



February 16, 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 Response to NRC Request for Additional Information No. 344 (eRAI No. 9290) on the NuScale Design Certification Application

**REFERENCE:** U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 344 (eRAI No. 9290)," dated January 26, 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 Questions from NRC eRAI No. 9290:

- 12.03-21
- 12.03-22

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](mailto:smirsky@nuscalepower.com).

Sincerely,

A handwritten signature in black ink, appearing to read 'Zackary W. Rad', written over a horizontal line.

Zackary W. Rad  
Director, Regulatory Affairs  
NuScale Power, LLC

Distribution: Gregory Cranston, NRC, OWFN-8G9A  
Samuel Lee, NRC, OWFN-8G9A  
Anthony Markley, NRC, OWFN-8G9A

Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9290



**Enclosure 1:**

NuScale Response to NRC Request for Additional Information eRAI No. 9290

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

**eRAI No.:** 9290

**Date of RAI Issue:** 01/26/2018

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**NRC Question No.:** 12.03-21

### **Regulatory Basis**

10 CFR 20.1602, “Control of access to very high radiation areas,” requires that, in addition to the requirements in § 20.1601, the licensee shall institute additional measures to ensure that an individual is not able to gain unauthorized or inadvertent access to areas in which radiation levels could be encountered at 500 rads (5 grays) or more in 1 hour at 1 meter from a radiation source or any surface through which the radiation penetrates.

As provided in accordance with 10 CFR 20.1601(c) the licensee includes proposed Technical Specifications (TS) in TS 5.7.2 in place of the controls required by 10 CFR 20.1601(a) and 10 CFR 20.1601(b). These TSs require in part that areas greater than 1 Rem/hour at 30 centimeters but less than 500 rads/hour at 1 meter be locked, except during periods of personnel or equipment entry or exit. TS 5.7.2(f) states such individual areas that are within a larger area where no enclosure exists for the purpose of locking and where no enclosure can reasonably be constructed around the individual area need not be controlled by a locked door or gate, nor continuously guarded, but shall be barricaded, conspicuously posted, and a clearly visible flashing light shall be activated at the area as a warning device. However, because the dose rates in a Very High Radiation Areas (VHRA) exceed 500 rads/hour at 1 meter, TS 5.7.2 is not applicable to VHRAs and there is no alternative TS in the NuScale for VHRAs.

The guidance in RG 8.38, Regulatory Position 1.5, “Physical Controls,” states that to the extent practicable, physical barriers should completely enclose very high radiation areas in a manner that is sufficient to thwart undetected circumvention of the barrier. RG 8.38 Regulatory Position 1.5 also states that controls must be established to prevent personnel from being locked in a high radiation area [10 CFR 20.1601(d)]. For example, if doors are self-locking, personnel must be able to open them from the inside without a key. Regulatory Position 3, “Very High Radiation Areas,” states that because of the potential danger of life-threatening overexposures to individuals, extremely tight control must be maintained over any entry to very high radiation areas. According to 10 CFR 20.1602, licensees must institute additional measures to ensure that an individual is not able to gain unauthorized or inadvertent access to very high radiation areas.

The acceptance criterion of NuScale Section 12.3-12.4, “Radiation Protection Design Features,”

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states that access control will be judged for acceptability in accordance with the requirements of 10 CFR 20.1601, 10 CFR 20.1602, 10 CFR 20.1901, 10 CFR 20.1902, and 10 CFR 20.1903, or access control alternatives in the NuScale Technical Specifications. The Acceptance Criteria of NuScale DSRS 12.3-12.4 further states facility design should ensure that an individual is not able to gain unauthorized or inadvertent access to areas in which radiation levels could be encountered at 500 rads (5 grays) or more in 1 hour at 1 meter from a radiation source or any surface through which the radiation penetrates (e.g., those adjacent to operating reactors, or irradiated portions or reactor or containment vessels, of shut down reactors).

