

From: Getachew Tesfaye
Sent: Saturday, March 9, 2024 4:07 PM
To: Request for Additional Information
Cc: Prosanta Chowdhury; Mahmoud -MJ- Jardaneh; Griffith, Thomas; Fairbanks, Elisa; NuScale-SDA-720RAIsPEm Resource
Subject: NuScale SDAA Section 3.9.3 - Request for Additional Information No. 020 (RAI-10150-R1)
Attachments: SECTION 3.9.3 - RAI-10150-R1-FINAL .pdf

Attached please find NRC staff's request for additional information (RAI) concerning the review of NuScale Standard Design Approval Application for its US460 standard plant design (Agencywide Documents Access and Management System (ADAMS) Accession No. ML23306A033).

Please submit your technically correct and complete response by the agreed upon date to the NRC Document Control Desk.

If you have any questions, please do not hesitate to contact me.

Thank you.

Getachew Tesfaye (He/Him)

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Options

Priority: Normal
Return Notification: No
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**REQUEST FOR ADDITIONAL INFORMATION No. 020 (RAI-10150-R1)
BY THE OFFICE OF NUCLEAR REACTOR REGULATION
NUSCALE STANDARD DESIGN APPROVAL APPLICATION
DOCKET NO. 05200050**

CHAPTER 3, "DESIGN OF STRUCTURES, SYSTEMS, COMPONENTS AND EQUIPMENT"
SECTION 3.9.3, "ASME Code Class 1, 2, and 3 Components, Component Supports, and
Core Support Structures"
ISSUE DATE: 03/09/2024

Background

By letter dated October 31, 2023, NuScale Power, LLC (NuScale or the applicant) submitted Part 2, Final Safety Analysis Report (FSAR), Chapter 3, "Design of Structures, Systems, Components and Equipment," Revision 1 (Agencywide Documents Access and Management System Accession No. ML23304A321), of the NuScale Standard Design Approval Application (SDAA) for its US460 standard plant design. The applicant submitted the US460 standard plant SDAA in accordance with the requirements of Title 10 Code of Federal Regulations (10 CFR) Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Subpart E, "Standard Design Approvals." The NRC staff has reviewed the information in Chapter 3 of the SDAA and determined that additional information is required to complete its review.

Question 3.9.3-11

Regulatory Basis

10 CFR 50.55a(b), "*Use and conditions on the use of standards.*" Systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the requirements of the ASME BPV Code and the ASME OM Code as specified in 10 CFR 50.55a(b).

Issue

Section 3.9.3 of FSAR Chapter 3 discusses the structural integrity of pressure-retaining components, their supports, and core support structures that are designed to be consistent with the 2017 ASME Code, Section III Division 1, subject to limitations and modification in 10 CFR 50.55a(b)(1).

In Section 3.9.3, it is stated that the lower RPV section and upper RPV section are connected by flange connection. However, the upper RPV section is made of low alloy steel and lower RPV section is made of austenitic stainless steel with different material properties (e.g., thermal expansion coefficients, modulus of elasticities, etc.). Because of the differing materials, shearing stress would also need to be accounted for in estimating the total load to determine whether the bolting stress limit would be exceeded. At this time, the ASME Code closure Bolting stress limit in XIII-4000 does not address combined tension and shear in Service Levels A, B and C.

Requested Information

Provide a summary of the inputs, assumptions, allowable stress limits, and results demonstrating that the upper-to-lower RPV flange bolted joint meets the ASME Section III stress limits, including consideration of the shear loading that results from differential thermal expansion. Make the analysis available for staff review and update the FSAR to clarify how the combined tension and shear for RPV closure bolts are accounted for and meet stress limits.