

February 13, 2018

Docket No. 52-048

U.S. Nuclear Regulatory Commission  
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**SUBJECT:** NuScale Power, LLC Submittal of Changes to Final Safety Analysis Report, Section 1.8, "Interfaces with Certified Design" and Section 7.0, "Instrumentation and Controls - Introduction and Overview"

**REFERENCES:** 1. NuScale Power, LLC, "Response to NRC Request for Additional Information No. 9218 (eRAI No. 9218) on the NuScale Topical Report "Evaluation Methodology for Stability Analysis of the NuScale Power Module," TR-0516-49417, Revision 0, dated February 12, 2018 (ML18043B178)

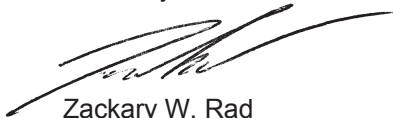
2. Letter from NuScale Power LLC, to Nuclear Regulatory Commission, "NuScale Power, LLC Submittal of the NuScale Standard Plant Design Certification Application," dated December 31, 2016 (ML17013A229)

On February 12, 2018, NuScale submitted a response to RAI 9128 (Reference 1) which described a planned update to the Final Safety Analysis Report (FSAR) Section 1.8, "Interfaces with Certified Design" and Section 7.0, "Instrumentation and Controls - Introduction and Overview." As a result of the RAI response, NuScale changed FSAR Section 1.8 and Section 7.0. The Enclosure to this letter provides a mark-up of the FSAR pages incorporating revisions to Section 1.8 and Section 7.0 in redline/strikeout format. NuScale will include these changes as part of a future revision to the NuScale Design Certification Application (Reference 2).

This letter makes no new regulatory commitments or revisions to any existing regulatory commitments.

Please feel free to contact Darrell Gardner at (980)-349-4829 or at [dgardner@nuscalepower.com](mailto:dgardner@nuscalepower.com) if you have any questions.

Sincerely,



Zackary W. Rad  
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Enclosure: "Changes to NuScale Final Safety Analysis Report Section 1.8, 'Interfaces with Certified Design' and Section 7.0, 'Instrumentation and Controls - Introduction and Overview'"

**Enclosure:**

“Changes to NuScale Final Safety Analysis Report Section 1.8, ‘Interfaces with Certified Design’ and Section 7.0, ‘Instrumentation and Controls – Introduction and Overview’”

