

NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Saturday, August 05, 2017 8:46 AM
To: RAI@nuscalepower.com
Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Samaddar, Sujit; Roche-Rivera, Robert; Vera Amadiz, Marieliz
Subject: RE: Request for Additional Information No. 132, RAI 8971 (3.8.4)
Attachments: Request for Additional Information No. 132 (eRAI No. 8971).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 20 days.

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
U.S. Nuclear Regulatory Commission
301-415-0546

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From: Cranston, Gregory

Created By: Gregory.Cranston@nrc.gov

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Options

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Request for Additional Information No. 132 (eRAI No. 8971)

Issue Date: 08/05/2017

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 03.08.04 - Other Seismic Category I Structures

Application Section:

QUESTIONS

03.08.04-11

10 CFR 50, Appendix A, GDC 1, 2, and 4, provide requirements to be met by SSC important to safety. In accordance with these requirements, DSRS Section 3.8.4 provides review guidance pertaining to the design of seismic Category I structures, other than the containment. Consistent with DSRS Section 3.8.4 Appendix C Sections IV and VI the staff review the design demands for seismic Category I structures.

While the magnitude of bounding demand forces and moments were provided for some critical sections (e.g. FSAR Tables 3B-36 to 3B-38), the FSAR did not provide the magnitudes of bounding demand forces and moments for all critical sections identified for the RXB and CRB. Provide in the FSAR the magnitude of bounding demand forces and moments for all critical sections, with a breakdown of seismic and static forces and moments.

Additionally, provide a numerical example that demonstrates how the direction of dynamic forces and moments is addressed in the load combinations as to ensure that the direction that is most adverse in a load combination has been considered as indicated in FSAR Section 3B.1.1.2.

03.08.04-12

10 CFR 50, Appendix A, GDC 1, 2, and 4, provide requirements to be met by SSC important to safety. In accordance with these requirements, DSRS Section 3.8.4 provides review guidance pertaining to the design of seismic Category I structures, other than the containment. Consistent with DSRS Section 3.8.4, the staff reviews loads and loading combinations.

FSAR Sections 3.8.4.3.19, 3.8.4.3.20, and 3.8.4.3.21, for Jet Impingement Load (Y_j), Pipe Break Reaction Loads (Y_t), and missile Impact Loads (Y_m), respectively, describe that these loads are not a load for the RXB. However Table 3.8.4-1 and 3.8.4-2 identifies these loads as part of the load combinations applicable to the RXB. The applicant is requested to clarify whether or not these loads are considered for the RXB design and correct any inconsistencies in the FSAR as necessary. The staff requests the applicant to provide the basis for taking an exception from the ACI 349 Code in regards to the consideration of the above loads as part of the design loads.

03.08.04-13

10 CFR 50, Appendix A, GDC 1, 2, and 4, provide requirements to be met by SSC important to safety. In accordance with these requirements, DSRS Section 3.8.4 provides review guidance pertaining to the design of seismic Category I structures, other than the containment. Consistent with DSRS Section 3.8.4, the staff reviews loads and loading combinations.

FSAR Section 3.8.4.4.1 indicates that an ANSYS model was created to evaluate the effects of thermal loads on the structure. Further, FSAR Section 3.8.4.5 indicates that load combination 10 from Table 3.8.4-1 has been determined to be the controlling load combination. The staff request the applicant to provide the following information.

- a) Magnitude of the bounding forces and moments profiles for walls and basemat resulting from thermal loads, T_o and T_a . Clarify whether such values were used in the load combinations 10 and 13 in Tables 3.8.4-1.
- b) Describe how load combination 10 was determined to be the controlling load combination instead of load combination 13, and provide an example of how the loads were combined.

03.08.04-14

10 CFR 50, Appendix A, GDC 1, 2, and 4 provides requirements to be met by SSC important to safety. In accordance with these requirements, DSRS Section 3.8.4 provides review guidance pertaining to the design of seismic Category I structures, other than the containment. Consistent with 3.8.4.II.4H, the staff reviews the consideration of dynamic lateral soil pressures on embedded walls.

FSAR Section 3.8.4.3.3 describes lateral soil pressures, including dynamic soil pressures corresponding to SSI and SSSI analyses, applicable to the embedded exterior walls of the buildings. The staff request the applicant to clarify whether these pressures are based on the envelope of all SSI and SSSI analysis cases. Also the staff notes that while FSAR Section 3.8.4.3.3 describes the consideration of the aforementioned lateral soil pressures as part of the design loads for the embedded exterior walls, the magnitude of such loads was not provided in the FSAR. The applicant is requested to provide in the FSAR the pressure distributions with depth of the bounding dynamic soil pressures considered in the design of the embedded exterior walls of the buildings.