NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Monday, February 05, 2018 8:38 AM
To: RAI@nuscalepower.com
Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Lupold, Timothy; Huang, Jason; Vera Amadiz, Marieliz
Subject: Request for Additional Information No. 362 RAI No. 9315 (3.8.2)
Attachments: Request for Additional Information No. 362 (eRAI No. 9315).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.

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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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Request for Additional Information No. 362 (eRAI No. 9315)

Issue Date: 02/05/2018
Application Title: NuScale Standard Design Certification - 52-048
Operating Company: NuScale Power, LLC
Docket No. 52-048
Review Section: 03.08.02 - Steel Containment
Application Section: 3/8.2

QUESTIONS

03.08.02-14

10 CFR 52.47 requires the design certification applicant to include a description and analysis of the structures, systems, and components with sufficient detail to permit understanding of the system designs.

Per NuScale FSAR Tier 2, Section 6.3.2.3, the emergency core cooling system (ECCS) components (including valves, hydraulic lines, and actuator assemblies) are Quality Group A, Seismic Category I components designed to ASME BPV Code, Section III, Subsection NB.

For consistency, Table 3.2-1, Classification of Structures, Systems, and Components, should be revised to clarify the specified ECCS valves are intended to include the valves, hydraulic lines, and actuator assemblies being Quality Group A, Seismic Category I components.

Per FSAR Tier 2, Section 6.3.2.2, the body of the ECCS actuator assembly serves as both a containment vessel (CNV) pressure boundary and reactor coolant pressure boundary (RCPB). General Design Criteria (GDCs) 14 and 16 require that:

- The reactor coolant pressure boundary shall be designed, fabricated, erected, and tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture.
- 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.

The ECCS actuator assembly currently protects both the CNV boundary and RCPB; therefore it is crucial that the welds and actuator assembly itself be designed to ensure and extremely low probability of leakage or failure in accordance with GDCs 14 and 16.

The NRC staff requests the applicant to clarify the inservice inspection (ISI) that will be performed to provide assurance of the structural integrity of the containment nozzle to safe end welds and safe end to ECCS actuator assembly welds, i.e. will they be full volumetric? FSAR Tier 2, Table 6.6-1, Examination Categories, should also be revised to include this information.

Also, will the material the actuator assembly body is manufactured from be volumetrically examined as part of the valve fabrication requirements? And what are the fabrication NDE requirements for the entire RCPB portion for this valve?

Also, Per FSAR 6.3.2.2, Equipment and Component Descriptions, valve bonnet seals on each pilot valve establish the pressure boundaries internal to the valve assembly body. And in TR-1116-51962-NP

“NuScale Containment Leakage Integrity Assurance Technical Report,” Section 3.2 “Containment Penetrations,” it describes a portion of the ECCS actuator pressure boundary that is accomplished by a bolted enclosure (body-to-bonnet) with a dual metal o-ring seal.

In generic technical specifications (TS) Subsection 3.4.5, "RCS Operational LEAKAGE," LCO 3.4.5 states that RCS operational LEAKAGE shall be limited to: a) no pressure boundary LEAKAGE, b) 0.5 gpm unidentified LEAKAGE, c) 2 gpm identified LEAKAGE from the RCS, and d) 150 gallons per day primary to secondary LEAKAGE.

The NRC staff requests that the applicant clarify the periodic testing and inspection provisions it will implement to ensure no leakage past the O-ring seals of the ECCS actuator pressure boundary during normal operating conditions. Also, explain how LCO 3.4.5 limits a), b), and c) would apply to leakage past the ECCS actuator O-ring seals or through the valve body. Explain how such RCS leakage outside of containment would be detected, identified, and quantified during operation." Were such leakage to occur without being identified but within the limit of LCO 3.4.5, what would the possible consequences be at the onset of an event?