



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

June 22, 2018

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

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

SUBJECT: SUMMARY OF THE JUNE 7, 2018, CATEGORY 1 PUBLIC  
MEETING TO DISCUSS WHITE PAPER AND DRAFT TOPICAL  
REPORT ON ACCIDENT SOURCE TERM  
METHODOLOGY ASSOCIATED WITH THE NUSCALE DESIGN  
CERTIFICATION APPLICATION

The U.S. Nuclear Regulatory Commission (NRC) held a Category 1 public meeting on June 7, 2018, to discuss the NuScale Power, LLC (NuScale) white paper and its draft topical report on accident source term methodology associated with its design certification application. Participants included personnel from NuScale and members of the general public that participated via bridgeline.

The public meeting notice dated June 7, 2018, can be found in the ADAMS under Accession No. ML18150A489. This meeting notice was also posted on the NRC public website.

Enclosed is the meeting agenda (Enclosure 1), list of participants (Enclosures 2), and overview (Enclosure 3).

Docket No. 52-048

Enclosures:

1. Meeting Agenda
2. List of Attendees
3. Meeting Overview

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

CONTACT: Getachew Tesfaye NRO/DLSE  
301-415-8013

SUBJECT: SUMMARY OF THE JUNE 7, 2018, CATEGORY 1 PUBLIC MEETING TO  
DISCUSS ACCIDENT SOURCE TERM METHODOLOGY ASSOCIATED WITH THE  
NUSCALE DESIGN CERTIFICATION APPLICATION

DATED: June 22, 2018

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**NRO-002**

OFFICE	DLSE/LB1:PM	DLSE/LB1:LA	DLSE/SPAC:BC	DSRA/SPRA:BC	DLSE/LB1:BC	DLSE/LB1:PM
NAME	GTesfaye(c)	RButler (RButler)	MDudek (M. Hart)*	MHayes*	SLee*	GTesfaye (s)
DATE	6/13/2018	6/22/2018	6/21/2018	6/22/2018	6/22/2018	6/22/2018

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**U.S. NUCLEAR REGULATORY COMMISSION**  
**CATEGORY 1 PUBLIC MEETING TO DISCUSS**  
**ACCIDENT SOURCE TERM METHODOLOGY**  
**ASSOCIATED WITH THE NUSCALE DESIGN CERTIFICATION APPLICATION**

**MEETING AGENDA**

**JUNE 7, 2018**

11:00 a.m. - 11:10 a.m.    Introductions

11:10 a.m. - 12:40 p.m.    NuScale Presentation on Source Term White Paper

- Motivation and general overview of accident source term approach
- Consistency with risk-informed integrated decision-making principles (e.g., maintain sufficient safety margins, consistency with defense in depth philosophy, meets current regulations, small risk change, performance measurement strategies)
- Acceptability of design certification PRA for supporting accident source term identification (e.g., scope, quality, level of detail, etc.)
- Technical basis and application of accident sequence frequency cutoff
- Application of source term approach to design certification and future combined license (COL) applications
- Potential impacts from change in established staff position for accident source terms (e.g., resolution of potential policy issues)

12:40 p.m. – 12:50 p.m.    Overview of next actions

12:50 p.m. – 13:00 p.m.    Public interaction

13:00 p.m. – End of Meeting

**U.S. NUCLEAR REGULATORY COMMISSION**  
**CATEGORY 1 PUBLIC MEETING TO DISCUSS**  
**ACCIDENT SOURCE TERM METHODOLOGY**  
**ASSOCIATED WITH THE NUSCALE DESIGN CERTIFICATION APPLICATION**

