NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Friday, December 22, 2017 1:22 AM
To: RAI@nuscalepower.com
Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Rivera-Varona, Aida; D'Agostino, Amy; Murray, Demetrius
Subject: Request for Additional Information No. 313 RAI No. 9312 (18)
Attachments: Request for Additional Information No. 313 (eRAI No. 9312).pdf

Attached please find NRC staff's request for additional information 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.

The NRC Staff recognizes that NuScale has preliminarily identified that the response to the question in this RAI is likely to require greater than 60 days.

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
301-415-0546

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Request for Additional Information No. 313 (eRAI No. 9312)

Issue Date: 12/22/2017
Application Title: NuScale Standard Design Certification - 52-048
Operating Company: NuScale Power, LLC
Docket No. 52-048
Review Section: 18 - Human Factors Engineering
Application Section: 18

QUESTIONS

18-13

Title 10 of the Code of Federal Regulations (10CFR) Section 52.47(a)(8) requires an applicant for a design certification to provide a final safety analysis report (FSAR) that must include 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), except paragraphs (f)(1)(xii), (f)(2)(ix), and (f)(3)(v). Section 10 CFR 50.34(f)(2)(iii) requires an applicant to "Provide, for Commission review, a control room design that reflects state-of-the-art human factor principles prior to committing to fabrication or revision of fabricated control room panels and layouts." Chapter 18, "Human Factors Engineering," of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," and NUREG-0711, "Human Factors Engineering Program Review Model," identify criteria the staff uses to evaluate whether an applicant meets the regulation. The applicant stated in the FSAR, Tier 2, Section 18.0, "Human Factors Engineering - Overview," that its human factors engineering (HFE) program incorporates accepted HFE standards and guidelines including the applicable guidance provided in NUREG-0711, Revision 3.

The applicant has, thus far, submitted for NRC review an implementation plan for the human factors verification and validation element of NUREG-0711 element. As part of this element NUREG-0711, Section 11.3 states that, "If the applicant submits an IP, it should describe the complete methodology for conducting V&V, including…the complete set of detailed scenarios for ISV (and how they were identified through the Sampling of Operational Conditions), performance measures, and acceptance criteria…Summaries may be used for any of the above items provided that references are given for more detailed documents."

Specifically, Criteria 11.4.1.3 (1) in NUREG-0711 states that "The applicant should identify operational conditions and scenarios to be used for HSI Task Support Verification, Design Verification, and ISV. The applicant should develop detailed scenarios suitable for use on a full-scope simulator. The level of detail should be comparable to what one would include in a test plan. For each one, the following information should be defined to reasonably assure that important dimensions of performance are addressed, and to allow the scenarios to be accurately and consistently presented for repeated trials:

- a description of the scenario and any pertinent prior history necessary for personnel to understand the state of the plant at the start-up of the scenario
- specific initial conditions (a precise definition of the plant's functions, processes, systems, component conditions, and performance parameters, e.g., similar to that at shift turnover)
- events (e.g., failures) that will occur during the scenario and their initiating conditions, e.g., based on time, or a value of a specific parameter
- precise definition of workplace factors, (e.g., environmental conditions, such as low levels of illumination)
- needs for task support (e.g., procedures and technical specifications)
- staffing level
- details of communication content between control room personnel and remote personnel (e.g., load dispatcher via telephone)
- scripted responses for test personnel who will act as plant personnel in the test scenarios
- the precise specification of what, when, and how data are to be collected and stored (including videotaping, questionnaires, and rating-scale administrations)
- precise specifications on simulator set up
- specific criteria for terminating the scenario"

During the staff's audit of the V&V methodology (the audit plan is available as ADAMS Accession No. ML17205A465), the staff reviewed scenario basis documents in the Electronic Reading Room. The scenario basis documents contain some, but not all, of the information listed in NUREG-0711, Criteria 11.4.1.3 (1). During the audit, NuScale staff explained that the complete scenarios will be developed prior to conducting integrated system validation testing in late 2018.

1. Please identify when the completed scenarios will be made available prior to ISV for the staff to complete its review of the V&V methodology.
2. Please explain whether the scenarios will docketed or if summaries of the scenarios will be docketed. Also, please explain whether the scenarios or summaries will be docketed before completion of the V&V RSR or included with the V&V RSR.