



June 21, 2018

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 Supplemental Response to NRC Request for Additional Information No. 277 (eRAI No. 8747) on the NuScale Design Certification Application

REFERENCES: 1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 277 (eRAI No. 8747)," dated November 03, 2017
2. NuScale Power, LLC Response to NRC "Request for Additional Information No. 277 (eRAI No.8747)," dated December 20, 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. 8747:

- 18-10

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,

A handwritten signature in black ink that reads "Jennie Wike".

Jennie Wike
Manager, Licensing
NuScale Power, LLC

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Enclosure 1: NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 8747



Enclosure 1:

NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 8747

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

eRAI No.: 8747

Date of RAI Issue: 11/03/2017

NRC Question No.: 18-10

Acceptance Criteria

NUREG-0711, Review Criteria 6.4(4), says, "The applicant's staffing analysis should determine the number and qualifications of operations personnel for the full range of plant conditions and tasks, including operational tasks (under normal, abnormal, and emergency conditions), plant maintenance, plant surveillance, and testing."

Relevant Background Information

On June 23, 2016, and August 30, 2016, Category 1 public meetings were held at the NRC Headquarters with representatives of the NRC staff and NuScale to discuss the NRC staff's response to the letter from NuScale to the NRC dated June 8, 2016, titled, "Regulatory Process for Addressing Licensed Operator Staffing Regulations in the NuScale Design Certification," (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16168A463). The letter states, "NuScale anticipates licensees referencing the NuScale design to use control room configurations—numbers of operators per reactor and number of reactors operated from a control room—that differ from existing large reactors and the requirements stated at 10 CFR 50.54(m). While the requirements for minimum licensed operator staffing are a license condition, and thus applicable to a licensee, NuScale will seek to resolve the matter in the NuScale design certification (DC)."

The NRC staff response was documented in Enclosure 1 of the meeting summary dated September 13, 2016 (ADAMS Accession No. ML16252A258). In Enclosure 1, the staff listed text to be included in the design certification application, including "a statement that the minimum staffing requirements are located in the Design Certification Rule Part 52 Appendix" in DCD Tier 1, section for human factors engineering, and a discussion of why an exemption is not necessary for NuScale in Part 7 of the design certification application. Also, Enclosure 1 stated NuScale should include a proposed staffing table and appropriate table notes in Part 7.

Application

1. The staff reviewed DCD Tier 1, Section 3.15, "Human Factors Engineering," and did not find a statement that the minimum staffing requirements are located in the Design Certification Rule Part 52 Appendix.

2. The staff reviewed Part 7, Section 6, "The staff reviewed Part 7, Section 6, "10 CFR 50.54(m), Control Room Staffing," and did not find a discussion of why an exemption is not necessary for NuScale.
3. The staff reviewed the staffing table and table notes provided in Part 7, Section 6, "The staff reviewed Part 7, Section 6, "10 CFR 50.54(m), Control Room Staffing." Note 2 on the proposed staffing table includes a statement that "a nuclear power unit is considered to be operating when it is fueled, in an operating bay, and has the ability to communicate with a support system as defined by the unit's technical specifications."

Part 4, "Generic Technical Specifications," Section 5.2.2, "Facility Staff," of the design certification application includes a similar table with one table note that says, "For the purposes of this table, a MODULE is considered to be operating when it is in MODE 1, 2, or 3."

4. The proposed staffing table provided in Part 7, Section 6.1.3, "Requested Action," says that the minimum number of operators is the same regardless of whether there are one to twelve units operating. Part 6, Section 6.2.1, "Technical Basis," says, "The NuScale-proposed staffing requirements are consistent with NUREG-0800, Chapter 18; NUREG-0711, Revision 3; NUREG-1791; and NUREG/CR-6838, February 2004 (endorsed in NUREG-0711) for the review criteria of plant staffing levels that require an exemption from 10 CFR 50.54."

RP-0516-49116, "Control Room Staffing Plan Validation Results," describes the method used to perform the staffing plan validation (SPV) described in NUREG-1791 and the results of results of NuScale' SPV. RP-0516-49116, "Abstract," says, "This report has been developed to describe the results of staffing plan validation testing performed to evaluate licensed operator workload in challenging high workload situations within a NuScale 12-unit control room environment...The results of the analysis...confirm that up to 12 NuScale power modules and the associated plant facilities may be operated safely and reliably by a minimum staffing contingent of three licensed reactor operators and three licensed senior reactor operators from a single control room during normal, abnormal, and emergency conditions."

5. Part 4, "Generic Technical Specifications," Section 5.2.2.c. states, "...a licensed reactor operator or senior reactor operator shall be present at the controls at all times." Part 7, Section 6.1.3(3) also states, "a licensed reactor operator or senior reactor operator shall be present at the controls at all times."
6. Part 4, "Generic Technical Specifications," Section 5.2.2 uses the word "MODULES" in the proposed minimum staffing table. The proposed staffing table in Part 7, Section 6 uses the phrase "nuclear power units."

