



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 24, 2024

Ms. Carrie Fosaaen
Vice President, Regulatory Affairs
NuScale Power, LLC
1100 NE Circle Boulevard, Suite 200
Corvallis, OR 97330

SUBJECT: AUDIT STATUS - THE STAFF REVIEW OF THE NUSCALE POWER, LLC
STANDARD DESIGN APPROVAL APPLICATION – NUSCALE US460

Dear Ms. Fosaaen:

This letter provides the current status of the regulatory audit being conducted by the U.S. Nuclear Regulatory Commission (NRC) staff as part of its safety review of the NuScale Power, LLC (NuScale) Standard Design Approval Application (SDAA), Revision 1, submitted on October 31, 2023 (Agencywide Documents Access and Management System (ADAMS) Package Accession No. ML23306A033). The staff began conducting the audit on March 27, 2023 (ML23067A300) that includes the following associated licensing topical reports (LTRs): (1) TR-0516-49422, "Loss-of-Coolant Accident [LOCA] Evaluation Model," Revision 3 (ML23008A002); (2) TR-0516-49416, "Non-Loss-of-Coolant Accident Analysis Methodology," Revision 4 (ML23005A305); (3) TR 124587, "Extended Passive Cooling and Reactivity Control Methodology," Revision 0 (ML23005A308); and (4) TR-131981, "Methodology for the Determination of the Onset of Density Wave Oscillations (DWO)," Revision 1 (ML23198A244). The audit is intended to achieve efficiencies in the safety review by allowing the staff to review and discuss supporting material with the objective of improving communication and understanding of complex technical topics.

To date, the NRC staff has presented 1,119 document requests and items for explanation in the audit. Of these, 807 items have been resolved in the audit, 86 items provided by NuScale are under review by the staff, and 153 items are waiting for NuScale to provide responses in the audit. The remaining items have either been processed as formal requests for additional information or voided. The staff has communicated to NuScale that the following items related to the final safety analysis report (FSAR) and the associated LTRs resolved in the audit need to be submitted on the docket:

Chapter 3

1. Information related to FSAR Section 3.3, "Wind and Tornado Loadings."
Six Items: 3.3-1, 3.3.1.1-1, 3.3-2, 3.3-3, 3.3-4, and 3.3-7
2. Information related to FSAR Section 3.4, "Water Level (Flood) Design."
Eight Items: 3.4.1-1, 3.4.1-2, 3.4.1-7, 3.4.2-4, 3.4.2-5, 3.4.2-6, 3.4.2-9, and 3.4.2-10
3. Information related to FSAR Section 3.5, "Missile Protection."
Three Items: 3.5.3-4, 3.5.3-6, and 3.5.3-7

4. Information related to FSAR Section 3.6, "Protection against Dynamic Effects Associated with Postulated Rupture of Piping."
Three Items: 3.6.1-2, 3.6.2-1 and 3.6.2-2
5. Information related to FSAR Section 3.7, "Seismic Design."
Eight Items: 3.7.2-14, 3.7.2-23, 3.7.2-24, 3.7.2-25, 3.7.2-27, 3.7.2-28, 3.7.2-29, and 3.7.3-1
6. Information related to FSAR Section 3.8, "Design of Category I Structures."
Three Items: 3.8.5-9, 3.8.5-10, and 3.8.5-12
7. Information related to FSAR Section 3.9, "Mechanical Systems and Components."
Twelve Items: 3.9.2-1 (just part c of the response), 3.9.2-13, 3.9.2-18, 3.9.2-19, 3.9.2-25, 3.9.2-5 (not 3.9.2-5S), 3.9.2-7, 3.9.2-8, 3.9.2-21, 3.9.2-22, 3.9.2-33, 3.9.4-6 (Contains PROP), 3.9.4-7, and 3.9.6-15,
8. Information related to FSAR Section 3.11, "Environmental Qualification of Mechanical and Electrical Equipment."
Seven Items: 3.11-2, 3.11.2.3-1, 3.11-3, 3.11-4, 3.11-5, 3.11-6, and 3.11.12-1
9. Information related to FSAR Section 3.12, "ASME Code Class 1, 2, and 3 Piping Systems, Piping Components and Associated Supports."
One Item: 3.12.5.9-2
10. Information related to FSAR Section 3C.7, "Documentation."
One Item: 3C.7-1

