

NuScaleTRRaisPEm Resource

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Attachments: RAI 8801.docx

TR-0516-49417-P, "Evaluation Methodology for Stability Analysis of the NuScale Power Module" RAI 8801 Question (29730)

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TR-0516-49417-P, "Evaluation Methodology for Stability Analysis of the NuScale Power Module"

RAI 8801 Question (29730)

(Question 29730) 15.09 - DSRS NuScale Thermal Hydraulic Stability

Title 10 Code of Federal Regulations (CFR), Part 50, Appendix A, General Design Criterion (GDC), "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 (SAFDLs) are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences (AOOs). Title 10 CFR, Part 50, Appendix A, GDC 12, "Suppression of Reactor Power Oscillations," requires that the reactor core and associated coolant, control, and protection system shall be designed to assure that power oscillation which can result in conditions exceeding SAFDLs are not possible or can be reliably and readily detected and suppressed. Title 10 CFR Part 52.47, "Contents of applications; technical information,"

Standard Review Plan (SRP) Section 15.0.2, "Review of Transient and Accident Analysis Method," and Regulatory Guide (RG) 1.203, "Transient and Accident Methods," provide guidance for complying with GDCs 10 and 12. Standard Review Plan 15.0.2 and RG 1.203 state that documentation must include a complete description of the code assessment, including showing a model nodalization diagram and all code options used for the calculations. Assessments must also compare code predictions to analytical solutions, where possible, to show the accuracy of the numerical methods in the mathematical models. RG 1.203 states that numerical solution convergence studies, including the basis for the time steps used and the chosen convergence criteria should be provided. Section 5.8 of topical report, TR-0516-49417-P, describes the numerical solution, but, does not provide sufficient detail about the required nodalization or time step size. Therefore to demonstrate compliance with GDCs 10 and 12:

- 1) Provide complete and detailed nodalization diagrams for calculations used to assess and validate the stability methodology.
- 2) Provide the time step size used for the calculations provided in the TR.
- 3) Provide a description of the nodalization and time step size selection methodology that is used for licensing applications.
- 4) Justify the nodalization and time step size. This justification should consider numerical diffusion and, where applicable, provide velocity field information and Courant number.