NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Friday, February 02, 2018 12:04 PM
To: RAI@nuscalepower.com
Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Martinez Navedo, Tania; Ray, Sheila; Tabatabai, Omid
Subject: Request for Additional Information No. 360 RAI No. 9308 (8.1)
Attachments: Request for Additional Information No. 360 (eRAI No. 9308).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

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Request for Additional Information No. 360 (eRAI No. 9308)

Issue Date: 02/02/2018
Application Title: NuScale Standard Design Certification - 52-048
Operating Company: NuScale Power, LLC
Docket No. 52-048
Review Section: 08.01 - Electric Power - Introduction
Application Section: 8.1

QUESTIONS

08.01-2

General Design Criteria (GDC) 4, “Environmental and dynamic effects design bases” requires, in part, that structures, systems, and components important to safety shall be 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 (LOCAs).

GDC 50, “Containment Design Basis,” requires, in part, that the design of containment penetrations, including electrical penetrations containing circuits of the ac power system and the capability of electrical penetration assemblies in containment structures to withstand a LOCA without loss of mechanical integrity and the external circuit protection for such penetrations. The staff has reviewed the following sections in the design certification application and noted some inconsistencies in addressing the Electrical Penetration Assemblies (EPA) and their conformance to GDC 50.

EPAs, since they are required to function during and after a LOCA to maintain containment integrity, are environmentally qualified. 10 CFR 50.49 established specific requirements for the environmental qualification (EQ) of certain electric equipment, including EPAs, important to safety located in a harsh environment. Design Review Specific Standard (DSRS) 3.11 states that Regulatory Guide 1.63, “Electrical Penetration Assemblies in Containment Structures for Nuclear Power Plants,” which endorses IEEE Std. 317-1983, “IEEE Standard for Electric Penetration Assemblies in Containment Structures for Nuclear Power Generating Stations,” contain general guidance that is acceptable to the staff for the environmental design and qualification of EPAs and should be used in conjunction with NUREG-0588 and Regulatory Guide 1.89, as appropriate, for evaluating the environmental design and qualification of EPAs.

Furthermore, DSRS 8.2 states that the penetration conductors should be able to withstand all ranges of overload and short-circuit currents up to the maximum fault current versus time conditions that could occur, given single random failures of circuit protective devices.

In the RAI 8788, Question No. 8.01-1, the applicant stated in revised FSAR Tier 2 Section 8.3.1.2.5, page 8.3-14 that Containment Vessel (CNV) 17,18,19 and 20, Containment Penetration, contain Class 1E circuits and are therefore designated Class 1E EPAs. The applicant also mentioned that coordinated primary and backup protective devices are provided for that are not self-limiting.

QUESTION:

The staff requests the following information:

a) Please define self-limiting protective device. IEEE Std. 242, “IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems,” does not include a

definition for a self-limiting protective device, but defines a current-limiting overcurrent protective devices which are used to protect other devices against high values of short circuit current, which exceed their short circuit ratings. In addition, identify which circuits are provided with self-limiting protective devices, if any.

b) The revised FSAR Tier 1 Table 2.8-1, “Module Specific Mechanical and Electrical\I&C equipment” indicates that the some EPAs are not Class 1E, including the I&C, Pressurizer Heater Power, and Control Rod Drive Power EPAs. Please explain why the aforementioned EPAs are non-Class 1E, in light of the guidance on special considerations in IEEE Std. 741, Clause 5.4, “Primary containment electrical penetration assemblies.” In addition, considering Tier 1 information is derived from Tier 2, please provide information in Tier 2 regarding whether or not an EPA is designated as Class 1E.

c)) In the July 19, 2017 response (ML17200D160) to RAI 8788, Question 08.01-1, the applicant stated that, “an evaluation of reactor pressure vessel penetrations RPV 39, 40, 41, and 42 determined that these ASME mechanical components should not be classified as electrical penetrations. IEEE Std. 317-1983, “IEEE Standard for Electric Penetration Assemblies in Containment Structures for Nuclear Power Generating Stations” defines EPA as an assembly of insulated electric conductors, conductor seals, module seals (if any), and aperture seals that provides the passage of the electric conductors through a single aperture in the nuclear containment structure, while providing a pressure barrier between the inside and the outside of the containment structure. Please explain why these components are not classified as electrical penetrations, if these components contain circuits and conductors and are used as a pressure boundary.