



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

June 21, 2018

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

FROM: Prosanta Chowdhury, Project Manager /RA/  
Licensing Branch 1  
Division of Licensing, Siting, and  
Environmental Analysis  
Office of New Reactors

SUBJECT: SUMMARY OF FEBRUARY 2, 2018, CATEGORY 1,  
PUBLIC/CLOSED TELECONFERENCE TO DISCUSS U.S.  
NUCLEAR REGULATORY COMMISSION STAFF FEEDBACK  
ON NUSCALE POWER, LLC GENERIC TECHNICAL  
GUIDANCE, REVISION 0

On February 2, 2018, the U.S. Nuclear Regulatory Commission (NRC) staff held a Category 1 public/closed teleconference with NuScale Power, LLC's (NuScale) to discuss NuScale's Generic Technical Guidance (GTG), Revision 0. Documents referenced during this meeting can be found in the NRC Agencywide Documents Access and Management Systems (ADAMS) Accession Nos. ML17334B739, ML17334B821 (Package). The closed portion of the meeting was reconvened on February 9, 2018, and February 15, 2018, in order to adequately cover the high volume of proprietary information contained within the GTG. No members of the general public participated during the meeting.

The public/closed meeting notice dated February 2, 2018, can be found in ADAMS under Accession No. ML18022B138. This meeting notice was also posted on the NRC public Web site.

CONTACT: Prosanta Chowdhury, NRO/DLSE  
301-415-1647

Enclosed are the meeting agenda, list of attendees, meeting summary, and issues discussion (non-proprietary and proprietary).

Docket No. 52-048

Enclosures:

1. Meeting Agenda
2. List of Attendees
3. Meeting Summary
4. Issues Discussion (Non-Proprietary)
5. Issues Discussion (Proprietary)

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

SUBJECT: SUMMARY OF FEBRUARY 2, 2018, CATEGORY 1, PUBLIC/CLOSED  
TELECONFERENCE TO DISCUSS U.S. NUCLEAR REGULATORY COMMISSION  
STAFF FEEDBACK ON NUSCALE POWER, LLC GENERIC TECHNICAL  
GUIDANCE, REVISION 0, DATED JUNE 21, 2018

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\*via E-mail

NRO-002

OFFICE	NRO/DLSE/LB1: PM	NRO/DLSE/LB1: LA	NRO/DCIP/HOIB: BC	NRO/DLSE/LB1: PM
NAME	PChowdhury*	MMoore*	ARivera-Varona*	PChowdhury
DATE	6/18/2018	6/18/2018	6/20/2018	06/21/2018

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**U.S. NUCLEAR REGULATORY COMMISSION**

**FEBRUARY 2, 2018, CATEGORY 1, PUBLIC/CLOSED TELECONFERENCE TO DISCUSS**

**STAFF FEEDBACK ON NUSCALE POWER, LLC**

**GENERIC TECHNICAL GUIDANCE, REVISION 0**

**MEETING AGENDA**

The purpose of this teleconference was for the U.S. Nuclear Regulatory Commission (NRC) staff to communicate to NuScale the NRC staff's comments on the NuScale's response to Request for Additional Information (RAI) No. 8738 and NuScale Generic Technical Guidance (GTG).

<b><u>Times</u></b>	<b><u>Topics</u></b>
1:00 p.m.	Introduction
1:10 p.m.	Non-Proprietary (Open) Discussion on Response to RAI 8738 and NuScale Generic Technical Guidance (GTG)
1:30 p.m.	Public Comment
1:45 p.m.	Proprietary (Closed) Discussion on Response to RAI 8738 and NuScale Generic Technical Guidance (GTG)
3:00 p.m.	Adjourn

**U.S. NUCLEAR REGULATORY COMMISSION**

**FEBRUARY 2, 2018, CATEGORY 1, PUBLIC/CLOSED TELECONFERENCE TO DISCUSS**

**STAFF FEEDBACK ON NUSCALE POWER, LLC**

**GENERIC TECHNICAL GUIDANCE, REVISION 0**

**LIST OF ATTENDEES**

<b>Name</b>	<b>Organization</b>	<b>Dates Attended</b>
Joseph Demarshall	U.S. Nuclear Regulatory Commission (NRC)	February 2, 9, 15
Prosanta Chowdhury	NRC	February 2, 9, 15
Timothy Drzewiecki	NRC	February 2, 9
John Budzynski	NRC	February 2, 9, 15
Tim Tovar	NuScale Power, LLC (NuScale)	February 2, 9, 15
Doug Bowman	NuScale	February 2, 9, 15
Ross Snuggerud	NuScale	February 2
Grant Buster	NuScale	February 2
Ryan Flamand	NuScale	February 2, 9, 15
Rufino Ayala	NuScale	February 2, 9, 15
Brian Arnholt	NuScale	February 2, 9, 15
Steve Pope	NuScale	February 2, 9, 15
Steve Mirsky	NuScale	February 2, 9, 15