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 03.13-3, 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 <del>Applicant</del> 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 <del>Applicant</del> 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 <del>Applicant</del> 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 <del>Applicant</del> 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 <del>Applicant</del> applicant that references the NuScale Power Plant design certification will list additional site-specific <del>pipng and instrumentation diagrams</del> P&IDs and legends as applicable.	1.7
COL Item 1.8-1:	A COL <del>Applicant</del> 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 <del>Applicant</del> 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 <del>Applicant</del> 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 <del>any</del> 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 <del>Applicant</del> 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 <del>Applicant</del> 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 <del>Applicant</del> 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 <del>Applicant</del> 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 <del>Applicant</del> 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 6.4-1:	A COL <del>Applicant</del> applicant that references the NuScale Power Plant design certification will comply with RG 1.78 Revision 1, "Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release."	6.4
COL Item 6.4-2:	<del>A COL Applicant that references the NuScale Power Plant design certification will specify operator training and qualification in the use of self-contained portable breathing apparatus.</del> Not used.	6.4
COL Item 6.4-3:	<del>A COL Applicant that references the NuScale Power Plant design certification will specify the technical resources to be stored within the CRE.</del> Not used.	6.4
COL Item 6.4-4:	<del>A COL Applicant that references the NuScale Power Plant design certification will specify food, water, and medical supplies to be stored within the CRE.</del> Not used.	6.4
COL Item 6.4-5:	A COL <del>Applicant</del> applicant that references the NuScale Power Plant design certification will specify testing and inspection requirements for the CRHS, including CRE integrity testing.	6.4
COL Item 6.6-1:	A COL <del>Applicant</del> applicant that references the NuScale Power Plant design certification will implement an Inservice Inspection Testing Program in accordance with 10 CFR 50.55a(f).	6.6
COL Item 6.6-2:	A COL <del>Applicant</del> applicant that references the NuScale Power Plant design certification will develop a preservice inspection and Inservice Inspection Program plans in accordance with Section XI of the ASME Code, and will establish the implementation milestones for the program. The COL applicant will identify the applicable edition of the ASME Code utilized in the program plan consistent with the requirements of 10 CFR 50.55a. The COL applicant will, if needed, address the use of a single ISI Program for multiple NPMs, including any Alternative to the Code that may be necessary to implement such an ISI Program.	6.6
<u>COL Item 7.0-1:</u>	<u>A COL applicant that references the NuScale Power Plant design certification is responsible for demonstrating the stability of the NuScale Power Module (NPM) during normal and power maneuvering operations for closed-loop module control system (MCS) subsystems that use reactor power as a control input.</u>	<u>7.0</u>
COL Item 7.2-1:	A COL <del>Applicant</del> applicant that references the NuScale Power Plant design certification is responsible for the implementation of the life cycle processes for the operation phase for the instrumentation and controls systems, as defined in IEEE Standard 1074-2006 and IEEE Standard 1012-2004.	7.2
COL Item 7.2-2:	A COL <del>Applicant</del> applicant that references the NuScale Power Plant design certification is responsible for the implementation of the life cycle processes for the maintenance phase for the instrumentation and controls systems, as defined in IEEE Standard 1074-2006 and IEEE Standard 1012-2004.	7.2
COL Item 7.2-3:	The NuScale Digital I&C Software Configuration Management Plan provides guidance for the retirement and removal of a software product from use. A COL <del>Applicant</del> applicant that references the NuScale Power Plant design certification is responsible for the implementation of the life cycle processes for the retirement phase for the instrumentation and controls systems, as defined in IEEE Standard 1074-2006 and IEEE Standard 1012-2004. The NuScale Digital I&C Software Configuration Management Plan provides guidance for the retirement and removal of a software product from use.	7.2
COL Item 8.2-1:	The design of the switchyard and the connections to an offsite power system are site-specific and are the responsibility of the combined license (COL) applicant. A COL <del>Applicant</del> applicant that references the NuScale Power Plant design certification will describe the site-specific switchyard layout and design, including offsite power connections, control and indication, characteristics of circuit breakers and buses, protective relaying, power supplies, lightning and grounding protection equipment, and conformance with <u>General Design Criteria (GDC) 5</u> .	8.2
COL Item 8.2-2:	A COL <del>Applicant</del> applicant that references the NuScale Power Plant design certification will describe the site-specific offsite power connection and grid stability studies, including the effects of grid contingencies such as the loss of the largest operating unit on the grid, the loss of one NuScale Power Module, and the loss of the full complement of NuScale Power Modules (up to 12). The study will be performed in accordance with the applicable Federal Energy Regulatory Commission, North American Electric Reliability Corporation, and transmission system operator requirements, including communication agreements and protocols.	8.2

while other logic directly supports the process systems. The logic processing of multiple channels can include two, three, or four input signals.

RAI 01-61

COL Item 7.0-1: A COL applicant that references the NuScale Power Plant design certification is responsible for demonstrating the stability of the NuScale Power Module (NPM) during normal and power maneuvering operations for closed-loop module control system (MCS) subsystems that use reactor power as a control input.

The NuScale power plant normal operation and power maneuvering control functions are provided by the following MCS functions for each NPM:

- turbine trip, throttle and governor valve control
- turbine bypass valve control
- feedwater pump speed control
- feedwater regulating valve control
- RCS boron concentration (chemical shim) control
- pressurizer pressure control
- pressurizer level control

The control inputs and functions for each during normal power operation are described below.

#### Turbine Trip, Throttle and Governor Valve Control

The turbine trip, throttle, and governor controls rely on the following control inputs:

- main turbine control system (MTCS) package sensors (case temperatures, drain valve position, eccentricity, speed sensing, shaft axial position, journal bearing displacement, journal bearing temperature and other sensors)
- demand power level (main turbine generator load or reactor power) from MCS and MTCS
- main steam line flow
- turbine inlet steam pressure
- secondary system calorimetric input
- target reactor power and change rate via the MCR operator workstation
- turbine generation limit and load change rate via the MCR operator workstation

During normal power operations, the turbine governor control maintains steam header pressure as a function of reactor power demand. During load following, operator input via the MCR human-system interface establishes the turbine generation limit. The turbine bypass valves divert excess steam energy to the main condenser to limit turbine generation to the power generation target. While normal turbine generator power changes are limited to a fixed rate, the turbine generator is capable of loading/unloading by diverting steam flow to and from the turbine bypass valves.