



June 03, 2019

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. 514 (eRAI No. 9645) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 514 (eRAI No. 9645)," dated December 18, 2018

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. 9645:

- 04.04-6

Enclosure 1 is the proprietary version of the NuScale Response to NRC RAI No. 514 (eRAI No. 9645). 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 Matthew Presson at 541-452-7531 or at mpresson@nuscalepower.com.

Sincerely,

Zackary W. Rad
Director, Regulatory Affairs
NuScale Power, LLC

Distribution: Gregory Cranston, NRC, OWFN-8H12
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Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9645, proprietary

Enclosure 2: NuScale Response to NRC Request for Additional Information eRAI No. 9645, nonproprietary

Enclosure 3: Affidavit of Zackary W. Rad, AF-0519-65800

Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9645, proprietary



Enclosure 2:

NuScale Response to NRC Request for Additional Information eRAI No. 9645, nonproprietary

Response to Request for Additional Information Docket: PROJ0769

eRAI No.: 9645

Date of RAI Issue: 12/18/2018

NRC Question No.: 04.04-6

GDC 10 requires that the reactor core and associated coolant, control, and protection systems be designed with sufficient margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effect of anticipated operational occurrences. Compliance with GDC 10 requires, in part, a demonstration of thermal margin by appropriate safety analyses. As described in Section 4.4.3.1.1 of the Final Safety Analysis Report (FSAR), these safety analyses include subchannel analyses that consider flow through the heated core and does not consider the flow that effectively bypasses the fuel rods.

During an audit, NRC staff observed that minimum and maximum bypass flow rates were calculated using computational fluid dynamics (CFD) analysis. Additionally, TR-0176-50439, "NuScale Comprehensive Vibration Assessment Program Technical Report," provides maximum design flow velocities, based on CFD analysis, for components that impact core bypass flow (i.e., the control rod assembly guide tubes). TR-0716-50439 further states, in Section 3.1.2.1, that, "[thermal-hydraulic] TH analysis provides validated maximum design flow rate results based on testing."

NRC staff needs to establish a finding that the design basis flow rate, used in the subchannel analyses, provides adequate margin to account for analysis uncertainties (e.g., manufacturing tolerances, boundary conditions, modeling simplifications, etc.). Accordingly, NRC staff requests that NuScale provide one of the following :

1. Justification to demonstrate that the CFD analysis provides adequate margin to the design basis bypass flow limit such that testing is not needed, or
 2. Evidence of separate effects testing that has been done to validate the CFD analysis as it pertains to core bypass flow, or
 3. Propose a startup test to validate the design basis bypass flow
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NuScale Response:

As noted in Final Safety Analysis Report (FSAR) Section 4.4.3.1.1, thermal margin calculations using subchannel analysis methods apply a penalty to the primary coolant system flow rate to account for the bypass fraction. For the subchannel analyses, TR-0915-17564-P-A, Revision 2, “Subchannel Analysis Methodology,” states in Section 3.8.4 that the maximum bypass fraction is conservative for critical heat flux calculations. The computational fluid dynamics (CFD) analysis calculation performed sensitivities on core power level and core power distribution and determined the bypass flow is insensitive to these perturbations. The core flow design basis in FSAR Section 4.4.1.3 is conservative relative to the CFD analysis results.

An independent calculation of bypass flow with explicit modeling of all flow path constituents was performed to demonstrate the core flow design basis. Consistent with FSAR Section 4.4.2.9.1.2, this calculation determined the analytical maximum bypass value used in the safety analysis. The determined analytical maximum value took into account the following uncertainties: operating conditions, manufacturing tolerances on reactor vessel internals components, and analytical model simplifications for pressure drop losses of components. When considering the minimum primary system mass flow rate conditions, the analytical maximum bypass fraction provides {{ }}^{2(a),(c)} margin to the core flow design basis. Therefore, the results presented with the CFD analysis remain applicable.

Impact on Topical Report:

There are no impacts to the Topical Report TR-0915-17564, Subchannel Analysis Methodology, as a result of this response.



RAIO-0519-65799

Enclosure 3:

Affidavit of Zackary W. Rad, AF-0519-65800

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 core bypass flow.

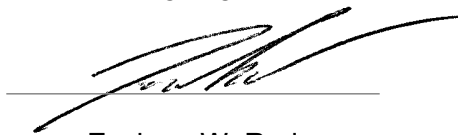
NuScale has performed significant research and evaluation to develop a basis for this method and has invested significant resources, including the expenditure of a considerable sum of money.

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. 514, eRAI 9645. 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 June 3, 2019.



Zackary W. Rad