**U.S. NUCLEAR REGULATORY COMMISSION**  
**SUMMARY OF FEBRUARY 2, 2018, CATEGORY 1, PUBLIC/CLOSED TELECONFERENCE**  
**TO DISCUSS STAFF INITIAL FEEDBACK ON NUSCALE POWER, LLC**  
**GENERIC TECHNICAL GUIDANCE, REVISION 0**

On February 2, 2018, the U.S. Nuclear Regulatory Commission (NRC) staff held a public/closed meeting with NuScale Power LLC, (NuScale) to communicate the staff's initial feedback on Technical Report, TR-1117-57216-P, "NuScale Generic Technical Guidelines," Revision 0, (Agencywide Documents Access and Management Systems (ADAMS) Accession No. ML17334B821) submitted with the NuScale supplemental response to Request for Additional Information (RAI) 8738, dated November 30, 2017 (ADAMS Accession Nos. ML17334B739). The initial feedback, proprietary in nature, was provided in the form of a multiple page document designated as Revision 1. The NRC staff emphasized that the information contained therein was not all inclusive and did not preclude the need for issuance of RAIs. NuScale and NRC staff agreed to reconvene the closed portion of the meeting on February 9, 2018, to allow NuScale sufficient time to conduct a review of the material prior to engaging the staff on any specifics. At the conclusion of the February 2, 2018 meeting, the NRC staff informed NuScale of its intent to update Revision 1 of the document with additional clarifying text and minor enhancements, and to specify this version as Revision 2, for use during the February 9, 2018, reconvened meeting. No members of the public attended this meeting.

On February 9, 2018, the NRC staff reconvened the closed portion of the meeting with NuScale to discuss the wide range of issues identified in Revision 2 of the feedback document. NuScale and NRC staff agreed to reconvene the closed portion of the meeting again on February 15, 2018, to continue these discussions due to insufficient time to adequately cover all of the items during the February 9<sup>th</sup> meeting. At the beginning of the meeting on February 9<sup>th</sup>, NuScale commented that the feedback document clearly conveyed the issues and was helpful in understanding the NRC staff's perspectives. In preparation for, and to further facilitate the meeting discussions held on February 15<sup>th</sup>, NuScale provided written comments, proprietary in nature, to individual items in Revision 2 of the NRC staff feedback document and made these available to the staff prior to the meeting. This effort: (1) provided the NRC staff the opportunity to engage NuScale in a more meaningful and informative discussion, and (2) served to inform the staff's decisions regarding which issues, if any, could be sufficiently resolved based on the February meeting discussions, contingent upon the subsequent and satisfactory evaluation of either: (a) GTG markups submitted for inclusion in the next revision of TR-1117-57216, or (b) the actual changes made to the GTGs in next docketed revision of TR-1117-57216.

During the closed discussions on February 9<sup>th</sup> and February 15<sup>th</sup>, NuScale and NRC staff discussed issues associated with the following subject matter, as identified in Revision 2 of the feedback document: (1) the critical safety functions (CSFs) defined for the NuScale plant design, (2) CSF flowchart functional decision logic and operator actions, including CSF hierarchy/prioritization and bases information, (3) the use of Analytical Limit values in the GTG flowcharts as decision variable setpoint values for evaluating the automatic actuation of Engineered Safety Feature (ESF) Systems, (4) inconsistencies in the information specified for

Post-Accident Monitoring (PAM) variables between Chapter 7 of the DCD and the GTGs basis, and separately within the GTGs basis, and (5) editorial errors.

