NuScaleDCRaisPEm Resource

From:	Chowdhury, Prosanta
Sent:	Monday, April 30, 2018 3:23 PM
To:	Request for Additional Information
Cc:	Lee, Samuel; Cranston, Gregory; Franovich, Rani; Karas, Rebecca; Schmidt, Jeffrey; NuScaleDCRaisPEm Resource
Subject:	Request for Additional Information No. 441 eRAI No. 9485 (15)
Attachments:	Request for Additional Information No. 441 (eRAI No. 9485).pdf

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

The NRC Staff recognizes that NuScale has preliminarily identified that the response to one or more questions in this RAI is likely to require greater than 60 days. NuScale is expected to provide a schedule for the RAI response by email within 14 days.

If you have any questions, please contact me.

Thank you.

Prosanta Chowdhury, Project Manager
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. 441 (eRAI No. 9485)

Issue Date: 04/30/2018
Application Title: NuScale Standard Design Certification - 52-048
Operating Company: NuScale Power, LLC
Docket No. 52-048
Review Section: 15 - Introduction - Transient and Accident Analyses
Application Section:

QUESTIONS

15-6

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, Section 47 requires 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, include accident analyses to (1) demonstrate that specified acceptable fuel design limits (SAFDLs) are not exceeded during normal operation, including the effects of anticipated operational occurrences (AOOs), and (2) determine the number of fuel failures associated with critical heat flux (CHF) that need to be included in the radiological consequences for postulated accidents.

As the return to power analysis in FSAR 15.0.6 can occur, assuming a stuck rod, within a few hours from either an AOO or postulated accident initiating event, the AOO acceptance criteria of General Design Criterion (GDC) 10 applies. GDC 10, Reactor design, requires that the reactor core and associated coolant, control, and protection systems be designed with appropriate margin to assure that SAFDLs are not exceeded during any condition of normal operation, including the effects of AOOs.

Consistent with Regulatory Guide 1.203, Transient and Accident Analysis Methods, the adequacy of the evaluation model for the expected phenomena and range of conditions should be assessed and comprehensive documentation should be provided for staff review.

In response to RAI 8771, the applicant provided updated FSAR Section 15.0.6.3.1, Evaluation Models, which provides an overview of the methods used in the return to power analyses. The response to RAI 8771 indicates that the non-loss of coolant accident (LOCA) NRELAP5 model is used to determine the maximum return for a decay heat removal system (DHRS) cooldown while the LOCA NRELAP5 model is used to calculate the minimum critical heat flux ratio (MCHFR). The staff has determined the level of detail associated with the analysis methodology used in the return power analysis is not consistent with Regulatory Guide 1.203 and hence is unable to make a safety finding relative to GDC 10.

As such, the staff is requesting the applicant provide details associated with changes from the non-LOCA and LOCA NRELAP5 models for the staff to assess the adequacy to predict the peak return to power and MCHFR. Details should include, any changes to model nodalization, the methods used to determine the reactivity coefficients, hot rod/channel model, CHF correlations used and how the MCHFR is determined. Reference to existing non-LOCA and LOCA topical reports is acceptable for modeling details which remain unchanged in the return to power analyses.

In addition to providing the documentation associated with changes to the models, the staff is requesting justification of the adequacy of the return to power models to predict key figures of merit (peak power and MCHFR). As with the documentation request, the validation that supports the adequacy of the return to power models can reference the applicable non-LOCA and LOCA topical reports.