Chapter 4

1. Information related to FSAR Section 4.3, "Nuclear Design"
Three Items: 4.3-3, 4.3-4, 4.3-11
2. Information related to FSAR Section 4.5.1, "Control Rod Drive System Structural Materials"
Two Items: 4.5.1-3, 4.5.1-4
3. Information related to FSAR Section 4.5.2, "Reactor Internals and Core Support Structure Materials"
Two Items: 4.5.2-1, 4.5.2-3
4. Information related to FSAR Section 4.6, "Nuclear Design "Functional Design of Control Rod Drive System"
One Item: 4.6-3
5. Information related to Licensing Technical Report, "Fluence Calculation Methodology and Results"
Four Items: 4.Fluence.TeR-4, 4.Fluence.TeR-5, 4.Fluence.TeR-6, 4.Fluence.TeR-7

Chapter 5

1. Information related to FSAR Section 5.1.3.4, "Reactor Vessel Internals"
One Item: 5.1.3.4-1
2. Information related to FSAR Section 5.2.5, "Reactor Coolant Pressure Boundary Leakage Detection"
One Item: 5.2.5-2

3. Information related to FSAR Section 5.2.3.4.2, "Cleaning and Contamination Protection Procedures"
One Item: 5.2.3.4.2-1
4. Information related to FSAR Section 5.3.1.5, "Fracture Toughness"
One Item: 5.3.1.5-1
5. Information related to FSAR Section 5.3.2.3, "Pressurized Thermal Shock"
One Item: 5.3.2.3-1
6. Information related to FSAR Section 5.3.2.4, "Upper Shelf Energy"
One Item: 5.3.2.4-1
7. Information related to FSAR Section 5.4, "Reactor Coolant System Component and Subsystem Design"
Four Items: 5.4-1, 5.4-3, 5.4-6, 5.4-8
8. Information related to FSAR Section 5.4.1, "Steam Generators"
One Item: 5.4.1-1
9. Information related to FSAR Section 5.4.1.2, "Steam Generators – System Design"
Three Items: 5.4.1.2-4, 5.4.1.2-5, 5.4.1.2-7
10. Information related to FSAR Section 5.4.1.3, "Steam Generators – Performance Evaluation"
One Item: 5.4.1.3-1
11. Information related to FSAR Section 5.4.1.4, "Steam Generators – Tests and Inspections"
Two Items: 5.4.1.4-1, 5.4.1.4-2
12. Information related to FSAR Section 5.4.3, "Decay Heat Removal System"
Two Items: 5.4.3-1, 5.4.3-2
13. Information related to Licensing Technical Report, "Pressure and Temperature Limits Methodology"
Six Items: 5. PTLR-6, 5.PTLR-8, 5.PTLR-9, 5.PTLR-10, 5.PTLR-14, 5.PTLR-17

Chapter 6

1. Information related to FSAR Section 6.1, "Engineered Safety Feature Materials."
Two Items: 6.1.1-1 and A-6.1.1-8
2. Information related to FSAR Section 6.2, "Containment Structure."
One Item: 6.2-5

Chapter 8

1. Information related to FSAR Section 8.3, "Onsite Power Systems."
Eight Items: EDAS audit meeting Action Item 1, Item 2, Item 3, Item 4, Item 5, Item 6, Item 9, Item 14

Chapter 14

1. Information related to FSAR Section 14.2, "Initial Plant Test Program."
One Item: 14.2.12-1

2. Information related to FSAR Section 14.3, "Inspections, Tests, Analyses, and Acceptance Criteria."
One Item: 14.3.2-1
3. Information related to Part 8, Section 8 "Radioactive Waste Building."
Two Items: Part 8-2.7-1 and Part 8-3.12-5

Chapter 15

1. Information related to FSAR Section 15.0.2 "Review of Transient and Accident Analysis Methods"
One Item: 15.0.5-2
2. Information related to FSAR Section 15.2.7 "Loss of Normal Feedwater Flow"
One Item: 15.2.7-1
3. Information related to FSAR Section 15.4.3 "Control Rod Misoperation (System Malfunction or Operator Error)"
Two Items: 15.4.3-1, 15.4.3-2

