



June 1, 2017

Docket No.: 52-048

U.S. Nuclear Regulatory Commission  
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**SUBJECT:** NuScale Power, LLC Submittal of Changes to Final Safety Analysis Report, Section 6.2-4 and Tables 1.9-3 and 1.9-5

**REFERENCE:** Letter from NuScale Power LLC, to Nuclear Regulatory Commission, "NuScale Power, LLC Submittal of the NuScale Standard Plant Design Certification Application," dated December 31, 2016 (ML17013A29)

During an April 7, 2017, closed teleconference, with Mr. Omid Tabatabai and Clinton Ashley of the NRC staff, NuScale Power, LLC (NuScale) discussed potential updates to Final Safety Analysis Report (FSAR) Tables 9.9-3 and 1.9-5, along with a related change to FSAR Section 6.2.4. As a result of this discussion, NuScale revised the referenced NuScale Design Certification Application. The Enclosure to this letter provides a mark-up of the FSAR pages incorporating revisions to Section 6.2.4 and Tables 1.9-3 and 1.9-5, in redline/strikeout format. NuScale will include this change as part of a future revision to the NuScale Design Certification Application.

This letter makes no regulatory commitments or revisions to any existing regulatory commitments.

Please feel free to contact Jennie Wike at 541-360-0539 or at [jwike@nuscalepower.com](mailto:jwike@nuscalepower.com) if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'Zackary W. Rad', written over a horizontal line.

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

Distribution: Samuel Lee, NRC, TWFN-6C20  
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Enclosure: "Changes to FSAR Section 6.2.4 and Tables 1.9-3 and 1.9-5"



LO-0517-54271

**Enclosure:**

“Changes to FSAR Section 6.2.4 and Tables 1.9-3 and 1.9-5”

**Table 1.9-3: Conformance with NUREG-0800, Standard Review Plan (SRP) and Design Specific Review Standard (DSRS) (Continued)**

SRP or DSRS Section, Rev: Title	AC	AC Title/Description	Conformance Status	COL Applicability	Comments	Section
NSDSRS 6.2.4, Rev 0: Containment Isolation System	II.13	Radiation Monitors for Initiation of Containment Isolation on Open Paths to the Environs	<del>Conforms</del> <u>Departure</u>	<u>Not</u> Applicable	<del>Radiation monitoring is not included as a containment isolation signal for any penetration.</del> <u>The containment evacuation system has the potential for an open path from containment to the environs but is isolated upon a high containment vessel pressure signal, a low-low pressurizer level signal, a low alternating current voltage signal, or high under-the-bioshield temperature. Additionally, the CES discharge is re-directed into the gaseous radioactive waste system upon a high radiation signal. These features provide an alternative, reliable means to prevent radiological release from the CES to the environs, consistent with the intent of this Acceptance Criterion. The NuScale design supports an exemption from 50.34(f)(2)(xiv).</u>	6.2.4
NSDSRS 6.2.4, Rev 0: Containment Isolation System	II.14	Isolation Valve Closure Times	Conforms	Applicable	None.	6.2.4
NSDSRS 6.2.4, Rev 0: Containment Isolation System	II.15	Use of Closed System Inside Containment	Conforms	Applicable	None.	6.2.4
NSDSRS 6.2.4, Rev 0: Containment Isolation System	II.16	Specific Design Criteria for Containment Isolation Components	Conforms	Applicable	None.	6.2.4
NSDSRS 6.2.4, Rev 0: Containment Isolation System	II.17	Provisions to Allow Control Room Operator Actions	Conforms	Applicable	None.	6.2.4
NSDSRS 6.2.4, Rev 0: Containment Isolation System	II.18	Operability and Leakage Rate Testing	Conforms	Applicable	None.	6.2.4

**Table 1.9-3: Conformance with NUREG-0800, Standard Review Plan (SRP) and Design Specific Review Standard (DSRS) (Continued)**

SRP or DSRS Section, Rev: Title	AC	AC Title/Description	Conformance Status	COL Applicability	Comments	Section
BTP 6-3, Rev 3: Determination of Bypass Leakage Paths in Dual Containment Plants	All	Various	Not Applicable	Not Applicable	These acceptance criteria (B.1 through B.9) are applicable only to large LWRs that incorporate both a primary and secondary containment. The NuScale containment vessel design does not include a secondary containment.	Not Applicable
BTP 6-4, Rev 3: Containment Purging During Normal Plant Operations	All (B.1 thru B.5)	Various	Not Applicable	Not Applicable	This guidance pertains to containment purge systems used to vent containment directly to the environs. While the NuScale containment vessel design includes an evacuation system, it serves a different purpose than a purge system, <u>and includes features that provide suitable means to prevent radiological release to the environs (see NDSRS 6.2.4, AC II.13), and does not provide an open path to the environs.</u> (The NuScale containment vessel evacuation system valve closure times are addressed under SRP Section 6.2.4.)	Not Applicable
BTP 6-5, Rev 3: Currently the Responsibility of Reactor Systems Piping From the RWST (or BWST) and Containment Sump(s) to the Safety Injection Pumps	All	Various	Not Applicable	Not Applicable	This guidance is applicable only to LWR ECCS designs that rely on safety injection pumps and refueling (or borated) water storage tanks. The NuScale ECCS design does not use pumps or refueling water storage tanks (or equivalent).	Not Applicable
NSDSRS 7.0, Rev 0: Instrumentation and Controls - Introduction and Overview of Review Process	All	Various	Conforms	Applicable	This NSDSRS section provides a general description of the process for reviewing I&C systems that is applicable to the DCA. However, this guidance does not contain specific acceptance criteria. Rather, specific acceptance criteria for SRP Chapter 7 are provided in the individual SRP Chapter 7 sections, and are summarized in SRP Section 7.1, SRP Table 7-1, and SRP Appendix 7.1-A.	7.0

