



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

April 7, 2020

MEMORANDUM TO: Michael I. Dudek, Chief  
New Reactor Licensing Branch  
Division of New and Renewed Licenses  
Office of Nuclear Reactor Regulation

FROM: Marieliz Johnson, Project Manager */RA/*  
New Reactor Licensing Branch  
Division of New and Renewed Licenses  
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF THE MARCH 9, 2020, CATEGORY 1 PUBLIC  
TELECONFERENCE WITH NUSCALE POWER, LLC TO  
DISCUSS THE EMERGENCY CORE COOLING SYSTEM  
BORON DISTRIBUTION OF THE DESIGN CERTIFICATION  
APPLICATION

On March 9, 2020, representatives from the U.S. Nuclear Regulatory Commission (NRC) and NuScale Power, LLC (NuScale), held a Category 1 public teleconference to discuss NuScale's Emergency Core Cooling System (ECCS) Boron Distribution of the Design Certification Application. Participants included personnel from the NRC, NuScale and a member of the public.

The public meeting notice can be found in the Agencywide Documents Access and Management Systems under Accession Number ML20063K550. This meeting notice was also posted on the NRC public website located at <https://www.nrc.gov/reactors/new-reactors/design-cert/nuscale/documents.html>.

The Meeting Agenda, List of Attendees and NuScale's Presentation Slides can be found in Enclosures 1, 2 and 3, respectively.

During the teleconference, NuScale discussed its presentation (Enclosure 3). NuScale explained that the NuScale design can experience redistribution of boron under ECCS operation. To address this phenomenon, NuScale performed an evaluation, summarized in FSAR Section 15.0.6.1 and the response to RAI 8930 (ML19332A120), which the NRC staff reviewed and summarized in Section 15.0.6 of its Phase 4 Safety Evaluation Report, that demonstrated that boron would concentrate in the core, and that the diluted return flow from the ECCS would not cause a recriticality due to the boron redistribution.

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NuScale discussed its recent discovery that, for certain conditions, the ECCS actuated later than expected for those scenarios, and is currently planning to lower the ECCS actuation setpoint on the containment high water level to ensure that the ECCS actuates sooner when the containment water level is lower. NuScale stated that this would preserve the RAI 8930 response basis and maintain the bounding analysis in FSAR Section 15.0.6, for a return-to-power from the end-of-cycle conditions. NuScale stated it is in the process of performing supporting analyses, and also described the potential need it is currently evaluating for an additional ECCS actuation on pressure difference between the reactor pressure vessel and containment.

NuScale will send the NRC a list of FSAR sections and technical and topical reports that will be affected because of the change. NuScale is in the process of determining a schedule for the submittal of the supplementary information.

Docket No. 52-048

Enclosures:  
As stated

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

SUBJECT: SUMMARY OF THE MARCH 9, 2020, CATEGORY 1 PUBLIC TELECONFERENCE WITH NUSCALE POWER, LLC TO DISCUSS THE EMERGENCY CORE COOLING SYSTEM BORON DISTRIBUTION DATED: APRIL 07, 2020

**DISTRIBUTION:**

PUBLIC  
NRLB R/F  
MJohnson, NRR  
MDudek, NRR  
RPatton, NRR  
TScarbrough, NRR  
RidsNrrLACSmith  
RidsOgcMailCenter  
RidsAcrsMailCenter

**ADAMS Accession No.: ML20097C229**

**\*via e-mail**

**NRR-106**

<b>OFFICE</b>	NRR/DNRL/NRLB: PM	NRR/DNRL/NRLB: LA	NRR/DNRL/NRLB: PM
<b>NAME</b>	MJohnson	CSmith*	MJohnson
<b>DATE</b>	04/06/2020	04/06/2020	04/07/2020

**OFFICIAL RECORD COPY**

**U.S. NUCLEAR REGULATORY COMMISSION CATEGORY 1 PUBLIC TELECONFERENCE  
WITH NUSCALE POWER, LLC TO DISCUSS THE EMERGENCY CORE COOLING SYSTEM  
BORON DISTRIBUTION OF THE DESIGN CERTIFICATION APPLICATION**

**March 9, 2020**

**1:30 p.m. – 3:00 p.m.**

**Meeting Agenda**

<b><u>Time</u></b>	<b><u>Subject</u></b>
1:30 p.m. - 1:45 p.m.	Welcome and Introductions
1:45 p.m. - 2:40 p.m.	Technical Discussion
2:40 p.m. - 2:50 p.m.	Public – Questions and Comments
2:50 p.m. - 3:00 p.m.	Closed Portion
3:00 p.m.	Adjourn

