



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

January 7, 2019

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

FROM: Omid Tabatabai, Senior Project Manager /RA/  
Licensing Branch 1  
Division of Licensing, Siting,  
and Environmental Analysis  
Office of New Reactors

SUBJECT: REGULATORY AUDIT OF NUSCALE POWER, LLC, NON-  
DOCKETED INFORMATION IN SUPPORT OF THE U.S. NUCLEAR  
REGULATORY COMMISSION STAFF'S REVIEW OF NUSCALE  
DESIGN CERTIFICATION APPLICATION, PART 2, CHAPTER 20,  
"MITIGATION OF BEYOND-DESIGN-BASIS EVENTS"

By letter dated December 31, 2016, NuScale Power, LLC., (NuScale) submitted to the U.S. Nuclear Regulatory Commission (NRC), a Design Control Document for its Design Certification (DC) application of the NuScale design (Agencywide Documents Access and Management System Accession Number ML17013A229). In support of the NRC staff's review of NuScale's response to the staff's request for additional information (RAI) 9486, the NRC staff plans to audit NuScale's non-docketed information to: (1) gain a better understanding of NuScale's assumptions used to prepare its response to RAI 9486; (2) verify information; and (3) identify information that will require docketing to support the basis of the licensing or NRC staff's regulatory decision. Enclosed is the Audit Plan.

Docket No. 52-048

Enclosure:  
As stated

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

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

SUBJECT: REGULATORY AUDIT OF NUSCALE POWER, LLC, NON-DOCKETED  
INFORMATION IN SUPPORT OF THE U.S. NUCLEAR REGULATORY  
COMMISSION STAFF'S REVIEW OF NUSCALE DESIGN CERTIFICATION  
APPLICATION, PART 2, CHAPTER 20, "MITIGATION OF BEYOND-DESIGN-  
BASIS EVENTS" DATED: January 7, 2019

**DISTRIBUTION:**

PUBLIC

LB1 R/F

SLee, NRO

OTabatabai, NRO

RidsOgcMailCenter

RKaras, NRO

GCranston, NRO

JBudzynski, NRO

ABradford, NRO

RTaylor, NRO

RidsAcrsAcnwMailCenter

RidsNroDsra Resource

RidsNroLACSmith

NuScale DC Listserv

**ADAMS Accession No: ML18348B076****\*via email****NRO-002**

OFFICE	NRO/DLSE/LB1: PM	NRO/DLSE/LB1: LA	NRO/DLSE/LB1
NAME	OTabatabai	CSmith*	OTabatabai (signed)
DATE	12/17/2018	12/31/2018	01/07/2019

**OFFICIAL RECORD COPY**

**UNITED STATES NUCLEAR REGULATORY COMMISSION**  
**AUDIT PLAN FOR THE REGULATORY AUDIT OF**  
**NUSCALE POWER, LLC., DESIGN CERTIFICATION APPLICATION**  
**CHAPTER 20, "MITIGATION OF BEYOND-DESIGN-BASIS EVENTS"**  
**RAI 9486 RESPONSE**  
**DOCKET NO. 52-048**

**AUDIT PLAN**

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

**APPLICANT CONTACT:** Carrie Fosaaen

**DURATION:** December 17, 2018, thru January 11, 2019

**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 Power, LLC  
11333 Woodglenn Drive  
Suite 205  
Rockville, MD 20852

**AUDIT TEAM:** John Budzynski (NRO, Audit Lead)  
Jeffrey Schmidt (NRO)  
Rebecca Karas (NRO/SRSB, Branch Chief)  
Donald Palmrose (NRO)  
Timothy Drzewiecki (NRO)  
Carl Thurston (NRO)  
Ryan Nolan (NRO)  
Omid Tabatabai (NRO, Senior Project Manager)

**I. BACKGROUND AND OBJECTIVES**

By a letter dated December 31, 2016, NuScale Power, LLC., (NuScale) submitted to the U.S. Nuclear Regulatory Commission (NRC), a Final Safety Analysis Report (FSAR) for its Design Certification (DC) application of the NuScale design (Agencywide Documents Access and Management System (ADAMS) Accession Number ML17013A229). The NRC staff initiated the DC review on March 27, 2017.

