

## NuScaleDCRaisPEm Resource

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**From:** Cranston, Gregory  
**Sent:** Wednesday, January 10, 2018 3:52 PM  
**To:** RAI@nuscaldpower.com  
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**Subject:** Request for Additional Information No. 335 RAI No. 9288 (12.3)  
**Attachments:** Request for Additional Information No. 335 (eRAI No. 9288).pdf

Attached please find NRC staff's request for additional information concerning review of the NuScale Design Certification Application.

Please submit your technically correct and complete response within 60 days of the date of this RAI to the NRC Document Control Desk. The NRC Staff recognizes that NuScale has preliminarily identified that the response to the question in this RAI is likely to require greater than 60 days. NuScale is expected to provide a schedule for the RAI response by email within 14 days.

If you have any questions, please contact me.

Thank you.

Gregory Cranston, Senior Project Manager  
Licensing Branch 1 (NuScale)  
Division of New Reactor Licensing  
Office of New Reactors  
U.S. Nuclear Regulatory Commission  
301-415-0546

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**Options**

**Priority:** Standard

**Return Notification:** No

**Reply Requested:** No

**Sensitivity:** Normal

**Expiration Date:**

**Recipients Received:**

## Request for Additional Information No. 335 (eRAI No. 9288)

Issue Date: 01/10/2018

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 12.03-12.04 - Radiation Protection Design Features

Application Section: 12.3, 9.1

### QUESTIONS

12.03-9

#### Regulatory Basis

10 CFR 70.24 states that the licensee shall maintain in each area in which such licensed special nuclear material is handled, used, or stored, a monitoring system capable of detecting a criticality that produces an absorbed dose in soft tissue of 20 rads of combined neutron and gamma radiation at an unshielded distance of 2 meters from the reacting material within one minute. Coverage of all areas shall be provided by two detectors. This section does not apply to a holder of a construction permit or operating license for a nuclear power reactor license issued under Part 52 of this chapter, if the holder complies with the requirements of paragraph (b) of 10 CFR 50.68.

10 CFR 50.68, "Criticality accident requirements," requires radiation monitors to be provided in storage and associated handling areas when fuel is present to detect excessive radiation levels and to initiate appropriate safety actions.

Appendix A to Part 50—General Design Criteria for Nuclear Power Plants, Criterion 61—"Fuel storage and handling and radioactivity control," and Criterion 63—"Monitoring fuel and waste storage," requires radiation monitoring in areas where fuel is located.

10 CFR Part 20 Subpart F—"Surveys and Monitoring," requires the appropriate radiation monitoring. The DSRS Acceptance Criteria section of NuScale DSRS section 12.3-12.4, "Radiation Protection Design Features," states that instrumentation for monitoring areas where reactor fuel is stored or handled will be acceptable if it meets the criteria of 10 CFR 50.68 or 10 CFR 70.24.

#### Background

DCD Tier 2 Section 9.1.1, "Criticality Safety of Fresh and Spent Fuel Storage and Handling," states that the design and controls for operation of the fuel handling equipment and fuel storage racks prevent an inadvertent criticality using geometrically safe configurations, and using plant programs and procedures for criticality control. The fuel storage racks have an effective multiplication factor ( $k_{\text{eff}}$ ) that meets 10 CFR 50.68. DCD Section 9.1.1 does not mention how the requirement of 10 CFR 50.68(b)(6) is met.

DCD Tier 2 Section 9.1.2.3.6, "Monitoring," states that radiation monitors are provided in the SFP area to detect both general area radiation levels and airborne contamination levels as described in Section 12.3. These instruments allow operators to initiate appropriate safety actions. DCD Section 9.1.2.3.6 does not indicate whether the radiation monitor mentioned satisfies the requirement of 10 CFR 50.68(b)(6).

DCD Section 12.3.4, "Area Radiation and Airborne Radioactivity Monitoring Instrumentation," states that the ARMs located in the reactor pool area and the spent fuel pool area provide the same functions as the general plant location monitors, and in addition monitor the fuel storage and handling areas. In addition, a local area radiation monitor mounted on the refueling bridge with local and MCR alarm function that monitors refueling activities.

DCD Section 12.3.4.1, "Design Bases," does not include 10 CFR 50.68(b)(6). DCD Section 12.3.4.2, "Fixed Area Radiation Monitoring Instrumentation," does not include the requirement of 10 CFR 50.68(b)(6) as one of the criteria for placement of a radiation monitor.

#### Key Issue 1

While DCD Section 9.1.1 indicates that the fuel storage racks meet several of the requirements of 10 CFR 50.68, the DCD does not clearly state which regulation, 10 CFR 50.68 or 10 CFR 70.24, the design meets for the requirements discussed above. In addition, DCD Tier 2, Sections 9.1.1, 9.1.2, and 12.3 do not identify the radiation monitor(s) for satisfying the requirements of 10 CFR 70.24(a)(1) or 10 CFR 50.68(b)(6) and do not state how the requirements for radiation monitor(s) are being met.

#### Question 1

To facilitate staff understanding of the application information sufficient to make appropriate regulatory conclusions with respect to radiation monitoring requirements in 10 CFR 50.68(b)(6), the staff requests that the applicant:

- As necessary, revise the DCD to clearly define which regulation (e.g., 10 CFR 70.24 or 10 CFR 50.68,) the NuScale design complies with,
- Justify/explain how the requirements of 10 CFR 70.24(a)(1) or 10 CFR 50.68(b)(6) for radiation monitoring are met for the regulatory approach adopted by NuScale,
- As necessary, revised section DCD Section 12.3, to reflect any changes to the DCD need to identify the radiation monitor(s) satisfying 10 CFR 70.24(a)(1) or 10 CFR 50.68(b)(6),

OR

Provide the specific alternative approaches used and the associated justification.