

## NuScaleDCRaisPEm Resource

---

**From:** Cranston, Gregory  
**Sent:** Tuesday, January 15, 2019 12:16 PM  
**To:** NuScaleDCRaisPEm Resource  
**Cc:** Chowdhury, Prosanta; Tesfaye, Getachew  
**Subject:** Request for Additional Information No. 486 eRAI No. 9296 (12.3)  
**Attachments:** Request for Additional Information No. 486 (eRAI No.9296).pdf

---

**From:** Cranston, Gregory  
**Sent:** Friday, June 01, 2018 3:10 PM  
**To:** Request for Additional Information <RAI@nuscalepower.com>  
**Cc:** Lee, Samuel <Samuel.Lee@nrc.gov>; Dudek, Michael <Michael.Dudek@nrc.gov>; Chowdhury, Prosanta <Prosanta.Chowdhury@nrc.gov>; Lavera, Ronald <Ronald.LaVera@nrc.gov>; Tesfaye, Getachew <Getachew.Tesfaye@nrc.gov>  
**Subject:** Request for Additional Information No. 486 eRAI No. 9296 (12.3)

Attached please find NRC staff's request for additional information (RAI) concerning review of the NuScale Design Certification Application. Password will be sent separately. A redacted (public) version of this RAI was issued today.

Please submit your technically correct and complete response within 60 days of the date of this RAI to the NRC Document Control Desk.

If you have any questions, please contact me.

Thank you.

**Hearing Identifier:** NuScale\_SMR\_DC\_RAI\_Public  
**Email Number:** 559

**Mail Envelope Properties** (BYAPR09MB3605EEC748CEFD386FFBF88490810)

**Subject:** Request for Additional Information No. 486 eRAI No. 9296 (12.3)  
**Sent Date:** 1/15/2019 12:16:12 PM  
**Received Date:** 1/15/2019 12:16:15 PM  
**From:** Cranston, Gregory

**Created By:** Gregory.Cranston@nrc.gov

**Recipients:**

"Chowdhury, Prosanta" <Prosanta.Chowdhury@nrc.gov>

Tracking Status: None

"Tsfaye, Getachew" <Getachew.Tsfaye@nrc.gov>

Tracking Status: None

"NuScaleDCRaisPEm Resource" <NuScaleDCRaisPEm.Resource@nrc.gov>

Tracking Status: None

**Post Office:** BYAPR09MB3605.namprd09.prod.outlook.com

Files	Size	Date & Time
MESSAGE	885	1/15/2019 12:16:15 PM
Request for Additional Information No. 486 (eRAI No.9296).pdf		59141

**Options**

**Priority:** Standard

**Return Notification:** No

**Reply Requested:** No

**Sensitivity:** Normal

**Expiration Date:**

**Recipients Received:**

## **Request for Additional Information No. 486 (eRAI No.9296)**

Issue Date: 06/01/2018

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, 12.2

### **QUESTIONS**

12.03-60

#### **Regulatory Basis**

10 CFR 52.47(a)(5) requires applicants to identify the kinds and quantities of radioactive materials expected to be produced in the operation and the means for controlling and limiting radiation exposures within the limits of 10 CFR Part 20.

Appendix A to Part 50—General Design Criteria for Nuclear Power Plants, Criterion 61—"Fuel storage and handling and radioactivity control," requires systems which may contain radioactivity to be designed with suitable shielding for radiation protection and with appropriate containment, confinement, and filtering systems.

10 CFR 20.1101(b) states that "the licensee shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA)." 10 CFR 20.1003 states that ALARA "means making every reasonable effort to maintain exposures to radiation as far below the dose limits in this part as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest."

NuScale DSRS Section 12.3, "Radiation Protection Design Features," states in the specific acceptance criteria that areas inside the plant structures should be subdivided into radiation zones, with maximum design dose rate zones and the criteria used in selecting maximum dose rates identified.

#### **Background**

NuScale DCD Tier 2, Revision 0 Figure 12.3-1g, " Reactor Building Radiation Zone Map - 100' Elevation," shows that the area above the reactor pool area (Room 010-022 per DCD Figure 1.2-216," Reactor Building 100'-0" Elevation"), as a Radiation Zone II. DCD Tier 2 Revision 0 Table 12.3-1,"Normal Operation Radiation Zone Designations," shows that areas designated as radiation zone II have dose rates  $\geq 0.25$  mrem/hr and  $\leq 2.5$  mrem/hr.

DCD Tier 2, Revision 0 Table 12.2-10, "Reactor Pool Cooling, Spent Fuel Pool Cooling, Pool Cleanup and Pool Surge Control System Component Source Terms - Radionuclide Content," provides the radionuclides concentration in the reactor pool water. Independent calculations of the dose rate from the ultimate heat sink pool water using the radionuclide concentrations listed in Table 12.2-10 column "Reactor Pool Water ( $\mu\text{Ci}/\text{gram}$ )," performed by the staff resulted in radiation zone designations higher than the radiation zone assigned to room 010-022 in DCD Figure 12.3-1 by the applicant.

Key Issue: The staff needs to understand the methods, models and assumptions used by the applicant to calculate the radiation zones depicted in DCD Chapter 12.3.

### Question

To facilitate staff understanding of the application information in support of its reasonable assurance review regarding the assignment of radiation zones, the staff requests that the applicant:

1. Explain/justify the methods, models, and assumptions used to determine the aforementioned radiation zoning assignment.
2. As appropriate, identify other areas of the Reactor Building where the previous methods, models and assumptions, have been applied
3. As necessary, revise and update Section 12.3 of the NuScale DCD to accurately reflect plant radiation zones,

OR

Provide the specific alternative approaches used and the associated justification.