

NuScaleDCRaisPEm Resource

From: Chowdhury, Prosanta
Sent: Friday, April 13, 2018 4:54 PM
To: Request for Additional Information
Cc: Lee, Samuel; Cranston, Gregory; Markley, Anthony; Dudek, Michael; Williams, Stephen; NuScaleDCRaisPEm Resource
Subject: Request for Additional Information No. 423 eRAI No. 9252 (11.05)
Attachments: Request for Additional Information No. 423 (eRAI No. 9252).pdf

Attached please find NRC staff's request for additional information (RAI) 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.

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301-415-1647

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Request for Additional Information No. 423 (eRAI No. 9252)

Issue Date: 04/13/2018

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 11.05 - Process and Effluent Radiological Monitoring Instrumentation and Sampling Systems

Application Section: 10 CFR 50.34(f)(2)(xiv)(E)

QUESTIONS

11.05-3

(Tier 1 RAI - on the CES Radmonitor)

Regulatory Basis:

10 CFR 50, Appendix A, GDC 30, as it relates to requiring an applicant the provide capability for detecting leaks before break (LBB). SRP section 5.2.5 details the staff's guidance as it relates to verifying that the monitors used for LBB leakage detection are capable of detecting leakage at the value specified by the applicant. RG 1.45 describes the acceptable methods for leakage detection, as committed by the applicant. RG 1.45 specifies that an analysis of a leakage monitoring systems that measures radioactivity should use a realistic primary coolant leakage concentration.

10 CFR 50.36(2)(ii)(A), indicates the criteria for establishing Technical Specification with criterion 1 stating: "Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary."

10 CFR 52.47(b)(1) states: "The proposed inspections, tests, analyses, and acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a facility that incorporates the design certification has been constructed and will be operated in conformity with the design certification, the provisions of the Act, and the Commission's rules and regulations."

10 CFR 52.47(a)(22) as it relates to how a design will incorporate operating experience as it relates to IN-1994-046, "NONCONSERVATIVE REACTOR COOLANT SYSTEM LEAKAGE CALCULATION," and RIS-2009-02, "USE OF CONTAINMENT ATMOSPHERE GASEOUS RADIOACTIVITY MONITORS AS REACTOR COOLANT SYSTEM LEAKAGE DETECTION EQUIPMENT AT NUCLEAR POWER REACTORS," on the use of radiation monitoring for detecting leaks.

Key Issue:

The application does not provide an ITAAC to test or analyze the ability of the containment evacuation system (CES) radiation monitor's to detect unidentified RCS leakage rate of one gpm within one hour to support the LBB consistent with GDC 30, and operating experience.

This ITAAC was identified in the letter sent to NuScale on April 8, 2017 (ML16097A121), as ITAAC M24 which tests RCS Pressure Boundary Leakage Detection Radiation Monitors. However, in review of DCD Tier 1, Section 2.3, "Containment Evacuation System," the staff determined there is no ITAAC to support testing or analysis demonstrating the radiation monitor's ability to detect one gpm of leakage in one hour. The staff determined there should be an ITAAC to test or confirm the ability to detect RCS leakage to support TS 3.4.7. The radiation monitor is the only credited RCS LBB Leakage detection instrument that does not have an ITAAC. Operating experience with the current operating fleet not properly establishing the detection capability of some LBB leakage detection instruments used in TS, is contained in IN-1994-046 and RIS-2009-02.

NuScale's generic technical specifications (TS), TS 3.4.7, for RCS Leakage Detection instrumentation, describes two condensate level channels, two containment evacuation system (CES) pressure channels and one CES gaseous radioactivity monitor. TS LCO 3.4.7 states that two of the listed RCS leakage detection instrumentation methods shall be operable. The use of the term operable denotes that the radiation monitor has the ability to detect a 1 gpm leak within one hour.

DCD Tier 1, Section 2.3, describes the CES tests performed to determine a one gpm leakage rate within one hour for the condensate level instrumentation and the CES pressure instrumentation, however, unlike the other two methods listed in TS 3.4.7, there is no corresponding ITAAC to verify this capability for the radiation monitor.

In review of both sections of the design the staff requests additional information to understand NuScale's rationale for not including an ITAAC for a test or analysis demonstrating that the CES radioactivity monitoring is capable of detecting one gpm of leakage within one hour during steady state conditions to support the leak before break analysis and operating experience.

In further review of Tier 1 Section 2.7 the staff noted the discussion of the CES radiation monitor to mitigate releases, but no test to verify the ability of the CES radiation monitor to detect RCS leakage of one gpm within one hour. Containment leakage ranges were discussed during the audit, but the Tier 1 ITAAC was not discussed during the audit.

Question:

The staff requests the applicant to update DCD Tier 1, Section 2.3 to include an ITAAC that states an analysis for the CES radiation monitor to detect leakage of one gpm within one hour will be performed.