



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

April 24, 2018

MEMORANDUM TO: Samuel S. Lee, Chief  
Licensing Branch 1  
Division of New Reactor Licensing  
Office of New Reactors

FROM: Omid Tabatabai, Senior Project Manager **/RA/**  
Licensing Branch 1  
Division of New Reactor Licensing  
Office of New Reactors

SUBJECT: PHASE 2 AUDIT PLAN FOR THE AUDIT OF NUSCALE POWER,  
LLC DOCUMENTS RELATED TO THE COMPONENT DESIGN  
SPECIFICATIONS

On January 6, 2017, NuScale Power, LLC (NuScale) submitted a design certification (DC) application for a small modular reactor to the U.S. Nuclear Regulatory Commission (NRC) (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17013A229). The NRC staff started its detailed technical review of NuScale's DC application on March 15, 2017. In August 2017, the NRC staff completed the Phase 1 regulatory audit of NuScale design specifications and issued the Phase 1 audit report (ADAMS Accession No. ML18018A234) which summarizes the NRC staff's Phase 1 audit findings.

The purpose of the Phase 2 subject audit is to examine NuScale's updated design documentation pursuant to the NRC staff's Phase 1 audit findings. The audit will take place at NuScale's offices in Rockville, Maryland, and/or online via NuScale's electronic reading room. The audit is currently scheduled for May 14, 2018, through June 19, 2018. The audit plan is enclosed.

Docket No. 52-048

Enclosure:  
Audit Plan

cc w/encl.: DC NuScale Power, LLC Listserv

CONTACT: Omid Tabatabai, NRO/DNRL  
301-415-6616

SUBJECT: AUDIT PLAN FOR THE PHASE 2 AUDIT OF NUSCALE POWER, LLC  
 DOCUMENTS RELATED TO THE COMPONENT DESIGN SPECIFICATIONS  
 DATED: 4/24/2018

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**U.S. NUCLEAR REGULATORY COMMISSION**

**PHASE 2 AUDIT OF NUSCALE POWER, LLC COMPONENT DESIGN SPECIFICATIONS**

**DOCKET NO. 52-048**

**AUDIT PLAN**

**APPLICANT:** NuScale Power, LLC (NuScale)

**APPLICANT CONTACT:** Marty Bryan

**DURATION:** May 14, 2018 - June 19, 2018

**LOCATION:** NuScale Power, LLC  
11333 Woodglen Drive, Suite 205  
Rockville, Maryland 20852

NuScale Electronic Reading Room (eRR)

**AUDIT TEAM:** Tuan Le, Mechanical Engineer (NRC), Audit Team Lead  
Cheng-Ih (John) Wu, Mechanical Engineer (NRC)  
Thomas G. Scarbrough, Sr. Mechanical Engineer (NRC)  
James Strnisha, Mechanical Engineer (NRC)  
Shanlai Liu, Sr. Reactor Systems Engineer (NRC)  
Jason Huang, Mechanical Engineer (NRC)  
James Gilmer, Reactor Systems Engineer (NRO)  
Yiu Law, Mechanical Engineer (NRC)  
Michael Breach, Mechanical Engineer (NRC)  
Omid Tabatabai, Sr. Project Manager (NRC)

**I. BACKGROUND**

On March 15, 2017, the U.S. Nuclear Regulatory Commission (NRC) accepted and docketed a standard design certification application (DCA) submitted by NuScale Power, LLC (NuScale), to certify its small module reactor design (Reference 1).

Between June 1, 2017 and August 29, 2017, the NRC staff completed Phase 1 of the subject audit that included review and examination of NuScale's design documentation for the American Society for Mechanical Engineers (ASME) Code components, including valves, pumps, component supports, dynamic restraints, equipment seismic qualifications, and component classifications. The NRC staff's Phase 1 audit summary report is available in Agencywide Documents Access and Management System (ADAMS) under Accession No. ML18018A234.

This audit plan describes the NRC staff's plans for conducting Phase 2 of the audit of NuScale's documents related to its component design specifications.

Enclosure

## II. PURPOSE

The purpose of the audit is to verify that the appropriate changes have been made to the specifications that were identified and summarized in the NRC staff's Phase 1 audit report.

## III. REGULATORY AUDIT BASIS

The Phase 1 audit basis was to confirm that the NuScale component design, qualification, and classification are being performed consistent with the NuScale DC application and American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME BPV Code) and other referenced standards and NRC regulatory guides.

Title 10 of the *Code of Federal Regulations* (10 CFR), Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Section 47, "Contents of Applications; Technical Information," states the following:

*The application must contain a level of design information sufficient to enable the Commission to judge the applicant's proposed means of assuring that construction conforms to the design and to reach a final conclusion on all safety questions associated with the design before the certification is granted. The information submitted for a design certification must include performance requirements and design information sufficiently detailed to permit the preparation of acceptance and inspection requirements by the NRC, and procurement specifications and construction and installation specifications by an applicant. The Commission will require, before design certification, that information normally contained in certain procurement specifications and construction and installation specifications be completed and available for audit if the information is necessary for the Commission to make its safety determination.*

The NRC staff will conduct this audit in accordance with the guidance provided in NRO-REG-108, "Regulatory Audits" (Reference 2).

## IV. REGULATORY AUDIT SCOPE

The scope of the NRC staff's Phase 2 audit is to examine revision(s) to the design and equipment qualification for components categorized as ASME BPV Code, Section III, Class 1, 2, and 3 components, component supports, and core supports. The audit team will focus on the areas listed below:

- updated specifications that establish the design basis for safety-related, seismic and quality group classifications pertaining to risk-significant systems, and important to safety and safety-related components, and
- updates to the design documents, in which the applicant addresses the staff's phase 1 audit findings, and that component design meets the design criteria and that the analytical methods and functional provisions are in accordance with the commitments made in the application.

