

November 09, 2017

Docket: PROJ0769

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
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11555 Rockville Pike  
Rockville, MD 20852-2738

**SUBJECT:** NuScale Power, LLC Response to NRC Request for Additional Information No. 9091 (eRAI No. 9091) on the NuScale Topical Report, "Evaluation Methodology for Stability Analysis of the NuScale Power Module," TR-0516-49417, Revision 0

**REFERENCES:** 1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 9091 (eRAI No. 9091)," dated September 10, 2017  
2. NuScale Topical Report, "Evaluation Methodology for Stability Analysis of the NuScale Power Module," TR-0516-49417, Revision 0, dated July 2016

The purpose of this letter is to provide the NuScale Power, LLC (NuScale) response to the referenced NRC Request for Additional Information (RAI).

The Enclosures to this letter contain NuScale's response to the following RAI Question from NRC eRAI No. 9091:

- 01-35

Enclosure 1 is the proprietary version of the NuScale Response to NRC RAI No. 9091 (eRAI No. 9091). NuScale requests that the proprietary version be withheld from public disclosure in accordance with the requirements of 10 CFR § 2.390. The proprietary enclosure has been deemed to contain Export Controlled Information. This information must be protected from disclosure per the requirements of 10 CFR § 810. The enclosed affidavit (Enclosure 3) supports this request. Enclosure 2 is the nonproprietary version of the NuScale response.

This letter and the enclosed responses make no new regulatory commitments and no revisions to any existing regulatory commitments.

If you have any questions on this response, please contact Darrell Gardner at 980-349-4829 or at [dgardner@nuscalepower.com](mailto:dgardner@nuscalepower.com).

Sincerely,



Jennie Wike  
Manager, Licensing  
NuScale Power, LLC



Distribution: Gregory Cranston, NRC, OWFN-8G9A  
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Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9091,  
proprietary

Enclosure 2: NuScale Response to NRC Request for Additional Information eRAI No. 9091,  
nonproprietary

Enclosure 3: Affidavit of Thomas A. Bergman, AF-1117-57095



**Enclosure 1:**

NuScale Response to NRC Request for Additional Information eRAI No. 9091, proprietary



**Enclosure 2:**

NuScale Response to NRC Request for Additional Information eRAI No. 9091, nonproprietary

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## Response to Request for Additional Information Docket: PROJ0769

**eRAI No.:** 9091

**Date of RAI Issue:** 09/10/2017

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**NRC Question No.:** 01-35

Title 10, the code of federal regulations (CFR), Part 50, Appendix A, General Design Criterion (GDC) 12- Suppression of reactor power oscillations, requires that oscillations be either not possible or reliably detected and suppressed. The Design-Specific Review Standard (DSRS), 15.9.A, “Design-Specific Review Standard for NuScale SMR Design, Thermal Hydraulic Stability Review Responsibilities,” indicates that the applicant’s analyses should correctly and accurately identify all factors that could potentially cause instabilities and their consequences. The analyses should also demonstrate that design features that are implemented prevent unacceptable consequences to the fuel.

Section 10.4, “Stability Analysis Application Methodology,” of topical report (TR), TR-0516-49417-P, states that a final analysis will be provided separately for the final design and that an application of the methodology with a full analysis scope is expected to support or disposition the stability impact of future NuScale power module design changes. The full scope of analysis will have to account for any plant design changes, however, core design changes will take place every cycle. To clarify the scope of the analysis and to reconcile the language of Sections 10.2, “General Stability Characteristics,” and 10.4, “Stability Analysis Application Methodology,” of the Stability TR, a listing of PIM models and PIM inputs that are fuel-design specific and would be subject to revision with the introduction of a new fuel assembly design are needed.

In order to make an affirmative finding NRC staff requests NuScale to:

- 1) Provide a complete listing of PIM model parameters and input parameters that are fuel-design specific.
- 2) Provide a list of all PIM model parameters that are subject to revision with the introduction of a new fuel assembly design.

Explain how such changes implemented with respect to the Q/A plan, and including: design control, documentation, software configuration control and testing, error identification, and corrective actions.

Explain how such changes are evaluated to determine if the changes constitute a change or departure from the method of evaluation in safety analysis.

- 3) Describe the process by which analyses are evaluated for potential re-analysis and how these analyses are re- performed for cases where there are changes in fuel-design-specific parameters.

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**NuScale Response:**

Item 1:

A list of the fuel design-specific parameters in PIM model and input is given in Table 1.

Table 1 Fuel Design-Specific Parameters in PIM Model

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}}<sup>2(a), (c), ECI</sup>

Item 2:

The list of PIM model parameters that are subject to revision with the introduction of a new fuel assembly design is provided in Item 1, Table 1. These PIM model fuel design-specific parameters are provided by user input. For assessment of stability with a new fuel type, the PIM code itself is not modified, rather the input data reflecting the new fuel design will be used. However, any future revisions to the PIM code including modeling refinements and new input are subject to all applicable QA procedures and software controls described in the NuScale Quality Assurance Program as referenced in Section 1.2 of the Topical Report, TR-0516-49417-P, "Evaluation methodology for Stability Analysis of the NuScale Power Module." Evaluation of changes to the fuel design and the



impact on the stability analysis methodology is discussed in Item 3.

