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

October 30, 2019

MEMORANDUM TO: Christian B. Cowdrey, Chief
Operator Licensing and Human Factors Branch
Division of Reactor Oversight
Office of Nuclear Reactor Regulation

FROM: Maurin C. Scheetz, Reactor Engineer /**RA/**
Operator Licensing and Human Factors Branch
Division of Reactor Oversight
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF OCTOBER 16, 2019 PUBLIC MEETING WITH NUSCALE POWER, LLC TO DISCUSS KNOWLEDGE AND ABILITIES CATALOG

On October 16, 2019, a Category 1 public teleconference meeting was held at the U.S. Nuclear Regulatory Commission (NRC) Headquarters office in Rockville, Maryland between representatives of the NRC staff and NuScale Power, LLC (NuScale), for the NRC staff to provide NuScale feedback on a learning objective-based Knowledge and Abilities (K/A) catalog. As discussed in the public meeting summary dated August 27, 2019 (ML19239A049), NuScale had developed a draft K/A catalog based on learning objectives to be used as input to a NUREG for NRC operator licensing examinations and stated that it would provide the draft for staff review.

The meeting began with an introduction of the teleconference participants. Then the NRC staff provided feedback from a review conducted from August 8, 2019, through October 9, 2019, of the "Learning Objective Based Knowledge, S/A Catalog for Nuclear Power Plant Operators," Draft Revision 0, dated August 2019, in the NuScale Electronic Reading Room. The staff considered the three topics listed below to assess whether development of a learning objective-based K/A catalog would be feasible.

(1) Does the proposed method enable the development of examinations that sample the items listed in Title 10 *Code of Federal Regulations* (CFR) 55.41, 55.43, and 55.45?

Based on the topics addressed by the standardized learning objectives and a review of selected learning objectives in Sections 3.0 and 4.0 of the draft K/A catalog, the proposed method should enable the development of examinations that sample the items listed in 10 CFR 55.41(b)(1)-(14), 55.43(1)-(7), and 55.45(a)(1)-(13).

(2) Does the proposed screening criteria for testable learning objectives address topics the NRC considers important (for example, safety-significant tasks and plant systems, risk-significant tasks and plant systems, tasks related to regulatory requirements such as

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implementing the emergency plan, and tasks related to implementing technical specifications)?

Generally, the staff concluded that the proposed screening criteria would ensure that the examination samples information that the staff considers important. The staff and NuScale discussed the following specific questions and comments about the screening criteria listed in Section 1.14 of the K/A catalog.

- The screening criteria for "important to safe plant operation" includes consideration of whether the system or function is "described in the plant licensing basis," which would seem to screen in every topic discussed in the facility licensee's final safety analysis report. As such, this seems to be too broad of a criterion. Is there any additional criteria to differentiate topics that are considered important to safe plant operation?

  NuScale responded that Section 1.14.2 of catalog explains that the starting point for screening K/As is the licensing basis. Next, they looked for ties to the Code of Federal Regulation items and then continued with the other screening criteria.

- How did NuScale determine if the K/A contributed to an increase in core damage frequency (see Section 1.14.2, Item (4))?

  NuScale explained that this was included because it was a technique used during the development of the AP1000 K/A catalog. NuScale wants to remove this criterion because it is redundant to other screening criteria.

- Would the staff be able to view the out-of-scope learning objectives in a separate document?

  NuScale responded that a list of out-of-scope learning objectives could be placed in ERR for the NRC staff to review.

- NuScale confirmed that "X" means selected for testing.

- Does NuScale consider any design-specific generic fundamentals K/As? For example, are there more than three K/As for natural circulation (indications for loss of natural circulation)? Did NuScale consider screening out some of the generic fundamental that don't apply to the NuScale design, for example, centrifugal pumps?

  NuScale replied that as of now they include the full set of pressurized water reactor (PWR) generic fundamental K/As; they did not evaluate additional K/As for their design. This is the same approach that was used for AP1000.

- Comparing NuScale system standardized K/A with NUREG-1122, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors:"

  Describe the system layout/flowpath and/or interfacing systems for the BAS system.

Vs.

(NUREG-1122): *Knowledge of the physical connections and/or cause and effect relationships between CVCS and the following systems:*

The first part of the learning objective (i.e., describe system layout) would appear to screen out for low level of difficulty. Why doesn't the second part of it involve cause and effect relationships or impact of one system to another during normal operations? Is this knowledge covered elsewhere?

NuScale responded that the cause and effect relationship between systems is tested in other standardized learning objectives: one covers the effects of failures or loss of an interfacing system on a main system, and the other covers the interactions between systems during normal operations.

(3) Is it feasible to develop written examination questions and job performance measures (JPMs) based on the proposed learning objectives?

Generally, the staff determined that it would be feasible to develop written examination questions and JPMs based on the proposed learning objectives. The staff and NuScale discussed the following specific questions and comments about this topic.

- For JPM selection purposes and consistency with how the staff selects JPMs, it will be very helpful to have a list of the NuScale plant systems that screen in for testing arranged by plant function or critical safety function (CSF) or some sort of function categorization similar to Section 1.9 of the traditional K/A catalogs. This would allow for JPM testing by safety function. (The staff may determine that this is not necessary as the final exam structure is finalized.) Alternatively, the staff could use the K/As that screen in for testing as related to a CSF, and if necessary, the staff could also factor in defense-in-depth functions for broader JPM sampling purposes.

  NuScale explained that actions to restore and maintain critical safety functions locally in the plant are covered in their proposed Job Performance Measure testing scheme. Additionally, their design has a small population of EOPs containing actions that are repetitive across EOPs making this approach undesirable for exam predictability reasons.

