NuScale Power™

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March 27, 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 Submittal of Minor Changes to Technical Specifications LCO 3.0.8, 3.1.9, "Boron Dilution Control," Table 3.3.1-1, "Module Protection System Instrumentation," 3.4.6 Bases, "CVCS Isolation Valves," 3.5.1, "Emergency Core Cooling System," and 5.6.4, "Reactor Coolant System PRESSURE AND TEMPERATURE LIMITS REPORT"

**REFERENCES:** Letter from NuScale Power LLC, to Nuclear Regulatory Commission, "NuScale Power, LLC Submittal of the NuScale Standard Plant Design Certification Application, Revision 1," dated March 15, 2018

During the February 21, 2018 and March 14, 2018 public meetings with A. Markley and the STSB of the NRC staff, NuScale Power, LLC (NuScale) discussed potential minor updates to various sections of the Technical Specifications and Bases. As a result of this discussion, NuScale changed the Technical Specifications and Bases:

- LCO 3.0.8 LCO Applicability
- 3.1.9 Boron Dilution Control
  Bases for Boron Dilution Control
- Table 3.3.1-1 Module Protection System Instrumentation
- Bases 3.4.6 Bases for CVCS Isolation Valves
- 3.5.1 Emergency Core Cooling System
  Bases for Emergency Core Cooling System
- 5.6.4 Reactor Coolant System PRESSURE AND TEMPERATURE LIMITS REPORT

The Enclosure to this letter provides a mark-up of the pages incorporating the revisions in redline/strikeout format. NuScale will include these changes 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 Steven Mirsky at 249-833-3001 or at smirsky@nuscalepower.com if you have any questions.

Sincerely,

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

Distribution: Samuel Lee, NRC, OWFN-8G9A
Prosanta Chowdhury, NRC, OWFN-8G9A
Anthony Markley, NRC, OWFN-8G9A

Enclosure: "Changes to Technical Specifications LCO 3.0.8, 3.1.9, "Boron Dilution Control," Table 3.3.1-1, "Module Protection System Instrumentation," 3.4.6 Bases, "CVCS Isolation Valves," 3.5.1, "Emergency Core Cooling System," and 5.6.4, "Reactor Coolant System PRESSURE AND TEMPERATURE LIMITS REPORT"

**Enclosure:**

"Changes to Technical Specifications LCO 3.0.8, 3.1.9, "Boron Dilution Control," Table 3.3.1-1, "Module Protection System Instrumentation," 3.4.6 Bases, "CVCS Isolation Valves," 3.5.1, "Emergency Core Cooling System," and 5.6.4, "Reactor Coolant System PRESSURE AND TEMPERATURE LIMITS REPORT"

**NuScale Power, LLC**
1100 NE Circle Blvd., Suite 200 Corvallis, Oregon 97330 Office 541.360-0500 Fax 541.207.3928
www.nuscalepower.com

## 3.0 LCO APPLICABILITY

LCO 3.0.7

Test Exception LCO 3.1.8 allows specified Technical Specification (TS) requirements to be changed to permit performance of special tests and operations. Unless otherwise specified, all other TS requirements remain unchanged. Compliance with Test Exception LCOs is optional. When a Test Exception LCO is desired to be met but is not met, the ACTIONS of the Test Exception LCO shall be met. When a Test Exception LCO is not desired to be met, entry into a MODE or other specified condition in the Applicability shall be made in accordance with the other applicable Specifications.

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[---------- REVIEWER'S NOTE ----------
A COL applicant who wants to adopt LCO 3.0.8 must perform or reference a risk assessment for the NuScale design that has been submitted to the NRC, and that was prepared consistent with the bounding generic risk assessment provided in TSTF-427-A, Rev. 2, "Allowance for Non-Technical Specification Barrier Degradation on Supported System OPERABILITY,;" ~~Revision 2-A.~~
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[LCO 3.0.8

When one or more required barriers are unable to perform their related support function(s), any supported system LCO(s) are not required to be declared not met solely for this reason for up to 30 days provided that at least one train or subsystem of the supported system is OPERABLE and supported by barriers capable of providing their related support function(s), and risk is assessed and managed. This Specification may be concurrently applied to more than one train or subsystem of a multiple train or subsystem supported system provided at least one train or subsystem of the supported system is OPERABLE and the barriers supporting each of these trains or subsystems provide their related support function(s) for different categories of initiating events.

If the required OPERABLE train or subsystem becomes inoperable while this Specification is in use, it must be restored to OPERABLE status within 24 hours or the provisions of this Specification cannot be applied to the trains or subsystems supported by the barriers that cannot perform their related support function(s).

At the end of the specified period, the required barriers must be able to perform their related support function(s) or the supported system LCO(s) shall be declared not met.]

