

NuScaleDCRaisPEm Resource

From: Chowdhury, Prosanta
Sent: Monday, April 30, 2018 5:40 PM
To: Request for Additional Information
Cc: Lee, Samuel; Cranston, Gregory; Markley, Anthony; Tesfaye, Getachew; Dudek, Michael; Lavera, Ronald; NuScaleDCRaisPEm Resource
Subject: Request for Additional Information No. 446 eRAI No. 9281 (12.03-12.04)
Attachments: Request for Additional Information No. 446 (eRAI No. 9281).pdf

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

You stated in an April 9, 2018, email (from Steven Mirsky to the NRC staff) that your response to this RAI will be submitted by August 31, 2018, which is beyond the usual 60 days. Please submit your technically correct and complete response by this date to the NRC Document Control Desk.

If you have any questions, please contact me.

Thank you.

Prosanta Chowdhury, Project Manager
Licensing Branch 1 (NuScale)
Division of New Reactor Licensing
Office of New Reactors
U.S. Nuclear Regulatory Commission
301-415-1647

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Options

Priority: Standard
Return Notification: No
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Request for Additional Information No. 446 (eRAI No. 9281)

Issue Date: 04/30/2018

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

12.03-56

Regulatory Bases

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 set forth in 10 CFR Part 20.

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."

The DSRS Acceptance Criteria 12.3-12.4, "Radiation Protection Design Features," states that the areas inside the plant structures, as well as in the general plant yard, should be subdivided into radiation zones, with maximum design dose rate zones and the criteria used in selecting maximum dose rates identified. The DSRS Acceptance Criteria section of NuScale DSRS Section 12.2, "Radiation Sources," states that the applications should contain the methods, models, and assumptions used as the bases for all sources described in DCD Section 12.2.

Background

DCD Tier 2 Revision 0, Section 12.2.1.4, "Reactor Pool Cooling, Spent Fuel Pool Cooling and Pool Cleanup Systems," states that the pool cleanup system (PCUS) draws water from either the Spent Fuel Pool Cooling System (SFPCS) or the reactor pool cooling system (RPCS) and removes impurities to reduce radiation exposures and to maintain water chemistry and clarity. The DCA states that the RPCS and SFPCS heat exchangers are conservatively assumed to be filled with reactor pool water even though the shell side is normally filled with site cooling water.

DCD Tier 2 Revision 0, Figure 12.3-1f, "Reactor Building Radiation Zone Map - 86' Elevation," shows the radiation zone for Spent Fuel Pool Heat Exchanger (SFPHX) as a radiation zone

0. DCD Table 12.3-1 shows that areas designated as radiation zone 0 have dose rates ≤ 0.05 mrem/hr.

However, the results of the independent analysis performed by the staff that included radiation contributions to the dose rate in the heat exchanger room from isotopes such as I-131, Cs-134, Cs-137, and Co-60 described in the application, and information made available to the staff as part of the staff's application review and the Chapter 12 Audit, appeared to differ by about a factor of 10. Therefore, the staff was unable to determine the bases for the designated radiation zone.

Key Issue

The staff is unable to determine that the information provided in DCA Subsection 12.2.1.4, and DCD Figure 12.3-1f, provides conservative estimates of the dose rates from components handling water containing the UHS pool source term.

Question

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

- Justify/explain the radiation zone designation of the SFPHX room,
- Provide/describe the methods, models, and assumptions used to develop the assumed dose rate used as the bases for the radiation zone designation,
- As necessary, revise DCD 12.2.14 and the associated radiation zone figures provided in DCD Section 12.3,

OR

Provide the specific alternative approaches used and the associated justification.