

NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Friday, August 25, 2017 8:50 AM
To: RAI@nuscalepower.com
Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Jackson, Diane; Ashley, Clinton; Tabatabai, Omid
Subject: RE: Request for Additional Information No. 195, RAI 9060 (6.2.4)
Attachments: Request for Additional Information No. 195 (eRAI No. 9060) .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

Hearing Identifier: NuScale_SMR_DC_RAI_Public
Email Number: 219

Mail Envelope Properties (412e0c9ca02f477d9d869823b3628802)

Subject: RE: Request for Additional Information No. 195, RAI 9060 (6.2.4)
Sent Date: 8/25/2017 8:49:56 AM
Received Date: 8/25/2017 8:50:02 AM
From: Cranston, Gregory

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Post Office: R4PWMSMRS03.nrc.gov

Files	Size	Date & Time
MESSAGE	813	8/25/2017 8:50:02 AM
Request for Additional Information No. 195 (eRAI No. 9060) .pdf		99256

Options

Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Request for Additional Information No. 195 (eRAI No. 9060)

Issue Date: 08/25/2017

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 06.02.04 - Containment Isolation System

Application Section: DCA Part 07, Exemption #13; FSAR 6.2.4

QUESTIONS

06.02.04-7

The provisions contained in 10 CFR 50.34(f)(2)(xiv) require containment isolation systems, which in subparagraph (E), "Include automatic closing on a high radiation signal for all systems that provide a path to the environs." NuScale requests an exemption from 10 CFR 50.34(f)(2)(xiv)(E) as applied to the containment evacuation system (CES). NuScale contends that the NuScale containment design has a small volume, which provides increased sensitivity of pressure changes within containment, and therefore, the CES isolation upon high containment pressure provides appropriate isolation for the CES system, considering the operating experience that led to the development 10 CFR 50.34(f)(2)(xiv) (see NUREG-0578, NUREG-0660, and NUREG-0737). NuScale provided no quantitative justification supporting its exemption request. The staff observes that NuScale's containment sensitivity to pressure changes may be dampened by operation (or maloperation) of the containment evacuation system pumps (e.g., pumps remove gases and steam), which are non-safety related. Therefore, the staff requests that the applicant provide quantitative justification for the exemption request including a description of the events considered, the methodology used to evaluate the events, the evaluation/acceptance criteria used to determine that containment pressure provides appropriate isolation and that a high-radiation isolation signal is unnecessary, and how uncertainties were considered. The events considered should include design basis events, and degraded-core and core-melt accidents (per NUREG-0660 objective for the provisions that eventually would become 10 CFR 50.34(f)(2)(xiv)).

06.02.04-8

In response to the lessons learned from the accident at Three Mile Island (TMI), the Nuclear Regulatory Commission (NRC) added requirements to its power reactor safety regulations (47 FR 2286 1982, Final Rule). In the *Federal Register* associated with these additional TMI-related requirements, the NRC refers to NUREG-0660, "NRC Action Plan Developed as a Result of the TMI-2 Accident," and NUREG-0737, "Clarification of TMI Action Plan Requirements." NUREG-0660 describes the objective of the provisions that eventually would become 10 CFR 50.34(f)(2)(xiv) as "...to improve the reliability and capability of nuclear power plant containment structures to reduce the radiological consequences and risks to the public from design basis events and degraded-core and core-melt accidents." The discussion in

NUREG-0737 describes the provision that would eventually become 10 CFR 50.34(f)(2)(xiv) subparagraph (E) as, "...features needed to improve containment isolation dependability."

The 10 CFR 50.34(f)(2)(xiv) provision requires containment isolation systems that in subparagraph (E) "Include automatic closing on a high radiation signal for all systems that provide a path to the environs."

NuScale requests an exemption from 10 CFR 50.34(f)(2)(xiv)(E) as applied to the containment evacuation system (CES). In exemption request No.13 NuScale states "The underlying purpose of 10 CFR 50.34(f)(2)(xiv)(E) is to limit radiological releases by ensuring containment isolation for systems that provide direct paths to the environs where reliance on a high containment pressure isolation signal may not be sufficient." In addition, NuScale indicates that special circumstances are present (10 CFR 50.12(a)(2)(ii)) in that application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule because alternate means to preclude a direct path to the environs are provided in the CES design. NuScale describes the alternate means as 1) the CES isolates upon a high CNV pressure signal and 2) the CES is redirected to the gaseous rad waste system (GRWS) upon a high radiation signal. The GRWS, according to FSAR Tier 2, Section 11.3, 'Gaseous Waste Management System,' serves no safety function, is not credited for mitigation of design basis accidents, and provides a path to the environs. NuScale contends that "...the underlying purpose of the rule to ensure containment isolation for systems that provide direct paths to the environs is accomplished without reliance on the features required by the rule."

Based on the information above, the staff requests the following:

- 1) Given that the rule does not use the expression "direct" path, the staff requests the applicant to explain usage of the term "direct" and why it believes the underlying purpose of the rule is limited to systems that provide "direct" paths to environment.
- 2) Given that the rule does not refer to pressure, the staff requests NuScale to explain why it believes the underlying purpose of the rule is tied to situations where reliance on a high containment pressure isolation signal may not be sufficient.
- 3) Given that the rule is to provide containment isolation systems, the staff requests NuScale to explain why it believes the underlying purpose of the rule can be met (i.e., alternate means) by redirecting CES to GRWS. As part of the response, consistent with the rule and discussion in NUREG-0660 and NUREG-0737, the staff requests NuScale to describe how redirecting CES flow to the non-safety-related GRWS would;
 - a. ensure containment isolation for systems that provide a path to the environs,
 - b. improve containment isolation dependability, and
 - c. improve the reliability and capability of the containment structure to reduce the radiological consequences and risks to the public from design basis events and degraded-core and core-melt accidents.

The staff requests for information discussed above may result in changes to the applicant's description of the exemption request related to the underlying purpose of the rule and

associated special circumstances. The exemption request should be modified accordingly to address any changes. This information is needed to complete the review of the exemption request.