

NuScaleDCRaisPEm Resource

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Sent: Tuesday, September 12, 2017 12:44 PM
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Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Park, Sunwoo; Roche-Rivera, Robert; Vera Amadiz, Marieliz
Subject: Request for Additional Information No. 221, RAI 9114 (3.7.2)
Attachments: Request for Additional Information No. 221 (eRAI No. 9114).pdf

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

Please submit your technically correct and complete response within 60 days of the date of this RAI to the NRC Document Control Desk. 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.

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Licensing Branch 1 (NuScale)
Division of New Reactor Licensing
Office of New Reactors
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301-415-0546

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Request for Additional Information No. 221 (eRAI No. 9114)

Issue Date: 09/10/2017

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 03.07.02 - Seismic System Analysis

Application Section: 3.7.2

QUESTIONS

03.07.02-31

10 CFR 52.47(a)(20) requires that an application for Design Certification must include the information necessary to demonstrate that the standard plant complies with the earthquake engineering criteria in 10 CFR 50, Appendix S. 10 CFR 50 Appendix S requires that the safety functions of structures, systems, and components (SSCs) must be assured during and after the vibratory ground motion associated with the Safe Shutdown Earthquake (SSE) through design, testing, or qualification methods.

FSAR Tier 2, Section 3A.1 states the seismic analysis of the NuScale Power Module (NPM) is provided in technical report, TR-0916-51502, "NuScale Power Module Seismic Analysis". In TR-0916-51502, Section 3.1, the applicant indicates that NPM simplified beam models developed in ANSYS are incorporated into the RXB system model used in SAP2000 and SASSI2010 analyses. In TR-0916-51502, Section 6.0, the applicant discusses how NPM simplified beam models were derived from the corresponding NPM detailed 3D models in ANSYS. However, the staff notes that the NPM beam models depicted in Figure 6-1 (dry) and Figure 6-13 (wet) in TR-0916-51502 appear to be different than the model shown in FSAR Figure 3.7.2-28, which FSAR Section 3.7.2.1.2.2 states represents the SASSI2010 NPM beam model. Therefore, the applicant is requested to explain how the NPM beam models included in the SAP2000/SASSI2010 RXB models were developed and validated (e.g., comparison of dynamic characteristics between the detailed and simplified models).

03.07.02-32

10 CFR 52.47(a)(20) requires that an application for Design Certification must include the information necessary to demonstrate that the standard plant complies with the earthquake engineering criteria in 10 CFR 50, Appendix S. 10 CFR 50 Appendix S requires that the safety functions of structures, systems, and components (SSCs) must be assured during and after the vibratory ground motion associated with the Safe Shutdown Earthquake (SSE) through design, testing, or qualification methods.

FSAR Tier 2, Section 3A.1 references NuScale technical report, TR-0916-51502, which provides details about the seismic analysis of the NuScale Power Module (NPM) and the models used. Additionally, in FSAR Section 3.7.2.1.2.4, the applicant indicates that the NPM model used in the ANSYS fluid-structure interaction (FSI) analysis consists of cylindrical shell elements representing the containment vessel (CNV) and beam elements representing the reactor pressure vessel (RPV), which is different from the NPM models discussed in TR-0916-51502. Therefore, the applicant is requested to explain how the NPM model used in ANSYS FSI analysis discussed in FSAR Section 3.7.2.1.2.4 were developed and validated (e.g., comparison of dynamic characteristics between the detailed and simplified models).