

NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Friday, November 24, 2017 7:58 AM
To: RAI@nuscalepower.com
Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Dias, Antonio; Hernandez, Raul; Vera Amadiz, Marieliz
Subject: RE: Request for Additional Information No. 287 RAI No. 9221 (3.6.1)
Attachments: Request for Additional Information No. 287 (eRAI No. 9221).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. The NRC Staff recognizes that NuScale has preliminarily identified that the response to this question 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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Licensing Branch 1 (NuScale)
Division of New Reactor Licensing
Office of New Reactors
U.S. Nuclear Regulatory Commission
301-415-0546

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Request for Additional Information No. 287 (eRAI No. 9221)

Issue Date: 11/24/2017

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 03.06.01 - Plant Design for Protection Against Postulated Piping Failures in Fluid Systems Outside Containment

Application Section: 3.6.1

QUESTIONS

03.06.01-1

GDC 4 "Environmental and Dynamic Effects Design Bases," in part, requires that nuclear power plant 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. These SSCs are to be protected against the effects of pipe whip and discharging fluids resulting from high or moderate energy pipe breaks. 10 CFR 52.47(a)(25) states the interface requirements for those portions of the plant for which the application does not seek certification must be sufficiently detailed to allow completion of the FSAR. In coordination with this requirement, the NRC staff's guidance as delineated in RG 1.206 Section C.III.1.4, "Combined License Action or Information Items," states that COL applicants should identify or uniquely designate the information provided in the application, including the FSAR to addresses the COL action or information items.

In RAI 8942 question 03.06.02-15, the staff requested the applicant to explain why the dynamic analysis for the high-energy lines outside the Reactor Pool Bay is not needed.

The applicant response to the RAI states that the NuScale design has used a 'graded level of detail' approach for piping design. The applicant states that essential systems and components are located primarily inside containment; however, there are some essential systems and components located just outside containment. A preliminary PRHA was completed for these areas of the NPM, up to the disconnect flanges as described in FSAR Sections 3.6.1.1.2, 3.6.2.1.2 and 3.6.4.6. The routing and analysis of the remainder of the piping beyond the Reactor Pool Wall is to be completed by the COL applicant as described in COL Item 3.6-3.

The staff evaluated the applicant's response and determined that additional information is needed. The staff finds that, as stated in GDC 4, structures important to safety shall be protected against the effects of pipe whip and discharging fluids resulting from high- or moderate-energy pipe breaks. The staff evaluated the design description of the reactor building and found that this building is classified as an A1 structure, which means this structure is determined to be both safety-related and risk-significant. Therefore, the adequate design of the RXB structure should be evaluated as part of the certification application, not the COL application.

It is not clear to the staff how the applicant determined that the safety-related RXB has been adequately designed to handle all accident scenarios if the applicant has not yet evaluated the consequences of pipe failures inside safety-related structures, particularly in areas that house high-energy lines of several

nuclear power modules (NPMs). The staff finds that, in order to clearly demonstrate conformance with the requirements of GDC 4, the applicant needs to discuss how all essential SSCs, including structures, are protected against the effects of pipe whip, discharging fluids, and overpressure resulting from high- or moderate-energy pipe breaks.

Therefore the staff requests the applicant to:

- a. discuss in the FSAR how the essential structures (including subcompartments) that house high- and moderate-energy lines are designed and/or protected against the dynamic and environmental effects of a high- and/or moderate-energy pipe break,
- b. identify in the FSAR the bounding conditions (for example; impact loads and peak subcompartment pressure) that the essential structures (and its subcompartments) are designed to withstand.