To facilitate the NRC staff's evaluation of information supporting the FSAR, and to complete its safety review of portions of FSAR Chapter 20, "Mitigation of Beyond-Design-Basis Events," and TR-0816-50797, "Mitigation Strategies for Extended Loss of AC Power Event;" pertaining to the

Enclosure

station blackout (SBO) transient analysis, the NRC staff is planning an audit to further evaluate NuScale's response to RAI 9486, Question 20.01-17. The audit entrance meeting is scheduled to be held on December 17, 2018, at NuScale's Rockville, Maryland office.

The audit is expected to primarily be performed via the NuScale eRR or, if necessary, at NuScale's Rockville, Maryland office. During this audit, the NRC staff will examine the documents referenced and analyses mentioned in the FSAR, but not specifically cited, to support the applicant's RAI response statements related to RAI 9486, Question 20.01-17.

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

1. gain a better understanding of the detailed calculations, analyses, and bases underlying NuScale's SBO transient analysis thermal-hydraulic parameters of specific time frames during the first 72 hours,
2. better understanding of the methodology and analysis supporting NuScale's response that the during equilibrium ECCS operation, the water levels in the riser, downcomer, and containment vessel (CNV) are all closely coupled with oscillations in the downcomer level to cause corresponding oscillations in the reactor recirculation valve (RRV) liquid flow rate with flow reversal and, if necessary,
3. develop requests for additional information (RAI).

The NRC staff determined efficiency gains would be realized by auditing documents that support the analysis presented in the FSAR to inform supplemental RAIs. During the audit and interactions with the applicant, the NRC staff may issue detailed RAIs separate from, but informed by, the audit. The staff will apply its enhanced safety focused review approach during the audit, and apply audit resources commensurate with the safety/risk significance of the area being audited.

## **II. REGULATORY AUDIT BASIS**

Title 10 of the *Code of Federal Regulations*, Section 52.47(a)(2), states that a DC application must contain an FSAR that includes:

*A description and analysis of the structures, systems, and components (SSCs) of the facility, with emphasis upon performance requirements, the bases, with technical justification therefor, upon which these requirements have been established, and the evaluations required to show that safety functions will be accomplished.*

JLD-ISG-2012-01 states: Section 3.2.1.7 of Nuclear Energy Institute (NEI) 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 2, specifies that strategies "that have a time constraint to be successful should be identified and a basis provided that the time can reasonably be met."

Also, NEI 12-06, Section 3.2.1, "General Criteria and Baseline Assumptions," provides the general criteria and assumptions to be used in establishing the baseline coping strategy. Past regulatory precedence have included the need for reactor designs, including other passive designs, to demonstrate the success of the strategies or include the ability to indicate core conditions.

An audit is needed to confirm the basis for the safety conclusions made in the applicant's Chapter 20 mitigation strategies for extended loss of AC power transient analyses based on the SBO transient analysis.

### **III. REGULATORY AUDIT SCOPE**

The scope of this audit includes information, documents, and supporting calculations related to the FSAR Chapter 20 transient analyses for the mitigation strategies for extended loss of AC power and referenced SBO transient analyses. In addition to the initial set of audit documents and information requested in Attachment A, the NRC staff may request other information 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 eRR allows multiple NRC staff reviewers 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 NuScale that these documents can be removed from the eRR, thereby minimizing their residence time in the eRR.

In addition, the NRC staff may request in-person audit meetings with NuScale personnel to facilitate the staff's understanding of material to be audited. 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. REQUESTED DOCUMENTS**

1. EC-0000-3070, "Station Blackout Analysis" and any other documentation which supports the development of this document.
2. ER\_0000\_00003573\_00, "Extended Loss of Alternating Current Power Assessment" and any other documentation which supports the development of this document.

### **VI. AUDIT ACTIVITIES AND DELIVERABLES**

The NRC audit team is expected to consist of aforementioned individuals covering the technical areas affecting Chapter 20 FSAR Sections 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 assist the NRC staff in the issuance of RAIs (if necessary) for the licensing review of the FSAR Sections identified above in preparation of the NRC staff's safety evaluation.

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

**VII. REFERENCES**

1. Letter from NuScale Power, LLC, "NuScale Power, LLC Submittal of the NuScale Standard Plant Design Certification Application," December 31, 2016 (ML17013A229).
2. RAI Response, "NuScale Response to NRC Request for Additional Information eRAI No. 9486" (ML18179A530).
3. NRO-REG-108, "Regulatory Audits," April 2, 2009 (ML081910260).