Item 3:

Section 10.4 of TR-0516-49417-P, “Stability Analysis Application Methodology” addresses several considerations when changes are made to the NuScale Power Module (NPM) or the fuel assembly design. These considerations include the key fuel design-specific inputs listed in Item 1, Table 1 and the key cycle-specific properties such as: moderator temperature coefficient, Doppler temperature coefficient and kinetics parameters. New fuel types are accepted for stability if they preserve the hydraulic performance of the NPM (rated flow remains within licensed range) and if the core design remains within the range of reactivity coefficients evaluated in the TR. Fuel designs that cause variations outside the licensed range will be subject to re-analysis of all aspects of operation including stability.

As an example, a significant change in hydraulic resistance (loss coefficients) that may result from a different fuel design with a different number of spacers or different spacer design could result in different rated mass flow. In the case where the change in rated flow is beyond the licensed range, this change triggers a review of the module performance and safety analysis where stability is only one part of the considerations.

**Impact on Topical Report:**

There are no impacts to the Topical Report TR-0516-49417, Evaluation Methodology for Stability Analysis of the NuScale Power Module, as a result of this response.



RAIO-1117-57094

**Enclosure 3:**

Affidavit of Thomas A. Bergman, AF-1117-57095



**NuScale Power, LLC**  
AFFIDAVIT of Thomas A. Bergman

I, Thomas A. Bergman, state as follows:

1. I am the Vice President, Regulatory Affairs of NuScale Power, LLC (NuScale), and as such, I have been specifically delegated the function of reviewing the information described in this Affidavit that NuScale seeks to have withheld from public disclosure, and am authorized to apply for its withholding on behalf of NuScale.
2. I am knowledgeable of the criteria and procedures used by NuScale in designating information as a trade secret, privileged, or as confidential commercial or financial information. This request to withhold information from public disclosure is driven by one or more of the following:
  - a. The information requested to be withheld reveals distinguishing aspects of a process (or component, structure, tool, method, etc.) whose use by NuScale competitors, without a license from NuScale, would constitute a competitive economic disadvantage to NuScale.
  - b. The information requested to be withheld consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), and the application of the data secures a competitive economic advantage, as described more fully in paragraph 3 of this Affidavit.
  - c. Use by a competitor of the information requested to be withheld would reduce the competitor's expenditure of resources, or improve its competitive position, in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product.
  - d. The information requested to be withheld reveals cost or price information, production capabilities, budget levels, or commercial strategies of NuScale.
  - e. The information requested to be withheld consists of patentable ideas.
3. Public disclosure of the information sought to be withheld is likely to cause substantial harm to NuScale's competitive position and foreclose or reduce the availability of profit-making opportunities. The accompanying Request for Additional Information response reveals distinguishing aspects about the method by which NuScale develops its stability analysis of the NuScale power module.

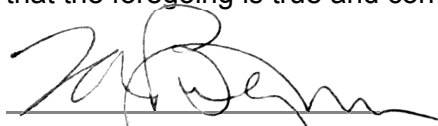
NuScale has performed significant research and evaluation to develop a basis for this method and has invested significant resources, including the expenditure of a considerable sum of money.

The precise financial value of the information is difficult to quantify, but it is a key element of the design basis for a NuScale plant and, therefore, has substantial value to NuScale.

If the information were disclosed to the public, NuScale's competitors would have access to the information without purchasing the right to use it or having been required to undertake a similar expenditure of resources. Such disclosure would constitute a misappropriation of NuScale's intellectual property, and would deprive NuScale of the opportunity to exercise its competitive advantage to seek an adequate return on its investment.

4. The information sought to be withheld is in the enclosed response to NRC Request for Additional Information No. 9091, eRAI No. 9091. The enclosure contains the designation "Proprietary" at the top of each page containing proprietary information. The information considered by NuScale to be proprietary is identified within double braces, "{{ }}" in the document.
5. The basis for proposing that the information be withheld is that NuScale treats the information as a trade secret, privileged, or as confidential commercial or financial information. NuScale relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC § 552(b)(4), as well as exemptions applicable to the NRC under 10 CFR §§ 2.390(a)(4) and 9.17(a)(4).
6. Pursuant to the provisions set forth in 10 CFR § 2.390(b)(4), the following is provided for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld:
  - a. The information sought to be withheld is owned and has been held in confidence by NuScale.
  - b. The information is of a sort customarily held in confidence by NuScale and, to the best of my knowledge and belief, consistently has been held in confidence by NuScale. The procedure for approval of external release of such information typically requires review by the staff manager, project manager, chief technology officer or other equivalent authority, or the manager of the cognizant marketing function (or his delegate), for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside NuScale are limited to regulatory bodies, customers and potential customers and their agents, suppliers, licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or contractual agreements to maintain confidentiality.
  - c. The information is being transmitted to and received by the NRC in confidence.
  - d. No public disclosure of the information has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or contractual agreements that provide for maintenance of the information in confidence.
  - e. Public disclosure of the information is likely to cause substantial harm to the competitive position of NuScale, taking into account the value of the information to NuScale, the amount of effort and money expended by NuScale in developing the information, and the difficulty others would have in acquiring or duplicating the information. The information sought to be withheld is part of NuScale's technology that provides NuScale with a competitive advantage over other firms in the industry. NuScale has invested significant human and financial capital in developing this technology and NuScale believes it would be difficult for others to duplicate the technology without access to the information sought to be withheld.

I declare under penalty of perjury that the foregoing is true and correct. Executed on 11/9/2017.



Thomas A. Bergman