

July 12, 2017

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

FROM: Bruce M. Bavol, Project Manager */RA/*  
Licensing Branch 1  
Division of New Reactor Licensing  
Office of New Reactors

SUBJECT: AUDIT PLAN FOR THE REGULATORY AUDIT OF NUSCALE  
POWER, LLC TOPICAL REPORT-0915-17564, REVISION 1,  
"SUBCHANNEL ANALYSIS METHODOLOGY"

NuScale Power, LLC (NuScale) submitted letter dated February 15, 2017, (Agencywide Documents Access and Management System Accession No. ML17046A333), Topical Report (TR)-0915-17564, Revision 1, "Subchannel Analysis Methodology." The U.S. Nuclear Regulatory Commission (NRC) staff started its detailed technical review of the NuScale TR on January 4, 2017.

The purpose of the NRC's regulatory audit of NuScale's TR is to: (1) gain a better understanding of the bases underlying the NuScale Subchannel Analysis Methodology and confirm the staff's understanding; (2) better understand if the methodology meets NRC regulations and conforms to any applicable regulatory guidance; and; (3) develop requests for additional information.

The audit entrance will be held on July 12, 2017, via conference call. The contents of the audit plan are provided as an enclosure.

Project No.: 0769

Enclosure:  
Audit Plan

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

CONTACT: Bruce M. Bavol, NRO/DNRL  
301-415-6715

SUBJECT: AUDIT PLAN FOR THE REGULATORY AUDIT OF NUSCALE POWER, LLC  
TOPICAL REPORT-0915-17564, REVISION 1, "SUBCHANNEL ANALYSIS  
METHODOLOGY" DATED

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ADAMS Accession No: ML17193A276

\*via email

NRO-002

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DATE	7/12/2017	7/12/2017	7/12/2017

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**UNITED STATES NUCLEAR REGULATORY COMMISSION**  
**AUDIT PLAN FOR THE REGULATORY AUDIT OF**  
**NUSCALE POWER, LLC TOPICAL REPORT-0915-17564, REVISION 1,**  
**“SUBCHANNEL ANALYSIS METHODOLOGY”**  
**PROJECT NO. 0769**

**AUDIT PLAN**

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

**APPLICANT CONTACTS:** Jennie Wike  
Darrell Gardner  
Steven Mirsky

**DURATION:** Stage 1: July 12, 2017, through August 14, 2017  
Stage 2: November 3, 2017, through March 15, 2018

**LOCATION:** **U.S. Nuclear Regulatory Commission Headquarters  
(via NuScale’s electronic reading room (eRR))**  
Two White Flint North  
11545 Rockville Pike  
Rockville, MD 20852-2738

**NuScale, (Rockville)**  
11333 Woodglenn Drive.  
Suite 205  
Rockville, MD 20852

**AUDIT TEAM:** Matt Thomas, NRO  
Syed Haider, NRO  
Joe Kelly, RES  
Bruce Bovol, NRO, Project Manager

**I. BACKGROUND AND OBJECTIVES**

NuScale submitted by a letter dated February 15, 2017, to the U.S. Nuclear Regulatory Commission (NRC) a Topical Report (TR) in support of its Design Certification application of the NuScale design (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17046A333).

To facilitate the NRC staff’s evaluation of this TR, the NRC staff is planning the following:

- An audit entrance meeting on July 12, 2017, via conference call. The audit stages are aligned with the staff’s review schedule. The audit is expected to primarily be

**Enclosure**

performed via the NuScale eRR or, if necessary, at NuScale's Rockville office. During this audit, the NRC staff will examine the documents and calculation notes which support the applicant's statements in the TR.

The objectives of this audit are for the NRC staff to:

- gain a better understanding of the bases underlying the NuScale Subchannel Analysis Methodology and confirm the staff's understanding;
- better understand if the methodology meets NRC regulations and conforms to any applicable regulatory guidance; and,
- develop requests for additional information (RAIs).

The NRC staff determined efficiency gains would be realized by auditing documents that support the methodology presented in the TR to inform RAIs. During the audit and interactions with the applicant, the NRC staff may issue detailed RAIs separate from, but informed by, the audit.

