

December 19, 2024

Docket No. 52-050

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. 032 (RAI-10297 R1) on the NuScale Standard Design Approval Application

REFERENCE: NRC Letter to NuScale, "Request for Additional Information No. 032 (RAI-10297 R1)," dated October 31, 2024

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

The enclosure to this letter contains the NuScale response to the following RAI question from NRC RAI-10297 R1:

- NonLOCA.LTR-60

Enclosure 1 is the proprietary version of the NuScale Response to NRC RAI No. 032 (RAI-10297 R1, Question NonLOCA.LTR-60). 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 makes no regulatory commitments and no revisions to any existing regulatory commitments.

If you have any questions, please contact Amanda Bode at 541-452-7971 or at abode@nuscalepower.com.

I declare under penalty of perjury that the foregoing is true and correct. Executed on December 19, 2024.

Sincerely,



Mark W. Shaver
Director, Regulatory Affairs
NuScale Power, LLC

Distribution: Mahmoud Jardaneh, Chief New Reactor Licensing Branch, NRC
Getachew Tesfaye, Senior Project Manager, NRC
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Enclosure 1: NuScale Response to NRC Request for Additional Information RAI-10297 R1,
Question NonLOCA.LTR-60, Proprietary Version

Enclosure 2: NuScale Response to NRC Request for Additional Information RAI-10297 R1,
Question NonLOCA.LTR-60, Nonproprietary Version

Enclosure 3: Affidavit of Mark W. Shaver, AF-177721

Enclosure 1:

NuScale Response to NRC Request for Additional Information RAI-10297 R1,
Question NonLOCA.LTR-60, Proprietary Version

Enclosure 2:

NuScale Response to NRC Request for Additional Information RAI-10297 R1,
Question NonLOCA.LTR-60, Nonproprietary Version

Response to Request for Additional Information Docket: 052000050

RAI No.: 10297

Date of RAI Issue: 10/31/2024

NRC Question No.: NonLOCA.LTR-60

Issue

Section 7.1.2, "Treatment of Plant Controls," of TR-0516-49416-P, "Non-Loss-of-Coolant Accident Analysis Methodology," describes the approach for determining whether operation of non-safety-related control systems should be modeled. Specifically, the LTR states that operation of the control system will be modeled if it leads to a more severe event response and will not be modeled if operation leads to a less severe event response. Topical report section 7.2.2.3, "Biases, Conservatism, and Sensitivity Studies," identifies that as the increase in feedwater flow event creates the potential for overfilling the steam generator, additional sensitivity studies are performed to identify the case(s) with a potentially limiting steam generator level. {{

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

described in Section 5.4.3.3.4 of the final safety analysis report (FSAR) provided with the NPM-20 standard design approval application, high DHRS inventory may inhibit DHRS performance if there is inadequate surface area in contact with the two-phase mixture for boiling and condensation to be effective.

In response to questions raised during the audit, NuScale provided the biases, conservatism, and sensitivity studies that will be evaluated to identify the highest steam generator level resulting from a potential increase in feedwater flow event. {{

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

NRC staff audited NuScale's calculation of the increase in feedwater flow event supporting the standard design approval application for the NPM-20 design. {{

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

{{

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

{{

}}^{2(a),(c)} . While NRC staff notes that the calculation methodology contains some conservatisms which help ensure a bounding steam generator level is identified {{

}}^{2(a),(c)} it is unclear to NRC staff if these conservatisms compensate for the potential nonconservatism from assuming {{
}}^{2(a),(c)} .

Information Requested

Demonstrate that each of these assumptions result in the limiting steam generator level or limiting DHRS capacity for the increase in feedwater flow event, or revise the Non-LOCA LTR with a revised treatment of {{
}}^{2(a),(c)} . If assuming {{
}}^{2(a),(c)} is more limiting for the NPM-20 design, revise the Non-LOCA LTR as well and make corresponding changes to FSAR Chapters 5, 15, or others as appropriate.

