NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Wednesday, December 06, 2017 11:21 AM
To: RAI@nuscalepower.com
Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Mitchell, Matthew; McMurray, Nicholas; Tabatabai, Omid
Subject: Request for Additional Information No. 293 RAI No. 9210 (6.2.1)
Attachments: Request for Additional Information No. 293 (eRAI No. 9210).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 this question in this RAI is likely to require greater than 60 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

Hearing Identifier: NuScale_SMR_DC_RAI_Public
Email Number: 320

Mail Envelope Properties (MWHPR09MB1200DD49708CB182C6F1E32790320)

Subject: Request for Additional Information No. 293 RAI No. 9210 (6.2.1)
Sent Date: 12/6/2017 11:21:07 AM
Received Date: 12/6/2017 11:21:12 AM
From: Cranston, Gregory

Created By: Gregory.Cranston@nrc.gov

Recipients:
"NuScaleDCRaisPEm Resource" <NuScaleDCRaisPEm.Resource@nrc.gov>
Tracking Status: None
"Lee, Samuel" <Samuel.Lee@nrc.gov>
Tracking Status: None
"Chowdhury, Prosanta" <Prosanta.Chowdhury@nrc.gov>
Tracking Status: None
"Mitchell, Matthew" <Matthew.Mitchell@nrc.gov>
Tracking Status: None
"McMurray, Nicholas" <Nicholas.McMurray@nrc.gov>
Tracking Status: None
"Tabatabai, Omid" <Omid.Tabatabai-Yazdi@nrc.gov>
Tracking Status: None
"RAI@nuscalepower.com" <RAI@nuscalepower.com>
Tracking Status: None

Post Office: MWHPR09MB1200.namprd09.prod.outlook.com

Files	**Size**	**Date & Time**
MESSAGE	718	12/6/2017 11:21:12 AM
Request for Additional Information No. 293 (eRAI No. 9210).pdf	105351	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Request for Additional Information No. 293 (eRAI No. 9210)

Issue Date: 12/06/2017
Application Title: NuScale Standard Design Certification - 52-048
Operating Company: NuScale Power, LLC
Docket No. 52-048
Review Section: 06.02.01 - Containment Functional Design
Application Section: 6.2.1

QUESTIONS

06.02.01-3

Regulatory Basis:

Appendix A, "General Design Criteria for Nuclear Power Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," General Design Criteria (GDC) 4 requires that SSCs important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents (LOCAs).

GDC 16 requires that the reactor containment and associated systems shall be provided to establish an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment and to assure that the containment design conditions important to safety are not exceeded for as long as postulated accident conditions require.

During the NRC staff's audit of DCD Tier 2, FSAR, Section 3.13, the staff reviewed the use of threaded inserts in the NuScale design. The audit team identified that threaded inserts are used for all threaded fasteners except for the main CNV and RPV flange studs. The threaded inserts provide a corrosion barrier to the base metal, and have a weld connecting them to the base metal. Degradation of these welds may cause degradation of the underlying base metal. Depending on their location, the threaded insert 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 these welds.

DCD Tier 2, FSAR, Section 6.1.1.1 states that threaded inserts for containment vessel (CNV) bolting are fabricated of corrosion resistant alloy SA-479, Type 304/304L, but does not describe other aspects of the threaded insert design.

DCD Tier 2, FSAR, Table 6.1-1 lists threaded inserts under the "CNV Upper Shell Assembly" and "CNV upper head assembly" heading, but does not describe the locations where they are used in Section 6.2.1.

- Revise the DCD Tier 2 FSAR, Section 6.2.1 to provide greater detail where the threaded inserts will be used in the NuScale CNV design.
- Revise the DCD to describe the welding procedures and inspections that will be performed on the CNV threaded insert welds during fabrication/installation.
- Provide justification that the CNV threaded insert 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.

06.02.01-4

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 CNV 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 6.1-2 and Section 6.2.1 to state the locations that the lock plate components will be used for the CNV.

- 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.