## V. DOCUMENTS/INFORMATION NECESSARY FOR THE AUDIT

The NRC staff requests NuScale to make the following documents available to the NRC staff in the NuScale eRR:

- Latest revisions of the design specifications of ASME BPV Code Class 1, 2, and 3 component, component supports and core supports including safety-related valves; and other pumps, valves, and snubbers determined to have high safety significance.
- The updated design specifications and stress calculation packages for components and component supports (pressure vessel, pumps, valves, and supports) of the following systems:
  - Reactor Coolant System Steam generator system;
  - Decay heat removal system;
  - Emergency core cooling system;
  - Chemical and Volume Control System;
  - Reactor Component Cooling Water System; and
  - Containment System.
- The updated design classification documents including processes, procedures of component classifications, and detailed piping and instrumentation diagrams that include the above listed systems, as well as designation of ASME BPV Code class and quality group, as applicable.
- The latest revisions of design specifications of the Reactor Recirculation Valves (RRVs) and Reactor Vent Valves (RVVs) including valve data, such as flow area and Cv requirements.

The NRC staff will be reviewing the NuScale resolution to Phase 1 audit findings; however, there may be a need to review additional data and calculations supporting the basis for the audit documents. The standard review plan (SRP) review areas are assigned to the following NRC staff:

- Tuan Le: SRP Section 3.2.1, "Seismic Classification," and SRP Section 3.2.2, "System Quality Group Classification."
- Jason Huang: DSRS Section 3.8.2, "Steel Containment."
- Cheng-Ih (John) Wu: SRP Section 3.9.3, "ASME Code Class 1, 2, and 3 Components and Component Supports, and Core Support Structures."
- Yiu Law: SRP Section 3.9.5, "Reactor Pressure Vessel Internals."
- Thomas Scarbrough and James Strnisha: SRP Section 3.9.6, "Functional Design, Qualification, and Inservice Testing Programs for Pumps, Valves, and

Dynamic Restraints,” and SRP Section 3.11, “Environmental Qualification of Mechanical and Electrical Equipment.”

- Michael Breach: SRP Section 3.10, “Seismic and Dynamic Qualification of Mechanical and Electrical Equipment.”
- Shanlai Liu and James Gilmer: RRV and RVV valve data.

Appropriate handling and protection of proprietary information shall be acknowledged and observed throughout the audit.

## **VI. SPECIAL REQUESTS**

The NRC staff requests that NuScale provide the technical staff with access to the audit documents. NuScale can upload the requested documents onto the NuScale eRR for the NRC staff’s review. During the audit, the NRC staff will have questions and discussion items for the NuScale subject matter experts. NuScale is requested to provide the NRC staff with telephone access to the NuScale subject matter experts. When the NRC staff’s review of the documents associated with a specific issue is complete, the staff will notify either the NRO Division of New Reactor Licensing, or NuScale that these documents can be removed from the eRR.

## **VII. AUDIT ACTIVITIES AND DELIVERABLES**

The NRC audit team will review the technical areas identified in Section V of this audit plan. Depending upon the effort needed in a given area, NRC team members may be reassigned to ensure adequate coverage of important technical elements.

The regulatory audit is currently scheduled to begin on May 14, 2018, and end on June 19, 2018. If the NRC staff determines the resolution of open items requires additional effort and time, a follow-up audit will be scheduled.

Within 90 days from the conclusion of the audit, the audit team will issue a publicly available audit summary report to the applicant.

The NRC project manager will coordinate with NuScale in advance of audit activities to verify specific documents and identify any changes to the audit schedule and requested documents. The audit entrance/exit meetings and weekly audit meeting are to be scheduled as follows:

- Entrance Meeting: May 14, 2018;
- Exit Meeting: TBD; and
- Weekly NRC Audit Team Meeting as needed: Wednesdays 11:00 AM – 12:00 PM EDT. Note: this meeting is reserved for the internal meeting of NRC audit team.

The NRC will hold bi-weekly audit teleconferences with NuScale to identify issues that have been closed or will be resolved by another mechanism, such as requests for additional information (RAIs) or public meetings. In the bi-weekly teleconferences, NRC will also identify any new emerging information needs as well as documents that can be removed from the eRR.

The NRC staff acknowledges the proprietary nature of the information requested. It will be handled appropriately throughout the audit. While the NRC staff will take notes, the NRC staff will not remove hard copies or electronic files from the audit site.

The audit outcome may be used to identify any additional information to be submitted for making regulatory decisions, and it will assist the NRC staff in the issuance of RAIs (if necessary) for the licensing review of NuScale final safety analysis report Chapter 3, and any related information provided in other chapters, in preparation of the NRC's Safety Evaluation Report.

If necessary, any circumstances related to the conductance of the audit will be communicated to Omid Tabatabai (NRC) at 301-415-6616, or email: [Omid.Tabatabai@nrc.gov](mailto:Omid.Tabatabai@nrc.gov).

#### **VIII. REFERENCES**

1. NRC Letter, "NuScale Power, LLC, – Acceptance of an Application for Standard Design Certification of a Small Modular Reactor," ADAMS Accession No. ML17074A087, March 23, 2017.
2. NRO-REG-108, "Regulatory Audits," ADAMS Accession No. ML081910260, April 2, 2009.
3. NuScale Standard Plant DCA, Revision 0, December 2016.
4. Summary Audit Report of NuScale Design Specifications, ML18018A234, January 25, 2018.