



June 11, 2018

Docket No. 52-048

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

SUBJECT: NuScale Power, LLC Supplemental Response to NRC Request for Additional Information No. 249 (eRAI No. 9135) on the NuScale Design Certification Application

REFERENCES: 1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 249 (eRAI No. 9135)," dated September 29, 2017
2. NuScale Power, LLC Response to NRC "Request for Additional Information No. 249 (eRAI No.9135)," dated November 21, 2017

The purpose of this letter is to provide the NuScale Power, LLC (NuScale) supplemental response to the referenced NRC Request for Additional Information (RAI).

The Enclosure to this letter contains NuScale's supplemental response to the following RAI Question from NRC eRAI No. 9135:

- 14.03.03-5

This letter and the enclosed response make no new regulatory commitments and no revisions to any existing regulatory commitments.

If you have any questions on this response, please contact Steven Mirsky at 240-833-3001 or at smirsky@nuscalepower.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Zackary W. Rad".

Zackary W. Rad
Director, Regulatory Affairs
NuScale Power, LLC

Distribution: Gregory Cranston, NRC, OWFN-8G9A
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Enclosure 1: NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 9135



Enclosure 1:

NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 9135

Response to Request for Additional Information Docket No. 52-048

eRAI No.: 9135

Date of RAI Issue: 09/29/2017

NRC Question No.: 14.03.03-5

The NRC regulations in 10 CFR 52.47(b)(1) require that a design certification application contain the inspections, tests, analyses, and acceptance criteria (ITAAC) that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a plant that incorporates the design certification is built and will operate in accordance with the design certification, the provisions of the Atomic Energy Act, and the NRC's regulations. The ITAAC proposed in the NuScale FSAR Tier 1, Section 2.1, "NuScale Power Module," Section 2.2, "Chemical and Volume Control System," and Section 2.4, "Turbine Generator System," do not include ITAAC to verify the functional arrangement or installed configuration of the applicable systems and components. See June 21, 2016, transmittal letter providing additional standardized ITAAC, ADAMS Accession No. ML16160A179). Verification of the installed configuration of a system includes verifying that the system and its components are installed in a manner that supports the safety functions for which the system is intended, consistent with procurement, construction, and installation specifications. This verification should include visual inspection (e.g., walkdown) of the system, including its flowpath, and may be performed in conjunction with other preoperational activities. Examples of the verification performed by the licensee to complete this ITAAC include confirmation of valve orientation, verification of adequate access for inservice inspection (ISI) and inservice testing (IST) activities, and confirmation that interferences are avoided. The Design Commitment of these ITAAC should specify that the installed configuration of the system, including its flowpath, is consistent with procurement, construction, and installation specifications such that the system's safety functions can be achieved. The ITA should specify that inspection of the as-built system will be performed to verify the installed configuration, including the flowpath. The Acceptance Criteria should specify that the system's installed configuration, including the flowpath, of the components listed in the applicable ITAAC table is consistent with procurement, construction, and installation specifications such that the system's safety functions can be achieved. As discussed above, the NRC staff requests that the NuScale design certification applicant include proposed ITAAC to verify the functional arrangement or installed configuration of the applicable systems and components in NuScale FSAR Tier 1, Section 2.1, 2.2, and 2.4.



NuScale Response:

This response supplements the November 21, 2017 eRAI No. 9135 response to the NRC (ML17325B432). NRC staff provided feedback and proposed an installed configuration ITAAC, specifically for the NPM and CVCS valves, during a February 6, 2018 teleconference and through a February 13, 2018 email, respectively. NuScale has concluded that the NRC-proposed installed configuration ITAAC is not required for the NuScale safety-related valve design.

As an example of NuScale's safety-related valve ITAAC, the attached diagram describes the population of as-built inspection ITAAC and preoperational test ITAAC required for each containment isolation valve which is a safety-related valve. Note that the implementation of the listed ITAAC requires each containment isolation valve to be inspected or tested twenty-five times.

As stated in 10 CFR 52.47(b)(1), the purpose of ITAAC is to provide reasonable assurance that a constructed facility conforms to NRC regulations and its license. ITAAC are not meant to be a one-for-one check of detailed design and construction features and do not verify every design and construction feature included in the FSAR. ITAAC are just one element of the licensee's construction, testing, and quality programs, which include: the quality assurance program, quality control inspections, vendor surveillances and inspections, engineering design verifications, operational readiness reviews, and the preoperational test program. Thus, NuScale considers the type, scope, number and detail of the cumulative safety-related valve ITAAC verifications shown in the figure to provide reasonable assurance that the NuScale constructed facility conforms to NRC regulations and its license.

The NRC's Construction Inspection Program (CIP) provides oversight of aforementioned programs. Thus, not all construction related activities need to be verified by ITAAC. Inspections, tests, and analyses would be conducted under the licensee's quality programs, and in accordance with applicable codes and standards, even if no ITAAC existed; therefore, it is unnecessary to include in ITAAC inspections, tests, and analyses that do not meet first principles, as defined and described in FSAR Section 14.3.2, and for which implementation is effectively assured via licensee quality programs and NRC oversight thereof.

The NRC uses CIP procedures to verify activities during plant construction. The following are examples of design attributes of safety-related valves inspected by NRC inspectors using inspection procedures to verify that the valves conform, as required, to procurement drawings and specifications and to applicable codes:

- valve and valve actuator orientation,
- valve special features such as coatings and insulation,
- torquing of valve bolts,
- proper valve lubrication,



- compliance with tolerance/clearance requirements (accessibility),
- utilization of special tools or equipment which conform to the manufacturer's instructions,
- visual inspection of installed cables to valves to look for evidence of damage, and
- visual inspection and testing of valve cable terminations, connectors, and splices.