Evaluation

1. The staff would like to understand why the DCD Tier 1, Section 3.15 does not include a statement that the minimum staffing requirements are located in the Design Certification Rule Part 52 Appendix.
2. The staff would like to understand why Part 7, Section 6 does not include a discussion



- of why an exemption is not necessary for NuScale.
3. The staff would like to understand the phrase in Note 2 of the proposed staffing table in Part 7, Section 6 that says, "...has the ability to communicate with a support system as defined by the unit's technical specifications," and how this statement relates to Note 1 of the staffing table included in Section 5.2.2 of Part 4, "Generic Technical Specifications," which says, "For the purposes of this table, a MODULE is considered to be operating when it is in MODE 1, 2, or 3."
 4. For the SPV, 12 units were simulated in the control room simulator and high workload scenarios were administered in order to demonstrate that the proposed minimum staffing level was acceptable under high workload conditions. However, human performance can also be affected negatively when workload is too low. The staff would like to understand whether workload analyses have been or will be done to evaluate whether workload is above an acceptable lower limit when fewer than 12 units exist at a plant.
 5. The staff would like to understand what is considered "at the controls" for a NuScale plant. As defined in 10 CFR 50.2, "Definitions," the word "controls" when used with respect to nuclear reactors means apparatus and mechanisms, the manipulation of which directly affects the reactivity or power level of the reactor.
 6. The staff would like to understand whether "units" and "MODULES" are synonymous.

Questions

1. Please explain why DCD Tier 1, Section 3.15 does not include the statement, or revise DCD Tier 1, Section 3.15, to include a statement that the minimum staffing requirements are located in the Design Certification Rule Part 52 Appendix.
2. Please explain why Part 7, Section 6 does not include a discussion of why an exemption is not necessary for NuScale, or revise Part 7, Section 6 to include a discussion of why an exemption is not necessary for NuScale.
3. Please explain what is meant by "support systems as defined by the unit's technical specifications," and how this statement relates to the note provided with the staffing table included in Section 5.2.2 of Part 4, "Generic Technical Specifications."
4. Please explain whether low workload has been or will be evaluated for the case where fewer than 12 units are operated from a single control room in order to justify that the minimum staffing level is appropriate for one to 12 modules.
5. Please explain what is considered "at the controls" for a NuScale plant.
6. Please explain whether "units" and "modules" are synonymous.



NuScale Response:

This response supplements NuScale's original response to eRAI No. 8747, dated December 20, 2017 (RAIO-1217-57684). During a May 30, 2018 clarification teleconference, the Office of New Reactors Human Factors Branch technical staff, asked for clarification on eRAI No. 8747, Question 18-10 response:

The eRAI 8747, question 18-10 asked NuScale to explain the reason for the difference between the phrase in Note 2 of the proposed staffing table in the DCA Part 7, Section 6 that says, "...has the ability to communicate with a support system as defined by the unit's technical specifications," and the statement in Note 1 of the staffing table in Section 5.2.2 of the DCA Part 4, "Generic Technical Specifications," which says, "For the purposes of this table, a MODULE is considered to be operating when it is in MODE 1, 2, or 3."

In the original NuScale response, Note 2 in the proposed staffing table in the DCA Part 7, Section 6 was changed to be consistent with Note 1 of the staffing table in Section 5.2.2 of the Generic Technical Specifications.

However, NRC staff noted, in the May 30 clarification call, that the same wording occurs in subparagraph (3), "...has the ability to communicate with a support system as defined by the unit's technical specifications," in the same section of the DCA Part 7, Section 6.

DCA Part 7, Section 6, subparagraph (3) has been updated to be consistent with Note 2 of the staffing table and the Generic Technical Specifications.

Impact on DCA:

Part 7, Section 6 has been revised as described in the response above and as shown in the markup provided in this response.

V. Applicable Regulations

C. A licensee referencing this appendix is exempt from portions of the following regulations:

1. Paragraph (m) of 10 CFR 50.54—Conditions of licenses—codified as of [date of NuScale Power Plant design certification]. In place, the following requirements shall be conditions of such licenses:

a. A senior operator licensed pursuant to part 55 of this chapter shall be present at the facility or readily available on call at all times during its operation, and shall be present at the facility during initial start-up and approach to power, recovery from an unplanned or unscheduled shut-down or significant reduction in power, and refueling, or as otherwise prescribed in the facility license.

b. Licensees shall meet the following requirements:

(1) Each licensee shall meet the minimum licensed operator staffing requirements in the following table:

RAI 18-10

Minimum Requirements¹ Per Shift for On-Site Staffing of NuScale Power Plants by Operators and Senior Operators Licensed Under 10 CFR Part 55

Number of nuclear power units operating ²	Position	One to twelve units
		One control room
None	Senior Operator	1
	Operator	2
One to twelve	Senior Operator	3
	Operator	3

¹ Temporary deviations from the numbers required by this table shall be in accordance with criteria established in the unit's technical specifications.

²For the purpose of this table, a nuclear power unit is considered to be operating when it is in MODE 1, 2, or 3 as defined by the unit's technical specifications.

(2) Each licensee shall have at its site a person holding a senior operator license for all fueled units at the site who is assigned responsibility for overall plant operation at all times there is fuel in any unit.

RAI 18-10S1

(3) When a nuclear power unit is ~~fueled, in an operating bay, and has the ability to communicate with a support system~~ in MODE 1, 2, or 3, as defined by the unit's technical specifications, each licensee shall have a person holding a senior operator license for the nuclear power unit in the control room at all times. In addition to this senior operator a licensed operator or senior operator shall be