

August 01, 2017

Docket: PROJ0769

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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11555 Rockville Pike
Rockville, MD 20852-2738

SUBJECT: NuScale Power, LLC Response to NRC Request for Additional Information No. 8867 (eRAI No. 8867) on the NuScale Topical Report, "Evaluation Methodology for Stability Analysis of the NuScale Power Module," TR-0516-49417, Revision 0

REFERENCES: 1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 8867 (eRAI No. 8867)," dated June 23, 2017
2. NuScale Topical Report, "Evaluation Methodology for Stability Analysis of the NuScale Power Module," TR-0516-49417, Revision 0, dated July 2016

The purpose of this letter is to provide the NuScale Power, LLC (NuScale) response to the referenced NRC Request for Additional Information (RAI).

The Enclosure to this letter contains NuScale's response to the following RAI Question from NRC eRAI No. 8867:

- 01-10

This letter and the enclosed response make no new regulatory commitments and no revisions to any existing regulatory commitments.

If you have any questions on this response, please contact Darrell Gardner at 980-349-4829 or at dgardner@nuscalepower.com.

Sincerely,



Zackary W. Rad
Director, Regulatory Affairs
NuScale Power, LLC



RAIO-0817-55189

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Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 8867



Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 8867

Response to Request for Additional Information Docket: PROJ0769

eRAI No.: 8867

Date of RAI Issue: 06/23/2017

NRC Question No.: 01-10

In accordance with 10 CFR 50 Appendix A GDC 10, "Reactor design," the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences. The SRP 15.0.2 acceptance criteria with respect to evaluation models specifies that the chosen mathematical models and the numerical solution of those models must be able to predict the important physical phenomena reasonably well from both qualitative and quantitative points of view.

Section 8.0, "Stability Demonstration within Allowable Conditions and Settings," of the topical report, TR-0516-49417-P, states that the stability at BOC and EOC conditions are verified, but it is not clear from the TR what is specifically verified, or if this verification is cycle-specific.

In order to make an affirmative finding associated with the above regulatory requirement important to safety, NRC staff requests NuScale to describe how stability is verified at BOC and EOC conditions, and confirm if verifications are performed on a cycle-specific basis.

NuScale Response:

The verification of the stability rests on demonstration runs using the PIM code at different power levels from rated to low power. There was no independent variation of flow as it is internally determined by natural circulation, and there was no variation of subcooling as it has no effect while the riser fluid is maintained as single-phase liquid. The remaining variable to vary is the cycle exposure since it is associated with large boron concentration change and consequently large moderator temperature coefficient (equivalently moderator density coefficient). The maximum variation in moderator reactivity is achieved by running the same set of power levels at both beginning of cycle and end of cycle.

The calculations are generic in the sense that no cycle-specific effects are implied. No sensitivity was identified for parameters that would be affected on cycle-specific basis.



Impact on Topical Report:

There are no impacts to the Topical Report TR-0516-49417, Evaluation Methodology for Stability Analysis of the NuScale Power Module, as a result of this response.