

NuScaleDCRaisPEm Resource

From: Chowdhury, Prosanta
Sent: Monday, April 9, 2018 5:05 PM
To: Request for Additional Information
Cc: Lee, Samuel; Cranston, Gregory; Tabatabai, Omid; Haider, Syed; NuScaleDCRaisPEm Resource
Subject: Request for Additional Information No. 411 eRAI No. 9467 (06.02.01.01.A)
Attachments: Request for Additional Information No. 411 (eRAI No. 9467).pdf

Attached please find NRC staff's request for additional information (RAI) 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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Licensing Branch 1 (NuScale)
Division of New Reactor Licensing
Office of New Reactors
U.S. Nuclear Regulatory Commission
301-415-1647

Hearing Identifier: NuScale_SMR_DC_RAI_Public
Email Number: 442

Mail Envelope Properties (BN7PR09MB260909A6DD8281B5B014A25E9EBF0)

Subject: Request for Additional Information No. 411 eRAI No. 9467 (06.02.01.01.A)
Sent Date: 4/9/2018 5:04:47 PM
Received Date: 4/9/2018 5:05:05 PM
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Tracking Status: None

Post Office: BN7PR09MB2609.namprd09.prod.outlook.com

Files	Size	Date & Time
MESSAGE	556	4/9/2018 5:05:05 PM
Request for Additional Information No. 411 (eRAI No. 9467).pdf		76428

Options

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

Request for Additional Information No. 411 (eRAI No. 9467)

Issue Date: 04/09/2018

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 06.02.01.01.A - PWR Dry Containments, Including Subatmospheric Containments

Application Section: FSAR Section 14.3.11

QUESTIONS

06.02.01.01.A-13

ITAAC for Containment Safety Analyses

The regulatory requirement 10 CFR 52.47(b)(1) listed in DSRS Section 6.2.1.1.A states that a DC application contain the proposed inspections, tests, analyses, and acceptance criteria (ITAAC) that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a plant that incorporates the DC is built and will operate in accordance with the DC, the provisions of the Atomic Energy Act, and the U.S. Nuclear Regulatory Commission's (NRC's) regulations. DSRS Section 6.2.1.1.A, paragraph III.4 requires the staff to review assumptions used in the containment response analysis to determine if the analyses are acceptably conservative. Section C.II.1.2.11 of Regulatory Guide 1.206 (ITAAC for Containment Systems (SRP Section 14.3.11)) guides the applicant to develop ITAAC to verify key input parameters used in the containment safety analyses for the design, such as about containment heat removal during LOCA, main steam line break, and main feedline break. Following 10 CFR 52.47, "Contents of applications; technical information," Part 2 of the NuScale FSAR presents the Tier 1 information developed for the NuScale Power Plant. Staff's SRP Section 14.3.11 review showed that the NuScale containment ITAAC provided in FSAR Tier 1 do not address some of the key physical parameters relied on in the containment safety analyses. Substantial changes to these parameters in the as-built NuScale containment structure could adversely impact the FSAR Section 6.2.1 safety analyses. The applicant needs to include containment ITAAC in the FSAR to validate the as-built safety-related functions of the NuScale containment structure and the reactor pool. In this regard, staff requests the applicant to address the following questions and update the FSAR, accordingly. The regulatory bases identified above are applicable to all questions in this RAI.

Containment net free volume is one of the principal containment design parameters. NuScale FSAR Tier 1 provided no ITAAC to confirm that the as-built containment net free volume is conservative with respect to the value assumed in the containment peak pressure and temperature analyses in FSAR Tier 2, Section 6.2.1. As the containment free volume is a key input parameter in the containment pressure analyses (both for calculating peak pressure in Section 6.2.1.1.A and the minimum pressure in Section 6.2.1.5), the applicant is requested to provide an ITAAC to verify its as-built value to conservatively bound the value assumed in the design-basis containment analyses.

06.02.01.01.A-14

Following a high energy line break within containment, containment internal heat structures (heat sinks) are important for condensing steam from the containment atmosphere and storing energy. As condensation influences the containment pressure and temperature following an accident, the heat sinks credited in the containment pressure analyses make a key input assumption (both for calculating peak pressure in Section 6.2.1.1.A and the minimum pressure in Section 6.2.1.5). However, NuScale FSAR Tier 1 provided no ITAAC to verify that the passive heat sinks credited to the design-basis analyses conform to the information provided in Section 8.2.1 through 8.2.4 of the Containment Response Analysis Methodology technical report. The applicant is requested to provide an ITAAC to verify the as-built heat sink parameters and compositions to conservatively bound the heat sink input design assumptions made in the design-basis containment analyses, e.g., the containment heat sinks dimensions and materials.

06.02.01.01.A-15

FSAR Tier 1 Section 3.6 states that the ultimate heat sink's (UHS) safety-related system function of heat removal via direct water contact with the containment vessel is verified by inspections, tests, analyses, and acceptance criteria, but the staff found that no such ITAAC was provided. The applicant is requested to clarify the statement and justify why it is not supported by an ITAAC, or include an appropriate ITAAC, accordingly.