

## NuScaleDCRaisPEm Resource

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**From:** Cranston, Gregory  
**Sent:** Saturday, August 05, 2017 2:18 PM  
**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. 151, RAI 8974 (3.8.4)  
**Attachments:** Request for Additional Information No. 151 (eRAI No. 8974).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.

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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**Received Date:** 8/5/2017 2:18:11 PM  
**From:** Cranston, Gregory

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## **Request for Additional Information No. 151 (eRAI No. 8974)**

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: 3.8.4

### QUESTIONS

03.08.04-20

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 important to safety seismic Category I structures, other than the containment. Consistent with DSRS Section 3.8.4, the staff reviews, in part, loads and loading combinations.

Provide the magnitude of bounding seismic design forces of the roof in the three orthogonal directions (North-South, East-West, and Vertical).

03.08.04-21

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, in part, loads and loading combinations.

Section 3B.2.7.4, "Nuclear Power Module Lug Restraint," states that "a separate local SAP2000 model is used to analyze the support system for increased demand." Further, this section states that "the load is distributed as point loads to one of the lugs." Figures 3B-58 and 3B-59 show the distribution of the point loads. Section 3B.2.7.4 also describes that the load used to evaluate the lug components is 3500 kip (which is consistent with the distributed loads shown in Figures 3B-58 and 3B-59). Clarify whether the aforementioned "increased demand" refers to the 3500 kip load. If not, define the "increased demand." Additionally, provide the basis for the 3500 kips including a description of the analysis cases from which this demand is obtained.

In addition to the above, FSAR Table 3B-27 provides the SASSI maximum lug reactions for RXB cracked model using Soil Type 7 (CSDRS) and Soil Type 9 (CSDRS-HF). Further, as stated in Section 3B.2.7.4.2, "since these maximum lug reactions are below the lug support design capacity of 3,500 kips, the design is acceptable." Justify the use of the aforementioned SASSI cases only and not the envelope of all SASSI cases, in comparing with the design capacity of 3,500 kips.

03.08.04-22

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, in part, loads and loading combinations.

Section 3B.1.2.2 indicates that the SAP2000 terminology is used in the T-Beam, Buttress, and Pilaster design check equations. This is contrary to a prior statement in FSAR Section 3B.1.2.1 which indicates that the combined resultant force or moment uses the SASSI2010 naming convention. Clarify this apparent discrepancy in the FSAR and address whether the design checks in section 3B.1.2.2 are based on the combined resultant demand (seismic and static) or the static demand only.

#### 03.08.04-23

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 Sections 3.7.1 and 3.8.4 provide review guidance pertaining to seismic parameters and design of seismic Category I structures. Consistent with the guidance in DSRS 3.7.1.II.4.A.viii, the staff reviews comparison criteria for the acceptability of a standard design for a potential site.

COL item 3.8-2 in Section 3.8.4.8 directs the COL applicant to confirm that the site independent RXB and CRB are acceptable for use at the designated site. Further, Section 3.8.4.8 identifies locations within the building and respective ISRS which are to be used by the COL applicant to compare with their respective site-specific ISRS for purposes of confirming the acceptability of the site independent structures for the designated site. The applicant is requested to correct inconsistencies between the ISRS Figures referred to in FSAR Section 3.8.4.8 and the respective Figures in FSAR Section 3.7. Further, clarify whether the ISRS in these figures are based on the envelope of all or a partial envelope of the SSI and SSSI analysis cases.

Further, the staff request the applicant to address the following in the FSAR.

- a) propose locations for the comparison of building member forces and deformations, with the identification of the respective FSAR Tables and Figures
- b) clarify whether the current locations for ISRS comparison include responses at peripheral locations to detect rocking and torsion or propose additional locations as necessary
- c) augment the list of locations for ISRS comparison in the RXB to address the fuel racks
- d) include responses to check overturning, torsional, and sliding stability of the structures