

## NuScaleDCRaisPEm Resource

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**From:** Cranston, Gregory  
**Sent:** Friday, February 15, 2019 6:10 AM  
**To:** Request for Additional Information  
**Cc:** Lee, Samuel; Dudek, Michael; Lavera, Ronald; Tesfaye, Getachew; Chowdhury, Prosanta; NuScaleDCRaisPEm Resource  
**Subject:** Request for Additional Information No. 517 eRAI No. 9657 (12.03)  
**Attachments:** Request for Additional Information No. 517 (eRAI No. 9657).pdf

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

Please submit your technically correct and complete response by April 8, 2019, to the RAI to the NRC Document Control Desk.

If you have any questions, please contact me.

Thank you.

**Hearing Identifier:** NuScale\_SMR\_DC\_RAI\_Public  
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**Options**

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## **Request for Additional Information No. 517 (eRAI No. 9657)**

Issue Date: 02/14/2019

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**

12.03-62

As a follow-up to RAI-9258 Question 29 and RAI to RAI 9257, Question 12.02-14, the staff is requesting additional information on the used to determine the dose rates from pipes containing demineralizer resin, and the methods for assuring the presence of shielding sufficient to provide the indicated radiation zones.

#### **The Regulatory Requirements:**

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 part 20 of this chapter.

10 CFR 52.47(a)(25) requires the applicant to provide interface requirements to be met by those portions of the plant for which the application does not seek certification. These requirements must be sufficiently detailed to allow completion of the FSAR.

10 CFR 52.47(a)(26) requires the applicant to provide justification that compliance with the interface requirements 10 CFR 52.47(a)(25) is verifiable through inspections, tests, or analyses. The method to be used for verification of interface requirements must be included as part of the proposed ITAAC.

#### Background:

The applicant's response to RAI-9257, Question 12.02-14, dated 8 August 2018 (ADAMS Accession No. ML18220B407), stated that the size of the resin transfer line was modeled using the parameters described in DCD Table 12.2-6: "Chemical and Volume Control System Component Source Term Inputs and Assumptions." This table list the resin transfer line as a 2 inch inside diameter pipe with a 0.154 inch thick wall (i.e., 2 inch schedule 40 pipe).

However, during the audit of the DBFF change and the associated RAI responses as described in "Audit Plan for the Phase II Regulatory Audit of the Design Basis Failed Fuel Fraction for NuScale Power, LLC Design Certification Application," (ML18243A296), the staff noticed that the "RXB Dose Rates and Shielding Calculations" package specified the use of a 3 inch schedule 40 pipe as the basis for the resin transfer line. The staff asked the applicant about the apparent difference in the description of the size of construction of the pipe used to transfer resin from the CVCS Mixed Bed demineralizers located in the reactor building (RXB) to the Spent Resin Storage Tanks (SRST), located in the radioactive waste building (RWB), the applicant stated that the Pool Clean Up System (PCUS) resin transfer lines were 3 inch lines. The staff noted that because of the relative location of the CVCS MB demineralizers and the PCUS demineralizers, that there was a reasonable expectation by the staff that these two lines would join in the RXB before going to the SRST in the RWB and asked the applicant about the joint location. The applicant stated that they were unable to determine the location of that juncture because they had not yet done the design of the resin transfer lines.

Additionally, while trying to ascertain the potential impact of having a transfer line clogged with resin, the staff looked at the radiation zone designations in Figure 12.3-1a: "Reactor Building Radiation Zone Map - 24' Elevation," Figure 12.3-1b: "Reactor Building Radiation Zone Map - 35'-8" Elevation" and Figure 12.3-1c: "Reactor Building Radiation Zone Map - 50' Elevation," provided in the response to RAI-9281 (ML18235A654) and DCD Table 12.3-1: "Normal Operation Radiation Zone Designations." The applicant stated that because the dose rates were only transient dose rates, they did not identify that on these figures. The staff evaluated this response and noted a discrepancy with Figure 12.3-1c: "Reactor Building Radiation Zone Map - 50' Elevation," note 2, which does address transient radiation zones changes during resin transfers.

Questions:

The staff seeks to understand the technical bases for the radiation zone designations for the areas between the location of the CVCS demineralizers and the adjacent radioactive waste building, along the path of the resin transfer line. To confirm the technical appropriateness of the zonation, as it bears upon identifying the kinds and quantities of radioactive material used as the basis for the shielding design, the staff needs to understand either the specific size(s) of the pipe(s) used to transfer resin and locations where different sizes of pipes may contain resin from the CVCS demineralizers, and the portions of the Reactor Building where it is located or a demonstration by the applicant of conservatism built into the analyses to address uncertainties in pipe sizing.

The staff is seeking clarification on whether the shielding design for the resin transfer line is complete, or if it is expected to be completed at a later date. If the design of the shielding for the resin transfer line is not complete, then the staff seeks to understand the regulatory process to be used by the applicant to ensure that the shielding is designed and installed consistent with the stated radiation zone designations. Therefore, please provide the following information:

A. Option 1

- Revise DCD Tier 2 Section 12.3 to indicate which portions of the application are considered outside of the scope of the design,
- Provide a proposed COL Item for DCD Tier 2 Section 12.3 stating that the COL applicant that references the NuScale Power Plant design certification will describe the radiation shielding design measures used to shield those portions of the resin transfer lines located within the Reactor Building,
- Provide the regulatory basis in 10 CFR 52.79 that supports the proposed COL Item that will facilitate the staff's review during the COL application review.

B. Option 2

- Provide a proposed COL Item for DCD Tier 2 Section 12.3 stating that the COL applicant that references the NuScale Power Plant design certification will describe the radiation shielding design measures used to shield those portions of the resin transfer lines located within the Reactor Building,
- Identify this shielding as an interface requirement in accordance with 10 CFR 52.47(a)(24) and revise DCD Tier 2 Section 12.3 to indicate which portions of the application are considered outside of the scope of the design,
- Consistent with the requirements of 10 CFR 52.47(a)(25) and 10 CFR 52.47(a)(26) to provide interface requirements to be met by those portions of the plant for which the application does not seek certification and the associated method to be used for verification of the interface requirement, revise DCD Tier 2 Table 1.8-1: "Summary of NuScale Certified Design Interfaces with Remainder of Plant listing the interface requirements for its design," to include the proposed interface requirement.

C. Option 3

- State that resin from the CVCS demineralizers is only in 2 inch lines while in the Reactor Building, or add the description of the 3 inch line to DCD Table 12.2-6, and describe in the DCD, including the RXB figures in DCA Section 12.3, the routing of the different sections of the resin transfer lines,
- State that the design of the shielding for the resin transfer line within the RXB is complete, and describe the shielding for the horizontal runs of the resin transfer line in DCA Tier 2 Table 12.3-7: "Radioactive Waste Building Shield Wall Geometry," and DCA Tier 1 Table 3.11-1: "Reactor Building Shield Wall Geometry,"
- Describe in DCD Tier 2 Section 12.3, the methods, models, and assumptions used as the basis for the design of the radiation shielding for the resin transfer lines.

