

October 24, 2017

Docket No. 52-048

U.S. Nuclear Regulatory Commission  
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**SUBJECT:** NuScale Power, LLC Response to NRC Request for Additional Information No. 207 (eRAI No. 9059) on the NuScale Design Certification Application

**REFERENCE:** U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 207 (eRAI No. 9059)," dated September 01, 2017

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

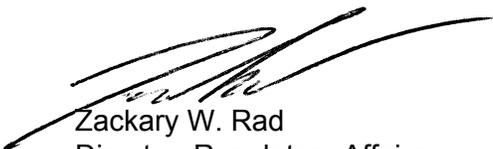
The Enclosure to this letter contains NuScale's response to the following RAI Question from NRC eRAI No. 9059:

- 06.02.04-9

This letter and the enclosed response 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  
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Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9059



RAIO-1017-56787

**Enclosure 1:**

NuScale Response to NRC Request for Additional Information eRAI No. 9059

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

**eRAI No.:** 9059

**Date of RAI Issue:** 09/01/2017

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**NRC Question No.:** 06.02.04-9

The 10 CFR 50.34(f)(3)(iv) requirement states in part “Provide one or more dedicated containment penetrations...in order not to preclude future installation of systems to prevent containment failure, such as a filtered vented containment system. (II.B.8)” In FSAR Tier 2, Table 1.9-5, “Conformance with TMI Requirements (10 CFR 50.34(f))...,” the applicant states “...should any future development identify a need for a new penetration, adding such a penetration to the NuScale vessel is a substantially different process versus the typical containment.” The staff would like the applicant to describe the “substantially different process versus the typical containment” and how this process if applied to the NuScale design would not preclude later installation of containment venting systems, if required.

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### **NuScale Response:**

The Table 1.9-5 discussion regarding 10 CFR 50.34(f)(3)(iv) technical relevancy has been revised, as shown in the attached markup, to indicate that a 3 foot containment opening is not necessary since the NuScale design already addresses severe accident scenarios that could lead to containment failure. As discussed in FSAR section 6.2, CNV structural integrity and availability of equipment necessary for safe shutdown are assured for hydrogen combustion scenarios occurring up to 72 hours following an event initiation, will have no adverse effect on containment integrity or plant safety functions. As stated in TR-0716-50424, Revision 0, Section 2.8, the NuScale design includes provisions to allow venting the containment atmosphere through the CES, including connections for portable equipment if necessary beyond 72 hours.

The size of the CES line supports gas flow capacity which exceeds hydrogen and oxygen generation rate due to radiolysis in beyond design basis events described in TR-0716-50424. TR-0716-50424, Figure 3-3 depicts the radiolytic production of hydrogen and oxygen in moles.

The production rate of hydrogen and oxygen at 72 hours is less than 0.1 ft<sup>3</sup>/min. The CES line capacity greatly exceeds this production rate, since the CES flowpath supports operation of the vacuum pump at a flow rate exceeding 300 ft<sup>3</sup>/min.

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These provisions support potential SAMG actions established by a COL applicant referencing the NuScale Power Plant design certification. Because a containment penetration is currently provided in the NuScale design that can accommodate future installation of a system to prevent containment failure, the 10 CFR 50.34(f)(3)(iv) requirement for one or more dedicated containment penetrations equivalent in size to a single 3-foot diameter opening is not technically relevant to the NuScale design. The sentence indicating adding such a new penetration to the NuScale vessel is a "substantially different process" is deleted.

**Impact on DCA:**

Table 1.9-5 has been revised as described in the response above and as shown in the markup provided in this response.