**LIST OF ATTENDEES**

June 7, 2018

Name	Organization
Getachew Tesfaye	U.S. Nuclear Regulatory Commission (NRC)
Gregory Cranston	NRC
Jason Schaperow	NRC
Andy Campbell	NRC
Michael Dudek	NRC
Michelle Hart	NRC
Ronald LaVera	NRC
John Monninger	NRC
Hanh Phan	NRC
Robert Taylor	NRC
Tony Nakanishi	NRC
Marie Pohida	NRC
Odunayo Ayegbusi	NRC
Michelle Hayes	NRC
Kevin Coyne	NRC
Olivia Mikula	NRC
Tom Bergman	NuScale Power, LLC (NuScale)
Paul Infanger	NuScale
Carrie Fosaaen	NuScale
John Fields	NuScale
Jennie Wike	NuScale
Ben Heald	NuScale
Ed Heald	NuScale
Cindy Williams	NuScale
Gary Becker	NuScale
Matt Mallet	NuScale
Zack Houghton	NuScale
Robert Gamble	NuScale
Paul Guinn	NuScale
Mark Shaver	NuScale
Scott Webber	NuScale
Dave Leaver	NuScale
Greg Myers	NuScale
Sarah Fields	General Public
Mark Holbrick	General Public
Wayne Moe	General Public
Jim Kinsey	General Public
Amir Afzali	General Public

**U.S. NUCLEAR REGULATORY COMMISSION**  
**OVERVIEW OF THE JUNE 7, 2018, PUBLIC MEETING TO DISCUSS**  
**ACCIDENT SOURCE TERM METHODOLOGY**  
**ASSOCIATED WITH THE NUSCALE DESIGN CERTIFICATION APPLICATION**

The purpose of this meeting was to discuss the content of a white paper submitted by NuScale Power, LLC (NuScale) on May 15, 2018, titled "Accident Source Terms Regulatory Framework," (Agencywide Documents Management and Access System (ADAMS) ML18136A850) and topics related to the maximum hypothetical accident (MHA) observed by the U.S. Nuclear Regulatory Commission (NRC) staff during an audit of the draft Revision 3 of the NuScale Accident Source Term Methodology licensing topical report (AST LTR) performed April 9 through May 4, 2018 (audit summary report (ADAMS Accession No. ML18172A076)).

The NRC staff opened the meeting by restating the topics included in the detailed agenda that the staff wanted NuScale to address. NuScale followed with a PowerPoint presentation (ADAMS Accession No. ML18165A146) that included an overview of NuScale source terms and accident source term methodology, the proposed "credible" accident threshold for maximum hypothetical accident (MHA), combined license (COL) implementation, AST LTR Iodine Spike MHA, AST LTR Core Damage MHA, and NuScale's regulatory assessment related to radiological source terms.

The NRC staff made several observations during the meeting on the following topics (Note: these are initial observations and the staff noted that they may have additional comments and questions after reviewing in more detail Revision 3 of the AST LTR and related proposed changes to the final safety analysis report (FSAR) when they are submitted):

1. Probabilistic risk assessment (PRA) Acceptability: Using the design certification PRA to screen event sequences for inclusion in the MHA source term is not listed in FSAR Section 19.0.2 as one of the specific uses of the design certification PRA, and as such, the PRA has not been assessed for this application. If a risk-informed approach to define the accident source term is proposed, NuScale should add this use to FSAR Chapter 19 "Probabilistic risk assessment" and demonstrate in Chapter 19 how the technical adequacy of the PRA is sufficient to provide the needed confidence that the results can be used for this application, consistent with Regulatory Guide (RG) 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities." For example, NuScale could describe how the PRA meets endorsed consensus PRA standards and the industry peer review program, and discuss how gaps between the PRA and PRA standard guidance were addressed. The staff stated that NuScale should also address the parametric, model, and completeness uncertainties in the PRA considering aspects such as incompleteness of design and lack of operating experience. This would be a first-of-a-kind review which could affect staff review cost and schedule.

