



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

December 13, 2018

MEMORANDUM TO: Samuel S. Lee, Chief
Licensing Branch 1
Division Licensing, Siting, and
Environmental Analysis
Office of New Reactors

FROM: Marieliz Vera, Project Manager */RA/*
Licensing Branch 1
Division Licensing, Siting, and
Environmental Analysis
Office of New Reactors

SUBJECT: PHASE 2 AUDIT PLAN FOR THE AUDIT OF NUSCALE POWER,
LLC., DOCUMENTS RELATED TO REACTOR INTERNALS
SEISMIC ANALYSIS

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 Number ML17013A229). The NRC staff started its detailed technical review of NuScale's DC application on March 15, 2017. In May 2017, the NRC staff completed the Phase 1 regulatory audit of NuScale Final Safety Analysis Report Section 3.9.2, "Dynamic Testing and Analysis of Systems, Components, and Equipment," and issued the Phase 1 audit report (ML18023A091) which summarizes the NRC staff's Phase 1 audit findings.

The purpose of the Phase 2 subject audit is to examine NuScale's reactor internals seismic analysis specifically related to the acoustic absorption analysis. 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 December 19, 2018. The audit plan is enclosed.

Docket No. 52-048

Enclosure:
Audit Plan

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

CONTACT: Marieliz Vera, NRO/DLSE
301-415-5861

SUBJECT: PHASE 2 AUDIT PLAN FOR THE AUDIT OF NUSCALE POWER, LLC.,
DOCUMENTS RELATED TO REACTOR INTERNALS SEISMIC ANALYSIS
DATED: December 13, 2018

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U.S. NUCLEAR REGULATORY COMMISSION**PHASE 2 AUDIT OF NUSCALE POWER, LLC., REACTOR INTERNALS SEISMIC ANALYSIS****DOCKET NO. 52-048****AUDIT PLAN**

APPLICANT: NuScale Power, LLC., (NuScale)

APPLICANT CONTACT: Marty Bryan

DURATION: December 19, 2018

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

NuScale Electronic Reading Room (eRR)

AUDIT TEAM: Yuken Wong (NRO, Audit Lead)
Timothy Lupold (NRO/MEB Branch Chief)
Stephen Hambric (NRC Consultant)
David Ma (NRC Consultant)
Marieliz Vera (NRO, Project Manager)

I. BACKGROUND

On March 15, 2017, the U.S. Nuclear Regulatory Commission (NRC) accepted and docketed a standard design certification application (DCA) (Reference 1) submitted by NuScale Power, LLC., (NuScale), to certify its small module reactor design (Reference 2).

Between May 16, 2017, and November 2, 2017, the NRC staff completed Phase 1 of the subject audit that included review and examination of NuScale's design documents, drawings, test plans, and test reports related to the reactor internals comprehensive vibration assessment program (CVAP) and NuScale power module (NPM) analysis for Service Level D (seismic in combination with pipe break events). The NRC staff's Phase 1 audit summary report is available in Agencywide Documents Access and Management System (ADAMS) under Accession Number ML18023A091 (Reference 3).

This audit plan describes the NRC staff's plans for conducting Phase 2 of the audit of NuScale's documents related to the reactor internals seismic analysis.

II. PURPOSE

The purpose of the audit is to review the NuScale Power Module seismic analysis to verify that the acoustic absorption analysis is appropriate. In TR-0916-51502, Revision 1, "NuScale Power Module Seismic Analysis" submitted to the NRC on October 2, 2018. NuScale discussed the calculation of acoustic absorption coefficient for the attenuation of acoustic loads at the interface between the pool water and the reactor building during a seismic event. To expedite access to the information, both NuScale and the NRC agreed that an audit would be the most expedient way to review the material.

III. REGULATORY AUDIT BASIS

Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, "Domestic Licensing of Production and Utilization Facilities," Appendix A, "General Design Criteria for Nuclear Power Plants," General Design Criterion 4, "Environmental and dynamic effects design bases" states the following:

Structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents. These structures, systems, and components shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit.

The NRC staff will conduct this audit in accordance with the guidance provided in the Office of New Reactors (NRO)-REG-108, "Regulatory Audits" (Reference 4).

IV. REGULATORY AUDIT SCOPE

The scope of the NRC staff's Phase 2 audit will focus on review the NuScale Power Module seismic analysis and finite element models to verify that the acoustic absorption coefficient is calculated appropriately. In TR-0916-51502, Revision 1, NuScale discusses the calculation of acoustic absorption coefficient for the attenuation of acoustic loads at the interface between the pool water and the reactor building during a seismic event.

V. DOCUMENTS/INFORMATION NECESSARY FOR THE AUDIT

The NRC staff requests NuScale to make documents, finite element models, and seismic analysis results available to the NRC staff in the NuScale eRR related to the reactor internals. A NuScale engineer familiar with these materials should be present at the audit and have access to a computer which can be used to examine modeling inputs and outputs.

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 (SME). NuScale is requested to provide the NRC staff with telephone access to the NuScale SMEs. 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 Division Licensing, Siting, and Environmental Analysis project manager, 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 IV 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 for December 19, 2018. If the NRC staff determines that 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: December 19, 2018.
- Exit Meeting: January 3, 2019.

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 Marieliz Vera (NRC) at 301-415-5861, or email: Marieliz.Vera@nrc.gov.

VIII. REFERENCES

1. NRC Letter, "NuScale Power, LLC, – Acceptance of an Application for Standard Design Certification of a Small Modular Reactor," ML17074A087, issued March 23, 2017.
2. NuScale Standard Plant DCA, Revision 0, issued December 2016.
3. Audit Summary Report of NuScale Reactor Internals Comprehensive Vibration

Assessment Program and Seismic Analysis, ML18023A091, issued February 5, 2018.

4. NRO-REG-108, "Regulatory Audits," ML081910260, issued April 2, 2009.