## **Background**

NuScale DCD Section 12.3.1.3.1 provides information on controls and design features for very high radiation areas. This section specifies, among other things, that very high radiation areas either are locked or have alarmed barriers. It also provides COL Item 12.3-2 which specifies that the COL applicant will develop the administrative controls regarding access to very high radiation areas per the guidance of RG 8.38. Table 12.3-3 only identifies one very high radiation area in the NuScale DCD (the Class A/B/C HIC Room in the Radioactive waste Building).

## **Key Issue 1**

The Acceptance Criteria of NuScale DSRS 12.3-12.4 states that facility design should ensure that an individual is not able to gain unauthorized or inadvertent access to areas in which radiation levels could be encountered at 500 rads (5 grays) or more in 1 hour at 1 meter from a radiation source or any surface through which the radiation penetrates (e.g., those adjacent to operating reactors, or irradiated portions or reactor or containment vessels, of shut down reactors). Physical controls for known VHRA areas are evaluated as part of the design review.

By stating in the DCD that it is optional for very high radiation areas to be locked appears inconsistent with the intent of 10 CFR 20.1602 and RG 8.38.

## **Question 1**

Please provide additional information explaining why it is acceptable for known very high radiation areas to be unlocked and how having it optional to lock doors that control access to very high radiation areas meets the requirement of 10 CFR 20.1602 and the guidance of RG 8.38, or provide the specific alternative approaches used and the associated justification.

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## **NuScale Response:**

The only identified very high radiation area is the Class A/B/C HIC Room (room # 030-034) on the 71' elevation of the Radioactive Waste Building. This room is normally inaccessible by plant personnel. The door to this room (door # 034A) on the 71' elevation is locked to prevent unauthorized or inadvertent personnel access, and this door will not impede personnel egress from the Class A/B/C HIC Room.



FSAR Section 12.3.1.3.1 has been revised to state that very high radiation areas are locked, and that egress from a high or very high radiation area is not impeded, to be consistent with Regulatory Guide 8.38 and 10 CFR 20, Subpart G.

**Impact on DCA:**

FSAR Section 12.3.1.3.1 has been revised as described in the response above and as shown in the markup provided in this response.

entrance and exit of personnel and materials into and out of the RCA. Access is controlled through a portal located in the Annex Building. Radiological areas are posted with signage in compliance with 10 CFR 20.1901 and 20.1902.

RAI 12.03-21, RAI 12.03-22

High radiation areas either are locked or have alarmed barriers. For areas that are not within lockable enclosures or other barriers, the area will be barricaded and posted, and be provided with a visible warning light. Positive control is exercised over each individual entry when access to the area is required, and egress from the area is not impeded.

COL Item 12.3-1: A COL applicant that references the NuScale Power Plant design certification will develop the administrative controls regarding access to High Radiation Areas per the guidance of Regulatory Guide 8.38.

RAI 12.03-21, RAI 12.03-22

Very high-radiation areas ~~either are locked or have alarmed barriers. For areas that are not within lockable enclosures or other barriers, the area will be barricaded and posted, and be provided with a visible warning light.~~ Positive control is exercised over each individual entry when access to the area is required, and egress from the area is not impeded. Access to very high-radiation areas complies with guidance in RG 8.38. The locations of very high-radiation areas are listed on Table 12.3-3.

COL Item 12.3-2: A COL applicant that references the NuScale Power Plant design certification will develop the administrative controls regarding access to very high radiation areas per the guidance of Regulatory Guide 8.38.

COL Item 12.3-3: A COL applicant that references the NuScale Power Plant design certification will specify personnel exposure monitoring hardware, specify contamination identification and removal hardware, and establish administrative controls and procedures to control access into and exiting the radiologically controlled area.

#### 12.3.1.3.2 Accident Conditions

A radiation and shielding design review has been performed of spaces around systems that may contain accident source term materials, consistent with 10 CFR 50.34(f)(2)(vii). Post-accident access is discussed in Section 12.4.1.8 and equipment qualification is addressed in Section 12.2.1.13 and Section 3.11. Area radiation monitors are provided to indicate the post-accident radiation levels, to monitor plant areas during the progression of a postulated accident, and provide local indication to plant personnel prior to area entry.

