

## NuScaleDCRaisPEm Resource

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**From:** Chowdhury, Prosanta  
**Sent:** Tuesday, February 27, 2018 9:41 AM  
**To:** 'RAI@nuscalepower.com'  
**Cc:** Lee, Samuel; Cranston, Gregory; Franovich, Rani; Thomas, Matt; Karas, Rebecca; NuScaleDCRaisPEm Resource  
**Subject:** Request for Additional Information No. 371 RAI No. 9373 (15.06.06)  
**Attachments:** Request for Additional Information No. 371 (eRAI No. 9373).pdf

Attached please find NRC staff's request for additional information (RAI) concerning review of the NuScale Design Certification Application.

The NRC Staff recognizes that NuScale has preliminarily identified that the response to one or more questions in this RAI is likely to require greater than 60 days. NuScale is expected to provide a schedule for the RAI response by email within 14 days.

If you have any questions, please contact me.

Thank you.

Prosanta Chowdhury, Project Manager  
Licensing Branch 1 (NuScale)  
Division of New Reactor Licensing  
Office of New Reactors  
U.S. Nuclear Regulatory Commission  
301-415-1647

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**Request for Additional Information No. 371 (eRAI No. 9373)**

Issue Date: 02/27/2018

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 15.06.06 - Inadvertent Operation of the Emergency Core Cooling System (ECCS)

Application Section:

QUESTIONS

15.06.06-2

In accordance with 10 CFR 50, Appendix A, General Design Criterion (GDC) 35, "Emergency Core Cooling," a system that provides abundant emergency core cooling shall be provided and the system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented and (2) clad metal-water reaction is limited to negligible amounts. Suitable redundancy in components and features, and suitable interconnections, leak detection, isolation, and containment capabilities, shall be provided to ensure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure. The staff notes that the applicant requests an exemption in Part 7 of the design certification application from the electric power provisions of this GDC.

To meet the requirements mentioned above, as they relate to the emergency core cooling system (ECCS) providing abundant core cooling during the inadvertent ECCS actuation event (a design basis event described in FSAR Tier 2, Section 15.6.6), the accident analysis should be performed using an acceptable analytical method as discussed in the NuScale Design Specific Review Standard, Section 15.6.6.

In Final Safety Analysis Report (FSAR) Tier 2, Section 15.6.6.3.1, "Evaluation Model," the applicant states that the loss of coolant accident (LOCA) evaluation model (EM), detailed in TR-0516-49422, "LOCA Evaluation Model," is conservatively used to analyze the spurious opening of a reactor pressure vessel (RPV) valve.

Furthermore, the applicant states in the same FSAR Tier 2 section that changes were applied to the LOCA EM to be consistent with modeling the event as an anticipate operational occurrence (AOO). The applicant then lists the changes made to the LOCA EM as part of this FSAR Tier 2 analysis. The NRC staff recognizes that these changes to the LOCA EM combined with the LOCA EM itself constitute a single methodology; however, the staff notes that the applicant does not clearly define this as a methodology in this FSAR Tier 2 section. Furthermore, the NRC staff notes that the changes made to the LOCA EM, which are a part of the FSAR Tier 2, Section 15.6.6 methodology, are not described in enough detail in the FSAR for the staff to make a safety finding. For example, the applicant states that valve models for the reactor safety valves (RSVs), reactor vent valves (RVVs), and reactor recirculation valves (RRVs) are revised from normal operation to reflect a transient event initiation. The NRC staff does not understand

what this means and cannot make a safety finding related to the DSRS acceptance criteria, which indicates that the applicant's analysis should use an acceptable analytical model. Lastly, the staff notes that the applicant does not justify applicability of the LOCA EM, with its modifications, to this FSAR Tier 2 event.

The staff requests the applicant to:

- 1) Clearly define in FSAR Tier 2, Section 15.6.6.3.1, the methodology used to analyze this event. The staff expects to see language clearly defining what constitutes the methodology used to analyze this event, e.g. "The methodology used to analyze this event is the LOCA EM (TR-0516-49422) plus the following changes..."
- 2) Clearly describe in FSAR Tier 2, Section 15.6.6.3.1, in more detail than what currently exists, the changes made to the LOCA EM. For the NRC staff to complete its review of the methodology used to analyze this event, the docketed information should contain sufficient information that the NRC staff can use as basis for its safety findings. The level of detail should be consistent with that provided for other methodology reviews (e.g. LOCA EM topical report). The staff is not requesting the applicant to repeat the LOCA EM topical report information in the FSAR; however, the staff is requesting the applicant to provide sufficient detail on the changes made to the LOCA EM. For example, describe the RSV, RVV, and RRV model revisions in a level of detail consistent with the level of detail that would be presented in the LOCA EM topical report for valve models.
- 3) Clearly justify in FSAR Tier 2, Section 15.6.6.3.1, the applicability of the LOCA EM with its modifications to analyze this event. For example, justify why the RSV, RVV, and RRV valve models are appropriate for analyzing this event. As another example, justify why the proposed 95/95 limit is appropriate for this event.