

December 5, 2016

Mr. Thomas Bergman
Vice President, Regulatory Affairs
NuScale Power, LLC
1100 Circle Boulevard, Suite 200
Corvallis, OR 97330

SUBJECT: ACCEPTANCE REVIEW OF NUSCALE POWER, LLC TOPICAL REPORT
TR-0116-21012, "NUSCALE POWER CRITICAL HEAT FLUX CORRELATION
NSP2," REVISION 0

Dear Mr. Bergman:

In an October 5, 2016, letter (Agencywide Documents Access and Management System Accession No. [ML16279A363](#)), NuScale Power, LLC (NuScale) submitted to the U.S. Nuclear Regulatory Commission (NRC) staff for review topical report (TR) TR-0116-21012, "NuScale Power Critical Heat Flux Correlation NSP2," Revision 0. The purpose of this letter is to provide the results of the NRC staff's acceptance review of this TR. The acceptance review was performed to determine if there is sufficient technical information in scope and depth to allow the NRC staff to conduct its detailed technical review.

The NRC staff has reviewed your TR and concluded that the information delineated in the enclosure to this letter is necessary to enable the NRC staff to conduct its detailed technical review.

In order to make the TR complete and not impact acceptance of the NuScale design certification application, the NRC staff requests that NuScale supplement the TR to address the information requested in the enclosure within 45 days of the date of this letter or with the submittal of the NuScale design certification application, whichever occurs first. If the TR is subsequently accepted for review, you will be advised of any further information needed to support the NRC staff's detailed technical review by separate correspondence.

The information requested and associated time frame in this letter were discussed with Steven Pope of your staff on December 05, 2016.

T. Bergman

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If you have any questions, please contact the Project Manager, Demetrius Murray at (301) 415-7646 or Demetrius.Murray@nrc.gov.

Sincerely,
/RA/

Samuel Lee, Chief
Licensing Branch 1
Division of New Reactor Licensing
Office of New Reactors

Enclosure:
Request for Supplementary Information

Project No.: PROJ0769

Cc: NuScale DC ListServ

T. Bergman

-2-

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***via email**

NRO-002

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NAME	RKaras	SLee		
DATE	11/22/2016	12/05/2016		

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REQUEST FOR SUPPLEMENTARY INFORMATION

Background

Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix A, General Design Criterion (GDC) 10, "Reactor design," requires that the reactor core and associated coolant, control, and protection systems be designed with appropriate margin to assure that specified acceptable fuel design limits (SAFDL) are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences. The critical heat flux (CHF) ratio limit is a SAFDL that is established, in part, through the use of a suitable CHF correlation.

To assist in its review of the NuScale Power, LLC (NuScale) CHF topical report (TR), U.S. Nuclear Regulatory Commission (NRC) staff conducted an audit at the KATHY facility in Karlstein, Germany on May 9 - 11, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No [ML16243A133](#)). One of the activities performed by NRC staff during the audit was to screen the draft of TR-0116-21012, Revision 0 (Draft), "NuScale Power Critical Heat Flux Correlation NSP1," 2016, and provide initial feedback regarding the contents of the TR to NuScale. This feedback was communicated during the exit briefing and documented in the NRC staff's audit summary (ADAMS Accession No. [ML16243A133](#)). Subsequently, by letter dated October 5, 2016 (ADAMS Accession No [ML16279A363](#)), NuScale submitted for NRC staff review TR-0116-21012, "NuScale Power Critical Heat Flux Correlation NSP2," Revision 0. During the acceptance review, NRC staff observed that significant technical content was not present in the TR, in particular the following appendices.

- Appendix A. Local Conditions for Stern U1, U2, and C1 Tests.
- Appendix B. Local Conditions for AREVA Test K8500 Test.
- Appendix C. Local Conditions for AREVA K9000, K9100, K9200, and K9300 Tests.

These appendices contain the database upon which statistical analysis is performed to develop the CHF correlation coefficients and CHF ratio limit. NRC staff depends on this database to establish findings that there is appropriate data density throughout the expected domain of the CHF correlation, that the application domain of the CHF correlation is free of non-conservative sub-regions, that the correlation uncertainty was calculated using an appropriate subset of the validation base, and that the correlations coefficients and limit were calculated from an appropriate data base using appropriate methods. Establishing these findings is necessary for the staff to conclude that the CHF correlation is acceptable for use in performing safety analyses and demonstrating compliance with GDC 10.

This information is standard content for a CHF TR. The table below provides references to similar TRs that have been previously reviewed and approved by the NRC staff. All of these reports provide the CHF database.

Enclosure

Critical Boiling Transition Model	Date	ADAMS Accession Number (Public)
WNG-1	2010	ML100850528
WRB-1 and WRB-2	2013	ML13284A071
KCE-1	2012	ML130180119
ORFEO	2016	ML16238A082
D4	2005	ML031400793
SPCB	2009	ML093650235

Information Gap in Topical Report

In order to conduct the review of TR-0116-21012, the NRC staff needs to establish findings that there is appropriate data density throughout the expected domain of the CHF correlation, that the application domain of the CHF correlation is free of non-conservative sub-regions, that the correlation uncertainty was calculated using an appropriate subset of the validation base, and that the correlations coefficients and limit were calculated from an appropriate data base using appropriate methods. Establishing these findings is necessary for the staff to conclude that the NSP2 CHF correlation is acceptable for use in performing safety analyses and demonstrating compliance with GDC 10. To that end, NRC staff needs NuScale to provide the following information to allow docketing of the TR for a detailed technical review:

- Local Conditions for Stern U1, U2, and C1 Tests at CHF.
- Local Conditions for AREVA Test K8500 Test at CHF.
- Local Conditions for AREVA K9000, K9100, K9200, and K9300 Tests at CHF.