Chapter 16

1. Information related to Generic Technical Specification 4.3, "Fuel Storage."
One Item: 16.4.3.1-1
2. Information related to Generic Technical Specification 3.4, "Reactor Coolant System"
Three Items: 16.3.4.7-1, 16.3.4-1, and 16.3.4.3-1
3. Information related to FSAR Chapter 16, "Technical Specifications."
Three Items: 16-3, 16-5, and 16-7
4. Information related to Generic Technical Specifications, Volume 1, Specifications, 1.1, "Definitions," and Generic Technical Specifications, Volume 2, Bases.
Two Items: 16-4 and 16-10
5. Information related to TR-101310-NP, "US460 Standard Design Approval Technical Specifications Development," Revision 0, Section 3.0.
Two Items: 16-6 and 16-9
6. Information related to Generic Technical Specification 5.5.4, "Steam Generator (SG) Program."
One Item: 16.5.5.04-1
7. Information related to Generic Technical Specification 3.0, "LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY."
Two Items: 16.3.0-1 and 16.3.0-2
8. Information related to Generic Technical Specification 1.1, "Definitions."
Two Items: 16.1.1-2 and 16.1.1-4
9. Information related to Generic Technical Specification 3.5.3, "Ultimate Heat Sink."
One Item: 16.3.5.3-1

10. Information related to Generic Technical Specification 3.3.1, "Module Protection System (MPS) Instrumentation."

Four Items: 16.3.3.1-1, 16.3.3.1-2, 16.3.3.1-5: Responses to items 2 and 3 only, and 16.3.3.1-6 (staff suggested words change)

11. Information related to Generic Technical Specification 3.5.1, "Emergency Core Cooling System (ECCS)."

Two Items: 16.3.5.1-1 and 16.3.5.1-2

12. Information related to Generic Technical Specification 3.3, "INSTRUMENTATION."

One Item: 16.3.3-1

13. Information related to Generic Technical Specification 5.6.4, "Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)."

Two Items: 16.5.6.4-1 and 16.5.6.4-2

14. Information related to Generic Technical Specification 5.5.6, "Explosive Gas and Storage Tank Radioactivity Monitoring Program."

One Item: 16.5.5.06-1

15. Information related to Generic Technical Specification 3.1.3, "Moderator Temperature Coefficient (MTC)."

One Item: 16.3.1.3-1 (including the correction discussed at the 4/4/2024 audit call)

16. Information related to Generic Technical Specification 3.1.9, "Boron Dilution Control."

Three Items: 16.3.1.9-1, 16.3.1.9-2, and 16.3.1.9-3

Chapter 17

1. Information related to FSAR Section 17.4, "Reliability Assurance Program."

One Item: 17.4-11 (response to 1st part)

Chapter 19

1. Information related to FSAR Section 19.1, "Probabilistic Risk Assessment."

Eight Items: 19.1-23, 19.1-30, 19.1-39, 19.1-41, 19.1-46, 19.1-51, 19.1-56: Responses to Questions 2 and 3 only, and 19.1-60

2. Information related to FSAR Section 19.2, "Severe Accident Evaluation."

One Item: 19.2-27

Non-LOCA

1. Information related to NuScale Topical Report: "Non-Loss-of-Coolant Accident Analysis Methodology," TR-0516-49416, Revision 0

Eleven Items: A-NonLOCA.LTR-4, A-NonLOCA.LTR-6, A-NonLOCA.LTR-7, A-NonLOCA.LTR-10, A-NonLOCA.LTR-12, A-NonLOCA.LTR-13, A-NonLOCA.LTR-14, A-NonLOCA.LTR-15, A-NonLOCA.LTR-16, A-NonLOCA.LTR-17, and A-NonLOCA.LTR-25.

DWO

1. Information related to TR-131981, "Methodology for the Determination of the Onset of Density Wave Oscillations (DWO)," Rev. 1

Four Items: DWO.LTR-33, DWO.LTR-46, DWO.LTR-58, DWO.LTR-64,
DWO.LTR-76

The information requested under each identifying number will be described in detail when NuScale submits the information for docketing as discussed in the audit.

If you have any questions, I can be reached at (301) 415-8013 or by email at Getachew.Tesfaye@nrc.gov.

Sincerely,

/RA/

Getachew Tesfaye, Senior Project Manager
New Reactor Licensing Branch
Division of New and Renewed Licenses
Office of Nuclear Reactor Regulation

Docket No: 05200050

cc: DC NuScale Power LLC Listserv

SUBJECT: AUDIT STATUS - THE STAFF REVIEW OF THE NUSCALE POWER, LLC STANDARD
DESIGN APPROVAL APPLICATION – NUSCALE US460
DATED: MAY 24, 2024

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