



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

September 24, 2018

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

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

SUBJECT: SUMMARY OF THE AUGUST 15, 2018, CATEGORY 1 PUBLIC  
TELECONFERENCE WITH NUSCALE POWER, LLC DESIGN  
TO DISCUSS CERTIFICATION APPLICATION SECTION, 3.9.6,  
"FUNCTIONAL DESIGN, QUALIFICATION, AND INSERVICE  
TESTING PROGRAMS FOR PUMPS, VALVES, AND DYNAMIC  
RESTRAINTS"

The U.S. Nuclear Regulatory Commission (NRC) held a Category 1 public teleconference on August 15, 2018, to discuss Final Safety Analysis Report (FSAR) Tier 2, Chapter 3, "Design of Structures, Systems, Components and Equipment," Sections 3.9.6, "Functional Design, Qualification, and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints," of the NuScale Power, LLC (NuScale) Design Certification. Participants included personnel from NuScale and members of the public.

The public meeting notice can be found in the Agencywide Documents Access and Management Systems under Accession No. ML18226A167. This meeting notice was also posted on the NRC public website.

The meeting agenda and list of participants can be found in Enclosures 1 and 2, respectively.

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

**Summary:**

During a public meeting on August 15, 2018, NuScale representatives described their plans to address the NRC findings from the audit of the NuScale emergency core cooling system (ECCS) valve design provided in the NRC audit report dated August 14, 2018 (ADAMS Accession No. ML18219B634). The public meeting included the following discussion topics:

**Partial Open ECCS Valve Failure Mode**

NuScale described its plans to demonstrate that tilting of the main valve disc is not credible during valve operation, and to complete its preliminary calculations for the performance of the main valve upon partial opening. The NRC staff noted that the NuScale plans should address the following aspects to resolve this audit finding:

- a. The main valve needs to be demonstrated to not be subject to tilting that could cause binding during valve actuation by the opening flow for the reactor vent valve (RVV) and reactor recirculation valve (RRV), including diffuser turbulent flow for the RVV.
- b. The pressure drop in the main valve control chamber upon operation of the inadvertent actuation block (IAB) valve needs to be evaluated to demonstrate that the main valve will not open prematurely.
- c. The preliminary calculations of the performance of the main valve upon partially opening need to be completed and verified with justification by analysis or testing as necessary, including demonstrating that the main valve will fully close or fully open in a timely manner in the event of a partial open condition.
- d. The verification activities to demonstrate that a partial open failure mode of the ECCS valve is not credible need to be finalized as quality assurance (QA) products that are available for NRC staff review.

Based on this discussion, the NRC staff indicated that the NuScale plans appear to address the NRC audit findings for the partial open failure mode for the ECCS Valve.

**Design Performance Testing**

NuScale described its plans to re-perform the proof-of-concept (POC) testing for the ECCS Valve design as follows:

- a. The POC test fluid conditions will be consistent with the full range of reactor temperature and pressure conditions, and boration concentration levels, for the 2-inch RRV. The fluid conditions will be sufficient to also cover the range of conditions for the RVV.
- b. The length, volume, and elevation of the connecting tubing of the POC test valves will be consistent with the actual reactor installation.
- c. The POC testing will not be performed to determine the reliability values to support the passive component assumption for the IAB valve.
- d. The POC test instrumentation will be controlled by the QA program.

- e. The internal dimensions of the POC test equipment will be verified to be consistent with the actual design of the ECCS valve system.
- f. The results of the POC testing for the RRV will be extrapolated where justified to the fluid conditions and functions for the 5-inch RVV to support the design demonstration for the NuScale design certification application.

During the public meeting, NuScale indicated that it might use the previous POC test valves or the final design test valves depending on the schedule for the new POC testing. NuScale will determine whether the new POC testing will provide the full design demonstration for the ECCS valves, or whether some aspect of the previous POC testing will be referenced as part of the design demonstration. For example, if the new POC testing does not include low temperature ranges, NuScale might need to use the initial POC test data to demonstrate the low temperature overpressure protection (LTOP) capability of the ECCS valves, including resolution of the Office of New Reactors (NRO) vendor inspection items. As part of the new POC testing, NuScale will demonstrate that the IAB valve performs its safety function to close and re-open in accordance with the specific time provisions.

The NRC staff indicated that these plans appear to address the ECCS Valve audit findings regarding the design demonstration testing for the NuScale design certification.

