

NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Wednesday, September 27, 2017 9:44 AM
To: RAI@nuscalepower.com
Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Dias, Antonio; Nolan, Ryan; Murray, Demetrius
Subject: Request for Additional Information No. 239 RAI No. 9075 (10.3)
Attachments: Request for Additional Information No. 239 (eRAI No. 9075).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.

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: 263

Mail Envelope Properties (d8eaca01289f46888f2d03525399ba51)

Subject: Request for Additional Information No. 239 RAI No. 9075 (10.3)
Sent Date: 9/27/2017 9:43:58 AM
Received Date: 9/27/2017 9:44:04 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
"Dias, Antonio" <Antonio.Dias@nrc.gov>
Tracking Status: None
"Nolan, Ryan" <Ryan.Nolan@nrc.gov>
Tracking Status: None
"Murray, Demetrius" <Demetrius.Murray@nrc.gov>
Tracking Status: None
"RAI@nuscalepower.com" <RAI@nuscalepower.com>
Tracking Status: None

Post Office: HQPWMSMRS07.nrc.gov

Files	Size	Date & Time
MESSAGE	561	9/27/2017 9:44:04 AM
Request for Additional Information No. 239 (eRAI No. 9075).pdf		98853

Options

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

Request for Additional Information No. 239 (eRAI No. 9075)

Issue Date: 09/27/2017

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 10.03 - Main Steam Supply System

Application Section: 10.3

QUESTIONS

10.03-1

10 CFR 52.47(b)(1) requires that a DC application contain the proposed inspections, tests, analyses, and acceptance criteria (ITAAC) that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a plant that incorporates the design certification is built and will operate in accordance with the design certification, the provisions of the Atomic Energy Act, and the NRC's regulations. In addition, RG 1.206, Appendix C.II.1-A, Section I provides guidance on fluid system design descriptions the staff expects to be included in FSAR, Tier 1.

NuScale FSAR Tier 1, Section 1.0, states this section contains design descriptions. The staff reviewed information (minimal information in tabular form) on main steam valves, and main steam pressure instruments; however, the staff could not find any top-level design description for the main steam piping systems, or any discussion on how the plant transports steam from the steam generators to the turbine. The main steam system as defined in NuScale DSRS 10.3 performs both safety-related and nonsafety-related functions, a top-level description of the whole fluid system (i.e. outlet of the steam generator to the turbine) should be included in Tier 1, per RG 1.206.

Therefore, the applicant is requested to provide a top-level design description of the NuScale main steam piping systems consistent with RG 1.206, Appendix C.II.1-A, Section I.

10.03-2

GDC 2 requires that SSCs important to safety be designed to withstand the effects of natural phenomena without loss of the capability to perform their safety function. In addition, GDC 4 requires that structures, systems, and components important to safety be appropriately protected against dynamic effects, including the effects of water hammer and discharging fluids.

NuScale Tier 2, Section 10.1.2.2 states "Overpressure protection of the steam and power conversion system is provided by main steam safety valves [MSSVs] located on the MSS [main steam system] header, in accordance with the ASME BPV Code, Section III." This appears to contradict Tier 2, Table 3.2-1 which identifies the MSSVs as nonsafety-related, quality group D.

The applicant is requested clarify the above statement and design requirements of the MSSVs.

10.03-3

GDC 2 requires that SSCs important to safety be designed to withstand the effects of postulated natural phenomena, such as earthquakes and tornadoes without loss of the capability to perform their safety functions.

The main steam system (MSS) safety functions include steamline isolation, steam generator and main steam line overpressure protection. FSAR Tier 2, Section 5.2.2.2 states “Integrated overpressure protection for the SG and main steam, feedwater, and decay heat removal systems (DHRS) is provided by system design that does not exceed the ASME BPVC service limits during normal operation or during transients, thereby precluding the need for pressure relieving devices on the secondary side of the SGs or the main steam, feedwater, and decay heat removal systems as indicated in ASME BPVC, Section III, Paragraph NB-7120(c) and NC-7120(b).” However, the FSAR does not address the potential for overpressure during normal operation when one train of DHRS is out of service for maintenance.

The applicant is requested to describe in the FSAR how overpressure protection of the main steam piping upstream of the main steam isolation valves is maintained when one train of DHRS is unavailable.

10.03-4

GDC 2 requires that SSCs important to safety be designed to withstand the effects of natural phenomena, such as earthquakes, without loss of the capability to perform their safety function. DSRs Section 10.3, Subsection III, “Review Procedure,” Item 3 indicates piping and instrumentation diagrams (P&IDs) should clearly indicate the physical division between the safety-related and nonessential portions of the system, and Item 4 specifies that the essential portions of the MSS should be designed to Quality Group B and/or seismic Category I requirements.

The staff reviewed FSAR Tier 2, Sections 5.4, 6.2, and 10.3 for the identification of quality group and seismic classification boundaries on system drawings and P&IDs. However, the staff could not find any drawings or figures that clearly indicate the seismic/quality group classification and non-seismic/nonsafety-related portions of the system. The staff reviewed FSAR Tier 2, Table 3.2-1 to find this information; however, Table 3.2-1 is not clear or detailed enough for the staff to make its safety findings. In addition, Table 3.2-1 appears to contradict Figure 6.6-1 in that Table 3.2-1 identifies “piping from [MSS] CIVs to disconnect flange (outside containment)” as quality group D; however Figure 6.6-1 identifies this section of piping as ASME Class 2.

The applicant is requested to provide in the FSAR system drawings that clearly indicate the physical division between the safety-related and nonessential portions of the system as specified in DSRs 10.3. Also, the applicant is requested to clarify the design of the main steam piping between the MSIV and disconnect flange.

10.03-5

GDC 2 requires that SSCs important to safety be designed to withstand the effects of natural phenomena, such as earthquakes, without loss of the capability to perform their safety function. GDC 4 requires that SSCs important to safety are 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. NuScale DSRS 10.3 specifies that the use of failure modes and effects analyses (FMEA) will be used by the staff to assure these requirements are met.

The staff reviewed the FMEA in FSAR Tier 2, Table 10.3-2, which contains the nonsafety-related components of the main steam lines; however, the staff could not find in the FSAR the FMEA for the safety-related components of the main steam lines (e.g. main steam isolation and bypass valves).

The applicant is requested to provide in the FSAR an FMEA for all components of the main steam lines to assure the requirements of GDC 2 and GDC 4 are met.