NuScaleTRRaisPEm Resource

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Sent:	Wednesday, February 07, 2018 11:30 AM
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Cc:	Lee, Samuel; Skarda, Raymond; Karas, Rebecca; Schmidt, Jeffrey; Chowdhury, Prosanta; Bavol, Bruce; NuScaleTRRaisPEm Resource
Subject:	Request for Additional Information Letter No. 9173 (eRAI No. 9173) Topical Report Thermal Hydraulic
Attachments:	Request for Additional Information No. 9173 (eRAI No. 9173).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. 9173 (eRAI No. 9173)

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Operating Company: NuScale
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QUESTIONS

01-60

Title 10 of the Code of Federal Regulations (CFR), Part 50 Appendix A, General Design Criteria (GDC) 12- Suppression of reactor power oscillations requires that oscillations be either not possible or reliably detected and suppressed. The 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.

In sections 9.1 and 9.2 of topical report (TR), TR-0516-49417-P, transient PIM analyses of unmitigated events are used to demonstrate that there is sufficient time between a module protection system (MPS) trip on loss of subcooling and reactor shut down to prevent development of oscillatory behavior. The analyses depend on PIM's ability to reliably predict onset of instability and subsequent oscillatory behavior. With respect to initiating instabilities, section 8.2, "Stability Analysis of Operational Events," of the TR, states that unlike starting from a steady state (fixed point), there is no need to apply artificial perturbations in the case of transient analyses. However, artificial perturbations are typically required for other systems codes applied for similar analyses in order for those codes to predict either onset of instability or subcritical finite amplitude instabilities.

In order to make an affirmative finding associated with the above regulatory requirement important to safety, NRC staff requests NuScale demonstrate the PIM code's ability to reliably simulate growing oscillations that are initiated from the onset of unstable conditions without applying artificial perturbations to trigger the instability. For example, demonstrating similar results (time of onset and subsequent oscillation behavior) are obtained from two PIM calculations, with and without artificial perturbations, would sufficiently satisfy staff's request.