NuScaleDCRaisPEm Resource

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Sent:	Friday, June 02, 2017 4:44 PM
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Subject:	Request for Additional Information No. 46, RAI 8787
Attachments:	Request for Additional Information No. 46 (eRAI No. 8787).pdf

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

Please submit your 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. 46 (eRAI No. 8787)

Issue Date: 06/02/2017
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

12.03-2

10 CFR 52.47(a)(5) requires applicants to identify the kinds and quantities of radioactive materials expected to be produced during operation and the means for controlling and limiting radiation exposures. 10 CFR 52.47(a)(6) requires applicants to provide the information required by 10 CFR 20.1406. 20.1406 requires applicants to describe in the application how facility design and procedures for operation will minimize, to the extent practicable, contamination of the facility and the environment, facilitate eventual decommissioning, and minimize, to the extent practicable, the generation of radioactive waste. As noted in Federal Register (FR) [62 FR 39058, July 21, 1997 "10 CFR Part 20, et al. Radiological Criteria for License Termination," section F.4.3, the intent of this regulation is to emphasize the importance in an early stage of planning for new facilities, that those facilities be designed to minimize contamination. IE Bulletin No. 80-10, "Contamination of Nonradioactive System and Resulting Potential for Unmonitored, Uncontrolled Release of Radioactivity to Environment," May 6, 1980, provides guidance regarding the provisions for ensuring that systems not expected to contain radioactive material remain free from radioactive contamination .

NuScale Design Control Document (DCD) Tier 2 Revision 0, subsection 9.2.3.1 "Demineralized Water System," (DWS) states that the DWS does not contain radioactive materials but does interface with radioactive systems. Subsection 9.2.3.1 states that where DWS interfaces with radioactive waste processing systems or radioactive liquid containing systems, the DWS includes backflow preventers in each of the lines that distribute demineralized water to these systems. This subsection further states that compliance with the requirements of 10 CFR 20.1406 is presented in Section 12.3. Table 9.2.3-2: "Demineralized Water System Monitoring Parameters," provides the list of demineralized water system chemical parameters requiring analysis.

However, DCD Tier 2 Revision 0, Section 12.3-12.4 does not mention the demineralized water system (DWS) backflow preventers as a mechanism employed to prevent contamination of the DWS. And, contrary to the guidance contained within IE Bulletin No. 80-10, Table 9.2.3-2 does not contain a requirement to check the DWS for radioactive material contamination. Environmental Protection Agency (EPA) 570989007-1989 – "Cross-Connection Control Manual," describes six basic types of devices that can be used to correct cross-connections: air gaps, barometric loops, vacuum breakers – both atmospheric and pressure type, double check with intermediate atmospheric vent, double check valve assemblies, and reduced pressure principle devices. None of these type of devices are described within DCD section 12.3-12.4 and Table 12.3-15: "Regulatory Guide 4.21 Design Features for Balance-of-Plant Drain System." In addition to installation requirements for backflow prevention devices, there are specific initial testing requirements as well as periodic testing requirements for backflow preventers. However, DCD Tier 2 Revision 0, Chapter 14 "Initial Test Program and Inspections, Tests, Analyses, and Acceptance Criteria," does not contain any initial test requirements for the backflow preventers described in subsection 9.2.3.1, and DCD section 9.2.3 does not contain any COL items related to providing testing for backflow preventers, and DCD Tier 2, Revision 0 Table 1.8-2: "Combined License Information Items," does not describe a COL Item for testing backflow preventers.

In order to support the staff's finding that facility design features facilitate eventual decommissioning and minimize, to the extent practicable, contamination of the facility and environment and the generation of radioactive waste in accordance with 10 CFR 20.1406(a), the applicant is asked to revise and update the appropriate sections of their application, to provide the following information:

- Sampling parameters for potential radioactive material within the DWS, including the kinds of material required to be detected.
- A description of the backflow preventers described in subsection 9.2.3.1, as contamination control devices in Table 12.3-1
- The initial testing program requirements in section 14.2 "Initial Plant Test Program," related to the initial testing of the backflow preventers
- COL Item in Table 1.8-2 and section 9.2.3 for periodic testing of backflow preventers installed in the DWS.

10 CFR 52.47(a)(5) requires applicants to identify the kinds and quantities of radioactive materials expected to be produced during operation and the means for controlling and limiting radiation exposures. 10 CFR 52.47(a)(6) requires applicants to provide the information required by 10 CFR 20.1406. 20.1406 requires applicants to describe in the application how facility design and procedures for operation will minimize, to the extent practicable, contamination of the facility and the environment, facilitate eventual decommissioning, and minimize, to the extent practicable, the generation of radioactive waste. As noted in Federal Register (FR) [62 FR 39058, July 21, 1997 "10 CFR Part 20, et al. Radiological Criteria for License Termination," section F.4.3, the intent of this regulation is to emphasize the importance in an early stage of planning for new facilities, that those facilities be designed to minimize contamination. IE Bulletin No. 80-10, "Contamination of Nonradioactive System and Resulting Potential for Unmonitored, Uncontrolled Release of Radioactivity to Environment," May 6, 1980, provides guidance regarding the provisions for ensuring that systems not expected to contain radioactive material remain free from radioactive contamination.

NuScale Design Control Document (DCD) Tier 2 Revision 0, subsection 9.2.9 "Utility Water Systems," (UWS) states that the supply portion of the UWS piping is not interconnected with other system piping that conveys radioactive materials. Subsection 9.2.9 states that the UWS distributes clarified water to the Reactor Building, the radioactive waste building, the demineralized water system and the potable water system. This subsection further states that compliance with the requirements of 10 CFR 20.1406 is presented in Section 12.3. Table 9.3.2-4: "Local Sample Points," describes sampling requirements for the discharge basis, however, this section does not specify any sampling requirements associated with the supply portion of the UWS.

Subsection 9.2.9 states that the UWS distributes clarified water to the Reactor Building and the radioactive waste building. However the intended use of UWS water in the reactor building and the radioactive waste building are not described in DCD Tier 2 Revision 0, chapters 9, 11 or 12. DCD Tier 2 Revision 0, Table 12.3-43: "Regulatory Guide 4.21 Design Features for Utility Water System," asserts that the only portion of the UWS that may become contaminated is the discharge basin. The UWS is composed of two separate sections, the supply side, which provides uncontaminated water for use by plant operators, and the disposal side which is normally expected to contain radioactivity. Contrary to the guidance contained within Bulletin 80-10 to perform sampling to detect inadvertent contamination of normally non-radioactive systems, Table 9.3.2-4 does not contain a requirement to check the supply portion of the UWS for radioactive material contamination. As noted in Bulletin 80-10, siphoning from temporary hoses connected to components containing radioactive material, may result in contamination of system not expected to contain radioactive material.

In order to support the staff's finding that facility design features facilitate eventual decommissioning and minimize, to the extent practicable, contamination of the facility and environment and the generation of radioactive waste in accordance with 10 CFR 20.1406(a), the applicant is asked to revise and update the appropriate sections of their application, to provide the following information:

- Sampling frequency and parameters for potential radioactive material within the supply portion of the UWS, including the kinds of material required to be detected.
- A description of the intended uses of the supply portion of the UWS within the reactor building and the radioactive waste building