## **II. REGULATORY AUDIT BASIS**

Title 10 of the *Code of Federal Regulations* Part 50, Appendix A, General Design Criterion 10, "Reactor Design," states that:

*The reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences.*

An audit is needed to confirm the basis for the safety conclusions made in the applicant's TR.

## **III. REGULATORY AUDIT SCOPE**

The scope of this audit includes information, documents, and supporting calculations related to the Subchannel Analysis Methodology TR. In addition to the initial set of audit documents and information requested in Attachment A, the Office of New Reactors (NRO) and RES staff may request other information too as needed to achieve audit objectives. These documents will be listed as references in the audit report prepared by the staff following the conclusion of the audit.

## **IV. SPECIAL REQUESTS**

The NRC staff requests the documents listed in Attachment A be available to the NRC auditors in NuScale's eRR. Use of the eRR allows multiple auditors in different geographic locations to examine the same document at the same time, which improves the efficiency and reduces the cost of the audit. Additional documents may be identified as the review progresses. When the staff's review of the documents associated with a specific issue is complete, the staff will notify either the NRC's Division of New Reactor Licensing or NuScale that these documents can be removed from eRR, thereby minimizing their residence time in eRR.

In addition, the NRC staff may request in-person audit meetings with NuScale personnel to facilitate the staff's understanding of material associated with the audit. Such meetings will be scheduled based on mutual availability. The NRC staff requests that document titles identified

by the NRC staff that are germane to an in-person audit meeting be made available in the eRR prior to any scheduled in-person audit meeting.

## **V. AUDIT ACTIVITIES AND DELIVERABLES**

The NRC audit team is expected to consist of the aforementioned individuals covering the technical areas affecting the TR covered by the requests in Attachment A. The NRC staff will conduct this audit in accordance with the guidance provided in NRO-REG-108, "Regulatory Audits" (Reference 2). The NRC staff acknowledges the proprietary nature of the information requested and will handle it 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(s).

The audit will initiate on July 12, 2017. The audit will consist of two stages, each aligning with the staff's review schedule and expected RAI schedule. The review of the majority of the Attachment A documents is expected to be complete by the end of Stage 1 and will help the staff develop any RAIs. The documents needed for Stage 2 will be identified at the end of Stage 1 and also include the documents identified in Attachment A, which will help the staff evaluate any RAI responses.

Stage 2 is expected to result in the closure of the remaining audit items and may include additional items related to RAI responses, as necessary. If additional items are identified late in Stage 2, which could include items related to RAI responses or design changes, the audit plan may be revised to include additional stages to address these specific identified items, or a new audit plan may be generated. An audit report will be generated upon completion of the audit and will be published in the NRC's ADAMS.

During each stage, the NRC will hold status calls and/or meetings with NuScale to identify issues and the closure of such issues every 30 days or as necessary. In the meetings, NRC will also identify any new emerging information needs as well as documents that can be removed from eRR.

The audit will assist the NRC staff in the issuance of RAIs (if necessary) for the licensing review of the TR in preparation of the NRC staff's safety evaluation.

If necessary, any concerns related to the conduct of the audit will be communicated to Bruce Bavol, NRC at 301-415-6715 or [Bruce.Bavol@nrc.gov](mailto:Bruce.Bavol@nrc.gov).

## **REFERENCES**

1. Letter from NuScale Power, LLC, "NuScale Power, LLC Proprietary Marking Changes to 'Subchannel Analysis Methodology' topical report," Revision 1, February 15, 2017 ADAMS Accession No. ML17046A333.
2. NRO-REG-108, "Regulatory Audits," April 2, 2009, ADAMS Accession No. ML081910260

**Attachment A – Requested Documents**

- ER-0000-2337 Subchannel Analysis Methodology
- EC-0000-2347 Steady-State Subchannel Analysis
- EC-0000-3633 VIPRE-01 Two-Phase Flow Models and Correlations
- EC-0000-2265 Subchannel Analysis Base model
- EC-0000-3369 Subchannel Application Parametric Sensitivity Analysis
- EC-0000-4696 Subchannel Input Sensitivity Analysis
- EC-0000-4296 VIPRE-01 Heat Transfer Correlations