NuScaleDCRaisPEm Resource

From:	Chowdhury, Prosanta
Sent:	Wednesday, April 25, 2018 5:32 PM
To:	Request for Additional Information
Cc:	Lee, Samuel; Cranston, Gregory; Kent, Lauren; Scheetz, Maurin; NuScaleDCRaisPEm Resource
Subject:	Request for Additional Information No. 436 eRAI No. 9435 (13.05.02.01)
Attachments:	Request for Additional Information No. 436 (eRAI No. 9435).pdf

Attached please find NRC staff's request for additional information (RAI) concerning review of the NuScale Design Certification Application.

Please submit your technically correct and complete response within 60 days of the date of this RAI to the NRC Document Control Desk.

If you have any questions, please contact me.

Thank you.

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Licensing Branch 1 (NuScale)
Division of New Reactor Licensing
Office of New Reactors
U.S. Nuclear Regulatory Commission
301-415-1647

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Request for Additional Information No. 436 (eRAI No. 9435)

Issue Date: 04/25/2018
Application Title: NuScale Standard Design Certification - 52-048
Operating Company: NuScale Power, LLC
Docket No. 52-048
Review Section: 13.05.02.01 - Operating and Emergency Operating Procedures
Application Section: SRP 13.5.2.1

QUESTIONS

13.05.02.01-21

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 NuScale GTGs are "symptom-based" procedural guidelines that allow the operator to respond directly to indications presented as part of an accident progression. Legacy plant generic guidelines include "event-based" descriptions; i.e., events based on the Transient and Accident Analysis events and associated operator actions described in Chapter 15 of the FSAR for a specific design. Because the NuScale design has no credited manual actions in FSAR

Chapter 15, the "symptom-based" approach allows for mitigating strategies to be effective with multiple failure, regardless of the combination.

Section 4.2, "Critical Safety Functions," of the NuScale GTGs states:

> *"The evaluation of symptoms is grouped into critical safety functions. This guidance is developed to maintain critical safety functions for the NuScale design. Evaluation of the NuScale design, in addition to performing a comparison with traditional light water reactor safety functions, was used to determine the appropriate NuScale safety functions." These functions are accomplished by maintaining the following:*
>
> - *Containment Integrity*
> - *Reactivity*
> - *Core Heat Removal*
>
> *Additional safety functions are not needed due to the simplicity and reliance on passive systems in the NuScale design."*

Section 4.2 also includes a brief discussion of the reasons for why the Secondary Heat Sink critical safety function (CSF) is defined for other PWR designs but not for the NuScale plant design. Section 4.2 does not however, provide any additional discussion, insights, or evaluation regarding the suitability of the "RCS Integrity" or "Inventory" CSFs defined for other PWR designs, to the NuScale design, in order to justify their exclusion from the GTGs, other than to state that "[t]he Core Heat Removal (CHR) CSF also evaluates RCS Integrity."

Similarly, Chapter 7 does not provide any additional discussion, insights, or evaluation regarding the suitability of the "RCS Integrity" or "Inventory" CSFs defined for other PWR designs, to the NuScale design, in order to justify their exclusion from the GTGs, other than to state the following in Section 7.1.1.2.2, "Post-Accident Monitoring:"

> *"The "remove fuel assembly heat" critical safety function includes the aspects of reactor coolant system (RCS) integrity. This is due to the integral nature of emergency core cooling system (ECCS) and RCS integrity – actuating ECCS opens valves to allow steam release to the containment and return of water back to the RCS – it is done to maintain core cooling and protect the fuel clad fission product barrier. This is automatically actuated when there is an existing loss of RCS as indicated by low reactor pressure vessel (RPV) riser water level or high containment water level."*

Previously approved Emergency Response Guidelines (ERGs) for other PWR designs verified the integrity of the reactor coolant system (RCS) in order to ensure that the pressure – temperature limits of the RCS are not violated. This verification is <u>not</u> included in the NuScale GTGs.

NRC staff is questioning whether the RCS Integrity needs to be included in the list of NuScale CSFs. Specifically, the staff is questioning whether pressure and temperature changes need to be verified to be within the pressure-temperature limits in the NuScale design. The staff is also questioning whether the Inventory CSF needs to be included in the NuScale GTGs.

INFORMATION NEEDED

NRC staff requests that NuScale: (1) either include the RCS Integrity and/or Inventory CSFs in the NuScale GTGs or provide the justification for their exclusion, 2) enhance the discussion in Section 4.2 of the GTGs to include a justification for the exclusion of any CSFs not defined for the NuScale power plant design, beyond stating that *"Additional safety functions are not needed due to the simplicity and reliance on passive systems in the NuScale design,"* and (3) make any additional changes to technical report TR-1117-57216 necessary to ensure the completeness and accuracy of the NuScale GTGs (flowchart and bases).