

NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Wednesday, November 22, 2017 1:04 PM
To: RAI@nuscalepower.com
Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Karas, Rebecca; Thomas, Matt; Franovich, Rani
Subject: Request for Additional Information No. 285 RAI No. 9205 (15)
Attachments: Request for Additional Information No. 285 (eRAI No. 9205).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 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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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. 285 (eRAI No. 9205)

Issue Date: 11/22/2017

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 15 - Introduction - Transient and Accident Analyses

Application Section: 15

QUESTIONS

15-3

In accordance with 10 CFR 50, Appendix A, General Design Criterion (GDC) 1, "Quality standards and records," structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed.

To meet the requirements mentioned above, as they relate to the Chapter 15 accident analyses, the accident analyses should show that despite the worst single failure, the safety systems are still capable of accomplishing their safety functions and maintaining defense-in-depth for the NuScale design.

In response to RAI 8744, Question 15.02.08-4, dated June 21, 2017, the applicant stated that NUREG-0138, Issue 1, is the basis for justification that the nonsafety-related check valve in the feedwater line can be credited for DBA mitigation in the event its safety-related counterpart (i.e. safety-related check valve in feedwater line) is assumed to fail under the single failure assumption because the nonsafety-related check valve is designed to requirements for augmented quality, is seismic Category I, and is included in the in-service testing program.

The staff considered NUREG-0138, Issue 1, in its review of the response to RAI 8744, Question 15.02.08-4. The staff quotes from NUREG-0138, Issue 1:

"for accidents involving spontaneous failures of secondary system piping not part of the primary system boundary, where the *potential consequences are significantly lower* [emphasis added], less stringent requirements are imposed on the quality and design of the systems needed to cope with such secondary system ruptures. This approach results, in the staff's judgement, in a *proper weighing of consequences and safety requirements* [emphasis added] in order to assure a balanced level of safety over the entire spectrum of postulated design basis accidents."

The staff notes that the NUREG-0138, Issue 1, justification for crediting nonsafety-related components for DBA mitigation is predicated on the fact that the DBA under question has relatively less severe consequences than an event where all components required for mitigation must be safety-related. Therefore, in order to rely on NUREG-0138, Issue 1, for justifying use of nonsafety-related components for DBA mitigation, the applicant must show that the acceptance criteria of a Condition II event are satisfied, assuming no credit of nonsafety-related components. If the acceptance criteria of a Condition II event cannot be met, assuming no credit of the nonsafety component, then it is the staff's understanding that GDC 1 is not met, the single failure criterion is not met for the safety-related component that was initially assumed to fail, and ultimately, the reactor's defense-in-depth features are inadequate.

Furthermore, it is the staff's understanding that in the case of the feedwater line break inside containment, assuming no credit of the nonsafety check valve, as described in RAI 8744, Question 15.02.08-4, then there exists a potential to have both trains of DHRS inoperable which could result in core melt. The staff requests the applicant to show that for a feed line break inside containment assuming no credit of the nonsafety-related check valve, the pressure in the reactor coolant and main steam systems is maintained below 110 percent of the design values in accordance with the ASME B&PV code, and the fuel cladding integrity is maintained by demonstrating that the MDNBR remains above the 95/95 DNBR limit. If these acceptance criteria cannot be met when assuming no credit of the nonsafety-related check valve, the staff requests the applicant to provide additional information in the FSAR justifying how GDC 1 and the single failure criterion are met for this event, and clarify how the NuScale design maintains adequate defense-in-depth for its safety systems.

Ultimately, the staff seeks to understand for all accident analyses presented in FSAR Tier 2, Chapter 15, where nonsafety-related components are currently credited for accident mitigation, how GDC 1 and the single failure

criterion are met, and how defense-in-depth is maintained. Therefore, for all accident analyses presented in FSAR Tier 2, Chapter 15, where nonsafety-related components are currently credited for accident mitigation, the staff requests the applicant to show that for each of these accidents, assuming no credit of nonsafety-related SSCs, the pressure in the reactor coolant and main steam systems is maintained below 110 percent of the design values in accordance with the ASME B&PV code, and the fuel cladding integrity is maintained by demonstrating that the MDNBR remains above the 95/95 DNBR limit. If these acceptance criteria cannot be met when assuming no credit of the nonsafety-related SSCs, the staff requests the applicant to provide additional information in the FSAR justifying how GDC 1 and the single failure criterion are met, and clarify how the NuScale design maintains adequate defense-in-depth for its safety systems.