

NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Friday, June 02, 2017 6:38 PM
To: RAI@nuscalepower.com
Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Lupold, Timothy; Vera Amadiz, Marieliz; Li, Yueh-Li
Subject: Request for Additional Information No. 52, RAI 8855
Attachments: Request for Additional Information No. 52 (eRAI No. 8855).pdf

Attached please find NRC staff's request for additional information concerning review of the NuScale Design Certification Application.

Please submit your response within 60 days of the date of this RAI to the NRC Document Control Desk.

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

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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
"Vera Amadiz, Marieliz" <Marieliz.VeraAmadiz@nrc.gov>
Tracking Status: None
"Li, Yueh-Li" <Yueh-Li.Li@nrc.gov>
Tracking Status: None
"RAI@nuscalepower.com" <RAI@nuscalepower.com>
Tracking Status: None

Post Office: HQPWMSMRS07.nrc.gov

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Request for Additional Information No. 52 (eRAI No. 8855)

Issue Date: 06/02/2017

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 03.06.02 - Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping
Application Section: 3.6.2

QUESTIONS

03.06.02-13

NuScale FSAR Tier 2, Section 3.6.1.2, "Types of Breaks," states that high-energy lines are evaluated for both line breaks and through-wall leakage cracks. Line breaks include both circumferential (i.e., complete rupture around the circumference of the pipe) and longitudinal breaks (i.e., rupture of the pipe along its axis). In addition, it states that through-wall leakage cracks are as defined in BTP 3-4, Revision 2. Moreover, in FSAR Section 3.6.2.1, "Criteria Used to Define Break and Crack Location and Configuration," the applicant refers to BTP 3-4 guidance that the types of breaks postulated in high-energy lines include circumferential breaks in fluid system piping greater than 1 inch nominal diameter; longitudinal breaks in fluid system piping that is 4-inch nominal diameter and greater, and through-wall leakage cracks in fluid system piping greater than 1 inch nominal diameter. Furthermore, in FSAR Section 3.6.5, "Integral Jet Impingement Shield and Pipe Whip Restraint," the applicant states that per the criteria of BTP 3-4, longitudinal pipe breaks need not be postulated at terminal ends.

To ensure the compliance with GDC 4 requirements that SSCs important to safety be designed to accommodate the effects of postulated pipe ruptures, the NRC staff in BTP 3-4, Part B, Item C provides its guidance for postulating the type of breaks and leakage cracks in fluid system piping which includes the associated postulated rupture location and configuration. The NRC staff reviewed the above FSAR information against the NRC staff's guidance as delineated in BTP 3-4, Part B, Item C(i), C(ii), and C(iii) for circumferential pipe breaks, longitudinal pipe breaks, and through-wall leakage cracks respectively. The NRC staff found either insufficient information or no information (or pointer) which addresses certain NRC staff's guidelines delineated in BTP 3-4, Part B, Items C(i)(1), C(i)(3), C(i)(5), C(ii)(1), C(ii)(3), C(ii)(5), C(iii)(2), C(iii)(3) and C(iii)(4). Explain how the referenced NRC staff's guidelines are considered in determining the break and crack location and configuration for the NuScale design.

03.06.02-14

To ensure the compliance with GDC 4 requirements for protecting SSCs important to safety against the dynamic effects of postulated pipe ruptures, the NRC staff in SRP Section 3.6.2 Section III.2.A provides its guidance for evaluating the dynamic response of the fluid system piping when pipe ruptures are postulated. Specifically, SRP Section 3.6.2 Section III.2.A states that an analysis of the dynamic response of the pipe run or branch should be performed for each longitudinal and circumferential postulated piping break. The loading condition (e.g., internal pressure, temperature, etc.) of a pipe run or branch, prior to the postulated rupture, should be used in the evaluation for postulated breaks. For piping pressurized during operation at power, the initial condition should be greater of the contained energy at hot standby or at 102 percent power. The NRC staff found no information (or pointer) in FSAR Section 3.6 which addresses the initial condition assumed for evaluating the dynamic response of the postulated breaks. Clarify the piping system initial conditions assumed in the pipe motion and dynamic effects of postulated breaks analysis and compare this with the NRC guidance as delineated in SRP Section 3.6.2 Section III.2.A.

