NuScaleDCRaisPEm Resource

From:	Cranston, Gregory
Sent:	Friday, July 07, 2017 9:45 AM
To:	RAI@nuscalepower.com
Cc:	NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Hayes, Michelle; Franovich, Rani; Caruso, Mark
Subject:	Request for Additional Information No. 82, RAI 8879
Attachments:	Request for Additional Information No. 82 (eRAI No. 8879).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.

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

Hearing Identifier: NuScale_SMR_DC_RAI_Public
Email Number: 99

Mail Envelope Properties (cd9ebf043e0244b68e9641f17b86d4d5)

Subject: Request for Additional Information No. 82, RAI 8879
Sent Date: 7/7/2017 9:44:54 AM
Received Date: 7/7/2017 9:44:55 AM
From: Cranston, Gregory

Created By: Gregory.Cranston@nrc.gov

Recipients:
"NuScaleDCRaisPEm Resource" <NuScaleDCRaisPEm.Resource@nrc.gov>
Tracking Status: None
"Lee, Samuel" <Samuel.Lee@nrc.gov>
Tracking Status: None
"Chowdhury, Prosanta" <Prosanta.Chowdhury@nrc.gov>
Tracking Status: None
"Hayes, Michelle" <Michelle.Hayes@nrc.gov>
Tracking Status: None
"Franovich, Rani" <Rani.Franovich@nrc.gov>
Tracking Status: None
"Caruso, Mark" <Mark.Caruso@nrc.gov>
Tracking Status: None
"RAI@nuscalepower.com" <RAI@nuscalepower.com>
Tracking Status: None

Post Office: HQPWMSMRS08.nrc.gov

Files	**Size**	**Date & Time**	
MESSAGE	522	7/7/2017 9:44:55 AM	
Request for Additional Information No. 82 (eRAI No. 8879).pdf			199472

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Request for Additional Information No. 82 (eRAI No. 8879)

Issue Date: 07/07/2017
Application Title: NuScale Standard Design Certification - 52-048
Operating Company: NuScale Power, LLC
Docket No. 52-048
Review Section: 17.04 - Reliability Assurance Program (RAP)
Application Section: 17

QUESTIONS

17.04-1

Section II.A.3 of Standard Review Plan Section 17.4, "Reliability Assurance Program" lists the following acceptance criterion for an application:

"If the applicant excludes certain types of risk-significant SSCs **[structures, systems and components]** *from the RAP* **[reliability assurance program]** *(e.g., passive SSCs such as pipes, ducts, electrical cables), then the application should provide a rationale for excluding these SSCs and address how other programs and requirements ensure that these SSCs do not degrade to an unacceptable level of reliability, availability, or condition during plant operations and will function reliably when challenged."*

The following statements regarding the reliability of reactivity control systems are provided in Section 4.3.1 of the FSAR:

"The control rods and soluble boron system are capable of reliably controlling reactivity changes to assure that under postulated accident conditions and with appropriate margin for stuck rods the capability to cool the core is maintained consistent with Principal Design Criteria (PDC) 27. CRAs **[control rod actuation]***, with all rods inserted, are capable of holding the reactor subcritical under postulated accident conditions in accordance with PDC 27."*

The following statement in Section 9.3.4.1 of the FSAR identifies the CVCS as in integral part of one of the reactivity control systems.

"Consistent with GDC **[General Design Criteria]** *26, the CVCS and BAS* **[boron addition system]** *operate together to control reactor coolant boron concentrations thereby providing a second means for reliably controlling the rate of reactivity changes resulting from planned, normal power changes, including xenon burnout, to assure acceptable fuel design limits are not exceeded. The CVCS also provides a secondary means of holding the reactor core subcritical under cold conditions."*

The following statement in section 19.1.7.2 of the FSAR acknowledges that the CVCS is considered risk significant under some conditions.

"The operator action for CVCS injection shows as risk significant in the MM **[multi-module]** *PRA* **[probabilistic risk assessment]** *but not in the single module PRA."*

The applicant's process for determining risk significance of SSCs, as depicted in Figure 17.4-1 in the FSAR, indicates that insights from the PRA and the importance of an SSC as a provision for defense-in-depth are factors considered in selection of SSCs for the reliability assurrance program.

The staff notes the following insights it has determined from its review of the application:

1. Information provided in Figures 19.1-2 through 19.1-11 in the FSAR indicate core damage in approximately one-half of the event sequences from the internal events, at-power PRA that do go to core damage could be avoided if injection to the reactor coolant system with the CVCS is successful.
2. The CVCS system provides an alternative means of reactor coolant make-up under accident conditions which is diverse [active] from the passive ECCS system, and therefore serves as an important contributor to defense-in-depth in the design.

The staff has reviewed list of risk signifiacnt SSCs provided in Section 17.4 of the final safety analysis report (FSAR) and determined that the applicant has not included the Chemical and Volume Control System (CVCS) functions for reactivity control and reactor coolant system make-up in the scope of the RAP. Based on statements and other information from the FSAR and described below, the staff questions the expert panel decision on CVCS and requests that the applicant provide a summary of the expert panel's deliberations regarding the CVCS and their rationale for not including it in the RAP.

17.04-2

Standard Review Plan section 17.4, "Reliability Assurance Program states that:

"The application should describe the roles and responsibilities of any expert panels used because they play an important role in reviewing the information associated with risk-significance determinations and could compensate for the limitations of the PRA **[probabilistic risk assessment]**.*"*

The staff has reviewed the description of expert panel roles and responsibilities in determining risk significant structures, systems and components(SSCs) in the Final Safety Evaluation Report (FSAR) which states that: *"Concurrence by the expert panel constitutes the final classification of the SSC."* In light of this important role the staff requires the following additional information--not provided in the FSAR--in order to complete its evaluation.

1. Describe the process used by the expert panel to weigh the eight different considerations (as depicted in Figure 17.4-1 of the FSAR) to arrive at a final decision regarding risk significance. For example: Were numerical weights given to the various considerations; Were any specific decision criteria applied?; Were the bases for decisions documented or just the results?
2. Eplain why the process of re-evaluation by the expert panel following non-agreement with the proposed category and classification, as depicted in Figure 17.4-1 of the FSAR, only includes some of the eight considerations, and appears to exclude consideration of operating experience, probabilistic risk assessment (PRA) and severe accident insights and assumptions, defense-in-depth and systems interactions.
3. Clarify whether the consideration of PRA and severe accident insights and assumptions includes insights from the seismic margin analysis. If insights from the seismic margins analysis are being excluded, please explain why.