**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)(2)(xiii)	Provide pressurizer heater power supply and associated motive and control power interfaces sufficient to establish and maintain natural circulation in hot standby conditions with only onsite power available (II.E.3.1)	Departure	Not Applicable	The NuScale design equivalent to hot standby condition as stated in 10 CFR 50.34(f)(2)(xiii) is hot shutdown condition. The NuScale design does not rely on pressurizer heaters to establish and maintain natural circulation in hot shutdown conditions. The NuScale design supports an exemption from 50.34(f)(2)(xiii).	5.4.5 8.3.1 8.3.2
50.34(f)(2)(xiv)	Provide containment isolation systems that (A) ensure all non-essential systems are isolated automatically; (B) ensure each non-essential penetration (except instrument lines) have two isolation barriers in series; (C) do not result in reopening of the containment isolation valves on resetting of the isolation signal; (D) use a containment set point pressure for initiating containment isolation as low as is compatible with normal operation; and (E) include automatic closing on a high radiation signal for all systems that provide a path to the environs (II.E.4.2)	Departure	<u>Not</u> Applicable	<del>The NuScale design does not include systems that provide a direct path from the containment to the environs.</del> <u>The containment evacuation system has the potential for an open path from containment to the environs but is isolated upon a high containment vessel pressure signal, a low-low pressurizer level signal, a low alternating current voltage signal, or high under-the-bioshield temperature. Additionally, the CES discharge is re-directed into the gaseous radioactive waste system upon a high radiation signal.</u> The NuScale design supports an exemption from 10 CFR 50.34(f)(2)(xiv)(E) as applied to CES.	5.2.5 6.2.4 7.1.5 7.2.13 9.3.6
50.34(f)(2)(xv)	Capability for containment purging/venting designed to minimize the purging time consistent with as low as reasonably achievable (ALARA) (II.E.4.4)	Not Applicable	Not Applicable	The NuScale containment vessel is significantly smaller than a typical containment building, does not contain sub-compartments and does not require or incorporate a purge or venting system function as contemplated by this requirement. Personnel access during reactor operation is not needed. In addition, the NuScale ECCS design does not include pumps, and does not involve a typical PWR ECCS recirculation mode where ECCS pump performance relies on containment pressure. Thus purge or vent capability as prescribed by 10 CFR 50.34(f)(2)(xv) is neither required nor included in the NuScale design. This requirement is not technically relevant to the NuScale design and no exemption is necessary.	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)	<del>Partially Conforms</del> <u>Departure</u>	<u>Not</u> Applicable	<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 would be infeasible to accommodate and is unnecessary. 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.	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
50.34(f)(3)(vi)	For plant designs with external hydrogen recombiners, provide redundant dedicated containment penetrations (II.E.4.1)	Not Applicable	Not Applicable	The NuScale design does not have external hydrogen recombiners.	Not Applicable
50.34(f)(3)(vii)	Provide a description of the management plan for design and construction activities (II.J.3.1)	Not Applicable	Not Applicable	This requirement is applicable only to applicants and holders of reactor facility licenses. As discussed in NUREG-0933, the underlying purpose of this requirement was to require COL applicants and licensees to improve the oversight of design, construction, and modification activities so that they would gain the critical expertise necessary for the safe operation of the plant.	Not Applicable

Reference 6.2-1, Section 5.1 presents the results of the NRELAP5 base case analyses of the spectrum of primary mass and energy release scenarios for the NPM, that are determined using the containment response analysis methodology. Section 5.1 also describes sensitivity analyses used to determine the limiting primary release case assumptions for CNV pressure and wall temperature and presents their results. Sections 5.2 and 5.3 of Reference 6.2-1 present the results of NRELAP5 limiting analyses of main steam line and feedwater line break (FWLB) scenarios, respectively. Table 6.2-2 presents the results of the base case and limiting CNV pressure and wall temperature analyses for primary release (LOCA and valve opening events), as well as, limiting secondary system break scenarios.

The sources and amounts of energy released to the containment and the post-accident time-dependence of mass and energy releases of postulated primary system events are described in Section 6.2.1.3.

The sources and amounts of energy released to the containment and the post-accident time-dependence of mass and energy releases of postulated secondary system pipe ruptures inside containment (main steam and feedwater line breaks) are described in Section 6.2.1.4.

The capability to remove energy from the CNV (depressurization rate) is determined by the heat transfer rate from the CNV to the reactor pool. In all postulated events, containment pressure is shown to be reduced to less than 50 percent of the peak calculated pressure in less than 24 hours after the postulated accident (principal design criterion 38 (Section 3.1.4)). Specifically, for the limiting peak pressure case, the CNV pressure is reduced to less than 50 percent of its peak value in less than two hours.

The NuScale CNV does not include one or more dedicated containment penetrations, equivalent in size to a single 3-foot diameter opening, to accommodate future installation of systems to prevent containment failure. As discussed in this section, the calculated peak containment pressures for design basis events remain less than the CNV internal design pressure. As discussed in Section 19.2.3, peak containment pressures do not challenge vessel integrity for any analyzed severe accident progression. Therefore, 10 CFR 50.34(f)(3)(iv) is not technically relevant to the NuScale design.

#### 6.2.1.1.2 Design Features

The NuScale CNTS includes the CNV, top auxiliary mechanical access structure, CNV supports, control rod drive mechanism (CRDM) support, CIVs, and containment instruments.

The CNTS design features passively support:

- enclosure of the RPV, RCS and associated components
- containment of fission product releases from the RCPB
- containment of the postulated mass and energy releases (LOCA and non LOCA) inside containment