- Is the intention for the written examination to sample learning objectives from all of the segments of the training program? Also, the staff would like to understand how the written exam selection technique will minimize duplicate topic selection. To clarify, there are similar classroom ("C"), simulator ("SG"), and/or qual guide ("QG") learning objectives.

  NuScale proposed limiting the K/As sampled on the written examination to classroom learning objectives. NuScale plans to share two different written examination outline types with the NRC staff can show two outlines: one with classroom learning objectives and one with simulator and qual guide learning objectives for comparison purposes. NuScale added that each scenario guide has a companion classroom guide.

The NRC staff added that additional review may be needed to ensure that the wording of the classroom learning objectives does not limit the ability to develop high cognitive level written examination questions.

The staff also had the following additional comments about the K/A catalog:

- Clarification is needed for the statement about “does not appear in another learning objective” appear for PS-C-XXX-E003 standardized LOB? (Page 1-10).

- The staff will likely need to replace “List” and “Describe” with “Knowledge of...” and “Demonstrate” with “Ability to...”

- What does “poor content” mean (Page 1-32)? NuScale stated this was a typographical error.

- Please explain the statement in Section 1.16 about minimizing setpoint values. Is that because these are site-specific and undetermined at this time? The staff understands that specific setpoint values would not be included in the catalog. Is this what is meant here? NuScale stated that was correct.

- Section 4.6, “Learning Objective Based K/A Catalog,” background section has a statement about the purpose of the facility licensee training program that the staff considers too limiting; the purpose of the training program is to prepare applicants to become competent operators.

- Are the CFR links all-inclusive? NuScale responded that they are not all inclusive.

- Section 4.6.F discusses a proposed process for establishing a K/A catalog prior to each class and exam. The staff understands there will be changes to training program content over time, but the process as proposed would seem to create an undesirable amount of additional work for the chief examiner prior to each exam. The staff would prefer to establish a baseline K/A catalog and provide a method for adding new K/As when needed and rejecting inapplicable K/As when necessary. This is aligned to the current process in NUREG-1021 and allows for consistency and reduces workload for NRC staff. NuScale recognized the advantages and disadvantages of this approach. NuScale proposed piloting the change management process for the catalog and added that the frequency for updates could be tied to Commission-approval of the training program.

- Please explain the scope from which the sample is drawn. The staff needs to understand the scope of information (for example, systems and equipment) selected for the initial examination training program. The staff would also like to understand whether and how the learning objectives were derived from the task analysis described in the design certification application (in Tier 2; Chapter 18, “Human Factors Engineering;” Section 18.4, Task Analysis”). Also, the staff would like to understand how the “DIF” process was used for the purposes of K/A sampling.

  NuScale used the task analysis resulting from the Human Factors Engineering program function requirements analysis and function allocation activities to create an SRO/RO

training task list. They used subject matter experts to perform a “DIF” of this list and then created a task to training matrix for the initial license training program. NuScale is conducting an additional DIF screening using more NuScale operations personnel to increase the number of subject matter experts from the first DIF evaluation. If DIF scores change, the task list may change. NuScale does not expect task list changes to cause many learning objective changes.

- Are there any learning objectives that are left to a facility licensee to be addressed in the initial training program and potentially on the examination?

  NuScale replied that feedback from facility licensee staff (i.e., incumbents) is necessary. They do not anticipate many changes to the learning objective population because the learning objectives include those for site specific systems (represented in broad terms).

  The NRC asked if fuel handling is covered in the K/A catalog and how is the crane covered if it is not designed yet. NRC expressed concern for consideration of systems left out of the deign certification application.

  NuScale replied that they could provide a list of site-specific systems. NuScale believes that the learning objectives are written broadly enough that changes to interlocks, for example, would still be covered because there is a learning objective to discuss all interlocks for a given system.

- Some learning objectives were identified as not being sampled, but have an “X” for selected. Also, some are identified as important to safe plant operation, but do not have an “X” for sampling.

  NuScale generated the catalog automatically using the Vision software. The “X” means selected.

The NRC staff and NuScale also discussed the next steps for developing a K/A catalog. The staff explained that this feedback is for NuScale to decide how to use for providing future input for a publicly available NUREG. The NRC staff would prefer this input in a format that allows sharing the information publicly and using copy and paste features for transfer. The NRC prefers that NuScale submit this information via a letter to the Chief, Operator Licensing and Human Factors Branch.

The meeting was opened to the public for comments and questions. There were no members of the public in attendance. The meeting ended with a summary of topics discussed and next steps.

The list of meeting attendees is included in the Enclosure. The meeting notice is available in ADAMS with Accession No. ML19176A475. Please direct any inquiries to Maurin Scheetz at (301) 415-2758, or email at maurin.scheetz@nrc.gov.

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Dated: October 30, 2019

Enclosure:
Meeting Attendees

DISTRIBUTION:
MScheetz, NRR

ADAMS ACCESSSION No. ML19301B256 Via email* NRC-001

OFFICE	NRR/DRO/IOLB	NRR/DRO/IOLB
NAME	MScheetz*	CCowdrey
DATE	10/28/2019	10/30/2019

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PUBLIC MEETING
U.S. NUCLEAR REGULATORY COMMISSION
October 16, 2019
1:30 p.m. – 3:00 p.m.

List of Attendees

NAME	**AFFILATION**
Mark Bates	NRC
Christian Cowdrey	NRC
Eugene Guthrie	NRC
Brandon Hartle	NRC
David Lanyi	NRC
Lauren Nist	NRC
Maurin Scheetz	NRC
Doug Bowman	NuScale
Mark Chitty	NuScale
Pat Leary	NuScale
Tim Tovar	NuScale