NuScaleDCRaisPEm Resource

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Sent:	Sunday, January 28, 2018 2:52 PM
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Subject:	Request for Additional Information No. 349 RAI No. 9284 (12.3)
Attachments:	Request for Additional Information No. 349 (eRAI No. 9284).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. .

If you have any questions, please contact me.

Thank you.

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Request for Additional Information No. 349 (eRAI No. 9284)

Issue Date: 01/28/2018
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

12.03-29

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. 10 CFR 20.1101(b) and 10 CFR 20.1003 require the use of engineering controls to maintain exposures to radiation as far below the dose limits in 10 CFR Part 20 as is practical. 10 CFR 20.1701 requires the use of process or engineering controls to minimize the potential for internal exposure to radioactive material.

10 CFR 52.47(a) (22) requires applicants to demonstrate how the operating experience insights have been incorporated into the plant design.

Appendix A to Part 50—General Design Criteria (GDC) 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.

The DSRS Acceptance Criteria section of NuScale DSRS section 12.3-12.4, "Radiation Protection Design Features," states that the applications should describe how operating experience insights have been incorporated into the plant design, to reduce maintenance and improve reliability.

Regulatory Guide (RG) 1.206 section C.1.12.3.1, "Facility Design Features," notes that the Applicant should identify features that reduce the potential for exposure by reducing source build up and reducing activation product generation. RG 8.8 Position C2, notes that the applicant should provide design features that reduce the potential for exposure by the selection of materials and finishing of the material surfaces for the purpose of minimizing facilitating decontamination and reducing deposition.

Background

DCD Tier 2 Revision 0 Section 12.3.1, "Facility Design Features," describes facility design features that implement as low as reasonably achievable (ALARA) principles to minimize occupation radiation exposure (ORE.) DCD section 12.3.1.1, "Equipment Design," provides specific design features for component types that aid in maintaining occupational exposures ALARA. However, there is no description of the design features of the dry dock provided to minimize ORE.

DCD Tier 2 Revision 0 Subsection 9.1.2.1, "Design Bases," of Section 9.1.2, "New and Spent Fuel Storage," states that smooth and nonporous surfaces prevent the buildup of radioactive material. DCD Subsection 9.1.2.3.7, "Radiation, Shielding, and Maintaining Doses as Low as Reasonably Achievable," states that the surface finishes of the components for the fuel storage racks and spent fuel pool (SFP) liner are smooth to minimize accumulation of radioactive materials and to facilitate surface decontamination.

Electric Power Research Institute (EPRI) technical report (TR) 016780, "Advanced Light Water Reactor Utility Requirements Document" (URD), subsection 2.3.1.3.1.2 states "The refueling pool wall liner shall be surface finished to reduce the adherence of contamination and increase the efficiency of refueling pool decontamination activities after draining. The liner plate shall have a No. 4 surface finish or better and the liner plate welds shall be ground smooth." The reason given in the URD for this specification is that past LWR refueling experience has shown that a smooth surface finish on the wall liners reduces the amount and depth of crevices which can accumulate contamination. NUREG-1242, "NRC Review of Electric Power Research Institute's Advanced Light Water Reactor Utility Requirements Document," Volume 3, Parts 1 2, documented the NRC staff's safety evaluation of the URD.

Key Issue 1:

While DCD Chapter 12 and Chapter 9 do indicate that surfaces should be "smooth," the information is provided in a manner subject to interpretation. The application does not describe the specification for the surface finish of those portions of the facility (i.e., the dry dock) that, when dry, may increase ORE resulting from direct radiation exposure from surface deposits of radioactive material or

from airborne radioactive material, resulting from the suspension of radioactive material remaining on the pool wall surface following dry dock drain down.

Question 1:
To facilitate staff understanding of the application information sufficient to make appropriate regulatory conclusions with respect to ORE, the staff requests that the applicant:

- As necessary, revise the DCD Section 12.3-12.4 to include information related to finish specifications for wetted surfaces of the pools,

OR

Provide the specific alternative approaches used and the associated justification.

12.03-30

Regulatory Basis and Background in RAI 9284 Question 31035

Key Issue 2:

There is no discussion in DCD Chapters 3, DCD Chapter 5 or DCD Chapter 12 about the surface finish of the exterior containment vessel (CNV). Like the dry dock wall, when dry, ORE results from direct radiation exposure from surface deposits of radioactive material, or from airborne radioactive material, resulting from the suspension of radioactive material remaining on the large wetted surface area of the CNV wall following dry dock drain down.

Question 2:
To facilitate staff understanding of the application information sufficient to make appropriate regulatory conclusions with respect to ORE, the staff requests that the applicant:

- As necessary, revise the DCD Section 12.3-12.4 to include information related to finish specifications for wetted surfaces of the CNV,

OR

Provide the specific alternative approaches used and the associated justification.