

September 27, 2017

Docket: PROJ0769

U.S. Nuclear Regulatory Commission
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Rockville, MD 20852-2738

SUBJECT: NuScale Power, LLC Response to NRC Request for Additional Information No. 8922 (eRAI No. 8922) 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. 8922 (eRAI No. 8922)," dated July 30, 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).

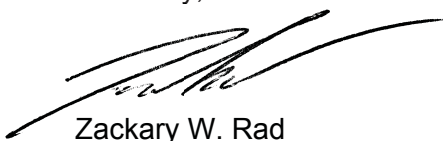
The Enclosure to this letter contains NuScale's response to the following RAI Question from NRC eRAI No. 8922:

- 01-23

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-0917-56236

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Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 8922

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NuScale Response to NRC Request for Additional Information eRAI No. 8922

Response to Request for Additional Information Docket: PROJ0769

eRAI No.: 8922

Date of RAI Issue: 07/30/2017

NRC Question No.: 01-23

Title 10 of the Code of Federal Regulations (CFR), Part 50, Appendix A, General. Design Criterion (GDC), 10, "Reactor design," 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 are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences. The Standard Review Plan (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.

In determining the important phenomena, a phenomena identification and ranking table (PIRT) has been developed. The PIRT ranking of the pellet thermal conductivity and pellet heat capacity appear to be inconsistent with the ranking of the reactivity feedback in Table 4-1 of the topical report, TR-0516-49417-P.

In order to make an affirmative finding, NRC staff requests NuScale provide additional justification of the ranking for the pellet thermal conductivity and pellet heat capacity. In this justification consider the importance of reactivity feedback arising from changes in fuel temperature.

NuScale Response:

The Phenomena Identification and Ranking Table (PIRT) 4-1 of Topical Report TR-0516-49417 includes a medium ranking for fuel pellet thermal conductivity and heat capacity. The pellet thermal conductivity is part of the calculation of pellet temperature and ultimately affects Doppler feedback during steady state and transient response. The pellet heat capacity impacts the pellet temperature for transients only. In the specific case of the NuScale Power Module, this effect is small given the natural oscillation period is much larger than the fuel pin conduction time constant. For this reason, the ranking is judged to be medium. The reactivity feedback has been designated as high, because the MTC (Moderator Temperature Coefficient) component of



reactivity magnitude varies widely with cycle exposure as the boron concentration varies (contrast with Doppler reactivity that varies rather mildly with exposure).

The PIRT table ranking is a qualitative process. It should also be noted that a medium ranked phenomena is modeled in PIM with the same attention to detail as a high ranked phenomena.

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.