

## **NuScaleDCRaisPEm Resource**

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**From:** Chowdhury, Prosanta  
**Sent:** Thursday, May 3, 2018 5:37 PM  
**To:** Request for Additional Information  
**Cc:** Lee, Samuel; Cranston, Gregory; Franovich, Rani; Karas, Rebecca; Burja, Alexandra; NuScaleDCRaisPEm Resource  
**Subject:** Request for Additional Information No. 464 eRAI No. 9504 (15.04.07)  
**Attachments:** Request for Additional Information No. 464 (eRAI No. 9504).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

**Hearing Identifier:** NuScale\_SMR\_DC\_RAI\_Public  
**Email Number:** 495

**Mail Envelope Properties** (BN7PR09MB2609B080B1ACAB177D194C2E9E870)

**Subject:** Request for Additional Information No. 464 eRAI No. 9504 (15.04.07)  
**Sent Date:** 5/3/2018 5:37:04 PM  
**Received Date:** 5/3/2018 5:37:09 PM  
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**Post Office:** BN7PR09MB2609.namprd09.prod.outlook.com

<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	675	5/3/2018 5:37:09 PM
Request for Additional Information No. 464 (eRAI No. 9504).pdf		13579

**Options**

**Priority:** Standard  
**Return Notification:** No  
**Reply Requested:** No  
**Sensitivity:** Normal  
**Expiration Date:**  
**Recipients Received:**

## Request for Additional Information No. 464 (eRAI No. 9504)

Issue Date: 05/03/2018

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

#### 15.04.07-3

General Design Criterion (GDC) 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 the provision of instrumentation 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.

According to TR-0915-17564-P, "Subchannel Analysis Methodology," which is incorporated by reference into the Final Safety Analysis Report (FSAR), the operating boundary conditions that are input into the subchannel analysis must account for measurement uncertainty. The staff understands that if biases are applied to parameters in the transient code input, biases for those parameters need not be applied in the subchannel analysis. However, when considering a steady-state analysis such as the inadvertent loading and operation of a fuel assembly in an improper position, the proper biases should be applied in the subchannel analysis. The staff audited engineering calculation (EC)-0000-2646, "Subchannel Analysis of Inadvertent Loading and Operation of a Fuel Assembly in an Improper Position," which supports the conclusions in FSAR Section 15.4.7, and notes that the applied system pressure bias of  psia is not consistent with the 70 psia bias specified in FSAR Tier 2, Table 15.0-6, "Module Initial Conditions Ranges for Design Basis Event Evaluation." Using a bias of the incorrect magnitude could produce non-limiting results for the minimum critical heat flux ratio (MCHFR) or linear heat generation rate evaluation. Therefore, please confirm whether the correct reactor coolant system pressure bias was applied in the subchannel analysis for this event. If it was not, either provide a revised analysis, or justify why the current analysis results remain valid. Update the FSAR as necessary.

In addition, the staff requests clarification of whether the  bias in core inlet temperature listed in EC-0000-2646 is consistent with a 10°F bias in RCS average temperature, as specified in FSAR Tier 2, Table 15.0-6. If it is not, provide a revised analysis that uses a core inlet temperature bias consistent with a 10°F bias in reactor coolant system average temperature, or justify why the current analysis results remain valid. Update the FSAR as necessary.