

NuScaleTRRaisPEm Resource

From: Cranston, Gregory
Sent: Sunday, July 30, 2017 10:24 AM
To: RAI@nuscalepower.com
Cc: NuScaleTRRaisPEm Resource; Lee, Samuel; Skarda, Raymond; Karas, Rebecca; Schmidt, Jeffrey; Chowdhury, Prosanta; Bovol, Bruce
Subject: Topical Report Thermal Hydraulic Stability - Request for Additional Information Letter No. 8846 (eRAI No. 8846)
Attachments: Request for Additional Information No. 8846 (eRAI No. 8846).pdf

Attached please find NRC staff's request for additional information concerning review of the NuScale Topical Report.

Please submit your 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.

Hearing Identifier: NuScale_SMR_DC_TR_Public
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Subject: Topical Report Thermal Hydraulic Stability - Request for Additional Information
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Created By: Gregory.Cranston@nrc.gov

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Options

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Request for Additional Information No. 8846 (eRAI No. 8846)

Issue Date: 07/30/2017
Application Title: NuScale Topical Report
Operating Company: NuScale
Docket No. PROJ0769
Review Section: 01 - Introduction and Interfaces
Application Section:

QUESTIONS

01-21

Title 10 of the Code of Federal Regulations (CFR), Part 50, Appendix A, General. Design Criterion (GDC) 10, "Reactor design," states 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 includes the requirement 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 5.5.3, "Steam Generator Model," of topical report (TR), TR-0516-49417-P, describes the steam generator model used in the PIM code and Section 10.1, "Revisiting High-Ranking Phenomena," the TR, dispositions the phenomena related to this model by referring to plant measurements. Section 10.1 of the TR also states that the heat transfer in PIM is effectively specified by user input.

In order to make an affirmative finding NRC staff requests NuScale to:

- (1) Describe the methods, including stochastic and curve fitting procedures, used to determine steam generator heat transfer parameter values, such as those used for calculating heat transfer coefficients. Also provide references that describe the experimental data and the related experimental facilities used in the determination of the parameter values. If scaled experimental data are referenced in this response, provide the applicable scaling analysis to justify the use of the data.
- (2) Describe the process a PIM user follows to specify the PIM input. This process description should start with the information provided under (1) and in a step-by-step manner describe how the user arrives at the numerical values that are specified in the PIM input for the NuScale power module.
- (3) Justify the overall method, including the use of steady-state data to provide heat transfer parameters to the PIM input that will be used to perform transient calculations.

01-22

Title 10 of the Code of Federal Regulations (CFR), Part 50, Appendix A, General. Design Criterion (GDC) 10, "Reactor design," states 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.

Section 5.5.3, "Steam Generator Model," of topical report (TR), TR-0516-49417-P describes the heat transfer regime transition from subcooled liquid to saturated boiling and from boiling heat transfer to steam-cooling. This section of the TR, also states that the transition points are empirically determined but does not provide the basis.

In order to make an affirmative finding and to demonstrate consistency with SRP 15.0.2 acceptance criteria, NRC staff requests NuScale to provide the basis for the empirically tuned parameters in the steam generator heat transfer regime transition models, and the subsequent parameters values.