

NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Friday, November 03, 2017 10:27 AM
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Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Dias, Antonio; Stubbs, Angelo; Murray, Demetrius
Subject: Request for Additional Information No. 275 RAI No. 9122 (10.4.7)
Attachments: Request for Additional Information No. 275 (eRAI No. 9122).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.

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Request for Additional Information No. 275 (eRAI No. 9122)

Issue Date: 11/03/2017

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 10.04.07 - Condensate and Feedwater System

Application Section: 10.4.7

QUESTIONS

10.04.07-1

10 CFR 52.47(a)(2) requires that a standard design certification applicant provide a description and analysis of the structures, systems, and components (SSCs) of the facility, with emphasis upon performance requirements, the bases, with technical justification therefor, upon which these requirements have been established, and the evaluations required to show that safety functions will be accomplished.

Guidance on the content to be included in the application for the power conversion system is contained in Regulatory Guide 1.206 "Combined License Applications for Nuclear Power Plants," Section C.I.10.4, "Other Features of Steam and Power Conversion System" Facility Design Features." The guidance specifies that the applicant should provide the following information for each subsystem, one of which is the condensate and feedwater system (CSFW).

- (1) design bases (including design codes to be applied)
- (2) system description
- (3) system layout drawings, process flow diagrams, and P&IDs
- (4) safety evaluation
- (5) performance requirements for startup and normal operation
- (6) inspections and periodic testing requirements, including preoperational and startup tests (reference Chapter 14 of the FSAR, as appropriate)
- (7) instrumentation applications for each subsystem or feature
- (8) seismic design criteria, the bases governing chosen criteria, and the seismic and quality group classifications for main system components, equipment, and piping (reference the seismic and quality group classifications provided in FSAR Section 3.2)

Based on its review of NuScale FSAR Tier 2, Section 10.4.7, "Condensate and Feedwater System," the staff found the information provided for items 3, 6 and 8 above to be insufficient for a complete review. Therefore the staff request the following:

1. In order to assess the design adequacy of the CFWS, the applicant is requested to provide in the FSAR a CFWS piping and instrumentation diagram (P&ID) that shows the major CFWS components and clearly identifies seismic classification and the boundary between nonsafety-related SSCs and safety-related or important to safety SSCs such as isolation valves credited for containment isolation or decay heat removal system (DHRS) operation.

2. In order for the staff to evaluate compliance with GDC 45, "Inspection of cooling water systems," and GDC 46, "Testing of cooling water system," the applicant is requested to include in the FSAR information on the inspection and testing of the CFWS once, after refueling, the NPM is reinstalled in its bay and connected back to the system.

In order to assess compliance with GDC 2, the applicant is requested to (a) clearly indicate on the CFWS system drawings (P&IDs) the applicable seismic classifications, (b) identify seismic classification of the CFWS removable spool pieces, and (c) clarify the seismic classification of the piping associated with the feedwater regulating valve, and the feedwater check valve, both specified as seismic I in FSAR table 3.2-1 while all other system component (including piping) are specified as seismic III.

10.04.07-2

10 CFR 52.47(a)(2) requires that a standard design certification applicant provide a description and analysis of the structures, systems, and components (SSCs) of the facility, with emphasis upon performance requirements, the bases, with technical justification therefor, upon which these requirements have been established, and the evaluations required to show that safety functions will be accomplished.

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.

FSAR Tier 2, Table 3.2-1, "Classification of Structures, Systems, and Components," categorizes SSCs based on safety importance and other considerations. Table 3.2-1 indicates that all of the condensate and feedwater system (CFWS) SSCs are located in the turbine generator building (TGB), and listed as non-safety related, quality group D, and seismic classification III, except for the feedwater regulating valves, feedwater supply check valves and the feedwater regulating valve limit switch, which are seismic classification I. However, in FSAR Tier 2, Table 3.11-1, "List of Environmentally Qualified Electrical/I&C and Mechanical Equipment Located in Harsh Environments," the same SSCs are listed as being located in the reactor building.

In order to verify that these SSCs, which are credited for providing a backup containment isolation function, are properly located and classified:

- The applicant is requested to identify the location of the feedwater regulating valves, feedwater supply check valves and the feedwater regulating valve limit switch and clarify the inconsistency between FSAR Tier 2, Table 3.2-1, which shows these SSCs to be located in the TGB, and FSAR Tier 2, Table 3.11-1, which shows these SSCs to be located in the reactor building.
- The applicant is requested to clarify the seismic design classification for CFWS piping associated with the seismic I CFWS regulating and check valves, including the removable spool pieces just outside containment.

10.04.07-3

GDC 4 requires structure systems and components important to safety be protected against the consequences of hydraulic instabilities such as water-hammer events. A water hammer event in the condensate and feedwater system (CFWS) has the potential to impact the steam generator and the connected safety-related decay heat removal system (DHRS).

FSAR Tier 2, Section 10.4.7.3 states that the potential for water hammer in the CFWS is minimized by design features such as pipe slope, the use of available drains before startup, and adjustment of valve closure timing. It also indicates that a description of steam generator design features implemented to prevent fluid flow water hammer is included in FSAR Tier 2, section 3.6.3. However, the staff found there was no information presented in the FSAR that will ensure development of operating and maintenance procedures by the COL that will minimize the potential for water hammer in the CFWS.

The staff requests that the applicant propose a COL information item to provide operating and maintenance procedures to address water hammer issues for the CFWS.