



January 02, 2018

Docket No. 52-048

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

SUBJECT: NuScale Power, LLC Response to NRC Request for Additional Information No. 9136 (eRAI No. 9136) on the NuScale Design Certification Application

REFERENCES: 1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 9136 (eRAI No. 9136)," dated November 01, 2017
2. NuScale Topical Report, "Evaluation Methodology for Stability Analysis of the NuScale Power Module," TR-0516-49417, Revision 0, dated July 2016
3. NuScale Power, LLC Response to NRC Request for Additional Information No. 9136 (eRAI No. 9136) on the NuScale Design Certification Application, dated December 19, 2017 (ML17353A494)

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. 9136:

- 01-51

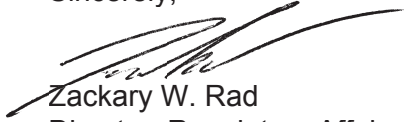
The response to RAI Questions 01-52, 01-53, 01-54, 01-55 and 01-56 were previously provided in Reference 3.

Enclosure 1 is the proprietary version of the NuScale Response to NRC RAI No. 9136 (eRAI No. 9136). NuScale requests that the proprietary version be withheld from public disclosure in accordance with the requirements of 10 CFR § 2.390. 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.

Sincerely,



Zackary W. Rad
Director, Regulatory Affairs
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. 9136,
proprietary

Enclosure 2: NuScale Response to NRC Request for Additional Information eRAI No. 9136,
nonproprietary

Enclosure 3: Affidavit of Zackary W. Rad, AF-0118-58000



Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9136, proprietary



Enclosure 2:

NuScale Response to NRC Request for Additional Information eRAI No. 9136, nonproprietary

**Response to Request for Additional Information
Docket: PROJ0769**

eRAI No.: 9136

Date of RAI Issue: 11/01/2017

NRC Question No.: 01-51

Title 10 of the Code of Federal Regulations (CFR), Part 50, Appendix A, General Design Criterion (GDC) 10, "Reactor design," requires that the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences. GDC 12 – Suppression of reactor power oscillations, states that the reactor core and associated coolant, control, and protection system shall be designed to assure that power oscillation which can result in conditions exceeding SAFDLs are not possible or can be reliably and readily detected and suppressed. The Standard Review Plan (SRP) 15.0.2 acceptance criteria with respect to evaluation models specifies that the chosen mathematical models and the numerical solution of those models must be able to predict the important physical phenomena reasonably well from both qualitative and quantitative points of view.

Section 5.5.3, "Steam Generator Model," of topical report (TR), TR-0516-49417-P, indicates that the coefficients for the Nusselt Number correlation, Eq. 55-44, of the TR, for the shell (primary) side of the steam generator are described and verified in the NRELAP5 documentation.

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

1. Provide the associated NRELAP5 documentation (or reference, if already provided) that describes the SG shell side heat transfer correlation that is mentioned in Section 5.5.3 of the Stability TR. Where applicable provide a description of how this documentation relates to the NRELAP5 Theory Manual and LOCA Evaluation Model.
 2. If applicable, justify any differences in Nusselt Number coefficients between the PIM model and the model described by the NRELAP5 Theory Manual.
 3. Provide the associated NRELAP5 documentation (or reference, if already provided) to the testing referenced in Section 5.5.3 of the Stability TR.
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NuScale Response:

Item 1:



The equation for the shell side heat transfer correlation is taken from {{

}}^{2(a),(c)}

Item 2:

There are differences in the PIM heat transfer coefficient model equation and its implementation in NRELAP5. {{

}}^{2(a),(c)}

However, the effect on stability results is minimal. This is shown in Figure 1 which is taken from a sensitivity case for a feedwater flow oscillation transient was evaluated with both the Dittus-Boelter and ESDU correlations. As noted in the response to Question 01-53 of this RAI. The



PIM code does not calculate {{

}}^{2(a),(c)} This point has been stated in the TR in

Section 5.5.3:

{{

}}^{2(a),(c)}

The sensitivity study evaluated the impact of SG heat transfer on the feedwater flow oscillation transient for cases where PIM {{

}}^{2(a),(c)} In both cases the resultant impact on the transient was small. The plot presented below is taken from the case where {{

}}^{2(a),(c)}

{{

}}^{2(a),(c)}

Figure 1 Comparison of Primary Mass Flow Rate with Different Heat Transfer Coefficients

Item 3:

The LOCA Topical Report, TR-0516-49422, Section 7.4.2.5 addresses the applicability of the horizontal bundle in cross flow heat transfer package for the use in the LOCA evaluation method via comparison to the TF-2 test data. Additionally the Non-LOCA Topical Report, TR-0516-49416, Section 5.3.5 also addresses the applicability ranges of this correlation.



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-0118-57999

Enclosure 3:

Affidavit of Zackary W. Rad, AF-0118-58000

NuScale Power, LLC
AFFIDAVIT of Zackary W. Rad

I, Zackary W. Rad, state as follows:

1. I am the Director, 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 methods 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 methods 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. 9136, eRAI No. 9136. 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 1/2/2018.



Zackary W. Rad