Based on the results of the February 2018 meeting discussions, including review of the comments provided by NuScale in advance of the February 15<sup>th</sup> discussions, the NRC staff has identified several issues. A proprietary version of these discussions has been provided to NuScale in Enclosure 5 (ADAMS Accession No. ML18169A174), while Enclosure 4 contains the non-proprietary/ public version. The NRC staff has determined that it would be both appropriate and acceptable to pursue resolution of the following issues through evaluation of either: (a) GTG markups submitted for inclusion in the next revision of TR-1117-57216, or (b) the actual changes made to the GTGs in next docketed revision of TR-1117-57216. The remaining issues will require formal resolution using the RAI process.

**U.S. NUCLEAR REGULATORY COMMISSION**

**ISSUES DISCUSSED IN CLOSED PORTION OF FEBRUARY 2018, CATEGORY 1,**

**PUBLIC/CLOSED TELECONFERENCE INVOLVING STAFF INITIAL FEEDBACK ON**

**NUSCALE GENERIC TECHNICAL GUIDANCE, REVISION 0**

During the reconvened closed meetings on February 9, 2018 and February 15, 2018, NuScale and NRC staff discussed issues associated with the following subject matters, as identified in Revision 2 of the feedback document: (1) the critical safety functions (CSFs) defined for the NuScale plant design, (2) CSF flowchart functional decision logic and operator actions, including CSF hierarchy/prioritization and bases information, (3) the use of Analytical Limit values in the GTG flowcharts as decision variable setpoint values for evaluating the automatic actuation of Engineered Safety Feature (ESF) Systems, (4) inconsistencies in the information specified for Post-Accident Monitoring (PAM) variables between Chapter 7 of the DCD and the GTGs basis, and separately within the GTGs basis, and (5) editorial errors.

Based on the results of the February 2018 meeting discussions, including review of the comments provided by NuScale in advance of the reconvened February 15<sup>th</sup> discussions, the staff has identified several issues, as enumerated below, and determined that it would be both appropriate and acceptable to pursue resolution of the following issues through evaluation of either: (a) GTG markups submitted for inclusion in the next revision of TR-1117-57216, or (b) the actual changes made to the GTGs in next docketed revision of TR-1117-57216. The remaining issues will require formal resolution using the request for additional information (RAI) process.

**1. Issue:**

The Containment Integrity (CI) Safety Function flowchart, CV-2 decision point technical basis, Page 35, states:

***[[ ]]***

If the reactor trip breakers are open and the reactor is NOT shutdown, with Reactor Coolant System (RCS) pressure > 1600 psia during the Anticipated Transient Without Scram (ATWS), is this technical basis statement still applicable? Further, if the reactor trip breakers open as designed on a valid reactor trip signal, does this statement imply that operators will intentionally/knowingly, and as a norm, always answer "NO" to CV-2 (i.e., take a dashed red path), which, according to text in the last paragraph of Page 14, means that the decision point is not answered in a way that is in accordance with the plant design.

***[[ ]]***

In addition, there is a subscript "2" in the CV-2 decision block that corresponds to a list of numerical notes on the CI flowchart; notes that provide specific guidance for how to answer the decision block on the basis of plant conditions. There is no information in the aforementioned



list that provides the operator with guidance pertaining to the status of reactor trip breaker position.

**NuScale Explanation:**

NuScale explained that the cited technical basis statement was in error, and will be revised to read:

[[ ]]

**2. Issue:**

The CI Safety Function flowchart, CI-3 decision point technical basis, Page 33, states:

[[ ]]

There is a CI-4 decision point for evaluating “ALL CIS valves CLOSED” when “under the bioshield” (UTB) temperature [[ ]], but NO decision point for evaluating the status of DHRS actuation when UTB temperature [[ ]]. Does there need to be one, and if no, then why not.

**NuScale Explanation:**

NuScale explained that: (1) the DHRS is evaluated separately for UTB temperature [[ ]] in the Core Heat Removal (CHR) Safety Function flowchart at decision point HD-11, as this parameter directly impacts core heat removal, and (2) the CI-3 decision point technical basis will be revised to incorporate this information.

**3. Issue:**

On the CI Safety Function flowchart, the grey background informational box that specifies the criteria for “DHRS ALIGNED,” should clarify that the information contained therein is for alignment of a “single” division of DHRS. The bulleted item which reads: “at least ONE DHR actuation valve OPEN,” could be misinterpreted to mean only ONE DHR actuation valve total, given that the text for associated decision point CP-2 reads: “BOTH trains DHRS ALIGNED\*.”