See Section 7.1 for additional information on post-accident monitoring (PAM) instrumentation.

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

**eRAI No.:** 9290

**Date of RAI Issue:** 01/26/2018

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**NRC Question No.:** 12.03-22

### **Regulatory Basis**

10 CFR 20.1602, “Control of access to very high radiation areas,” requires that, in addition to the requirements in § 20.1601, the licensee shall institute additional measures to ensure that an individual is not able to gain unauthorized or inadvertent access to areas in which radiation levels could be encountered at 500 rads (5 grays) or more in 1 hour at 1 meter from a radiation source or any surface through which the radiation penetrates.

As provided in accordance with 10 CFR 20.1601(c) the licensee includes proposed Technical Specifications (TS) in TS 5.7.2 in place of the controls required by 10 CFR 20.1601(a) and 10 CFR 20.1601(b). These TSs require in part that areas greater than 1 Rem/hour at 30 centimeters but less than 500 rads/hour at 1 meter be locked, except during periods of personnel or equipment entry or exit. TS 5.7.2(f) states such individual areas that are within a larger area where no enclosure exists for the purpose of locking and where no enclosure can reasonably be constructed around the individual area need not be controlled by a locked door or gate, nor continuously guarded, but shall be barricaded, conspicuously posted, and a clearly visible flashing light shall be activated at the area as a warning device. However, because the dose rates in a Very High Radiation Areas (VHRA) exceed 500 rads/hour at 1 meter, TS 5.7.2 is not applicable to VHRAs and there is no alternative TS in the NuScale for VHRAs.

The guidance in RG 8.38, Regulatory Position 1.5, “Physical Controls,” states that to the extent practicable, physical barriers should completely enclose very high radiation areas in a manner that is sufficient to thwart undetected circumvention of the barrier. RG 8.38 Regulatory Position 1.5 also states that controls must be established to prevent personnel from being locked in a high radiation area [10 CFR 20.1601(d)]. For example, if doors are self-locking, personnel must be able to open them from the inside without a key. Regulatory Position 3, “Very High Radiation Areas,” states that because of the potential danger of life-threatening overexposures to individuals, extremely tight control must be maintained over any entry to very high radiation areas. According to 10 CFR 20.1602, licensees must institute additional measures to ensure that an individual is not able to gain unauthorized or inadvertent access to very high radiation areas.

The acceptance criterion of NuScale Section 12.3-12.4, “Radiation Protection Design Features,”

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states that access control will be judged for acceptability in accordance with the requirements of 10 CFR 20.1601, 10 CFR 20.1602, 10 CFR 20.1901, 10 CFR 20.1902, and 10 CFR 20.1903, or access control alternatives in the NuScale Technical Specifications. The Acceptance Criteria of NuScale DSRS 12.3-12.4 further states facility design should ensure that an individual is not able to gain unauthorized or inadvertent access to areas in which radiation levels could be encountered at 500 rads (5 grays) or more in 1 hour at 1 meter from a radiation source or any surface through which the radiation penetrates (e.g., those adjacent to operating reactors, or irradiated portions or reactor or containment vessels, of shut down reactors).

## **Background**

NuScale DCD Section 12.3.1.3.1 provides information on controls and design features for very high radiation areas. This section specifies, among other things, that very high radiation areas either are locked or have alarmed barriers. It also provides COL Item 12.3-2 which specifies that the COL applicant will develop the administrative controls regarding access to very high radiation areas per the guidance of RG 8.38. Table 12.3-3 only identifies one very high radiation area in the NuScale DCD (the Class A/B/C HIC Room in the Radioactive waste Building).

## **Key Issue 2**

NuScale DCD Tier 2 Revision 0 Section 12.3-12.4 does not describe the design features or the requirement of the design that prevent personnel from being locked in a high radiation area [10 CFR 20.1601(d)].

## **Question 2**

- As necessary, revise DCD Section 12.3 to describe the design features provided to prevent personnel from being locked in VHRA, or provide the specific alternative approaches used and the associated justification.

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## **NuScale Response:**

See the response to RAI 12.03-21.

## **Impact on DCA:**

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