

October 19, 2016

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

SUBJECT: REQUEST FOR THE REVIEW OF NUSCALE POWER, LLC, POWER TOPICAL
REPORT TR-0516-49417-P, "EVALUATION METHODOLOGY FOR STABILITY
ANALYSIS OF THE NUSCALE POWER MODULE"

Dear Mr. Bergman:

By letter dated July 31, 2016, (Agencywide Documents Access and Management System Accession No. ML16250A850), NuScale Power, LLC, (NuScale) submitted Topical Report (TR) TR-0516-49417-P, Revision 0, "Evaluation Methodology for Stability Analysis of the NuScale Power Module," to the U.S. Nuclear Regulatory Commission (NRC) staff for review. The purpose of this letter is to inform you of the results of the NRC staff's acceptance review of this TR.

The NRC staff has reviewed TR-0516-49417-P, Revision 0, "Evaluation Methodology for Stability Analysis of the NuScale Power Module," and concluded that the information delineated in the enclosure to this letter is necessary to enable the NRC staff to complete its acceptance review. The TR should provide the technical basis for why secondary side stability need not be addressed, along with sufficient rationale and justification.

Consequently, the application will be considered tendered, but will not be docketed until the requested information is submitted and the acceptance review process can be re-initiated to determine if the TR is acceptable for review. In order to make the TR submittal complete, the NRC staff requests that NuScale submit a revised TR that addresses the requests for supplemental information identified in the enclosure within 45 days of the date of this letter. If the TR is subsequently accepted for review, you will be advised of any further information needed to support the NRC staff's technical review by separate correspondence.

T. Bergman

-2-

If you have questions, please contact the Project Manager, Anthony Markley at (301) 415-3165 or Anthony.Markley@nrc.gov.

Sincerely,
/RA/

Anna H. Bradford, Deputy Director
Division of New Reactor Licensing
Office of New Reactors

Enclosure:
Requests for Supplementary Information

Project No.: PROJ0769

cc: NuScale DC ListServ

T. Bergman

-2-

If you have questions, please contact the Project Manager, Anthony Markley at (301)415-3165 or Anthony.Markley@nrc.gov.

Sincerely,
/RA/

Anna H. Bradford, Deputy Director
Division of New Reactor Licensing
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cc: NuScale DC ListServ

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***via email**

NRO-002

OFFICE	DNRL/LB1:PM	DNRL/LB1:LA	DNRL/LB1:PM	DSRA/SRSB:BC	DNRL/LB1:BC	DRNL:DD
NAME	AMarkley*	MBrown*	GCranston*	RKaras	MTonacci	ABradford
DATE	09/26/2016	09/28/2016	10/17/2016	10/17/2016	10/17/2016	10/19/2016

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REQUESTS FOR SUPPLEMENTARY INFORMATION

Background

Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix A, General Design Criterion (GDC) 12 requires that the reactor core and associated coolant, control, and protection systems shall be designed to assure that power oscillations which can result in conditions exceeding specified acceptable fuel design limits are not possible or be reliably and readily detected and suppressed.

From the abstract:

“NuScale requests approval of the computational methods described in this topical report for demonstrating the stability performance of the NPM [NuScale Power Module] and approval of the regional exclusion approach based on maintaining subcooling in the riser for protecting the onset of instabilities in the NPM.”

Section 4.3.3.2 of Topical Report (TR), “Evaluation Methodology for Stability Analysis of the NuScale Power Module,” along with Appendix A of the TR discusses the disposition of secondary side instability effects on the primary. Further, Bullet 4 of Section 5.2 and Section 5.5.3 of the TR describe the approach used to model the secondary side. However, your report did not provide the technical information in sufficient detail to determine whether secondary side stability would appreciably affect primary side stability.

Information Gaps in the Topical Report

Because secondary side instability could appreciably affect stability of the primary side, please provide the technical basis, including analyses and experimental/testing information that supports your position. Your supplemental information should:

- Contain sufficient technical information to support the NuScale position related to secondary side individual tube stability.
- Present and support the NuScale position related to the potential for feedback from the secondary side controllers to erode in-phase mode stability margin on the secondary side.
- Present and support the NuScale position related to the potential for density wave instabilities between steam generator tubes connected by common headers, and its effect on secondary side stability and should consider potential mechanisms for communication on the primary side (shell side) between tubes and its potential effect on steam generator stability.
- Discuss the potential for flow oscillation including the potential for in-phase heat transfer oscillation and coupled modes.

Enclosure

- Consider the potential for feedback mechanisms arising from interaction between the primary and secondary side due to integrated secondary side behavior (such as control system operation).

The above mechanisms are complicated by the different lengths of steam generator tubes with slightly different natural frequencies. The effect of different tube lengths on secondary side stability also needs to be discussed.