

July 19, 2017

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: SUMMARY OF JUNE 28, 2017, CLOSED MEETING WITH
NUSCALE POWER, LLC, TO DISCUSS STAFF'S QUESTIONS
RELATED TO CHAPTER 20, "MITIGATION OF BEYOND
DESIGN BASIS EVENTS," OF THE NUSCALE DESIGN
CERTIFICATION APPLICATION (DOCKET NO. 52-048)

On June 28, 2017, representatives of the U.S. Nuclear Regulatory Commission (NRC) and NuScale Power, LLC, (NuScale) held a closed meeting at the NuScale Offices located at 11333 Woodglen Ave., Rockville, Maryland 20852. The purpose of these meetings was to discuss staff's questions related to Chapter 20, "Mitigation of Beyond Design Basis Events," of NuScale's design certification application (DCA). A complete copy of NuScale's DCA is available on the NRC public Webpage at <https://www.nrc.gov/reactors/new-reactors/design-cert/nuscale/documents.html>.

Enclosure 1, "NRC Staff Questions and Meeting Conclusion" captures NRC staff questions that were discussed during the meeting and the meeting conclusion.

The agenda and list of meeting attendees are included in Enclosures 2 and 3, respectively. The meeting notice is available in the NRC's Agencywide Documents Access and Management System under Accession No. ML17172A230.

Docket No.: 52-048

Enclosures:

1. NRC Staff Questions and Meeting Conclusion
2. Meeting Agenda
3. List of Attendees

cc: NuScale DC Listserv

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

SUBJECT: SUMMARY OF JUNE 28, 2017, CLOSED MEETING WITH NUSCALE POWER, LLC, TO DISCUSS STAFF'S QUESTIONS RELATED TO CHAPTER 20, "MITIGATION OF BEYOND DESIGN BASIS EVENTS," OF THE NUSCALE DESIGN CERTIFICATION APPLICATION (DOCKET NO. 52-048)
 DATE: 7/19/2017

DISTRIBUTION:

PUBLIC
 Reading File
 CLi, NRO
 DPalmrose, NRO
 JBudzynski, NRO
 CAshley, NRO
 OTabatabai, NRO
 ADias, NRO
 FAKstulewicz, NRO
 SLee, NRO
 RidsAcrsAcnwMailCenter
 RidsNroDnrLb1
 RidsOgcMailCenter
 NuScale DC Listserv
 RidsNroDnrl

ADAMS Accession No.: ML17192A231 *via email NRC-001

OFFICE	NRO/DNRL/LB1: PM	NRO/DNRL/LB1: LA	NRO/DSRA/SPSB: BC	NRO/DNRL/LB1: PM
NAME	OTabatabai	SGreen*	ADias*	OTabatabai (sign)
DATE	7/11/2017	7/11/2017	7/19/2017	7/19/2017

OFFICIAL RECORD COPY

U.S NUCLEAR REGULATORY COMMISSION
STAFF QUESTIONS AND MEETING CONCLUSION

1. TR-0816-50797, "Mitigation Strategies for Extended Loss of AC Power Event," Section 6.5.1, "Core Cooling," indicates that in preparation for refueling, the most restrictive core cooling conditions for a nuclear power module (NPM) in transition occurs when the NPM is lifted to the maximum lift height and an extended loss of AC power (ELAP) occurs during this brief period of time when the NPM in transition is lifted to the maximum lift height. The ultimate heat sink (UHS) is intended to provide sufficient decay heat removal to maintain safe shutdown conditions for a sufficient duration from the ELAP event. The staff noticed that under this condition the NuScale passive core cooling systems being used for mitigation strategies such as decay heat removal system (DHR) and emergency core cooling system (ECCS) are no longer available for the NPM being lifted, and a significant portion of this NPM is not submerged in the UHS pool. The applicant was requested to provide the heat removal analysis including the methodology, major assumptions, and results that supports the above statement regarding sufficient decay heat removal.

2. NEI 12-06, Revision 2, Section 3.2.2, "Minimum Baseline Capabilities," Paragraph 17 indicates that the FLEX fluid connections for core and SFP cooling functions are expected to have a primary and an alternate connection or delivery point. FSAR Tier 2, Section 20.1.2.2 states that a robust makeup line with an external connection point for providing inventory to the SFP is available to support spent fuel pool (SFP) makeup following a beyond design basis external events (BDBEE.) The applicant was asked to clarify the NuScale design relative to this Nuclear Energy Institute (NEI) guidance (one connection vs. two connections), or justify the differences, if any.

With respect to question 1, the U.S. Nuclear Regulatory Commission (NRC) staff reviewed NuScale's additional calculations (described in a proprietary document, EC-A030-4366, Revision 1) related to keeping the NPM (and its content) sufficiently cool while the module is held up by the crane during an ELAP event. From a heat sink point of view, the staff believes there is enough water in the pool to keep the NPM cool for an extend period of time, if necessary. The staff, however, believes further interactions with NuScale may be warranted to better understand NuScale's analysis and the assumptions used for deriving temperature conditions inside the NPM as well as the height of the water in the containment annulus. This is due to the fact that NuScale used a one-dimensional radial heat transfer approach and assumed convection as the only means of heat transfer wherever water is present (e.g., the annulus region between the core and the containment). Additionally, the staff is concerned that the use of Churchill & Chu correlation to account for heat removal through convection may be inappropriate.

With respect to question 2, the staff informed NuScale that a formal request for additional information (RAI) would be submitted to NuScale to obtain the information that the staff needs to continue with the review of NuScale design certification application, Chapter 20. On July 10, 2017, the NRC staff issued a RAI No. 8923, and requested NuScale to explain how its design is consistent with the NEI guidance relating to having a primary and an alternate connection or delivery point for SFP makeup. The staff will evaluate NuScale's response once received.

MEETING AGENDA

Wednesday, June 28, 2017

<u>Time</u>	<u>Topic</u>
10:00 – 10:15 am	Meeting Introductions
10:15 – 11:00 am	Review of NuScale Power, LLC Nuclear Power Module Heat Removal Analysis/Calculations
11:00 – 11:45 am	Discussion of U.S. Nuclear Regulatory Commission Staff's Questions
11:45 – 12:00 pm	Meeting Summary and Conclusion

LIST OF ATTENDEES

Wednesday, June 28, 2017

NAME	AFFILIATION
Omid Tabatabai	NRC/NRO
Don Palmrose	NRC/NRO
Antonio Dias	NRC/NRO
Chang Li	NRC/NRO
John Budzynski	NRC/NRO
Dustin Greenwood	NuScale
Christopher Maxwell	NuScale
Steven Mirsky	NuScale
Steven Unikewicz	NuScale