RAIO-0618-60378

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 Response to NRC Request for Additional Information No. 412 (eRAI No. 9433) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 412 (eRAI No. 9433)," dated April 10, 2018

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

The Enclosure to this letter contains NuScale's response to the following RAI Question from NRC eRAI No. 9433:

- 13.05.02.01-5

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,

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

Distribution: Gregory Cranston, NRC, OWFN-8G9A
Samuel Lee, NRC, OWFN-8G9A
Prosanta Chowdhury NRC, OWFN-8G9A

Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9433

Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9433

NuScale Power, LLC
1100 NE Circle Blvd., Suite 200 Corvalis, Oregon 97330, Office: 541.360.0500, Fax: 541.207.3928
www.nuscalepower.com

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

eRAI No.: 9433
Date of RAI Issue: 04/10/2018

NRC Question No.: 13.05.02.01-5

REGULATORY BASIS REQUIREMENTS

Title 10 of the *Code of Federal Regulations* (10 CFR) Section 52.47(a)(8) requires an applicant for a design certification to provide an FSAR (Final Safety Analysis Report) which includes the information necessary to demonstrate compliance with any technically relevant portions of the Three Mile Island requirements set forth in 10 CFR 50.34(f), with certain exceptions. Section 10 CFR 50.34(f)(2)(ii) requires an applicant to "Establish a program, to begin during construction and follow into operation, for integrating and expanding current efforts to improve plant procedures. The scope of the program shall include emergency procedures, ... “

TMI Action Plan Item I.C.1, a Post-TMI requirement approved by the Commission for implementation, requires the preparation of emergency procedure technical guidelines for development of the Emergency Operating Procedures (EOPs). Preparation of the technical guidelines is conducted in accordance with NUREG-0737, “Clarification of TMI Action Plan Requirements,” and NUREG-0737, Supplement 1, “Requirements for Emergency Response Capability,” which also specify submittal of the technical guidelines to the NRC for review and approval.

Meeting the requirements of TMI Action Plan Item I.C.1 as prescribed in NUREG-0737, Section I.C.1, and Supplement 1 to NUREG-0737, Section 7, is acceptance criteria in SRP 13.5.2.1, “Operating and Emergency Operating Procedures.” Design-specific Generic Technical Guidelines (GTGs), otherwise referred to as the Emergency Operating Guidelines (EOGs), will be used by COL applicants to develop their Plant-Specific Technical Guidelines (P-STGs), from which their EOPs will be developed, and are the responsibility of the DC applicant.

By letter dated November 30, 2017 (ADAMS Accession No. ML17334B822) NuScale submitted technical report TR-1117-57216, “NuScale Generic Technical Guidelines,” for docketing.

ISSUE

The Analytical Limit values specified in Table 7.1-4, “Engineered Safety Feature (ESF) Actuation System Functions (ESFAS),” are used exclusively in the Critical Safety Function

(CSF) flowcharts as “decision variable” setpoint values for determining whether ESF Systems have automatically actuated when required by plant conditions. TR-1117-57216, Section 4.7, “Setpoint Selection,” Page 25, states the following:

> *"The final setpoints may deviate from those listed here due to final selection of instrumentation, accuracy, and allowing appropriate time for the operator to respond. The values have been included within these guidelines to provide a reference and it is anticipated that the basis for the setpoints will remain constant.”*
>
> *“Emergency procedures developed from these GTGs will need to reference the plant specific equipment values, ranges, and accuracies.”*

With respect to final setpoint selection in the NuScale GTGs, use of the words "may deviate" in the first paragraph of the cited text, warrants clarification. Final setpoint values for the actuation of ESF Systems evaluated in the CSF flowcharts will knowingly deviate from the Analytical Limit values that have been provided for reference purposes. ESFAS setpoints are selected to provide sufficient allowance (i.e., conservative margin) between the actuation setpoint and the Analytical Limit to account for instrument uncertainties. NuScale Power TR-616-49121, “NuScale Instrument Setpoint Methodology Technical Report,” describes the instrumentation setpoint determination methodology applied to safety-related Instrumentation and Control (I&C) functions. The Analytical Limits, uncertainties, and setpoints for ESFAS Functions are summarized in this technical report document.

INFORMATION NEEDED

NRC staff requests that NuScale: (1) make the necessary changes to Section 4.7 of TR-1117-57216, to clarify that the final setpoint values for the actuation of ESF Systems evaluated in the CSF flowcharts will in fact deviate from the Analytical Limit values currently specified, as determined by TR-616-49121, “NuScale Instrument Setpoint Methodology Technical Report,” and (2) Include TR-616-49121, “NuScale Instrument Setpoint Methodology Technical Report,” in Section 7.2, “Referenced Documents,” of the NuScale GTGs.

NuScale Response:

The following statement in TR-1117- 57216, NuScale Generic Technical Guidelines, Section 4.7, "Setpoint Selection," page 25, makes it clear that current values in the generic technical guidelines (GTGs) are preliminary.

"The final setpoints may deviate from those listed here due to final selection of instrumentation, accuracy, and allowing appropriate time for the operator to respond. The values have been included within these guidelines to provide a reference and it is anticipated that the basis for the setpoints will remain constant.”

"… Emergency procedures developed from these GTGs will need to reference the plant specific equipment values, ranges, and accuracies."

The setpoints listed in the GTGs are derived through the NuScale design control process and are an accurate reflection of the current design. As the design matures, the setpoints change as needed to reflect design changes. This is consistent with the nature of an iterative design process. Plant-specific equipment values, ranges and accuracies; resolution of corrective action reports; and changes in operating requirements are all examples that will cause the design to change which in turn might require setpoints to be adjusted.

The paragraph quoted above has been adjusted to explain that the setpoint changes are part of the design process.

Impact on DCA:

Technical Report TR-1117-57216, NuScale Generic Technical Guidelines, has been revised as described in the response above and as shown in the markup provided in this response.

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}}2(a),(c)

4.7 Setpoint Selection

The listed setpoints have been derived from safety analysis (Table 7.1-4 of Reference 7.2.1), calculations, or best estimate. These ~~final~~ setpoints may be adjusted to reflect design changes~~deviate from those listed here~~ due to final selection of instrumentation, accuracy, and allowing appropriate time for the operator to respond. The values have been included within these guidelines to provide a reference and it is anticipated that the basis for the setpoints will remain constant.

Instrumentation requirements have been provided based on NuScale requirements, regulatory requirements, or vendor recommendations, but must be refined once the actual instrumentation is selected or purchased. Emergency procedures developed from these GTGs will need to reference the plant specific equipment values, ranges, and accuracies.

4.8 Implementation Strategy

Upon meeting an entry condition as listed in section 4.5, all of the the safety function and defense-in-depth flow charts for the affected unit are entered concurrently. By design, the various flow chart analysis is completed by the human-system interface automatically more than once per second. This analysis consists of evaluating system parameters against the flow chart decision setpoints and resulting in an end point. An end point can be either the green safety function met indication and no procedure to be performed, OR a red/yellow condition in which there are applicable procedure steps to be performed. When the procedure steps have been successful, the flow chart is re-evaluated to determine the appropriate end point.

Safety functions always take priority over defense-in-depth functions. The safety functions are arranged in order of importance: containment integrity, reactivity, and core heat removal. If two or more red paths exist on a single unit, then the crew starts with containment integrity then reactivity and core heat removal as actions are completed. If an operator is performing steps in a higher priority function but is waiting for an action to complete, then actions may be taken on lower level safety functions or defense-in-depth