

NuScaleDCRaisPEm Resource

From: Chowdhury, Prosanta
Sent: Thursday, April 26, 2018 9:59 AM
To: Request for Additional Information
Cc: Lee, Samuel; Cranston, Gregory; Franovich, Rani; Karas, Rebecca; Skarda, Raymond; NuScaleDCRaisPEm Resource
Subject: Request for Additional Information No. 437 eRAI No. 9465 (15.09)
Attachments: Request for Additional Information No. 437 (eRAI No. 9465).pdf

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

You stated in an April 18, 2018, email (from Paul Infanger to the NRC staff) that your response to this RAI will be submitted by September 4, 2018, which is beyond the usual 60 days. Please submit your technically correct and complete response by this date to the NRC Document Control Desk.

If you have any questions, please contact me.

Thank you.

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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. 437 (eRAI No. 9465)

Issue Date: 04/26/2018

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 15.09 - A.DSRS NuScale Thermal Hydraulic Stability

Application Section:

QUESTIONS

15.09-1

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, section 47 and section 79 require a final safety analysis report (FSAR) to analyze the design and performance of the structures, systems, and components (SSCs). Safety evaluations, performed to support the FSAR, require reactor physics parameters to determine reactor core performance under normal operations, including anticipated operational occurrences, and accident conditions. The description shall be sufficient to permit understanding of the system designs and their relationship to the safety evaluations. Title 10 of the Code of the 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 (SAFDLs) are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences (AOOs). GDC 12-Suppression of Reactor Power Oscillations requires that power oscillations which can result in conditions exceeding specified acceptable fuel design limits are not possible or can be detected and suppressed. Design-Specific Review Standard (DSRS) 15.9 provides review procedures and acceptance criteria for evaluating the safety analysis report (SAR) analysis and assessment of potential thermal-hydraulic instability concerns.

In FSAR Tier 2 section 15.9, "Stability," the applicant provides a description of thermal-hydraulic instabilities, conditions under which they might occur, and proposed methodology for complying with the above regulatory requirements. Rather than present and describe key events analyzed, initial conditions, biases, and results directly in the FSAR; FSAR Tier 2, Section 15.9 frequently cites the topical report (TR), "Evaluation Methodology for Stability Analysis of the NuScale Power Module," TR-0516-49417-P, which is incorporated by reference in Chapter 15.9 of DCD, for such information. For example, sections 15.9.2, 15.9.3.1, 15.9.3.2, 15.9.3.2, 15.9.3.5, and 15.9.3.7 of the FSAR reference conditions, bias values and results presented in the stability TR, describing the methodology, in place of presenting this information directly in the FSAR. In principal, incorporating-by-reference, limiting events, parameter values, and results into the final safety analysis report from the topical report is possible. However, several statements and disclaimers exist in the current stability TR that indicate information in the TR is for "illustrative purposes only" and that NuScale is not requesting approval for feature and parameters [values] used in the TR. These statements do not necessarily impact the applicant's request for approval of its stability methodology. However to comply with the above regulatory requirements, these disclaimers should be removed from the TR, if the applicant intends to incorporate events, conditions, results provided from the TR to address FSAR acceptance criteria. Additionally, events, conditions, parameter values, and results cited in the TR may require revision to both the TR and the FSAR.

Also, information marked proprietary and ECI in the stability TR is inconsistent with markings of corresponding information presented in FSAR Tier 2 section 15.9. For example, none of the figures in section 15.9 of the FSAR are marked proprietary or ECI, but the same figures are designated as proprietary and ECI in the stability TR. Similarly, a significant amount of the information concerning event sequences, condition, and results provided in the stability TR is designated as proprietary and ECI. While equivalent, and often identical, information described in FSAR, Tier 2 subsections of section 15.9 is not designated proprietary and non-ECI. Examples include portions of sections 8.2 and 9.1 and 9.2 from the stability TR that are marked proprietary and ECI, while the equivalent information is not designated proprietary or ECI in section 15.9 of the FSAR. Any proposed revisions to the FSAR should ensure that sufficient stability related information is available for compliance with 15.47 and 15.79.

In order to make an affirmative finding with regard to the above regulatory requirements important to safety, the NRC staff requests that NuScale:

1) Clarify if NuScale intends to incorporate, by reference, stability events, initial conditions, and/or results from the stability TR into section 15.9 of the Tier 2 FSAR.

If the applicant intends to incorporate this information from the stability methodology TR into the FSAR, then the TR should be revised such that the following statements, in addition to other similar statements, be eliminated from stability TR:

- The Abstract of the TR states that NuScale is requesting approval of the computational methods described in the TR for demonstrating the stability of performance of the NPM and approval of the regional exclusion approach based on maintaining subcooling in the riser for protecting the onset of instabilities in the NPM. This topical report is not intended to provide final design values or evaluation of Stability. Rather, "example values for the various evaluations are provided for illustrative purposes"
- The executive summary states, "The methodology in this report utilizes design features and parameters as assumptions. NuScale is not requesting approval for these features and parameters as part of this review of this report."
- In section 8.2, "Stability Analysis for Operational Events" of the stability TRm the applicant states: "While not intended to be the final event evaluation, results are present to demonstrate the proper behavior of the code.... "Formal application of the stability methodology is expected to address and disposition plausible events associates with the licensing biases of NPM,"
- Section 10.4 of the stability TR, Stability analysis application says "demonstration examples of the scope of analysis in this report to support the applicability of the analytical methods of the PIM code."
- Section 10.4 of the stability TR, "Final analysis will be provided separately in the final design."

2) Reconcile proprietary and ECI designations of the stability TR with the non-proprietary and non-ECI designations for the identical or equivalent information provided in section 15.9 of the FSAR.