

## NuScaleDCRaisPEm Resource

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**From:** Chowdhury, Prosanta  
**Sent:** Tuesday, May 1, 2018 11:58 AM  
**To:** Request for Additional Information  
**Cc:** Lee, Samuel; Cranston, Gregory; Franovich, Rani; Karas, Rebecca; Burja, Alexandra; NuScaleDCRaisPEm Resource  
**Subject:** RE: Request for Additional Information No. 449 eRAI No. 9497 (15.04.07)  
**Attachments:** Request for Additional Information No. 449 (eRAI No. 9497).pdf

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

The NRC Staff recognizes that NuScale has preliminarily identified that the response to one or more questions in this RAI is likely to require greater than 60 days. NuScale is expected to provide a schedule for the RAI response by email within 14 days.

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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## Request for Additional Information No. 449 (eRAI No. 9497)

Issue Date: 05/01/2018

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 15.04.07 - Inadvertent Loading and Operation of a Fuel Assembly in an Improper Position

Application Section: FSAR Section 15.4.7

### QUESTIONS

#### 15.04.07-1

General Design Criterion 10, "Reactor design," in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix A, requires that the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits (SAFDLs) are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences (AOOs). GDC 13 requires that instrumentation be provided to monitor variables and systems over their anticipated ranges of normal operation, including the effects of AOOs, and appropriate controls to maintain listed variables and systems within prescribed operating ranges.

NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," (SRP) Section 15.4.7, "Inadvertent Loading and Operation of a Fuel Assembly in an Improper Position," provides the staff guidance in reviewing potential fuel loading errors. The areas of review under SRP Section 15.4.7 include identification of the worst situation undetectable by incore instrumentation and the resulting changes in the power distribution.

To allow the staff to ascertain that the most limiting misload has been identified, provide the following details regarding the worst-case misload, and update FSAR Section 15.4.7 to include this information:

- Location of the worst-case misload
- Whether the worst-case misload involves rotation of an assembly
- The resulting change in the power distribution (such as power peaking augmentation factors as input to the subchannel analysis)

#### 15.04.07-2

GDC 13 requires that instrumentation be provided to monitor variables and systems over their anticipated ranges of normal operation, including the effects of AOOs, and of appropriate controls to maintain listed variables and systems within prescribed operating ranges.

The staff requests further clarification or correction of the following statements in FSAR Tier 2, Section 15.4.7:

- FSAR Section 15.4.7.2: "The overpower fraction detection threshold is 1.44 and the underpower fraction detection threshold is 0.65. These fractions mean that an assembly could be as much as [emphasis added] 44 percent above its predicted power or 35 percent below its predicted power to be detectable by the core monitoring system." However, the staff understands that the deviation must be higher than the detection threshold. Therefore, it seems that an assembly must be at least 44 percent above its predicted power or 35 percent below its predicted power to be detectable by the core monitoring system.
- FSAR Section 15.4.7.3.3 states that the results for the limiting undetectable fuel misloading event are in FSAR Table 15.4-15, but the results are shown in FSAR Table 15.4-14.

The information in the design certification application that demonstrates how GDC 13 is met needs to be precise and consistent so the staff is able to make a reasonable assurance finding. Regarding the above items, either (1) update the FSAR to correct them or (2) justify why the information is correct as currently written.