NuScaleTRRaisPEm Resource

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Sent:	Friday, November 17, 2017 12:32 PM
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Subject:	Request for Additional Information Letter No. 9129 (eRAI No. 9129 Thermal Hydraulic Topical Report LOCA (4.4)
Attachments:	Request for Additional Information No. 9129 (eRAI No. 9129).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.

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Request for Additional Information No. 9129 (eRAI No. 9129)

Issue Date: 11/17/2017
Application Title: NuScale Topical Report
Operating Company: NuScale
Docket No. PROJ0769
Review Section: 04.04 - Thermal and Hydraulic Design
Application Section: 4.04

QUESTIONS

04.04-13

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.

To meet the requirements of GDC 10, as they relate to using a subchannel analysis methodology for determining the thermal margin available for the NuScale design in steady-state and transient events, the applicant’s methodology should clearly define and justify the approach used for axial power assumptions in all steady state and transient events.

Part 1: In topical report section 3.10.9, the applicant states that "for the events involving control rod motion (SRP Section 15.4), an event-specific nuclear analysis is performed to determine control rod worth, radial power distribution, and axial power distribution." However, in the NuScale subchannel analysis methodology audit, the applicant stated that for all SRP Section 15.4 analyses, excluding the single rod withdrawal event, the axial power shape used is the CHF-limiting axial power shape from the generic axial power shape analysis, which is detailed in topical report Section 3.10.8. Furthermore, for the single rod withdrawal event, the applicant stated in the audit that the axial power shape used here is the post-rod movement axial shape as opposed to the more conservative initial condition power shape; the staff believes the use of the post-rod movement axial shape would be the conservative axial power shape choice. The staff asks the applicant to clarify in the topical report which axial power shape methodology is used for any and all 15.4 events (e.g. does the axial power shape come from an event specific nuclear analysis or is the axial power shape that which comes from the generic axial power shape analysis detailed in topical report section 3.10.8). The staff further asks the applicant to justify in the topical report why the specified axial power shape methodology for use in any and all 15.4 analyses is conservative.

Part 2: In topical report section 3.10.9, the applicant states that "if a permissible normal operation power swing results in the core-average axial power shape at the edges of the [axial offset] window, then once rods leave the core for an uncontrolled bank withdrawal or single rod withdrawal, the core-average axial power shape has the potential to go beyond the AO limits. The potential to exceed the AO limits is for a brief amount of time; however, this would be unanalyzed space from the axial power shapes analysis." The staff understands that there is potential for the AO window to be exceeded and that this would constitute unanalyzed space for performing a subchannel analysis that uses an axial power shape from the generic axial power shape analysis because the applicant did not originally consider axial power shapes outside of the AO window in the generic axial power shape analysis. The staff asks the applicant to identify all events for which the AO window could be exceeded and provide justification for why the chosen axial power shape is conservative.