



October 15, 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 Supplemental Response to NRC Request for Additional Information No. 410 (eRAI No. 9310) on the NuScale Design Certification Application

**REFERENCES:** 1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 410 (eRAI No. 9310)," dated April 09, 2018  
2. NuScale Power, LLC Response to NRC "Request for Additional Information No. 410 (eRAI No.9310)," dated July 19, 2018

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

The Enclosures to this letter contain NuScale's supplemental response to the following RAI Question from NRC eRAI No. 9310:

- 03.09.02-64

Enclosure 1 is the proprietary version of the NuScale Supplemental Response to NRC RAI No. 410 (eRAI No. 9310). 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 Marty Bryan at 541-452-7172 or at mbryan@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 Supplemental Response to NRC Request for Additional Information eRAI No. 9310, proprietary

Enclosure 2: NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 9310, nonproprietary

Enclosure 3: Affidavit of Zackary W. Rad, AF-1018-62130

**Enclosure 1:**

NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 9310,  
proprietary



**Enclosure 2:**

NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 9310,  
nonproprietary

## **Response to Request for Additional Information Docket No. 52-048**

**eRAI No.:** 9310

**Date of RAI Issue:** 04/09/2018

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**NRC Question No.:** 03.09.02-64

In the response to Subquestion 2 of RAI 8911, Question 03.09.02-29, the applicant stated that the upper riser bellows are between the upper riser shell and the upper riser cone section. The bellows allow for vertical thermal growth while limiting relative horizontal deflections between the upper riser and the lower riser. The applicant further stated that while the geometry of the bellows has not been explicitly modeled, its effect has been captured by coupling the upper riser and lower riser in the horizontal directions while the vertical direction is not coupled. The staff is not clear about the properties and modeling of the bellows. Provide the following information:

1. Describe detailed properties of the bellows (thickness, connections to the upper riser including connections between the bellow and the riser sliding surfaces, sketches, etc.).
2. Does the bellow behave like a spring in axial direction? Explain why the bellows are not modelled as springs in the NPM seismic model and provide justification that the NPM seismic response without considering the spring constant of the bellows in the upper/lower riser conical joint is conservative.
3. Discuss whether sliding in the upper/lower riser conical joint will introduce nonlinearity under seismic loading. If yes, provide justification that not modeling sliding behavior in the upper/lower riser conical joint in the NPM seismic model is conservative.
4. Table C-1 of TR-0916-51502 states that the upper riser is not restrained in the vertical direction other than by gravity and compression of the bellows which keeps the interface between the upper riser and lower riser closed. Figure B-21 of TR-0916-51502 indicates

that the vertical spectral frequency at high frequency end is about 1.6 g. Address the potential that the upper riser may uplift from the lower riser at the upper/lower riser conical joint under 1.6 g vertical spectral acceleration.

5. Provide stress evaluation of the upper riser bellows in the response to RAI 8911, Question 03.09.02-18 which is scheduled for July 2018.

Include the requested information in the NPM Seismic Report.

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### **NuScale Response:**

In a followup closed meeting with NRC on September 19, 2018, confirmation was requested that failure of the bellows does not affect the natural circulation of the reactor due to the narrow flow path of the lateral restraints and the low differential pressure in the primary loop.

This information supplements the initial response to RAI 9310 Question 03.09.02-64, provided by RAIO-0718-60977 dated July 19, 2018.

If the bellows convolutions fail, the bellows lateral restraints remain intact, leaving only a narrow path for flow to occur. Additionally, due to the natural circulation conditions, the differential pressure between the hot leg and cold leg at the bellows is small {{ }}<sup>2(a),(c)</sup>. These conditions result in an insignificant amount of bypass flow due to failure of the non-seismic, convoluted portion of the bellows.

### **Impact on DCA:**

There are no impacts to the DCA as a result of this response.



RAIO-1018-62129

**Enclosure 3:**

Affidavit of Zackary W. Rad, AF-1018-62130

**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 method by which NuScale develops its power module seismic analysis.

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. 410, eRAI 9310. 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 October 15, 2018.



Zackary W. Rad