



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

February 19, 2019

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 JANUARY 9, 2019, CATEGORY 1 PUBLIC
TELECONFERENCE WITH NUSCALE POWER, LLC, TO
DISCUSS THE INADVERTENT ACTUATION BLOCK VALVE OF
THE DESIGN CERTIFICATION APPLICATION

The U.S. Nuclear Regulatory Commission (NRC) held a Category 1 public teleconference on January 9, 2019, to discuss the Inadvertent Actuation Block (IAB) valve of the NuScale Power, LLC (NuScale) Design Certification Application. Participants included personnel from NuScale and members of the public.

The public meeting notice can be found in the Agencywide Documents Access and Management System under Accession Number ML19009A015. 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.

On January 9, 2019, the NRC staff held a public teleconference to discuss the letter submitted by NuScale on December 14, 2018, regarding the application of the single failure criterion (SFC) to the IAB valve in the emergency core cooling system for the NuScale small modular reactor. (ML18351A145) During the teleconference, NuScale provided an overview of its position that the IAB valve has a passive closing function with respect to the SFC based on SECY-77-439, "Single Failure Criterion." For example, NuScale considers SECY-77-439 to specify check valves as only one example of active components that can be treated as passive with respect to the SFC. NuScale acknowledged that there were differences between the information provided in its design certification application (DCA), submitted under oath and affirmation, and the December 14, 2018, letter, but that the December 14, 2018, letter provides the current NuScale position.

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During the teleconference, the NRC staff indicated several agreements with the NuScale positions in its December 14, 2018, letter. For example, the SFC guidance in SECY-77-439 and SECY-94-084, "Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems in Passive Plant Designs," has some ambiguity. Further, the NuScale probabilistic risk assessment supports a conclusion that failure of the IAB valve is not likely to result in core damage (extensive fuel failure). In addition, there is a nuanced history of how the NRC has applied the SFC policy, and development of a coherent framework for SFC application would be beneficial. However, the NRC staff indicated that it does not consider the NuScale letter to support an assumption that the closing function of the IAB valve may be treated as a passive failure with respect to SFC application.

In its December 14, 2018, letter, NuScale asserts that SECY-77-439 provides applicable SFC guidance for the IAB valves while SECY-94-084 is only applicable to low differential-pressure check valves in reactors with passive safety systems. NuScale believes that reliability data are not required to consider a component failure as passive under SECY-77-439. NuScale considers that a qualitative evaluation of a component's design and function, including comparison to other component functions that have been and are treated as passive, is sufficient to demonstrate a component's expected reliability. NuScale asserts that evaluating the IAB valve under the SECY-77-439 framework demonstrates that the IAB valve closure function is sufficiently reliable to be considered a passive failure. NuScale based its reliability estimate for the IAB valve, in part, on operating experience from the pilot valve in main steam safety relief valves (MSSRVs) in boiling water reactor nuclear power plants. NuScale references the Exelon Backfit Appeal Review Panel Report, dated August 23, 2016 (ML16236A198) as the basis for new SFC criteria of design, application, and function. The NuScale letter references American National Standards Institute/American Nuclear Society (ANSI/ANS) Standard 58.9-1981 (2015), "Single Failure Criteria for Light Water Reactor Safety-Related Fluid Systems," to support its position that mechanical valve motion, in addition to simple check valve operation, may be treated as a passive failure.