**NuScale Explanation:**

NuScale explained that the grey informational box on the CI Safety Function flowchart would be revised to read: “ONE train DHRS ALIGNED.”

**4. Issue:**

On the CHR Safety Function flowchart, the grey background informational box that specifies the criteria for “DHRS ALIGNED,” should clarify that the information contained therein is for alignment of a “single” division of DHRS. The bulleted item which reads: “at least ONE DHR actuation valve OPEN,” could be misinterpreted to mean only ONE DHR actuation valve total, given that the text for associated decision point HD-12 reads: “BOTH divisions of DHRS ALIGNED\*.”

**NuScale Explanation:**

NuScale explained that the grey informational box on the CHR Safety Function flowchart would be revised to read: "ONE train DHRS ALIGNED."

**5. Issue:**

On the Reactivity Safety Function flowchart, the operator actions listed under RA-2 for a failure of the reactor trip breakers to open, includes a bulleted item to "Insert control rods." The associated basis discussion for RA-2 on Page 40, describes each of the RA-2 actions listed in the flowchart, except for the last one, which is to insert control rods. If applicable, what operator actions would be taken to insert control rods in accordance with RA-2 if the other actions, listed in order of preference, were unsuccessful? Explain the RA-2 inconsistency between the Reactivity Safety Function flowchart and the basis.

**NuScale Explanation:**

NuScale explained: (1) that the RA-2 basis discussion in Revision 0 of the GTGs was accurate, (2) that the bulleted item in RA-2 to insert control rods was an unintentional holdover from an earlier internal revision of the document and should have been removed, and (3) that the set of operator actions listed in the flowchart for RA-2 will be revised to remove the action to insert control rods.

**6. Issue:**

On the Reactivity Safety Function flowchart, all of the red path arrows are solid lines instead of dashed lines. Section 4.3, "Structure and Use," Page 14, last paragraph states:

***[[ ]]***

The CI and CHR CSF flowcharts, and the Electrical Defense-in-Depth (DID) flowchart all reflect the dashed red arrow convention. The Reactivity CSF flowchart does not.

**NuScale Explanation:**

NuScale explained that all red path arrows on the Reactivity Safety Function flowchart will be changed from solid to dashed lines, consistent with the other flowcharts.

**7. Issue:**

On the Reactivity Safety Function flowchart, the last bulleted item in the NOTES box states:

***[[ ]]***

The cited flowchart note conflicts with the basis text in Section 5.2.2, "Reactivity Verification," Page 42, Operator Actions, RV-3, which states:

***[[ ]]***

The cited flowchart note also conflicts with the basis text in Section 5.2.3, “Demineralized Water Isolation,” Page 45, 4<sup>th</sup> bulleted paragraph, which states:

**[[ ]]**

Explain the inconsistencies between the cited flowchart note and the above referenced basis text from Sections 5.2.2 and 5.2.3, with respect to: **[[ ]]**

**NuScale Explanation:**

NuScale explained: (1) **[[ ]]**, and (2) that the aforementioned flowchart and basis information will be revised accordingly to ensure the consistency and accuracy of the GTGs.

**8. Issue:**

On the CHR Safety Function flowchart, a “No” answer to decision point HF-1 directs the operator to decision point HC-1 to evaluate whether CNV level is **[[ ]]**. The associated basis discussion in Section 5.3.2, Fuel Clad Protection, Page 48, under “HF-1 identification,” specifies that a “No” answer to decision point HF-1 directs the operator to decision point HC-1 to evaluate the module protection system (MPS) low AC voltage 24-hour timer. It appears that the basis information on Page 48 should instead specify “*NO: HC-1 evaluate CNV level **[[ ]]**,” to be consistent with the flowchart.*

**NuScale Explanation:**

NuScale explained: (1) that the basis information on Page 48 under “HF-1 identification,” was incorrect, and (2) that it will be revised to read “*NO: HC-1 evaluate CNV level **[[ ]]**,” consistent with that of the flowchart.*

**9. Issue:**

The CHR Safety Function flowchart, HF-1 decision point technical basis, Page 48, states:

**[[ ]]**

The associated setpoint basis on Page 48 states:

**[[ ]]**

These two statements appear to conflict. The technical basis states that **[[ ]]** is above any temperature that results in core damage (as predicted by safety analysis and the PRA), whereas the associated setpoint basis states that **[[ ]]** may be an indication that core damage is imminent. Explain the disparity between these two basis statements.