RAI 06.02.04-9, RAI 08.01-1, RAI 08.02-4, RAI 08.02-6, RAI 08.03.02-1, RAI 09.02.06-1

**Table 1.9-5: Conformance with TMI Requirements (10 CFR 50.34(f)) and Generic Issues (NUREG-0933)**

Item	Regulation Description / Title	Conformance Status	COL Applicability	Comments	Section
50.34(f)(1)(i)	Perform a plant/site-specific probabilistic risk assessment, the aim of which is to seek such improvements in the reliability of core and containment heat removal systems as are significant and practical and do not impact excessively on the plant (II.B.8)	Partially Conforms	Applicable	Design certification will address reliability of core and containment heat removal systems, with an update required by COL applicant to reflect site-specific conditions.	19.0 19.1 19.2
50.34(f)(1)(ii)	Perform an evaluation of the proposed auxiliary feedwater system (II.E.1.1)	Not Applicable	Not Applicable	This rule requires an evaluation of proposed PWR auxiliary feedwater (AFW) systems. The NuScale plant design does not involve an AFW system as would be found at a typical large LWR. Neither the literal language nor the intent of this rule applies to the NuScale design.	Not Applicable
50.34(f)(1)(iii)	Perform an evaluation of the potential for and impact of reactor coolant pump seal damage following small-break LOCA (II.K.2.16 and II.K.3.25)	Not Applicable	Not Applicable	The NuScale reactor design differs from that of large PWRs in that the NuScale design does not require or include reactor coolant pumps. Rather, the NuScale design uses passive natural circulation of the primary coolant, eliminating the need for reactor coolant pumps.	Not Applicable
50.34(f)(1)(iv)	Perform an analysis of the probability of a small-break LOCA caused by a stuck-open power-operated relief valve (PORV) (II.K.3.2)	Not Applicable	Not Applicable	This guidance is applicable only to PWRs that are designed with power-operated pressurizer relief valves. The NuScale design does not use power-operated relief valves.	Not Applicable
50.34(f)(1)(v)	Perform an evaluation of the safety effectiveness of providing for separation of high pressure coolant injection and reactor core isolation cooling system initiation levels (II.K.3.13)	Not Applicable	Not Applicable	This requirement explicitly states its applicability only to BWRs. As a PWR, the NuScale design is fundamentally different than that of a BWR, such that separation of system initiation levels as contemplated by this requirement is not pertinent.	Not Applicable
50.34(f)(1)(vi)	Perform a study to identify practicable system modifications that would reduce challenges and failures of relief valves (II.K.3.16)	Not Applicable	Not Applicable	This requirement explicitly states its applicability only to BWRs. Regardless, the issue contemplated by this requirement was related to power-operated relief valves. The NuScale design does not use power-operated relief valves.	Not Applicable

Table 1.9-5: Conformance with TMI Requirements (10 CFR 50.34(f)) and Generic Issues (NUREG-0933) (Continued)

Item	Regulation Description / Title	Conformance Status	COL Applicability	Comments	Section
50.34(f)(3)(iv)	Provide one or more dedicated containment penetrations, equivalent in size to a single 3-foot-diameter opening (II.B.8)	Partially- Conforms Departure	Not Applicable	<p><u>This requirement is not technically relevant to the NuScale design.</u> This TMI requirement is based on traditional large LWR containment designs and the potential, as of the time of the requirement, need for future containment venting systems to accommodate severe accidents. The NuScale containment vessel design is significantly different than that of a typical LWR containment structure, <del>the NuScale containment design is substantially different from traditional designs</del> because of its high-pressure capability. <del>Moreover, the NuScale design accounts for severe accidents and does not require containment venting to safely mitigate them.</del> A 3-foot opening relative to the NuScale containment <del>would be infeasible to accommodate and</del> is unnecessary. <del>Furthermore, should any future development identify a need for a new penetration, adding such a penetration to the NuScale vessel is a substantially different process versus the typical containment.</del> <u>Containment structural integrity and availability of equipment necessary for safe shutdown are assured for hydrogen combustion scenarios occurring 72 hours following an event initiation, with have no adverse effect on containment integrity or plant safety functions. The NuScale design includes provisions to allow venting the containment atmosphere, including connections for portable equipment, if necessary beyond 72 hours. (Refer to TR-0716-50424, Section 2.8).</u></p>	6.2
50.34(f)(3)(v)	Preliminary Design Information - Containment Integrity (II.B.8)	Not Applicable	Not Applicable	Pursuant to 10 CFR 52.47(a)(8) and 10 CFR 50.34(f), Paragraph (f)(3)(v) is excluded from the information required to be included in an application for a design certification.	Not Applicable