NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Saturday, August 12, 2017 1:31 PM
To: RAI@nuscalepower.com
Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Lupold, Timothy; Tsirigotis, Alexander; Vera Amadiz, Marieliz
Subject: RE: Request for Additional Information No. 175, RAI 9069 (3.12)
Attachments: Request for Additional Information No. 175 (eRAI No. 9069).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

Hearing Identifier: NuScale_SMR_DC_RAI_Public
Email Number: 198

Mail Envelope Properties (2f34e112ca624c61826be93fe6047ffe)

Subject: RE: Request for Additional Information No. 175, RAI 9069 (3.12)
Sent Date: 8/12/2017 1:31:00 PM
Received Date: 8/12/2017 1:31:01 PM
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
"Lupold, Timothy" <Timothy.Lupold@nrc.gov>
Tracking Status: None
"Tsirigotis, Alexander" <Alexander.Tsirigotis@nrc.gov>
Tracking Status: None
"Vera Amadiz, Marieliz" <Marieliz.VeraAmadiz@nrc.gov>
Tracking Status: None
"RAI@nuscalepower.com" <RAI@nuscalepower.com>
Tracking Status: None

Post Office: HQPWMSMRS08.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	832	8/12/2017 1:31:01 PM
Request for Additional Information No. 175 (eRAI No. 9069).pdf	97366	

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

Request for Additional Information No. 175 (eRAI No. 9069)

Issue Date: 08/12/2017
Application Title: NuScale Standard Design Certification - 52-048
Operating Company: NuScale Power, LLC
Docket No. 52-048
Review Section: 03.12 - ASME Code Class 1, 2, and 3 Piping Systems and Piping Components and TheirAssociated Supports
Application Section:

QUESTIONS

03.12-5

For applications for light-water-cooled nuclear power plants, 10 CFR 52.47(a)(2) requires an application contain a final safety analysis report (FSAR), that includes a description and analysis of the structures, systems, and components (SSCs) of the facility. The description shall be sufficient to permit understanding of the system designs and their relationship to the safety evaluations.
For applications for light-water-cooled nuclear power plants, 10 CFR 52.47(a)(9) requires an evaluation of the standard plant design against the Standard Review Plan (SRP) revision in effect 6 months before the docket date of the application. The evaluation required shall include an identification and description of all differences in design features, analytical techniques, and procedural measures proposed for the design and those corresponding features, techniques, and measures given in the SRP acceptance criteria. Where a difference exists, the evaluation shall discuss how the proposed alternative provides an acceptable method of complying with the Commission's regulations, or portions thereof, that underlie the corresponding SRP acceptance criteria. The SRP is not a substitute for the regulations, and compliance is not a requirement.
ASME BPV Section III, mandated by 10 CFR 50.55a, requires that piping analysis considers combinations of various loadings, including deadweight, pressure, seismic, thermal expansion and transient loads. NuScale FSAR Section 3.12 states that NuScale has adapted the graded approach for piping design, which the NRC staff had proposed in the March 4, 2014 NRC white paper - Piping Level of Detail for Design Certification (ML14065A067). Accordingly, the FSAR identifies piping that has been selected for preliminary and for final as-designed pipe stress analysis for the design certification. Provide the following information.

1) Clarify in FSAR 3.12 what piping sections are included in the chemical and volume control system (CVCS) RCS discharge piping and feedwater math models for detailed final piping design analysis. If not all the piping within the reactor building is included in the analysis model, justify the termination points.

2) Clarify in FSAR 3.12 whether preliminary pipe stress evaluation is performed for all piping within the NuScale Power Module (NPM). Provide a justification for piping that is left out of the preliminary piping evaluations.

3) FSAR Section 3.12 identifies that preliminary pipe stress evaluation is performed for decay heat removal system (DHRS) lines up to the first 6-way rigid restraint beyond the containment isolation valves. The staff does not understand the reference of the 6-way rigid restraint beyond the containment isolation valves regarding the DHRS. Discuss whether the DHRS piping system is included in its entirety in the preliminary piping analysis and provide a justification if portions of the piping system are excluded.

4) The FSAR identifies that all ASME Class 1 piping is NPS 2.

According to operating experience (see EPRI TR-111188), Failures of socket welded piping connections continue to occur frequently in U.S. nuclear power plants, resulting in degraded plant systems. Small bore piping fatigue failures in primary loop has mostly occurred at the socket weld joints (IAEA-CN-155-055).

Please clarify whether the class 1 piping is socket welded or butt welded. If socket welded connections are utilized for NuScale piping, define the socket-weld detail and discuss how failure in these socket welded connections will be prevented.

5) It is stated in FSAR 3.12 that the RCS discharge (RCS/CVCS letdown) line and a FW line have been chosen for detailed completed stress analysis. The MS line has been identified in the NRC white paper as a system in the category of the most significant piping systems for which detailed information is required for providing the staff with sufficient basis to make a safety determination. Include the detailed final as-designed piping analysis for main steam or provide a justification for not including the main steam in the completed detailed stress analysis pipe line selection.

6.a) FSAR Section 3.12.1 indicates that the detailed piping stress analyses considered loads due to deadweight, seismic and thermal expansion, and that fatigue analysis, including environmentally assisted fatigue, has been performed for class 1 piping. These are not the only loads that a piping system could potentially experience. Please clarify whether all applicable loads listed in Section 3.12.5.3 have been considered in pipe stress analysis or provide a justification for loads that are left out?

6.b) NRC white paper recommendation for preliminary piping evaluations is that these evaluations need to consider deadweight, seismic, thermal, dynamic and fatigue piping analyses, as applicable. FSAR Section 3.12.1 shows that in the preliminary pipe stress evaluations only loads due to deadweight, seismic and thermal expansion have been considered. This is a departure from the NRC white paper's recommendation. Please provide a technical justification for considering only these loads for the preliminary analyses of piping that may be needed for pipe routing, pipe support selections, postulating pipe break locations, leak-before-break (LBB)analyses and pipe whip and jet impingement protection.

6.c) Please provide a technical justification for the rational of using ASME Class 2 rules for ASME Class 1 piping in the preliminary piping evaluations that is indicated in Section 3.12.1.