RAIO-0918-61657

September 05, 2018

Docket No. 52-048

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

**SUBJECT:** NuScale Power, LLC Supplemental Response to NRC Request for Additional Information No. 329 (eRAI No. 9270) on the NuScale Design Certification Application

**REFERENCES:**
1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 329 (eRAI No. 9270)," dated January 08, 2018
2. NuScale Power, LLC Response to NRC "Request for Additional Information No. 329 (eRAI No.9270)," dated June 04, 2018

The purpose of this letter is to provide the NuScale Power, LLC (NuScale) supplemental response to the referenced NRC Request for Additional Information (RAI).

The Enclosure to this letter contains NuScale's supplemental response to the following RAI Question from NRC eRAI No. 9270:

- 12.02-20

This letter and the enclosed response make no new regulatory commitments and no revisions to any existing regulatory commitments.

If you have any questions on this response, please contact Carrie Fosaaen at 541-452-7126 or at cfosaaen@nuscalepower.com.

Sincerely,

Zackary W. Rad
Director, Regulatory Affairs
NuScale Power, LLC

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Enclosure 1: NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 9270

**Enclosure 1:**

NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 9270

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# Response to Request for Additional Information
# Docket No. 52-048

**eRAI No.:** 9270
**Date of RAI Issue:** 01/08/2018

**NRC Question No.:** 12.02-20

The Regulatory Basis and Background are in RAI-9270 Quesiton 31001
Key Issue 2:
The methodology used by the applicant to calculate the tritium concentration in the RCS does not account for the buildup of tritium due to recycling of previously used RCS, therefore RCS tritium concentration appears to be underestimated. NuScale has proposed an alternative and potentially non-conservative design basis RCS tritium concentration value, which is used for determining airborne activity concentrations within the plant, without demonstrating that the health and safety of occupational workers is maintained and that the potential doses are ALARA for compliance with 10 CFR Part 20. Since airborne activity concentrations in equipment cubicles is more dependent on RCS activity concentrations, and less on ultimate heat sink (UHS) pool tritium concentration, the airborne tritium activity concentrations in equipment cells may be underestimated by over a factor of 3
Question 2:
To facilitate staff understanding of the application information sufficient to make appropriate regulatory conclusions with respect to the potential production of tritium in the RCS, the staff requests that the applicant:

- Explain the use of an apparent non-conservative tritium value as discussed above, and
- Revise DCD Chapter 12.2 to use an RCS tritium concentration value of 1.3x10+5 Bq/gm (3.5 µCi/gm), or revise DCD Chapter 12.2 to use a calculated RCS tritium concentration supported by the associated, including methods, models and assumptions, for determining the RCS coolant concentration of tritium, consistent with the system description provided in DCD Tier 2 Revision 0, including sections in Chapters 9 and sections in Chapter 11,

AND

- Revise DCD Section 12.2.2 “Airborne Radioactive Material Sources,” to reflect the changes to RCS tritium concentration and the associated bases,

AND

- Revise DCD Table 12.2-32: “Input Parameters for Determining Facility Airborne Concentrations,” to reflect the revised methods, models and assumptions,

AND

- Revised DCD Table 12.2-33: “Reactor Building Airborne Concentrations,” to reflect the changes to tritium concentrations,

OR

Provide the specific alternative approaches used and the associated justification.

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**NuScale Response:**

On a public phone call on July 26, 2018 with the NRC, NuScale agreed to add a footnote to FSAR Table 11.1-8 indicating the peak primary coolant tritium concentration value for recycling of the primary coolant back to chemical volume and control system.

This response supplements the response provided for RAI 9270 on June 4, 2018 (ML18155A622).

**Impact on DCA:**

FSAR Table 11.1-8 has been revised as described in the response above and as shown in the markup provided in this response.

RAI 12.02-20, RAI 12.02-20S1

**Table 11.1-8: Tritium Concentrations versus Primary Coolant Recycling Modes**

| Recycle Mode | Primary Coolant Average Concentration (Ci/g) | RCS Letdown / CVCS Outlet (Ci/g) | Realistic Secondary Coolant Concentration (Ci/g) | Design Basis Secondary Coolant Concentration (Ci/g) |
|---|---|---|---|---|
| No recycle (discharge) | 9.6E-07 | 7.2E-07 | 1.8E-09 | --- |
| Recycle to reactor pool makeup | 9.9E-07 | 7.4E-07 | 1.8E-09 | --- |
| Recycle back to CVCS makeup | 2.8E-06 | 2.8E-06 | --- | 5.2E-09 |

Note: The maximum calculated peak primary coolant tritium concentration is 3.5µCi/g.