2. Issue Finality: The staff emphasized that this is a design-specific, not a plant-specific, PRA and asked what would compel the COL applicant or holder to revisit the source term analysis if new accident sequences were identified when the PRA is upgraded for The COL application, prior to fuel load, or every 4 years afterwards. NuScale stated that if this happened, the COL applicant or holder would be required to propose design features to lower the core damage frequency (CDF) or make some other design changes to account for a different source term. NuScale noted that changes to the certified design will be made in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, "Licenses, Certifications, And Approvals For Nuclear Power Plants," processes for changes and departures. The staff asked NuScale to clarify how the various finality provisions in Part 52 interplay with NuScale's notion that additional design features or analyses would be conducted in the event new accident sequences are identified.
3. Methodology: The staff stated that the LTR and white paper do not appear to be consistent with the NRC's policies on risk-informed integrated decision making. The staff noted that, for each safety analysis for which the source term is used (e.g., control room habitability), NuScale should provide justification beyond a low CDF to demonstrate the risk-informed decision-making principles described in RG 1.174, "An Approach for using Probabilistic Risk Assessment in Risk-informed Decisions on Plant-specific Changes to the Licensing Basis" (e.g., safety margin, defense in depth, performance measurement) are met. The staff stated that it expects qualitative evaluations and a demonstration that uncertainties are treated consistent with NUREG 1855, Revision 1, "Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decision Making." NuScale should justify why the methodology only considers internal events and individual sequences verses a full scope (all hazards) evaluation. NuScale should provide additional justification for using a threshold CDF of  $10^{-6}$  per year to identify "credible" accidents. Staff did not agree with the white paper statement that this threshold is consistent with the State-of-the-Art Reactor Consequence Analysis (SOARCA) because four of the seven selected SOARCA scenarios had a CDF below this value. Staff also noted that the NRC Accident Sequence Precursor Program threshold of  $10^{-6}$  was intended to identify potential precursor sequences and was not intended to define "credible." Staff acknowledged that a  $10^{-6}$  per year threshold was cited in the 10 CFR Part 100 rulemaking, but suggested examples of its use in the recent/modern PRA era would be helpful.
4. Potential Policy Issue: The staff stated that this approach deviates from past practice and could result in a potential policy issue requiring Commission notification or direction, which could affect staff review cost and schedule.
5. The staff stated that NuScale should provide additional information regarding how its topical report CDF criterion would be implemented in (a) their Design Certification Application (DCA), and (b) combined license application (COLAs) to determine the accident source terms. The staff had the following questions regarding the proposed approach:
  - a. Would different COLAs potentially make different decisions such that one COLA would have a core melt MHA, while another has a spiked iodine coolant release MHA?
  - b. Would the different evaluations within an application have different assumptions (e.g., MHA and control room habitability analyses assume core melt, but

equipment qualification (EQ) analyses and TMI items assume spiked iodine coolant)?

- c. Will the design certification FSAR only include one of the two potential MHA source terms from the topical report, or will it include both the core melt and spiked iodine coolant source terms to bound site-specific determinations?
- d. Would the reactor building crane failure accident (module drop) scope into the design basis MHA using the CDF criterion (see DCA Part 3 (Environmental Report) Table B-27)?
- e. How does site-specific seismic hazard have an effect on the selection of source term for the MHA using the CDF criterion?

At the end of the meeting, the staff and NuScale agreed that the meeting was productive, but that additional dialogue would be needed to address numerous issues depicted above to substantiate the forthcoming AST topical report as a risk-informed submittal.

During the public interaction portion of the meeting, a public attendee requested the staff to address the following questions:

1. It is important for the public to understand how the NuScale proposals regarding accident consequences would impact off-site emergency planning at a NuScale reactor site. Will the NRC be looking at the potential consequences of the lack of off-site emergency planning and preparedness for a NuScale reactor operation?
2. Is the NRC giving consideration of a possible fire in the Spent Fuel Pool or an accident at the Integrated Spent Fuel Storage Installation for a NuScale reactor facility? Currently, more information is coming to light about problems associated with irradiated fuel storage in thin-walled canisters that cannot be inspected or repaired over the decades of on-site storage. This includes the loading of the canisters and on-site transport.
3. How would the NuScale proposals impact the 50-mile ingestion exposure pathway emergency planning zones (EPZ)?

The staff will consider these questions during its review and will communicate to the public attendee at a later date.