

NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Tuesday, November 14, 2017 4:13 PM
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Subject: Request for Additional Information No. 282 RAI No. 9196 (19)
Attachments: Request for Additional Information No. 282 (eRAI No. 9196).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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Office of New Reactors
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301-415-0546

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Request for Additional Information No. 282 (eRAI No. 9196)

Issue Date: 11/14/2017

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 19 - Probabilistic Risk Assessment and Severe Accident Evaluation

Application Section: 19

QUESTIONS

19-36

Regulatory basis

10 CFR 52.47(a)(23) requires a description and analysis of design features for the prevention and mitigation of severe accidents, e.g., challenges to containment integrity caused by core-concrete interaction, steam explosion, high-pressure core melt ejection, hydrogen combustion, and containment bypass. Standard Review Plan Chapter 19.0 refers to SECY-93-087 for guidance regarding intersystem loss-of-coolant accident (ISLOCA). SECY-93-087 provides the following guidance:

Designers should reduce the possibility of a loss-of-coolant accident outside containment by designing (to the extent practicable) all systems and subsystems connected to the reactor coolant system (RCS) to withstand the full RCS pressure. Systems that have not been designed to full RCS pressure should include the following:

- the capability for leak testing of the pressure isolation valves;
- valve position indication that is available in the control room when isolation valve operators are de-energized; and
- high-pressure alarms to warn control room operators when rising reactor coolant pressure approaches the design pressure of attached low pressure systems and both isolation valves are not closed.

The degree of isolation or number of barriers (for example, three isolation valves) is not sufficient justification for using low-pressure components that can practically be designed to the full RCS ultimate rupture strength criterion.

Request for additional information

Final Safety Analysis Report (FSAR) Section 19.2.2.5 states that the chemical and volume control system (CVCS) is the only system connected to the RCS that has piping outside containment, the CVCS is designed to RCS pressure, and the CVCS has pressure isolation valves with the capability for leak testing.

The information in FSAR Section 9.3.4 indicates that CVCS subsystems may not meet the guidance in SECY-93-087. FSAR Table 9.3.4-1 lists 150 psig as the design pressure for the CVCS Chemical Mixing Tank and the CVCS Expansion Tank.

The information in FSAR Section 9.3.4 indicates that CVCS connecting systems (i.e., systems that are connected to the RCS via the CVCS) may not meet the guidance in SECY-93-087. CVCS connecting systems (e.g., liquid radioactive waste system, demineralized water system, process sampling system, boron addition system) are shown in Figure 9.3.4-1. FSAR Table 9.3.4-2 lists 125 psig and atmospheric pressure as the design pressure for two of the components in the boron addition system which is a CVCS connecting system.

The applicant is requested to provide additional information for CVCS subsystems and CVCS connecting systems to clarify how the guidance in SECY-93-087 is met or how 10 CFR 52.47(a)(23) is otherwise complied with.