RAIO-0318-59240

March 21, 2018

Docket No. 52-048

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

SUBJECT: NuScale Power, LLC Response to NRC Request for Additional Information No. 251 (eRAI No. 9188) on the NuScale Design Certification Application

REFERENCES:
1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 251 (eRAI No. 9188)," dated October 13, 2017
2. NuScale Power, LLC Response to NRC "Request for Additional Information No. 251 (eRAI No. 9288)," dated December 12, 2017

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

The Enclosure to this letter contains NuScale's response to the following RAI Question from NRC eRAI No. 9188:

- 05.03.01-4

The response to RAI Question 05.03.01-3 was previously provided in Reference 2. This completes all responses to eRAI 9188.

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 Carrie Fosaaen at 541-452-7126 or at cfosaaen@nuscalepower.com.

Sincerely,

Zackary W. Rad
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NuScale Power, LLC

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Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9188

Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9188

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

eRAI No.: 9188
Date of RAI Issue: 10/13/2017

NRC Question No.: 05.03.01-4

During the NRC staff's audit of DCD Tier 2, FSAR, Section 3.13, the staff reviewed the use of lock plates in the NuScale design. These components are not described in the DCD. However, based on information obtained during the audit, the lock plates are used to hold the RPV main flange studs in place to allow the fastener bolts to be inserted from below. The lock plates are connected to the top flange by two studs which are screwed into the top flange and have a weld around the stud into the flange.

The lock plate welds provide a corrosion barrier to the base metal. Therefore, degradation of these welds may cause degradation of the underlying base metal. Depending on their location, the lock plate welds may be subject to stresses during normal operation, refueling tensioning and de-tensioning, and ECCS actuation. The DCD does not discuss the installation and inspection (construction and inservice) of the welds. During the audit, NuScale stated that the lock plates are not intended to be removed on a regular basis (i.e., they are not going to be removed at every refueling).

- Revise the DCD Tier 2, FSAR, Table 5.2-4 and Section 5.3.1 to state the locations that the lock plate components will be used for the reactor coolant pressure boundary (RCPB).
- Revise the DCD to describe the use of lock plates, including the welding procedures and inspections that will be performed on the lock plate welds during fabrication/installation.
- Provide justification that the lock plate welds will not degrade during service. If justification cannot be provided, revise the DCD to describe augmented inspections to provide reasonable assurance that the welds will remain intact during operation.

NuScale Response:

The reactor pressure vessel (RPV) and containment vessel (CNV) lock plates perform a tooling function to hold the top flange nuts in place when the flange studs are being installed into the nuts from below. This installation is only required during threading of the stud into the nut, so the load on the lock plate is only from the thread friction between the nut and the stud and any upward force being applied by the installation tooling. The stud is then restrained from rotating when the preload is applied to the nut on the lower side of the flange. Based on this function, the lock plate acts as a tool, that is left on the flange, and performs no function until the next

refueling. At the start of refueling, the stud is restrained from rotating when the preload is removed. Removal of the stud from the nut that is held in place by the lock plate will generate a thread friction torque load on the lock plate. Thread friction torque values will be generated during tooling qualifications.

Since the RPV and CNV lock plates only perform the tooling function of holding the nuts on the top flange face when the flanges are disassembled, they are not considered part of the reactor coolant pressure boundary.

The ½ inch diameter studs that retain the lock plates are now attached with a stud weld to the top of the cladding. The previous method of drilling into the base metal to attach the studs to the top flange has been eliminated from the design. For proper stud welding, the minimum thickness of the base material must be at least ¼ of the stud size. For this application the cladding is ¼ inch thick for the ½ inch diameter stud. These welds receive a liquid penetrant inspection at installation and subsequent in-service inspection per the regulatory requirements. Since the revised design welds the lock plate studs directly to the cladding, degradation of the of the stud weld will not degrade the CNV and RPV base metal.

The RPV lock plates are used for the studs and nuts that connect the Upper RPV Section Transition Shell Flange to the Lower RPV Section Flange Shell as shown on Figure 5.3-1. The CNV lock plates are used for the studs and nuts that connect the Upper CNV to the Lower CNV at the Refueling Flange as shown on Figure 3.8.2-1. Figure 1 below shows the revised lock plate design.

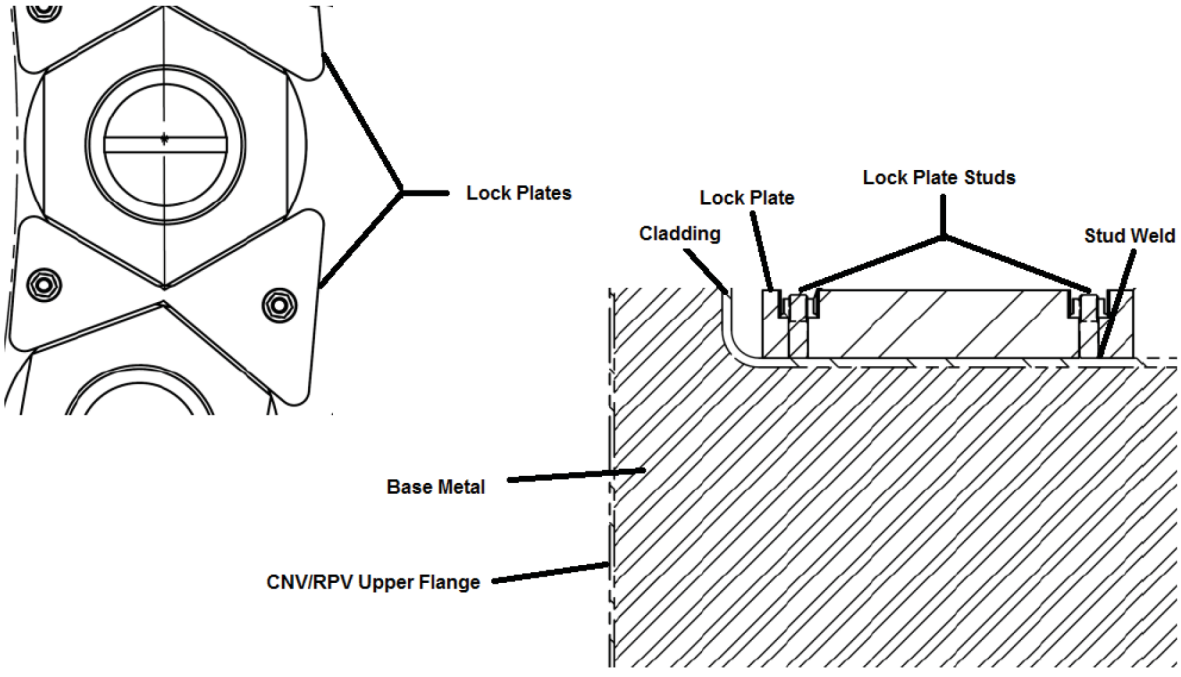

Figure 1

The RPV and CNV lock plates do not perform a RCPB function and serve only a tooling function to hold the flange nuts in place while stud torquing is performed. In addition, the current design eliminates the potential for RPV and CNV base metal degradation as the modified lock plate studs do not penetrate beyond the flange cladding. Therefore, no change to the FSAR is required as there is no safety function for the lock plates to describe or potential degradation mechanism caused by the lock plate studs to describe.

Impact on DCA:

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