

NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Friday, July 21, 2017 6:14 PM
To: RAI@nuscalepower.com
Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Hayes, Michelle; Caruso, Mark; Franovich, Rani
Subject: RE: Request for Additional Information No. 101, RAI 8940 (19.1)
Attachments: Request for Additional Information No. 101 (eRAI No. 8940).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.

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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Options

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Request for Additional Information No. 101 (eRAI No. 8940)

Issue Date: 07/21/2017

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 19 - Probabilistic Risk Assessment and Severe Accident Evaluation

Application Section: 19.1.7

QUESTIONS

19-17

It is stated in Section 19.0 of the Standard Review Plan (SRP), Revision 3, "Probabilistic Risk Assessment (PRA) and Severe Accident Evaluation," that if an applicant is seeking approval of an application for a plant containing multiple modules, the staff reviews the applicant's assessment of risk from accidents that could affect multiple modules to ensure appropriate treatment of important insights related to multi-module design and operation. The staff will verify that the applicant has:

- i. Used a systematic process to identify accident sequences, including significant human errors, that lead to multiple module core damages or large releases and described them in the application.
- ii. Selected alternative features, operational strategies, and design options to prevent these sequences from occurring and demonstrates that these accident sequences are not significant contributors to risk. These operational strategies should also provide reasonable assurance that there is sufficient ability to mitigate multiple core damages accidents.

NuScale has addressed the risk from accidents that could affect multiple modules in section 19.1.7. The staff has reviewed the information in section 19.1.7 and also reviewed non-docketed supporting material as part of its ongoing audit of the NuScale PRA. Based on its review the staff believes that section 19.1.7 of the Final Safety Analysis Report (FSAR) does not provide an adequate description of those design features and/or operational strategies to prevent the sequences described in the FSAR from occurring or reduce the likelihood of occurring. Therefore, please provide a description of such features and/or operational strategies that can prevent or reduce the likelihood of occurrence for the following events that can affect multiple modules:

- Loss of Offsite Power
- Station Blackout
- Complete Loss of a support system or support subsystem, as appropriate, including
 - o reactor closed cooling water system
 - o circulating water system
 - o instrument air system
 - o common DC power systems
 - o plant control system
- Fire induced events
 - o loss of offsite power
 - o transient
 - o emergency core cooling demand
 - o loss of coolant accident inside containment
- Internal flooding

If an adequate description is provided in a parts of the FSAR other than chapter 19, simply reference the section of the FSAR it is provided in. If the description does not exist elsewhere in the FSAR, please provide it in response to the above request and include the description in an update

to the FSAR.

19-18

The staff conducts its review of section 19.1.7 of the NuScale FSAR, "Multi-module Risk," using the following review process provided in Standard Review Plan (SRP) Chapter 19.0, Revision 3, "Probabilistic Risk Assessment and Severe Accident Evaluation for New Reactors":

"...the staff reviews the applicant's assessment of risk from accidents that could affect multiple modules to ensure appropriate treatment of important insights related to multi-module design and operation. The staff will verify that the applicant has:

- 1. Used a systematic process to identify accident sequences, including significant human errors that lead to multiple module core damages or large releases and described them in the application.*
- 2. Selected alternative features, operational strategies, and design options to prevent these sequences from occurring and demonstrated that these accident sequences are not significant contributors to risk. These operational strategies should also provide reasonable assurance that there is sufficient ability to mitigate multiple core damages accidents."*

The staff has reviewed information in Section 19.1.7 of the FSAR addressing multi-module risk; examined additional clarifying information during an audit of the fire PRA; and reviewed information in Appendix 9A of the FSAR, which includes the fire hazards analysis and a description of the fire safe-shutdown path. Some of this information suggests that there may be (1) single fire areas that contain equipment in redundant safety divisions relied upon for safe shutdown for multiple modules or (2) multiple fire areas in close proximity to one another that contain redundant equipment relied upon for safe shutdown for multiple modules. In light of this, the staff needs additional information to confirm that accident sequences stemming from fires are not significant contributors to multi-module risk. Specifically:

1. Please identify any single fire or flood areas that contain equipment in redundant safety divisions relied upon for safe shutdown of multiple modules. If such fire or flood areas exist, please (a) describe those design features and operational strategies put in place to ensure that any simultaneous fire or flood damage to safe shutdown equipment for multiple modules can be mitigated and (b) provide qualitative assessments of the likelihood of a fire or flood in the area and the likelihood that damaged equipment will achieve its fail-safe condition.
2. Please identify (a) those single fire or flood areas that contain safe shutdown equipment from a single safety division for multiple modules; and (b) those design features and operational strategies to prevent fires and floods from spreading to a fire or flood area that contains the redundant safe shutdown equipment for those same modules, including but not limited to, fire or flood barriers and physical separation.

Information provided in response to the above request should be included in an update to the FSAR.