant design certification will ensure the environmental qualification program cited in COL Item 3.11-1 includes a description of how equipment located in harsh conditions will be monitored and managed throughout plant life. This description will include methodology to ensure equipment located in harsh environments will remain qualified if the measured dose is higher than the calculated dose.</u>	<u>3.11</u>
COL Item 3.12-1:	A COL Applicant applicant that references the NuScale Power Plant design certification may use a piping analysis program other than the programs listed in Section 3.12.4.1; however, the applicant will implement a benchmark program using the models for <u>the</u> NuScale Power Plant standard design.	3.12
COL Item 3.12-2:	A COL Applicant applicant that references the NuScale Power Plant design certification will confirm that the site-specific seismic response is within the parameters specified in Section 3.7. A COL applicant may perform a site-specific piping stress analysis in accordance with the methodologies described in this section, as appropriate.	3.12
COL Item 3.13-1:	A COL Applicant applicant that references the NuScale Power Plant design certification will provide an in-service inspection program for ASME Class 1, 2 and 3 threaded fasteners or describe the implementation program, including milestones, completion dates and expected conclusions. The program will identify the applicable edition and addenda of ASME BPVC Boiler and Pressure Vessel Code, Section XI and ensure compliance with 10 CFR 50.55a.	3.13
COL Item 5.2-1:	A COL Applicant that references the NuScale Power Plant design certification and uses a later Code edition or addenda other than American Society of Mechanical Engineers Boiler and Pressure Vessel Code 2013 will perform and document with a code reconciliation an American Society of Mechanical Engineers Design Report as required by American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section III, Paragraph NCA-3554, "Modification of Documents and Reconciliation With Design Report. Not used	5.2
COL Item 5.2-2:	A COL Applicant applicant that references the NuScale Power Plant design certification will provide a certified Overpressure Protection Report in compliance with American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section III, Subarticles NB-7200 and NC-7200 to demonstrate the reactor coolant pressure boundary and secondary system are designed with adequate overpressure protection features, <u>including low temperature overpressure protection features.</u>	5.2
COL Item 5.2-3:	A COL Applicant that references the NuScale Power Plant design certification will establish measures to control the on-site cleaning of RPV and pressure retaining components associated with the RCPB during construction. Not Used	5.2
COL Item 5.2-4:	A COL Applicant applicant that references the NuScale Power Plant design certification will develop and implement a Strategic Water Chemistry Plan. The Strategic Water Chemistry Plan will provide the optimization strategy for maintaining primary coolant chemistry and provide the basis for requirements for sampling and analysis frequencies, and corrective actions for control of primary water chemistry consistent with the <u>latest version of the</u> Electric Power Research Institute Pressurized Water Reactor Primary Water Chemistry Guidelines.	5.2

environment, compliance with the environmental design provisions of GDC 4 are generally achieved by demonstrating that the non-metallic parts/components of the equipment suitable for the postulated design basis environmental conditions. Safety-related mechanical equipment that performs an active function during or following exposure to harsh environmental conditions will be qualified in accordance with ASME QME-1, Appendix QR-B (Reference 3.11-13), ~~as described in Section 3.10~~. Documentation and the status of the testing and analysis are performed in accordance with the processes presented in Appendix 3.C.

Mechanical equipment located in harsh environmental zones is designed to perform under all appropriate environmental conditions. The primary focus with mechanical equipment is on materials that are sensitive to environmental effects (e.g., seals, gaskets, lubricants, fluids for hydraulic systems, and diaphragms). A list of the mechanical components that contain non-metallic or consumable parts located in harsh environment areas that require EQ is provided in Table 3.11-1.

RAI 03.11-14

3.11.7 **Equipment Qualification Operational Program**

An EQ operational program is provided that ensures continued capability of qualified mechanical and electrical equipment to perform its design function throughout its qualified life. The EQ operational program contains the following aspects specific to the EQ of mechanical and electrical equipment: (1) evaluation of EQ results to establish activities to support continued EQ for the entire time an item is installed in the plant, (2) determination of surveillance and preventive maintenance activities based on EQ results, (3) consideration of EQ maintenance recommendations from equipment vendors, (4) evaluation of operating experience in developing surveillance and preventive maintenance activities for specific equipment, (5) development of plant procedures that specify individual equipment identification, appropriate references, installation requirements, surveillance and maintenance requirements, post-maintenance testing requirements, condition monitoring requirements, replacement part identification, and applicable design changes and modifications, (6) development of plant procedures for reviewing equipment performance and EQ operational activities, and for trending the results to incorporate lessons learned through appropriate modifications to the EQ operational program, and (7) development of plant procedures for the control and maintenance of EQ records.

RAI 03.11-14, RAI 03.11-14S1

COL Item 3.11-3: A COL applicant that references the NuScale Power Plant design certification will implement an equipment qualification operational program that incorporates the aspects in Section 3.11-7 specific to the equipment qualification of mechanical and electrical equipment.

3.11.8 **References**

- 3.11-1 NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety Related Electrical Equipment," Revision 1, July 1981.
- 3.11-2 IEEE Std. 323-1974, IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations.