NuScaleDCRaisPEm Resource

From:	Chowdhury, Prosanta
Sent:	Thursday, April 26, 2018 10:30 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. 438 eRAI No. 9491 (15.09)
Attachments:	Request for Additional Information No. 438 (eRAI No. 9491).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. 438 (eRAI No. 9491)

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

15.09-2

Title 10 of the *Code of Federal Regulations* (10 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 states that the reviewer verifies that all analysis methodologies, including treatment of uncertainties, are acceptable. DSRS 15.0 indicates that the reviewer verify that applicant has identified major input parameters and initial conditions used in the analyses, included the initial values of other initial values if they are used in the analyses, provided the bases and degree of conservatism for numerical values of the input parameters and initial conditions, and evaluate the applicant's claims that AOOs are limiting or nonlimiting, or bounded by other AOOs.

The applicant performed stability analyses over a spectrum of events that includes perturbation of steady state and transient operations where the initiating events are variations of selected anticipated operational occurrences (AOO) discussed in other FSAR chapter 15 subsections. The applicant states "The operation events are analogous to the licensing basis AOOs. However, typical licensing basis AOO scenarios are chosen to provide limiting system response and generally result in a reactor trip … The stability operational events are constructed to avoid a reactor trip in order to assess the stability of the NPM." The applicant considers events from six AOO classification types listed in DSRS 15.0. However, a list or table of key parameters, values, and uncertainty biases for each limiting event was not found in Section 15.9 of the FSAR. In addition, it is not clear if the events analyzed are the most limiting stability events for the given classification type. Several 15.9 subsections of the FSAR, including 15.9.3.1, 15.9.3.2, 15.9.3.5, 15.9.4.1, and 15.9.4.2 refer to the stability methodology topical report (TR), TR-0516-49417-P, for additional event specific information, however staff was unable to find the aforementioned proposed key parameter tables in the TRTo make an affirmative finding associated with the above regulatory requirement important to safety, NRC staff requests NuScale to:

1. Provide, in the FSAR, tables of key initial conditions and parameters, their values, and their biases, that were applied to the limiting events for a given event category. Initial condition and parameter tables similar to those provided for AOO events in sections 15.1 and 15.2 of the FSAR are acceptable to staff. Examples include: Tables 15.1-2 – through 15.1-4, or Tables 15.2-1 through 15.2-3, of the FSAR. Initial values of amplitude

and frequency (or period) should be included in key initial condition parameter tables for stability events where external oscillations are imposed on the reactor system model.

2. Provide, in the FSAR, tables containing acceptance criteria values for limiting stability events. The tables should include decay ratios.