These examples illustrate the level of design attributes that are inspected and verified in the CIP and do not require ITAAC. The level of design detail provided in these examples is equivalent to the inspection detail requested in the NRC-proposed installed configuration ITAAC. This level of inspection detail is not commensurate to the level of detail required in ITAAC for safety-related valves.

Impact on DCA:

There are no impacts to the DCA as a result of this response.

NUSCALE SAFETY-RELATED CONTAINMENT ISOLATION VALVE ITAAC

**25 Total
As-Built and
Preoperational
Test ITAAC**

NuScale Containment System ITAAC

Containment ITAAC

As-built Inspections

- ITAAC 02.01.09 Containment Isolation Valve Location

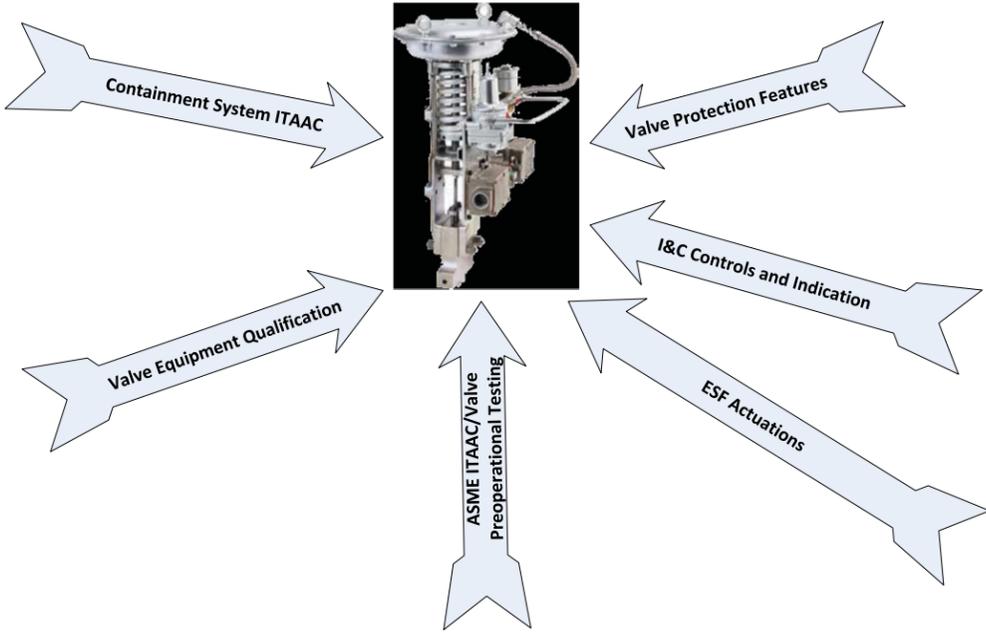
Preoperational Tests

- ITAAC 02.01.07 Containment Leak Rate (10 CFR Part 50, Appendix J)
- ITAAC 02.01.08 Containment Isolation Valve Closure Time

NuScale Non-Safety Related Components Providing Protection of Safety-Related Valves

As-built Inspections

- ITAAC 02.01.04 Pipe Break Hazards Protective Features Verification
- ITAAC 03.11.07 Non-Seismic Category I Structures, Systems, and Components (SSCs) Seismic Interaction



NuScale Containment Isolation Valve Qualification

Equipment Qualification ITAAC

- ITAAC 02.08.01* Seismic Category I Equipment Qualification/ Installation
- ITAAC 02.08.02* Class 1E Electrical Equipment Harsh Environment Qualification/ Installation (10 CFR Part 50.49)
- ITAAC 02.08.03 Safety-Related Mechanical Equipment Harsh Environment Qualification
- ITAAC 2.08.06 Safety-Related Valve Functional Qualification

As-built Inspections

- ITAAC 02.08.01* Seismic Category I Equipment Qualification/ Installation
- ITAAC 02.08.02* Class 1E Electrical Equipment Harsh Environment Qualification/ Installation (10 CFR Part 50.49)

*ITAAC 02.08.01 and 02.08.02 have two parts: (i) verification of qualification testing and (2) as-built inspection at design location which result in two as-built ITAAC inspections for each ITAAC

Fission Product Barrier

Mechanical ITAAC

As-built Inspection

- ITAAC 02.01.01 ASME Section III Piping System Design Report
- ITAAC 02.01.02 ASME Section III Code Class 1, 2 and 3 Data Reports

Preoperational Tests

- ITAAC 02.01.13 Safety-Related Valve Stroke Test Under Preoperational Test Conditions
- ITAAC 02.01.18 Safety-Related Air-Operated Valve Operation on Loss of Motive Power

NuScale Module Protection System Provides Engineered Safeguards Equipment Actuation and Displays

I&C ITAAC

As-built Inspections

- ITAAC 02.01.11* Class 1E I&C Circuits Physical Separation (two verifications)

Module Protection System ITAAC

As-built Inspections

- ITAAC 02.05.03* Class 1E I&C Circuits Physical Separation (two verifications)
- ITAAC 02.05.04 Class 1E I&C Circuits Electrical Isolation

Preoperational Tests

- ITAAC 02.05.09 Protection System - Manual ESF Equipment Actuation
- ITAAC 02.05.10 Protection System - Automatic ESF Equipment Actuation
- ITAAC 02.05.16 Protection System - Completion of Protective Actions
- ITAAC 02.05.17 Protection System - Response Time Testing of ESF Equipment Actuation
- ITAAC 02.05.25 PAM Type B and Type C variables displayed on SDIS displays in the MCR. (valve position indication for safety-related valves)

*ITAAC 02.01.11 and 02.05.03 have two parts: (i) separation between redundant circuits (2) separation between Class 1E and non-Class 1E circuits