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| **From:** | Getachew Tesfaye |
| **Sent:** | Wednesday, October 11, 2023 10:02 AM |
| **To:** | Request for Additional Information |
| **Cc:** | Thomas Hayden; Mahmoud Jardaneh; Griffith, Thomas; Fairbanks, Elisa; NuScale-SDA-720RAIsPEm Resource |
| **Subject:** | NuScale SDAA Chapter 10 - Request for Additional Information No. 001 (RAI-10083-R1) |
| **Attachments:** | CHAPTER 10 - RAI-10083-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. ML222339A066).

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)
Senior Project Manager
NRC/NRR/DNRL/NRLB
301-415-8013

**Hearing Identifier:** NuScale_SDA720_RAI_Public
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**Options**
**Priority:** Normal
**Return Notification:** No
**Reply Requested:** No
**Sensitivity:** Normal
**Expiration Date:**

**REQUEST FOR ADDITIONAL INFORMATION No. 001 (RAI-10083-R1)**
**BY THE OFFICE OF NUCLEAR REACTOR REGULATION**
**NUSCALE STANDARD DESIGN APPROVAL APPLICATION**
**DOCKET NO. 05200050**
CHAPTER 10, "STEAM AND POWER CONVERSION SYSTEM,"
ISSUE DATE: 10/11/2023

## Background

By letter dated December 15, 2022, NuScale Power, LLC (NuScale or the applicant) submitted Part 2, Final Safety Analysis Report (FSAR), Chapter 10, "Steam and Power Conversion System," Revision 0 (Agencywide Documents Access and Management System Accession No. ML22349A671) of the NuScale Standard Design Approval Application (SDAA) for its US460 standard plant design. The applicant submitted the US460 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 on the Power Conversion System provided in Chapter 10 of the SDAA and determined that additional information is required to complete its review.

## Question 10.1-1

### Regulatory Basis

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 52.137(a)(2) requires an applicant for an SDA to provide a final safety analysis report (FSAR) that that describes the facility, presents the design bases and the limits on its operation, and presents a safety analysis of the structures, systems, and components and of the facility, or major portion thereof. Section 52.137(a)(2) requires that the applicant include:

a description and analysis of the SSCs of the facility, with emphasis upon performance requirements, the bases, with technical justification, upon which the requirements have been established, and the evaluations required to show that safety functions will be accomplished. It is expected that the standard plant will reflect through its design, construction, and operation an extremely low probability for accidents that could result in the release of significant quantities of radioactive fission products. The description shall be sufficient to permit understanding of the system designs and their relationship to the safety evaluations. Items such as the reactor core, reactor coolant system, instrumentation and control systems, electrical systems, containment system, other engineered safety features, auxiliary and emergency systems, power conversion systems, radioactive waste handling systems, and fuel handling systems shall be discussed insofar as they are pertinent.

### Issue

FSAR Chapter 10 describes the steam and power conversion systems. For the staff to understand the system design and its relationship to plant safety, the descriptions in Chapter 10 should include the systems' design and performance characteristics and a reference heat balance diagram based on the normal plant operation at rated power. In general, the balance of

plant (BOP) secondary plant system components and parameters are developed from the heat balance mass flow, temperatures, and steam system pressures which are used. If these are not used, a description of the bases for BOP system calculations and evaluations is needed. Power conversion system and component design must take into account the conditions established by the secondary side heat balance in order to ensure safety related components can perform their functions. For example, the main steam isolation valves (MSIVs) which will be required to close against system flow and pressure associated with the plant operating at rated power. In addition, the information provided in the heat balance allows the staff to confirm that analyses performed in Chapter 15 adequately reflect the design and use appropriate initial conditions reflective of the plant's normal operation at rated power. The heat balance also provides information on the turbine bypass and main condenser heat removal capacity.

**Requested Information**

Based on its review of Chapter 10, the staff has determined that additional information is required to fully satisfy 10 CFR 52.137(a)(2) requirements. The staff requests that NuScale include in Section 10.1 of the FSAR a reference heat balance diagram and associated table based on normal plant operation at rated power.