RAIO-0118-58031

January 04, 2018

Docket No. 52-048

U.S. Nuclear Regulatory Commission
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11555 Rockville Pike
Rockville, MD 20852-2738

SUBJECT: NuScale Power, LLC Supplemental Response to NRC Request for Additional Information No. 137 (eRAI No. 8973) on the NuScale Design Certification Application

REFERENCES:
1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 137 (eRAI No. 8973)," dated August 05, 2017
2. NuScale Power, LLC Response to NRC "Request for Additional Information No. 137 (eRAI No.8973)," dated October 03, 2018

The purpose of this letter is to provide the NuScale Power, LLC (NuScale) supplemental response to the referenced NRC Request for Additional Information (RAI).

The Enclosure to this letter contains NuScale's supplemental response to the following RAI Question from NRC eRAI No. 8973:

- 03.08.04-19

This letter and the enclosed response make no new regulatory commitments and no revisions to any existing regulatory commitments.

If you have any questions on this response, please contact Marty Bryan at 541-452-7172 or at mbryan@nuscalepower.com.

Sincerely,

Zackary W. Rad
Director, Regulatory Affairs
NuScale Power, LLC

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Enclosure 1: NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 8973

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NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 8973

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Response to Request for Additional Information
Docket No. 52-048

eRAI No.: 8973
Date of RAI Issue: 08/05/2017

NRC Question No.: 03.08.04-19

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.

The section views in Figures 3B-14 and 3B-42 show wall portions that do not appear to be included in the SAP model section views in Figures 3B-15 and 3B-43, respectively. Clarify and/or correct the inconsistencies between these figures, as applicable.

NuScale Response:

Based on a public meeting with the NRC Staff on November 29, 2017, NuScale is supplementing the original response to RAI Question 03.08.04-19 to provide a description of the seismic input, analysis, and design process for partition walls.

The reactor building (RXB) has several interior steel partition walls and slabs that are not part of the main lateral force resisting system. These walls and roofs are designed as steel box type structure filled with “nonstructural fill concrete” to provide radiation protection. The majority of equipment rooms in the RXB consist of partition walls and roofs. Each wall is welded to floor embed plates. The vertical sides and top of the partition walls are laterally supported by angle supports to transfer lateral loads only. In other words, the partition walls are fixed at the base and pin supported on three or two sides.

The two basic configurations are two steel plates welded to hollow structured section (HSS) tubes. The cover plate is fabricated from A36 steel and the HSS tubes are fabricated from A500, Gr B, Fy = 46 ksi steel. The various cells in the walls are filled with normal weight concrete which provides the major portion of the shielding. The base of the walls are welded to a base plate which is in turn welded to steel embedded plates. Where the sides of the partition walls are connected to the major walls, there is a gap to isolate them. There is also a gap at the top to

isolate them from the concrete slab above. Along the sides and top, the partition walls are connected to the major walls and floor slab by steel angles. Fillet welds attach the angles to the partition walls and embeds in the major walls and floor slabs. The steel plates are attached to the HSS tubes by fillets welds inside an opening in the steel plate. The HSS tubes are oriented vertically. In some locations, there are intermediate roof slabs. These slabs have the same basic construction with the tubes. The orientation of the tubes depends on the spans and the connection to the supporting walls. The partition walls are anchored to the floor slabs located at top of concrete (TOC) elevations 24’-0”, 50’-0”, 75’-0”, 100’-0” and 126’- 0” in the gallery areas at North, South, and East and West sides of the RXB. The anchorages for the partition walls are cast-in place anchors that are comprised of embedded plates with Nelson studs.

Due to the complexity of the steel partition configuration, a local SAP2000 model of the steel partitions was created to obtain the demands for designing the steel partitions and the anchorages of the steel partitions. The walls and slabs are modeled with thick shell elements. The HSS members are modeled explicitly with beam elements. The nodes along the bottom boundary are fixed in all degrees of freedom since anchor bolts will be used along the bottom boundary. The nodes along the west edges of the walls are restrained only in the transverse (North-South) direction. The nodes along the west edge of the slab are restrained only in the vertical direction.

The loadings on the steel partition walls consist of the self-weight and an additional 50 psf on the slabs. For the seismic loading, a response spectrum analysis was performed. The response spectra input used was the CSDRS 4% damped floor response spectra at Elevation 100'. A review of the partition walls indicated the walls on Elevation 100' between Grid Lines RX-B, RX-D, RX-6 and RX-7 have a longer vertical span than other locations and represented a bounding case. Also, the steel partitions at this elevation will have higher loadings from the in-structure response spectra (ISRS) than the partitions at the lower elevations.

Demand loads for the design of the steel partitions are obtained directly from the SAP2000 local model. Nodal reactions from the SAP2000 local model analysis were used to design the wall connections. The steel partition walls and slabs were designed using provisions in the AISC 14th edition steel construction manual. The design of the steel partition anchorages was based on Appendix D of the code ACI 349-06 and the guide ACI 349.2R-07.

Impact on DCA:

There are no impacts to the DCA as a result of this response.