NuScaleDCRaisPEm Resource

From:	Cranston, Gregory
Sent:	Friday, July 14, 2017 2:56 PM
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Subject:	Request for Additional Information No. 94, RAI 8900
Attachments:	Request for Additional Information No. 94 (eRAI No. 8900).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.

If you have any questions, please contact me.

Thank you.

Gregory Cranston, Senior Project Manager
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. 94 (eRAI No. 8900)

Issue Date: 07/14/2017
Application Title: NuScale Standard Design Certification - 52-048
Operating Company: NuScale Power, LLC
Docket No. 52-048
Review Section: 03.07.01 - Seismic Design Parameters
Application Section: 3.7.1

QUESTIONS

03.07.01-1

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) ground motion through design, testing, or qualification methods. DSRS Section 3.7.1.II.A.i specifies that the foundation level response spectra consistent with the certified seismic design response spectra (CSDRS) are to be determined for each seismic Category I structure. In Section 3.7.1.1.2.4, "Results," of the DCD Tier 2, Rev 0, the applicant stated that, "The five CSDRS compatible time histories sets and one CSDRS-HF compatible time histories set are used for the design of the buildings, the bio shield, the fuel storage rack, and the reactor building crane." This statement may imply that not all the sets of time histories were used for the design of all the SSCs. If that is the case, the applicant is requested to address in detail any exceptions in the DCD including a basis for not using all the CSDRS and the CSDRS-HF compatible time histories (and the resulting in-structure response spectra) for the design of all the SSCs. Additionally, the applicant is requested to augment applicable sections of the DCD accordingly.

03.07.01-2

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) ground motion through design, testing, or qualification methods. In relation to the seismic analysis of deeply embedded nuclear structures, DSRS Section 3.7.1.II.4 provides guidance stating that a COL application referencing a design certification (DC) should include the Performance Based Response Spectra (PBRS) established at the surface and intermediate depth(s) and that the selection of the number and locations of the intermediate depths should take into account the complexities of the subsurface layer profiles of the site. The DSRS further specifies that the adequacy of the input ground motion and deterministic soil columns used in site-specific SSI analysis should be demonstrated using the PBRS at the ground surface and intermediate depth(s) as the benchmarks and following the guidance provided in DC/COL-ISG-017. Therefore, the applicant is requested to provide a COL Item that requires a COL applicant to ensure the adequacy of the seismic input motion and deterministic soil columns used in the site-specific SSI analysis of the NuScale seismic Category I structures.

03.07.01-3

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) ground motion through design, testing, or qualification methods. DSRS Section 3.7.1 provides guidance stating that the foundation input response spectra (FIRS) for the vertical direction can be obtained with the vertical to horizontal (V/H) spectral ratios appropriate for the site; and that the PBRS for the vertical direction can be obtained with the appropriate V/H ratios used to develop the FIRS. DSRS Section 3.7.2.I.4.J further states that, for a deeply embedded nuclear structures, uncertainties associated with the variation of V/H spectral ratios on the ground motion over the depth of the facility should be considered. Therefore, the applicant is requested to provide a COL Item that requires a COL applicant to provide a technical justification for the adequacy of V/H spectral ratios used in establishing the site-specific FIRS and PBRS for the vertical direction.