NuScale Response:

TR-0516-49416-P, Revision 4, “Non-Loss-of-Coolant Accident Analysis Methodology,” is revised as indicated in the markup attached to this response. Because the markup includes

changes on top of those previously provided in the response to related audit question A-NonLOCA.LTR-60, a summary of the changes is provided for convenience as follows:

- Section 7.2 is revised to clarify that the turbine bypass system response to a turbine trip is not typically credited. This is an editorial change {{
}}^{2(a),(c)}
- Table 7-15 is revised to indicate that the effect of steam pressure control on steam generator level and decay heat removal system performance is considered {{
}}^{2(a),(c)}

The increase in feedwater flow event analysis has been revised to implement the changes to TR-0516-49416-P described above. The revised analysis, EC-0000-8328, Revision 1, "Increase in Feedwater Flow Transient Analysis," is made available for NRC audit in the electronic reading room (eRR) for Final Safety Analysis Report (FSAR) Chapter 15. The EC-0000-8328, Revision 1, analysis shows that {{

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

Impact on Topical Report:

Topical Report TR-0516-49416, Non-Loss-of-Coolant Accident Analysis Methodology, has been revised as described in the response above and as shown in the markup provided in this response.

An NPM utilizes a nonsafety-related turbine bypass system sized to handle full steam flow rate at 100 percent RTP. As such, the turbine bypass valves open following a turbine trip to control the RCS temperature without steam relief to the atmosphere. Since the turbine bypass system enhances heat removal by the secondary system, these actions are not typically credited for the non-LOCA transient analyses.

{{

}}2(a),(c)

Separate analyses for subchannel CHF, fuel centerline temperature, and containment pressure calculations are performed using the appropriate licensed NuScale methodologies. Extended cooldown via the DHRS is considered as part of the system design.

7.2.1 Decrease in Feedwater Temperature

The methodology used to simulate a postulated decrease in feedwater temperature for an NPM, and an evaluation of the acceptance criteria for an AOO listed in Table 7-4, are presented below.

7.2.1.1 General Event Description and Analysis Methodology

The event is initiated by a feedwater system malfunction that causes a decrease in feedwater temperature, resulting in an unplanned overcooling of the RCS. The subsequent decrease in RCS temperature increases core reactivity due to moderator feedback, which raises reactor power. Decreasing average RCS temperature also prompts the control rod controller to withdraw the regulating bank from the core if automatic control is enabled. Rising reactor power typically causes RTS actuation on a high power or high power rate signal, and DHRS actuation and isolation of the secondary system occur post-reactor trip on other MPS signals.

Table 7-15 Initial conditions, biases, and conservatisms for SG overfill - increase in feedwater flow (Continued) ~~Not-Used~~

<u>Parameter</u>	<u>Bias / Conservatism</u>	<u>Basis</u>
<u>Steam Pressure Control</u> <u>Turbine throttle valves</u>	<u>Varied.</u>	}}
<u>Turbine bypass valves</u>	<u>Varied.</u>	
		}}
<u>Feedwater and Turbine Load Control</u> <u>Feedwater pump speed</u>	<u>N/A.</u>	}}
		}}
<u>CNV Pressure Control</u> <u>CNV evacuation system</u>	<u>Enabled.</u>	}}
		}}
1. {{		}}

Enclosure 3:

Affidavit of Mark W. Shaver, AF-177721

NuScale Power, LLC

AFFIDAVIT of Mark W. Shaver

I, Mark W. Shaver, state as follows:

- (1) I am the Director of 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 response by which NuScale develops its NuScale Power, LLC Response to NRC Request for Additional Information (RAI No. 10297 R1, Question NonLOCA.LTR-60) on the NuScale Standard Design Approval Application.

NuScale has performed significant research and evaluation to develop a basis for this response 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 RAI 10297 R1, Question NonLOCA.LTR-60. 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 December 19, 2024.



Mark W. Shaver