

## **NuScaleDCRaisPEm Resource**

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**From:** Chowdhury, Prosanta  
**Sent:** Friday, March 09, 2018 11:06 PM  
**To:** Request for Additional Information  
**Cc:** Lee, Samuel; Cranston, Gregory; Murray, Demetrius; Kent, Lauren; D'Agostino, Amy; NuScaleDCRaisPEm Resource  
**Subject:** Request for Additional Information No. 380 eRAI No. 9394 (Ch. 18)  
**Attachments:** Request for Additional Information No. 380 (eRAI No. 9394).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.

Prosanta Chowdhury, Project Manager  
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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**Options**

**Priority:** Standard  
**Return Notification:** No  
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## Request for Additional Information No. 380 (eRAI No. 9394)

Issue Date: 03/09/2018

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:

### QUESTIONS

18-16

Title 10 of the *Code of Federal Regulations* (10 CFR) 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.

#### Question

Criteria 11.4.2.2 (4) and 11.4.2.3 (4) in NUREG 0711, Section 11.4 addresses HED Documentation. These criteria state:

11.4.2.2 (4) "HED Documentation – The applicant should document HEDs in terms of the HSI involved, and how its characteristics depart from a particular guideline."

11.4.2.3 (4) "HED Documentation – The applicant should document HEDs to identify the HSI, the tasks affected, and the basis for the deficiency (what aspect of the HSI was identified as not meeting task requirements).

While the staff understands, via information provided in Section 5.0 of the V&V IP, that HEDs are identified and tracked in the "Human Factors Engineering Issues Tracking System (HFEITS) database, it is not clear to staff the specific information captured for each HED. Please clarify whether the information cited in the above criteria are captured in HFEITS for each HED.

18-17

Title 10 of the *Code of Federal Regulations* (10 CFR) 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.

NUREG-0711, Section 11.4.4 (4), states, "Design Solution Evaluation – The applicant should evaluate design solutions to demonstrate the resolution of that HED and to ensure that new HEDs are not introduced. Generally, the evaluation should use the V&V method that originally detected the HED."

In Section 5.1 of the V&V IP the applicant explains that after an HED has been prioritized, it is routed to the HFE design team, simulator review board, or both as appropriate for resolution. Please clarify how (i.e. the method by which) design solutions are evaluated to ensure HEDs are resolved and no new HEDs are introduced.

18-18

Title 10 of the *Code of Federal Regulations* (10 CFR) 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.

NUREG-0711, Section 11.4.4 (5), states, "HED Evaluation Documentation – The applicant should document each HED, including:

- the basis for not correcting an HED
- related personnel tasks and functions
- related plant systems
- cumulative effects of HEDs
- HEDs as indications of broader issues"

In Section 5.0 of the V&V IP, the applicant explains that HFE issues and HEDs are documented and tracked in the Human Factors Engineering Issues Tracking System (HFEITS) database. If

an HED is not resolved, “the basis for a decision for accepting an HED without change in the integrated design is documented. It may be based on accepted HFE practices, current published HFE literature, trade-off studies, tests, or engineering evaluations.”

Section 5.2 of the V&V IP, the applicant describes how HEDs are categorized based on their impact on:

- personnel tasks and functions
- plant systems
- human-system interface feature
- individual HSI component
- operating procedure

In addition, the applicant describes an extent of condition analysis for HEDs that considers cumulative or combined effects of multiple HEDs and HEDs that may represent a broader issue. While the staff understands that the bulleted information in this criteria are *considered* during the analysis of each HED, it is not clear to the staff whether the information is *documented* in HFEITS (e.g. related task/functions/plant systems) with the exception of the basis for not correcting an HED. Please clarify how and where this information is documented.