RAIO-0218-58932

February 28, 2018

Docket No. 52-048

U.S. Nuclear Regulatory Commission
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11555 Rockville Pike
Rockville, MD 20852-2738

SUBJECT: NuScale Power, LLC Response to NRC Request for Additional Information No. 347 (eRAI No. 9299) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 347 (eRAI No. 9299)," dated January 29, 2018

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

The Enclosure to this letter contains NuScale's response to the following RAI Question from NRC eRAI No. 9299:

- 12.02-25

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 Steven Mirsky at 240-833-3001 or at smirsky@nuscalepower.com.

Sincerely,

Zackary W. Rad
Director, Regulatory Affairs
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Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9299

Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9299

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

eRAI No.: 9299
Date of RAI Issue: 01/29/2018

NRC Question No.: 12.02-25

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) 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 20as is practical. 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.

NuScale DCD Tier 2, Revision 0 Section 11.4.2, “System Description,” states that spent filters are removed from the filter housing and placed into a high integrity container (HIC). Once the HIC is full, it is dewatered, sealed, and stored for eventual offsite processing and disposal. DCD Section “11.4.2.2 Wet Solid Waste,” indicates that this may include spent cartridge filters as well as filter membranes from the Tubular Ultra Filtration system (TUF) and the Reverse Osmosis unit (RO). DCD Table 11.4-3: “Estimated Annual Volumes of Wet Solid Waste,” states that some of these filters may be Waste Class B or C.

DCD Section 12.2.1.3, “Chemical and Volume Control System,” states that cartridge filters clean radioactive particulate from radioactive fluid streams. DCD Section 12.2.1.7, “Solid Radioactive Waste System,” states there is storage space provided in the Radioactive Waste Building for processed waste packages that contain spent filters.

Department of Energy (DOE) DOELLW-114F “Greater-Than-Class C Low-Level Waste Characterization, Appendix F: Greater-Than- Class C Low-Level Radioactive Waste Light Water Reactor Projections,” states that some individual PWR filters may have dose rates in the 50 rad/hour to 200 rad/hour range. The dose rates reported in DOELLW-114F were based on operating experience from commercial nuclear power plants.

Key Issue:

DCD Tier 2, Revision 0 subsection 12.2.1.7, “Solid Radioactive Waste System,” states that the assumed values used to develop the solid radioactive waste system (SRWS) source terms are listed in Table 12.2-18. DCD subsection 12.2.1.7 also states that Table 12.2-19, “Solid Radioactive Waste System Component Source Terms – Radionuclide Content,” lists the

radionuclide inventory of the major SRWS components and Table 12.2-20, “Solid Radioactive Waste System Component Source Terms – Source Strengths” lists the SRWS component source strengths. The information contained in DCD Table 12.2-18, DCD Table 12.2-19 and DCD Table 12.2-20 does not describe the source term in the HIC containing filters. Based on information made available to the staff during the RPAC Chapter 12 Audit, the staff was not able to determine the source term in the HIC containing filters

The radionuclide concentrations listed in DCD subsection 12.2 are the basis of the information used to establish plant source terms, consistent with NuScale DSRS 12.2 Acceptance Criteria, which states that all of the sources of radiation exposure to workers and members of the public (from contained sources) are identified, characterized, and considered in the design and operation of the facility. This section of the DSRS also states that unless described within other sections of the FSAR, source descriptions should include the methods, models, and assumptions used as the bases for all values provided in FSAR Section 12.2.

Question

To facilitate staff understanding of the application information sufficient to make appropriate regulatory conclusions, with respect to the descriptions of the sources of radiation present in the facility, the staff requests that the applicant:

- Provide the radionuclide content of the HICs containing filters,
- Provide the methods, models and assumptions, used to develop the assumed radionuclide concentrations, and associated basis,

OR

Provide the specific alternative approaches used and the associated justification.

NuScale Response:

10 CFR 20.1101(b) and 10 CFR 20.1003 allow the use of both procedures and engineering controls to maintain exposures to radiation as far below the dose limits in 10 CFR Part 20 as is practical. As in the case of operating licensed nuclear power plants and previously NRC-approved design certification applications, the facility's design features work in concert with the radiation protection programs and procedures to comply with this regulation. Operational procedures are frequently relied upon to comply with regulations.

Plant procedures will play a significant role in the operation of filters, including the filter change-out frequency. Typically, several process parameters are monitored to determine the appropriate duration of a filtering media's useful life, including pressure drop, radiation level, and downstream process stream properties. Plant procedures will be developed for the various filtering media change-out criteria that will ensure compliance with regulations. Because there is no current repository that accepts greater than Class C (GTCC) waste, it is common practice at nuclear facilities to avoid the creation of such wastes. As indicated in FSAR Tables 11.4-2 and

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11.4-3, there are no GTCC wastes expected to be generated and processed in the radioactive waste systems.

As described in the NuScale response to RAI 12.02-2, the HIC radiological source term is conservatively developed assuming a HIC contains Class B/C spent resins from the spent resin storage tank (SRST) that has been decayed for two years. As described in the NuScale response to RAI 12.02-7 and FSAR Section 11.4.2.5.1, the SRST contains spent resins collected from the pool cleanup system (PCUS) and the chemical and volume control system (CVCS). As described in FSAR Section 11.4.2.2.3, spent cartridge filters are removed from their filter housings and transported to the Radioactive Waste Building where they are placed in a HIC. Because of the programmatic controls to prevent the creation of GTCC waste, the Class B/C spent cartridge filters are assumed to be of similar source strength as that of Class B/C spent resins from PCUS and CVCS. Therefore, the existing HIC source term is conservative. As in currently operating licensed nuclear power plants, spent filter cartridges would typically be placed in a HIC with other waste (typically spent resins) surrounding the filter, thereby providing shielding and immobilization, or are shredded and mixed with other material. The actual operational details of spent filter processing and waste packaging will be delineated in plant procedures and the process control program (PCP) to ensure compliance with applicable regulations.

Impact on DCA:

There are no impacts to the DCA as a result of this response.