

NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Tuesday, June 20, 2017 11:19 AM
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Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Lupold, Timothy; Vera Amadiz, Marieliz; Strnisha, James
Subject: Request for Additional Information No. 67, RAI 8883
Attachments: Request for Additional Information No. 67 (eRAI No. 8883).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.

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301-415-0546

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Request for Additional Information No. 67 (eRAI No. 8883)

Issue Date: 06/20/2017

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 03.11 - Environmental Qualification of Mechanical and Electrical Equipment

Application Section: 3.11

QUESTIONS

03.11-12

NRC regulations in GDC 4 require that components important to safety be designed to accommodate the effect of, and be compatible with, the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including LOCAs. DSRS 3.11, "Design-specific Review Standard for NuScale SMR Design," specifies the following acceptance criteria for the environmental qualification of mechanical equipment:

For mechanical equipment, the staff concentrates its review on materials that are sensitive to environmental effects (e.g., seals, gaskets, lubricants, fluids for hydraulic systems and diaphragms). The reviewer confirms that the applicant has (1) identified safety-related mechanical equipment located in harsh or mild environment areas and the required operation time for equipment located in harsh environment areas, and (2) identified nonmetallic subcomponents of such equipment.

DCD Tier 2, Table 3.11-1, "Environmentally Qualified Electrical/I&C and Mechanical Equipment Located in Harsh Environments," provides a list of safety-related mechanical equipment that contain nonmetallic parts located in harsh environments and their required operating time. However, the applicant does not identify safety-related mechanical equipment located in mild environments that may contain nonmetallic subcomponents.

To support a finding under GDC 4, the NRC staff requests the applicant to identify safety-related mechanical equipment located in mild environments that may contain nonmetallic subcomponents.

03.11-13

NRC regulations in GDC 4 require that components important to safety be designed to accommodate the effect of, and be compatible with, the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including LOCAs. DSRS 3.11, "Design-specific Review Standard for NuScale SMR Design," specifies the following acceptance criteria for the environmental qualification of mechanical equipment:

Appendix QR-B, "Guide for Qualification of Nonmetallic Parts," of ASME QME-1-2007 as accepted in RG 1.100 (Revision 3) provides a methodology and documentation of records that the staff finds acceptable to demonstrate that nonmetallic parts of mechanical equipment are designed to accommodate the effects of environmental conditions. The environmental design of nonmetallic parts for mechanical equipment shall consider both the external and internal service conditions of the component. The applicant should apply ASME QME-1-2007, Appendix QR-B, as accepted in RG 1.100 (Revision 3), or describe a suitable alternative in its application for NRC staff review.

DCD Tier 2, Section 3.11.6 states that safety-related mechanical equipment that performs an active function during and following exposure to harsh environmental conditions will be qualified in accordance with ASME QME-1, Appendix QR-B, as described in Section 3.10.

DCD Tier 2, Section 3.11.6 and Tier 2, Appendix 3C.4 states that mechanical equipment required to perform a design function related to safety located in mild environments is qualified in accordance with the provisions of GDC 4. For each piece of equipment selected for environmental qualification, the environmental parameters and the qualification process is listed in the associated equipment qualification record file (EQRf).

DCD Tier 2, Section 3.11.6 states that the programs identified in Section 3.11.2.1 for verifying that electrical equipment located in a mild environment are capable of performing their intended function will also be applied to mechanical equipment located in a mild environment.

The staff approved methodology in ASME QME-1-2007, Appendix QR-B contains specific guidance for qualification of nonmetallic parts of active mechanical equipment that is not addressed in the programs identified in DCD Section 3.11.2.1 for verifying that electrical equipment located in a mild environment are capable of performing their intended function. To support a finding under GDC 4, the NRC staff requests the applicant to provide the following additional information.

a. Discuss the intent of adding the phrase “as described in Section 3.10” after ASME QME-1, Appendix QR-B. ASME QME-1, Appendix QR-B addresses environmental qualification for nonmetallic parts of mechanical equipment, however, Section 3.10 addresses provisions for the seismic qualification of equipment.

b. The NRC staff requests that the applicant describe how they will apply ASME Standard QME-1-2007, Appendix QR-B, as accepted in RG 1.100 (Revision 3), for the environmental qualification of nonmetallic parts of safety-related active mechanical equipment located in harsh and mild environments. If QME-1-2007 is not applied, provide justification that the qualification process contains qualification parameters for nonmetallic parts of active mechanical equipment.

03.11-14

NRC regulations in GDC 4 require that components important to safety be designed to accommodate the effect of, and be compatible with, the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including LOCAs. DSRS 3.11, “Design-specific Review Standard for NuScale SMR Design,” specifies the following acceptance criteria for the environmental qualification of mechanical equipment:

A well-supported maintenance/surveillance program, in conjunction with a good preventive maintenance program, is needed to provide assurance that the environmental design and qualification status of equipment in both mild and harsh environments will be maintained during the operational life of the plant.

The applicant should specify in its DCD/FSAR that the EQ operational program shall contain the following aspects specific to the EQ of mechanical and electrical equipment: (1) evaluation of EQ results to establish activities to support continued EQ for the entire time an item is installed in the plant, (2) determination of surveillance and preventive maintenance activities based on EQ results, (3) consideration of EQ maintenance recommendations from equipment vendors, (4) evaluation of operating experience in developing surveillance and preventive maintenance activities for specific equipment, (5) development of plant procedures that specify individual equipment identification, appropriate references, installation requirements, surveillance and maintenance requirements, post-maintenance testing requirements, condition monitoring

requirements, replacement part identification, and applicable design changes and modifications, (6) development of plant procedures for reviewing equipment performance and EQ operational activities, and for trending the results to incorporate lessons learned through appropriate modifications to the EQ operational program, and (7) development of plant procedures for the control and maintenance of EQ records.

To support a finding under GDC 4, the NRC staff request the applicant to address in its DCD/FSAR that the EQ operational program should contain the above aspects specific to the EQ of mechanical and electrical equipment and the applicant is requested add a COL item to specify that a COL applicant that references the NuScale Power Plant design certification will address operational aspects for maintaining the environmental qualification status of components after initial qualification.