

NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Friday, June 29, 2018 1:57 PM
To: Request for Additional Information
Cc: Lee, Samuel; Dudek, Michael; Lavera, Ronald; Tesfaye, Getachew; Chowdhury, Prosanta; NuScaleDCRaisPEm Resource
Subject: Request for Additional Information No. 493 eRAI No. 8859 (12.3)
Attachments: Request for Additional Information No. 493 (eRAI No. 8859).pdf

Attached please find NRC staff's request for additional information (RAI) concerning review of the NuScale Design Certification Application. Password will be sent separately.

Please submit your technically correct and complete response within 60 days of the date of this RAI to the NRC Document Control Desk (or provide alternate date within 14 days).

If you have any questions, please contact me.

Thank you.

Hearing Identifier: NuScale_SMR_DC_RAI_Public
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From: Cranston, Gregory

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Options

Priority: Standard
Return Notification: No
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Request for Additional Information No. 493 (eRAI No. 8859)

Issue Date: 06/29/2018

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

QUESTIONS

12.03-61

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 Feature," 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 12.3-2a, "Radioactive Waste Building Radiation Zone Map - 71' Elevation," shows that the "Class A/B/C HICS Storage Area," (Room 030-034 per DCD Figure 1.2-28, "Radioactive Waste Building 71'-0" Elevation"), as a Radiation Zone VII. DCD Tier 2 Revision 0 Table 12.3-1, "Normal Operation Radiation Zone Designations," shows that areas designated as radiation zone VII have dose rates ≥ 500 Rad/hr, with no upper limit specified. DCD Table 12.3-7, "Radioactive Waste Building Shield Wall Geometry," shows that the concrete thickness of interior walls of Room 030-034 are 36 inches, and the concrete thickness of the ceiling of Room 030-034 is 24 inches. DCD Figure 12.3-2a

shows the adjacent room (identified on DCD 1.2-28 as room number 030-004, a "Tank Room,") as a radiation zone 1 area. Table 12.3-1 shows that areas designated as radiation zone I have dose rates ≥ 0.05 mrem/hr and ≤ 0.25 mrem/hr. The staff independent analysis of the stated dose rate in room 030-034, and the attenuation provided by the concrete thickness between rooms 030-034 and 030-004, predicts higher radiation zones than those assigned by the applicant to room 030-004, even without considering any source terms specific to room 030-004.

In addition, on DCD Figure 12.3-2b, "Radioactive Waste Building Radiation Zone Map - 100' Elevation," in the area identified as "Truck Bay," (room 030-103 per DCD Figure 1.2-30, "Radioactive Waste Building 100'-0" Elevation,") is identified as a radiation zone II. Table 12.3-1 shows that areas designated as radiation zone II have dose rates ≥ 0.25 mrem/hr and ≤ 2.5 mrem/hr. The staff independent analysis of the stated dose rate in room 030-034, and the attenuation provided by the concrete thickness between rooms 030-034 and 030-103, predicts higher radiation zones than those assigned by the applicant to room 030-103, even without considering any source terms specific to room 030-103.

Key Issue: The staff needs to understand the methods, models and assumptions used by the applicant to establish radiation zones.

Question

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

1. Explain/Justify the methods, models, and assumptions used to calculate the radiation zone designations in the adjacent rooms (030-034 and 030-004 and 030-103),
2. As appropriate, identify other areas of the RXB and RWB where radiation zones are inconsistent with the types and quantities of radiation in the area, due to the use of the previously applied methods, models and assumptions,
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.