

NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Thursday, August 10, 2017 4:09 PM
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Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Dias, Antonio; Nolan, Ryan; Franovich, Rani
Subject: RE: Request for Additional Information No. 159, RAI 9023 (19.5)
Attachments: Request for Additional Information No. 159 (eRAI No. 9023).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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301-415-0546

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Request for Additional Information No. 159 (eRAI No. 9023)

Issue Date: 08/10/2017

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 19.05 Aircraft Impact Assessment (NuScale SMR design)

Application Section: 19.5

QUESTIONS

19.05 Aircraft Impact Assessment (NuScale SMR design)-1

In accordance with 10 CFR 50.150(a)(1), each applicant listed in paragraph (a)(3) shall perform a design-specific assessment of the effects on the facility of the impact of a large, commercial aircraft. Using realistic analyses, the applicant shall identify and incorporate into the design those design features and functional capabilities to show that, with reduced use of operator actions:

- (i) The reactor core remains cooled, or the containment remains intact; and
- (ii) Spent fuel cooling or spent fuel pool integrity is maintained.

In addition, 10 CFR 50.150(b) requires that the Final Safety Analysis Report (FSAR) contain a description of the design features and functional capabilities and how the design features and functional capabilities meet the assessment requirements.

To ensure compliance with 10 CFR 50.150, the staff requests that the applicant address the following:

- a. FSAR Tier 2, Section 19.5.5.1, lists the ultimate heat sink as a key design feature for providing core cooling; however, the design feature and functional capabilities are not sufficiently described. The applicant is requested to ensure that this credited key design feature is adequately described in FSAR Tier 2, Section 19.5. Please provide a sufficiently detailed description or a reference to an associated FSAR section where there is an existing description of the design feature and functional capabilities that are not included in Section 19.5.5.1.
- b. FSAR Tier 2, Section 19.5.4.1 states the decay heat removal system (DHRS) and emergency core cooling system (ECCS) are capable of providing core cooling to each NuScale power module (NPM); however, it is not clear to the staff whether these systems are considered key design features for meeting 10 CFR 50.150. In addition, FSAR Tier 2, Section 19.5.4.1 references Section 5.4.3 and Section 6.3 but it is not clear if this is for the purpose of providing additional information or a reference describing the key design features and functional capabilities, as required by 10 CFR 50.150. The applicant is requested to clarify whether the DHRS and ECCS are considered key design features and, if so, include a sufficiently detailed description of each in FSAR Tier 2, Section 19.5.
- c. FSAR Tier 2, Section 19.5.5.4 states spent fuel pool cooling is provided by the mass of water of the ultimate heat sink; however, it is not clear if this is a credited design feature in the aircraft impact assessment. If spent fuel pool cooling via the ultimate heat sink is a credited design feature, Section 19.5.5.4 is also missing a sufficiently detailed description of the design feature, or a reference to an associated FSAR section where there is a sufficiently detailed description. The applicant is requested to ensure that this (potentially) credited key design feature is clearly identified and adequately described in FSAR Tier 2, Section 19.5.
- d. FSAR Tier 2, Section 19.5.5.7 identifies the main control room (MCR) and remote shutdown station (RSS) as key design features that allow monitoring and control of the plant; however, manually tripping the reactor and inserting the control rods prior to aircraft impact is assumed as part of the core cooling strategy. Therefore, the staff questions whether the MCR and RSS are

also credited for core cooling. In addition, FSAR Tier 2, Section 19.5, does not contain a description of the MCR and RSS design features and functional capabilities. The applicant is requested to ensure that FSAR Tier 2, Section 19.5, clearly states how the MCR and RSS are being credited to meet the assessment requirements and contains a description of their design features and functional capabilities.

- e. FSAR Tier 2, Section 19.5.5.7 states the module protection system cabinets and associated direct current (DC) power equipment are available to monitor various reactor and containment parameters. However, it is not clear to the staff whether the module protection system cabinets and associated DC power equipment are considered key design features and are necessary to meet the assessment requirements (i.e., necessary for core cooling or other criteria). In addition, FSAR Tier 2, Section 19.5 does not contain a description of the module protection system cabinets and associated DC power equipment design features and functional capabilities. The applicant is requested to ensure that FSAR Tier 2, Section 19.5 clearly states how the module protection system cabinets and associated DC power equipment are being credited to meet the assessment requirements, and contains a sufficiently detailed description of their design features and functional capabilities.
- f. FSAR Tier 2, Section 19.5.5.7 identifies “any support equipment” for the DHRS and ECCS as key design features. This statement does not adequately identify the key design features necessary to support the operation of DHRS and ECCS. The applicant is requested to ensure that FSAR Tier 2, Section 19.5, clearly identifies and describes any design features necessary for supporting DHRS and ECCS.
- g. FSAR Tier 2, Section 19.5 identifies some design features credited in the aircraft impact assessment; however, the FSAR may be missing additional systems, structures, and components (SSCs) that are necessary or are credited for core cooling. The staff questions whether the control rod drive system, reactor and containment vessels, containment isolation system, and/or others should be identified. The applicant is requested to verify and confirm that FSAR Tier 2, Section 19.5, contains a complete list of key design features credited in the assessment for core cooling.

FSAR Tier 2, Section 19.5 identifies some design features credited in the aircraft impact assessment; however, the FSAR may be missing additional systems, structures, and components (SSCs) that are necessary or are credited for core cooling. The staff questions whether the control rod drive system, reactor and containment vessels, containment isolation system, and/or others should be identified. The applicant is requested to verify and confirm that FSAR Tier 2, Section 19.5, contains a complete list of key design features credited in the assessment for core cooling.

19.05 Aircraft Impact Assessment (NuScale SMR design)-2

10 CFR 50.150 (a)(1) requires the applicant to perform a design-specific assessment of the effects on the facility of the impact of a large, commercial aircraft. 10 CFR 50.150 (b) requires that the applicant include a description of the design features and function capabilities identified in the design-specific assessment and how these design features and function capabilities identified in the design-specific assessment meet the assessment requirements in 10 CFR 50.150 (a)(1).

In FSAR Tier 2, Section 19.5.1, the applicant states that “[T]he NuScale Power Plant meets all four criteria (i.e., core cooling, containment integrity, spent fuel cooling, and spent fuel pool integrity) as discussed in the following sections.” In FSAR Tier 2, Section 19.5.5.2, the applicant states that, “[T]he NPM design includes an integral containment. The NPMs are located within the RXB and are not susceptible to physical, fire, or shock damage resulting from an aircraft impact to the reactor building (RXB). (See Section 19.5.5.5 for additional details of the RXB design feature).” However, these containment intact discussions lack information specific to the containment ultimate pressure capability as per the containment intact sufficiency criteria in Section 2.5.1 of NEI 07-13, Revision 8.

The applicant is requested to provide a discussion in the FSAR regarding ultimate pressure capability of the containment to meet the containment intact provision of 10 CFR 50.150 and NEI 07-13, Revision 8. In addition, the applicant is requested to use language consistent with the regulation and guidance, and note the term is containment "intact."