RAIO-0918-61814

Docket No. 52-048

September 17, 2018

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

SUBJECT: NuScale Power, LLC Supplemental Response to NRC Request for Additional Information No. 162 (eRAI No. 8901) on the NuScale Design Certification Application

REFERENCES:
1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 162 (eRAI No. 8901)," dated August 11, 2017
2. NuScale Power, LLC Response to NRC "Request for Additional Information No. 162 (eRAI No.8901)," dated October 10, 2017

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. 8901:

- 03.09.05-8

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. 8901

Enclosure 1:

NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 8901

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

eRAI No.: 8901
Date of RAI Issue: 08/11/2017

NRC Question No.: 03.09.05-8

10 CFR 50 Appendix A GDC 1 requires that structures, systems, and components important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed.

DCD Tier 2 Section 3.9.5.1 states that the core support assembly includes the core barrel, upper support blocks, lower core plate, lower fuel pins and nuts, reflector blocks, lock plate assembly, lower core support lock inserts, and the RPV surveillance specimen capsule holder and capsules. The core barrel is a continuous ring with no welds. The upper support blocks, which are welded to the core barrel, serve to center the core barrel in the lower RPV. One of the upper support blocks engages a core barrel guide feature on the lower RPV to provide circumferential positioning of the core barrel as it is lowered into the lower RPV. The lower core plate, which is welded to the bottom of the core barrel, serves to support and align the bottom end of the fuel assemblies. Locking devices align and secure the lower core plate to the core support blocks located on the RPV bottom head. TR-0716-50439-P, Rev. 0, "NuScale Comprehensive Vibration Assessment Program Technical Report" provides a brief description of each of the major components for the CSA.

In order for the staff to make a safety finding, the following information is requested from the applicant:

1. Provide detailed design description, including drawing, of the core barrel, its classification and design code/standard. Both DCD Tier 2 Figure 3.9-4 and report TR-0716-50439-P Figure 2-18 show the top of the core barrel to have the shape of a castle nut, but it is unclear to the staff how the top of the core barrel is fitted with the bottom of the lower riser assembly. The applicant is requested to describe how the lower riser assembly fits

onto the core barrel, and what mechanism is there to align these two components.

2. Provide detailed design description, including drawing, of the upper support blocks, its classification, design code/standard and the number of upper support blocks that are welded on the core barrel. DCD Tier 2 Section 3.9.5.1 states that one of the upper support blocks engages a core barrel guide feature on the lower RPV to provide circumferential positioning of the core barrel as it is lowered into the lower RPV. It is unclear to the staff why only one upper support block is engaged. In addition, the applicant is requested to provide detailed design description, including drawing, of the core barrel guide feature on the lower RPV that a upper support block is engaged to when the core barrel is at its normal operation position, its classification and design code/standard.

3. Provide detailed design description, including drawing, of the lower core plate, its classification and design code/standard. The applicant is also requested to describe what kind of locking devices are used to align and secure the lower core plate to the core support blocks. DCD Tier 2 Figure 3.9-4 shows two inverted pins at the bottom of the lower core plate, while report TR-0716-50439-P Figure 2-22 shows two pins that are located at the top of the core support block. Figure 2-18 also shows a lower core support lock insert and lock plate assembly. The applicant is requested to provide detailed design description, including drawing, of this lock plate assembly and the corresponding lock inserts/pins, how they function, their classification and design code/standard.

4. Provide detailed design description, including drawing, of the core support blocks, its classification and design code/standard. Specify the number of core support blocks and the mechanism at which they are attached to the RPV bottom head. Specify under which conditions, if not all conditions, at which the core support blocks directly support the core. In some large light water PWRs, a spring like structure is built in at the bottom of the reactor vessel to absorb the impact load from a beyond design basis core drop event so the bottom of the reactor vessel would not be damaged, provide detail description that in such event, how the core support blocks would prevent the CSA assembly from dropping to the bottom of the RPV bottom head.

5. Provide detailed design description, including drawing, of the reflector blocks, its classification and design code/standard. DCD Tier 2 Figure 3.9-4 and report TR-0716-50439-P Figure 2-18 both show that there are 6 levels of reflector blocks attached to each other with alignment pins. Provide detailed design description, including drawing, of these

reflector block alignment pins, how they function, their classification and design code/standard. In addition, provide detailed description on how the reflector blocks are attached and secured to the core barrel.

6. Provide detailed design description, including drawing, of the fuel pins and nuts at the lower core plate, its classification and design code/standard.

7. Provide detailed design description, including drawing, of the surveillance capsule holders and capsules, their classification and design code/standard. The applicant is also requested to specify the number of surveillance capsule holders and the mechanism at which they are attached to the core barrel. If fasteners and dowel pins are used, provide detailed design description of such, their classification and design code/standard.

NuScale Response:

The following information is provided as a supplement to the initial response to RAI 8901 Question 03.09.05-8, as submitted by RAIO-1017-56539 dated October 10, 2017.

In a followup public telecon on July 18, 2018, NRC questioned the reflector block attachment mechanism, specifically how does the radial gap between the upper support block and the inside wall of the pressure vessel change during hot and cold condition?

The gap between the upper support block and the inside wall of the reactor pressure vessel is 0.20 inches in the cold condition and closes to approximately 0.12 inches in the hot condition.

Impact on DCA:

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