**NuScale Explanation:**

NuScale explained: (1) that the technical basis statement will be revised to read as follows in order to eliminate the disparity:

**[[ ]]**

and (2) that the technical basis discussion will be further revised to provide additional clarifying information regarding selection of the **[[ ]]** temperature threshold for decision point HF-1.

**10. Issue:**

The CHR Safety Function flowchart, HC-5 decision point basis discussion, Page 53, is missing the associated header text which reads: “HC-5 identification.”.

**NuScale Explanation:**

NuScale explained that the “HC-5 identification.” header text will be added to the HC-5 decision point basis discussion on Page 53.

**11. Issue:**

Decision point HC-5 on the CHR flowchart specifies **[[ ]]**. The technical basis discussion for HC-5 on Page 54 states:

**[[ ]]**

Is it correct to assume that this statement is referring to the equivalent of a “single division,” where the **[[ ]]**.

**NuScale Explanation:**

NuScale explained that the NRC staff’s interpretation was correct and that the following statement will be added to the HC-5 technical basis discussion on Page 54, to provide additional clarification:

**[[ ]]**

**12. Issue:**

The CI Safety Function flowchart, CP 1 decision point basis discussion, Page 37, identifies the Condenser Air Removal (CAR) Radiation Monitoring instrumentation as a PAM Type E variable. Should this instrumentation be specified as a Type B variable, given that it provides early indication of a containment bypass event (i.e., steam generator tube failure (SGTF)), before the Main Steam and Feedwater containment isolation valves (CIVs) are closed?

Note: No revisions to the GTGs were warranted on the basis of NuScale’s explanation below.

**NuScale Explanation:**

NuScale explained that: (1) the CAR Radiation Monitoring instrumentation is used to identify a steam generator tube leak, and that a steam generator leak is not a containment bypass event, nor is it a SGTF (i.e., an accident), (2) a containment bypass event would result from a failure of the redundant Main Steam and Feedwater CIVs to close, concurrent with a breach in the piping system, (3) decision point CP-1 was included in the CI Safety Function flowchart to make it clear that the appropriate response to a steam generator tube leak would be actuation of the DHRS,

and (4) Type E variables are used to determine the magnitude of offsite releases and continually assess such releases.

### 13. Issue:

The NRC staff identified the following editorial errors/issues in the NuScale GTG technical report document:

- **Page 3:** Need to include the acronym “ELVS” in the Table 1-1, “Abbreviations List”; “ELVS” is referenced in Table 10-2 and stands for “Low Voltage AC Electrical Distribution System.”
- **Page 23:** The Notes column associated with the Action to “Manually Actuate ECCS,” specifies “ECCS-HFE-0001C-**FTO**-N.” Suspect this should actually be “ECCS-HFE-0001C-**FTS**-N.”
- **Page 33:** CI-3 basis does not specify an Instrument Used for Under the Bioshield (UTB) Temperature.
- **Page 33:** CI-4 Technical basis paragraph, first sentence states: **[[ ]]**.
- **Page 37:** first bulleted paragraph under **[[ ]]**. This should actually read: **[[ ]]**.
- **Page 44:** The bolded heading “**Operator Actions**” should precede Operator Action items RD-6 and RD-7, for consistency and to provide clarity to the basis discussion.
- **Page 44:** Should be RD-6 and RD-7, instead of RV-6 and RV-7.
- **Page 54:** first bulleted paragraph under HC-6, 3<sup>rd</sup> sentence, states: **[[ ]]**. This sentence should actually read: **[[ ]]**
- **Page 62:** “Instrument used” should specify **[[ ]]** instead of **[[ ]]**

### NuScale Explanation:

NuScale explained that each of the editorial errors/issues identified by the staff will be corrected.

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**U.S. NUCLEAR REGULATORY COMMISSION**

**ISSUES DISCUSSED IN CLOSED PORTION OF FEBRUARY 2018, CATEGORY 1,  
PUBLIC/CLOSED TELECONFERENCE INVOLVING STAFF INITIAL FEEDBACK ON  
NUSCALE POWER, LLC GENERIC TECHNICAL GUIDANCE, REVISION 0**

[[This enclosure contains proprietary information and is withheld from public disclosure]]

Enclosure 5

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