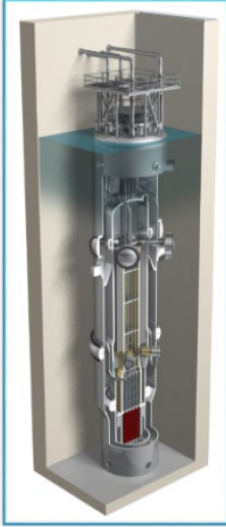
**U.S. NUCLEAR REGULATORY COMMISSION CATEGORY 1 PUBLIC TELECONFERENCE  
WITH NUSCALE POWER, LLC TO DISCUSS THE EMERGENCY CORE COOLING SYSTEM  
BORON DISTRIBUTION OF THE DESIGN CERTIFICATION APPLICATION**

**March 9, 2020**

**List of Attendees**

<b><u>NAME</u></b>	<b><u>AFFILIATION</u></b>
Marieliz Johnson	U.S. Nuclear regulatory Commission (NRC)
Rebecca Patton	NRC
Michael Dudek	NRC
Bruce Bovol	NRC
Anna Bradford	NRC
Robert Caldwell	NRC
Joseph Donoghue	NRC
Dinesh Taneja	NRC
Jeffrey Schmidt	NRC
Ryan Nolan	NRC
Thomas Scarbrough	NRC
Shanlai Lu	NRC
Omid Tabatabai-Yazdi	NRC
Syed Haider	NRC
Marie Pohida	NRC
Stacey Rosenberg	NRC
Gregory Cranston	NRC
Michael Snodderly	NRC
Joseph Ashcraft	NRC
Matthew Presson	NuScale Power, LLC (NuScale)
Mike Melton	NuScale
Elisa Fairbanks	NuScale
Ben Bristol	NuScale
Meghan McCloskey	NuScale
Taylor Coddington	NuScale
Morris Byram	NuScale
Marty Bryan	NuScale
Andy Lingenfelter	NuScale
Paul Infanger	NuScale
Sarah Fields	Public

# Public Meeting Presentation



## Topic

Emergency Core Cooling System  
(ECCS) Boron Distribution

March 9, 2020

## Presenters

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**Ben Bristol**

Supervisor, System Thermal-Hydraulics

**Matthew Presson**

Licensing Project Manager

## Agenda

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- Boron Transport – Background and Discussion
- Boron Transport – Update and Resolution
- Conclusion

## ECCS Boron Transport – Background

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### **NuScale Response to RAI 8930 (ML19332A120) supports our priority to develop a safe and passive design**

- FSAR 15.0.6.1 describes analyses which evaluate the transport of boron to the core under postulated Chapter 15 events.
- Concludes that boron will concentrate in the core region, and that the 15.0.6 evaluation provides a bounding analysis.
- Supports NRC Staff safety evaluation discussion that:
  - “core reactivity would not be adversely affected by boron redistribution to places outside the core, and therefore, would not return to power”
  - Section 15.0.6.4.4 of the Chapter 15 Safety Evaluation Report (ML20027A108)

## ECCS Boron Transport – Discussion

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### Discussion for expanding the ECCS boron transport analysis:

- As boron accumulates in the core/riser region, boron concentration in the downcomer and in containment decreases as steam is condensed and lower concentration water is recirculated in to the reactor vessel
  - Boron precipitation analysis performed as part of ECCS long term cooling analysis
- Boron dilution analysis was performed to:
  - Evaluate potential for lower boron concentration fluid in core or near core inlet
  - Demonstrate that core region boron concentration remains above the initial concentration
  - Confirm the basis for the response to RAI 8930

### Boron transport governed by:

- boiling in the core
- condensation in the containment vessel

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## ECCS Boron Transport – Update/Resolution

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### Update:

In preparation for Ch. 15 ACRS subcommittee meeting NuScale determined under certain conditions, ECCS actuated later than expected and resulted in higher containment water level accumulation than is considered in RAI 8930 response basis.

### Resolution:

Lowering the containment high water level set point actuates ECCS earlier to reduce the initial containment water accumulation and maintain the RAI 8930 response basis.

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## ECCS Boron Transport – Conclusions

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- NuScale is highly committed to plant safety, and to providing a safe and passive design
- In supporting this commitment, NuScale’s position is that this design change is appropriate to resolve as part of finalizing the DCA
- This change confirms the boron distribution analyses provided in FSAR 15.0.6.1, and maintains 15.0.6 as the bounding analysis for the NuScale design

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