



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001**

August 6, 2020

MEMORANDUM TO: Walter L. Kirchner, Chairman  
Jose March-Leuba, Member  
NuScale Subcommittee  
Advisory Committee on Reactor Safeguards

FROM: Mike Snodderly, Senior Staff Engineer */RA/*  
Technical Support Branch,  
Advisory Committee on Reactor Safeguards

SUBJECT: ANALYSIS OF NRR RESPONSE TO ACRS LETTER ON  
NUSCALE'S NON-LOSS-OF-COOLANT ACCIDENT ANALYSIS  
METHODOLOGY

Attached is a copy of the April 27, 2020, Office of Nuclear Reactor Regulation (NRR) response to the March 25, 2020, ACRS letter on the U.S. Nuclear Regulatory Commission (NRC) staff's safety evaluation report (SER) of NuScale topical report, TR-0516-49416, Revision 2, "Non-Loss-Of-Coolant Accident Analysis Methodology." A copy of the Committee's letter is also attached.

**Committee Letter:**

In its March 25, 2020 letter:

The Committee concluded that the Non-Loss-Of-Coolant Accident Analysis Methodology topical report, with the limitations and conditions imposed by the staff SER, provides an acceptable methodology to analyze anticipated occurrences, infrequent events, and postulated accidents for the NuScale Power Module.

The Committee recommended that the staff should include an additional condition that allows application of this topical report with any critical heat flux correlation approved for use in NuScale Power Module applications.

Finally, the Committee recommended that the staff's SER should be issued with this additional condition.

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**NRR Response:**

The staff did not accept the Committee's final recommendation. The NRR Office Director stated that they will issue the safety evaluation with no additional conditions and limitations by June 2020.

With regard to the above conclusions and recommendations, the NRC staff has concluded that the behavior of the prescreening critical heat flux correlation noted by the ACRS is expected, and the references support, the validity of the correlation for comparing relative minimum critical heat flux ratio values (e.g., for identifying limiting critical heat flux cases) but not for calculating absolute values (e.g., for quantifying thermal margins).

The prescreening critical heat flux correlation described in the non-LOCA topical report and the NSP correlations, implemented in the VIPRE-01 subchannel code, produce similar trends given variations in the input parameters as shown in the non-LOCA topical report. NRC staff, therefore, finds the prescreening critical heat flux correlation to be acceptable because it can be reasonably expected to identify the limiting critical heat flux cases to be further analyzed using VIPRE-01. The NRC staff emphasizes that the non-LOCA prescreening critical heat flux correlation is used for relative comparisons only and is not used to determine thermal margins.

While the NRC staff understands the ACRS's desire for flexibility in the prescreening critical heat flux correlation, reflected in Conclusions and Recommendations 2 and 3, the NRC staff notes that the applicant has not requested NRC approval of other critical heat flux correlations for prescreening. As such, the NRC staff has not reviewed other critical heat flux correlations for this purpose. The condition and limitation proposed by ACRS would necessitate additional justification from the applicant, and review findings by the NRC staff, that other critical heat flux correlations approved for NuScale Power Module applications can reliably identify the limiting critical heat flux cases relative to the NSP correlations in VIPRE-01. The NRC staff does not believe that the proposed condition and limitation is needed given that a methodology acceptable to the NRC staff already exists. Should an applicant or licensee wish to use a different approach as part of its non-LOCA critical heat flux prescreening process in the future, it should submit a change to the topical report for the NRC staff's review and approval.

**Analysis:**

I recommend that the Committee accept the staff's response in light of the Committee's July 29, 2020 letter report, "Report on the Safety Aspects of the NuScale Small Modular Reactor." In this letter report, the Committee stated that the NRC staff's final SER for the NuScale design should be issued.