During the teleconference, the NRC staff provided NuScale with its views on the NuScale letter regarding SFC application to the IAB valve. For example, the staff does not consider SECY-77-439 to be the sole guidance for application of the SFC to the IAB valve. Further, SECY-77-439 requires reliability information in evaluating the application of the SFC to the IAB valve. The staff does not consider the NuScale letter to support the use of only qualitative information in determining the application of the SFC to the IAB valve. Also, the NuScale letter does not support the assertion that the closing function of the IAB valve is sufficiently reliable to be assumed a passive failure with respect to the SFC application. The staff noted that: (1) the MSSRV normally closed pilot valve is not a good surrogate for the IAB valve because of design and operational differences; (2) the IAB valve has a different failure mode; (3) operating experience with safety relief valves (SRVs) indicates a higher failure rate than the NuScale estimate (e.g., higher than simple check valve failure to close); and (4) the consequences of failure of an IAB valve are significant while, conversely, consequences of the failure of an individual MSSRV pilot valve are negligible. The staff does not consider the use of the SFC framework, described in the Exelon Backfit Appeal Review Panel Report discussing the performance of pressurizer safety valves under water flow conditions in nuclear power plants with operational and test experience, to be appropriate for the NuScale IAB valve without operational or test history. Even if that framework is applied, the IAB valve would not clearly satisfy the design, application, and function criteria obtained from the Exelon Backfit Appeal Review Panel Report, or the additional factors identified by NuScale (such as safety significance or importance) in its letter. In referencing ANS Standard 58.9 in its letter, NuScale did not address relevant guidance from that standard and other sources that does not support the

NuScale position that qualitative information may be used to justify an exception to SFC application for a component without operating or test experience. The NRC staff also queried NuScale whether it had performed any analysis of the DCA Part 2, Tier 2, Section 15.6.6, "Inadvertent Operation of Emergency Core Cooling System," event considering single failure of the IAB valve to determine the impact to critical heat flux. NuScale stated it had not performed any calculation relative to Chapter 15, "Transient and Accident Analyses," and critical heat flux (fuel damage), but had performed a calculation relative to Chapter 19, "Probabilistic Risk Assessment and Severe Accident Evaluation," which showed no core damage.

At the end of the teleconference, NuScale agreed that there are no valves with nuclear power plant experience identical to the IAB valve. NuScale stated that it considers the question to be addressed, is the appropriate implementation of SECY-77-439 for SFC application to a new component without operational and test history. The NRC staff and NuScale agreed to continue the discussions regarding SFC application to the NuScale IAB valve.

Docket No. 52-048

Enclosures:
As stated

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

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TELECONFERENCE WITH NUSCALE POWER, LLC, TO DISCUSS THE
INADVERTENT ACTUATION BLOCK VALVE OF THE DESIGN CERTIFICATION
APPLICATION
DATED: February 19, 2019

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U.S. NUCLEAR REGULATORY COMMISSION

**CATEGORY 1 PUBLIC TELECONFERENCE WITH NUSCALE POWER, LLC, TO DISCUSS
THE INADVERTENT ACTUATION BLOCK VALVE OF THE DESIGN CERTIFICATION**

APPLICATION

January 9, 2019

1:00 p.m. – 2:30 p.m.

Meeting Agenda

<u>Time</u>	<u>Topic</u>
1:00 p.m. - 1:15 p.m.	Welcome and Introductions
1:15 p.m. - 2:00 p.m.	Technical discussion
2:00 p.m. - 2:15 p.m.	Public – Questions and Comments
2:15 p.m. - 2:30 p.m.	Closed portion
2:30 p.m.	Adjourn

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THE INADVERTENT ACTUATION BLOCK VALVE OF THE DESIGN CERTIFICATION**

APPLICATION

January 9, 2019

List of Attendees

<u>NAME</u>	<u>AFFILIATION</u>
Antonio Barrett	U.S. Nuclear Regulatory Commission (NRC)
Eric Bowman	NRC
Chris Cook	NRC
Kevin Coyne	NRC
Gregory Cranston	NRC
Rebecca Karas	NRC
Rob Krsek	NRC
Sam Lee	NRC
Shanlai Lu	NRC
Timothy Lupold	NRC
Tim McGinty	NRC
Ryan Nolan	NRC
Vonna Ordaz	NRC
Thomas Scarbrough	NRC
Thomas Steinfeldt	NRC
Robert Taylor	NRC
Nanette Valliere	NRC
Marieliz Vera	NRC
Gary Becker	NuScale Power, LLC (NuScale)
Tom Bergman	NuScale
Ben Bristol	NuScale
Marty Bryan	NuScale
John Fields	NuScale
Robert Gamble	NuScale
Paul Infanger	NuScale
Greg Myers	NuScale
Zack Rad	NuScale
Colin Sexton	NuScale