#### NuScale ECCS Valve Failure Modes and Effects Analysis, Technical Reports, and Initial Audit Responses

The NRC staff and NuScale discussed the individual findings listed in the NRC audit report regarding the NuScale ECCS Valve Failure Modes and Effects Analysis (FMEA), technical reports, and initial ECCS Valve audit. Based on the discussion, the NRC staff considers the NuScale plans to update the FMEA and technical reports appear to address the audit report findings. The NRC staff and NuScale might discuss specific items in a future telephone meeting.

#### Next Steps

The NRC staff stated that the phase 4 public milestone for the NRC safety evaluation report for the NuScale design certification application is December 12, 2019. To support this public milestone date, the NRC staff stated that data from the new POC testing will be needed by mid-July at the latest. To meet the NRC staff internal milestone date of May 2019, the test data would be needed in February 2019.

By September 21, 2018, NuScale will submit a letter describing its plans to address the NRC findings from its review of the NuScale ECCS Valve design audit report dated August 14, 2018. The NuScale letter will address (1) the evaluation of the partial open failure mode of the NuScale ECCS Valve; (2) the performance of the new POC testing; and (3) updating of the FMEA and technical reports to resolve the audit report findings. NuScale might request a telephone meeting as it prepares the planned letter to clarify any specific items.

Docket No. 52-048

Enclosures:

1. Meeting Agenda
2. List of Attendees

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

SUBJECT: SUMMARY OF THE AUGUST 15, 2018, CATEGORY 1 PUBLIC TELECONFERENCE WITH NUSCALE POWER, LLC TO DISCUSS DESIGN CERTIFICATION APPLICATION SECTION 3.9.6 "FUNCTIONAL DESIGN, QUALIFICATION, AND INSERVICE TESTING PROGRAMS FOR PUMPS, VALVES, AND DYNAMIC RESTRAINTS" DATE: September 24, 2018

**DISTRIBUTION:**

PUBLIC

Reading File

MVera, NRO

MMoore, NRO

TLupold, NRO

TScarborough, NRO

RNolan, NRO

RidsOgcMailCenter

RidsAcrcAcnwMailCenter

RidsNroDnrl

**ADAMS Accession No.: ML18260A263****\*via email****NRC-002**

<b>OFFICE</b>	NRO/DLSE/LB1: PM	NRO/DLSE/LB1: LA	NRO/DNRL/LB1: PM
<b>NAME</b>	MVera	MMoore	MVera
<b>DATE</b>	09/17/2018	09/19/2018	09/24/2018

**OFFICIAL RECORD COPY**

**U.S. NUCLEAR REGULATORY COMMISSION**

**CATEGORY 1 PUBLIC TELECONFERENCE WITH NUSCALE POWER, LLC TO DISCUSS  
DESIGN CERTIFICATION APPLICATION SECTION 3.9.6, “FUNCTIONAL DESIGN,  
QUALIFICATION, AND INSERVICE TESTING PROGRAMS FOR PUMPS, VALVES, AND  
DYNAMIC RESTRAINTS”**

**August 15, 2018**

**2:30 p.m. – 3:30 p.m.**

**AGENDA**

<b>Public Meeting</b>	
2:30-2:35pm	Welcome and Introductions
2:35-3:20pm	Technical discussion
3:20-3:30pm	Public – Questions and Comments

**U.S. NUCLEAR REGULATORY COMMISSION****CATEGORY 1 PUBLIC TELECONFERENCE WITH NUSCALE POWER, LLC TO DISCUSS****DESIGN CERTIFICATION APPLICATION SECTION 3.9.6, “FUNCTIONAL DESIGN,****QUALIFICATION, AND INSERVICE TESTING PROGRAMS FOR PUMPS, VALVES, AND****DYNAMIC RESTRAINTS”****LIST OF ATTENDEES****August 15, 2018**

<b>NAME</b>	<b>AFFILIATION</b>
Marieliz Vera	U.S. Nuclear regulatory Commission (NRC)
Timothy Lupold	NRC
Thomas Scarbrough	NRC
Ryan Nolan	NRC
Shanlai Lu	NRC
Jeffrey Schmidt	NRC
Marty Bryan	NuScale Power, LLC (NuScale)
Zack Houghton	NuScale
Scott Harris	NuScale
Daniel Lassiter	NuScale
Colin Sexton	NuScale
Greg Myers	NuScale
Nadja Joergensen	NuScale
Sarah Fields	Public