

NuScaleDCRaisPEm Resource

From: Chowdhury, Prosanta
Sent: Tuesday, March 27, 2018 10:49 PM
To: Request for Additional Information
Cc: Lee, Samuel; Cranston, Gregory; Tabatabai, Omid; Dias, Antonio; Ashley, Clinton; NuScaleDCRaisPEm Resource
Subject: Request for Additional Information No. 401 eRAI No. 9447 (03.11)
Attachments: Request for Additional Information No. 401 (eRAI No. 9447).pdf

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

The NRC Staff recognizes that NuScale has preliminarily identified that the response to one or more questions in this RAI is likely to require greater than 60 days. NuScale is expected to provide a schedule for the RAI response by email within 14 days.

If you have any questions, please contact me.

Thank you.

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Division of New Reactor Licensing
Office of New Reactors
U.S. Nuclear Regulatory Commission
301-415-1647

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Request for Additional Information No. 401 (eRAI No. 9447)

Issue Date: 03/28/2018

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 03.11 - Environmental Qualification of Mechanical and Electrical Equipment

Application Section: Various Sections in Chapter 3

QUESTIONS

03.11-19

This is a follow-up RAI to eRAI 9160.

General Design Criterion 4, "Environmental and dynamic effects design bases," in part, requires that SSCs important to safety be designed to accommodate the effects of and be compatible with environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss of coolant accidents.

In 10 CFR 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants," the U.S. Nuclear Regulatory Commission (NRC) established specific requirements for the environmental qualification (EQ) of certain electric equipment important to safety located in a "harsh" environment (see DSRS 3.11).

NuScale's FSAR Tier 2, Chapter 3 analysis in part provides environmental conditions (e.g., pressure and temperature) during a design basis event (e.g., high energy line break (HELB)) used to qualify equipment that is required to perform a design function related to safety and could be subject to these environmental conditions. In particular, NuScale's FSAR Chapter 3 provides the environmental conditions during a HELB outside containment and under the bioshield (e.g., a harsh environment).

NuScale's FSAR Tier 2 Chapter 3 (e.g., Table 3.11-1) lists equipment in zone G (outside containment and under the bioshield) "...that will experience the environmental conditions of design basis accidents for which it must function to mitigate said accidents, and that will be qualified to demonstrate operability in the accident environment for the time required for accident mitigation with safety margin to failure." (EQ Category A). A similar equipment list can be found in FSAR Tier 1, Table 2.8-1. Safety-related equipment under the bioshield is associated with systems that are essential for emergency reactor shutdown, containment isolation, and decay heat removal. These systems are required to be environmentally qualified to meet their intended design function related to safety.

NuScale's FSAR Chapter 3 describes that the environmental conditions of design basis accidents under the bioshield are established assuming a vented bioshield (Appendix 3C and Figure 3C-3). In a response to RAI 9160, the applicant describes that the bioshield relieves (i.e., vents) the high pressure and temperature environment under the bioshield by opening relief panels. The panels are required to change position from normally closed to open in order to vent the atmosphere under the bioshield into the reactor building. The panels are hinged and provide one-way relief (venting) in response to a HELB under the bioshield.

NuScale's response to RAI 9160 describes in part that all the bioshield functions, including the venting function, are nonsafety-related. If the function of a component or part is nonsafety-related, the staff expects that its failure to function could not prevent the satisfactory performance of a safety-related function. As discussed above, NuScale's FSAR Chapter 3 safety analysis, which establishes the environmental conditions under the bioshield for items related to safety, currently assumes a vented bioshield (e.g., opening nonsafety-related relief panels discussed in response to RAI 9160). Therefore, the staff requests NuScale to assess the failure of the venting function (i.e., nonsafety-related bioshield relief panels do not open) and its impact on the performance of equipment important to safety (e.g., safety-related). As part of the response, because the FSAR Chapter 3 safety analysis currently assumes a vented bioshield and the bioshield vents (relief panels) are nonsafety-related, FSAR Chapter 3 safety analysis (e.g., under the bioshield HELB environmental conditions for pressure and temperature) should be revised assuming bioshield venting is not achieved by the relief panels. Otherwise, NuScale will need to provide additional information to justify reliance on the bioshield relief panels (vents) in its safety analysis.