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.1.9.1 | Verify that CVCS makeup pump demineralized water flow path is configured to ensure that it remains within the limits specified in the COLR. | In accordance with the Surveillance Frequency Control Program |
| SR 3.1.9.2 | Verify each automatic CVCS demineralized water isolation valve that is not locked, sealed, or otherwise secured in the isolated position, actuates to the isolated position on an actual or simulated signal except for valves that are open under administrative controls. | In accordance with the Surveillance Frequency Control Program |
| SR 3.1.9.3 | Verify Boric Acid Storage Tank boron concentration ~~to be~~is within the limits specified in the COLR. | In accordance with the Surveillance Frequency Control Program |
| SR 3.1.9.4 | Verify each CVCS makeup pump maximum flowrate is ≤ 25 gpm. | In accordance with the Surveillance Frequency Control Program |

Table 3.3.1-1 (page 1 of 7)
Module Protection System Instrumentation

| FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS |
|---|---|---|---|
| 1. High Power Range Linear Power | | | |
| a. RTS | 1, 2[(a)], 3[(a)] | 4 | D |
| b. DWSI | 1, 2[(a)], 3[(a)] | 4 | H |
| 2. High Power Range Positive and Negative Rate | | | |
| a. RTS | 1[(b)] | 4 | E |
| b. DWSI | 1[(b)] | 4 | H |
| 3. High Intermediate Range Log Power Rate | | | |
| a. RTS | 1[(c)], 2[(a)], 3[(a)] | 4 | D |
| b. DWSI | 1[(c)], 2[(a)], 3[(a)] | 4 | H |
| 4. High Source Range Count Rate | | | |
| a. RTS | 1[(d)], 2[(a)], 3[(a)] | 4 | D |
| b. DWSI | 1[(d)], 2[(a)], 3[(a)] | 4 | H |
| 5. High Source Range Log Power Rate | | | |
| a. RTS | 1[(d)], 2[(a)], 3[(a)] | 4 | D |
| b. DWSI | 1[(d)], 2[(a)], 3[(a)] | 4 | H |
| 6. High Subcritical Multiplication | | | |
| a. DWSI | 1[(d)], 2[(a)], 3[(a)] | 4 | H |

(a) When capable of CRA withdrawal.
(b) ~~Above the N-2H Interlock~~With power above the N-2H interlock.
(c) Below the N-2L Interlock.
(d) When Intermediate Range Log Power less than N-1 interlock.

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.5.1.1 | ----------NOTE----------<br>Not required to be met for valves that are open.<br>----------<br>Verify each RVV and RRV actuates to the open position on an actual or simulated actuation signal. | In accordance with the Surveillance Frequency Control Program |
| SR 3.5.1.2 | ----------NOTE----------<br>Not required to be met for valves that are open.<br>----------<br>Verify the open actuation time of each RVV and RRV is within limits. | In accordance with the INSERVICE TESTING PROGRAM |
| SR 3.5.1.3 | Verify the inadvertent actuation block function of each RVV and RRV. | In accordance with the Surveillance Frequency Control Program |
| SR 3.5.1.4 | Verify the inadvertent actuation block setpoint is within limits for each RVV and RRV. | In accordance with the INSERVICE TESTING PROGRAM |

5.6 Reporting Requirements

5.6.3 Core Operating Limits Report (COLR) (continued)

d. The COLR, including any mid-cycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

5.6.4 Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

a. RCS pressure and temperature limits for heat up, cooldown, low temperature operation, criticality, and hydrostatic testing as well as heatup and cooldown rates shall be established and documented in the PTLR for the following:

3.3.1, “Module Protection System (MPS) Instrumentation”;

3.3.3, “Engineered Safety Features Actuation System (ESFAS) Logic and Actuation”;

3.3.4, “Manual Actuation Functions”;

3.4.3, “RCS Pressure and Temperature (P/T) Limits”; and

3.4.4, “Reactor Safety Valves (RSVs)”.

b. The analytical methods used to determine the RCS pressure and temperature limits shall be those previously reviewed and approved by the NRC, specifically those described in the following document:

TR-1015-18177, "Pressure and Temperature Limits Methodology," [Revision 0, December 2016.]."

c. The PTLR shall be provided to the NRC upon issuance for each reactor vessel fluency period and for any revision or supplement thereto.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.1.9.2

This Surveillance demonstrates that each automatic CVCS demineralized water isolation valve actuates to the isolated position on an actual or simulated actuation signal. This Surveillance is not required for automatic valves that are locked, sealed, or otherwise controlled under administrative controls. This means the Surveillance does not apply if the valve is open under administrative controls that assure they can be promptly closed. This exception is acceptable because of the slowly changing conditions and responses in the design basis events that the automatic isolation protects.

~~T~~In addition to this Surveillance, the automatic actuation logic is tested as part of Engineered Safety Features Actuation System Actuation and Logic testing, and valve performance is monitored as part of the INSERVICE TESTING PROGRAM.

The Surveillance Frequency for this test is controlled under the Surveillance Frequency Control Program.

SR 3.1.9.3

This Surveillance ensures that the boric acid storage tank is not a potential source of dilution water.

Boron concentration in the tank is verified to be within the limits specified in the COLR by periodic measurement.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.1.9.4

This Surveillance verifies that CVCS makeup pump maximum flowrate is ≤ 25 gpm. The lowest maximum makeup pump demineralized water flowrate that can be used while in operation is that of one CVCS makeup pump as assumed in the boron dilution analysis. The Surveillance verifies the maximum flowrate of each CVCS makeup pump is consistent with the analysis assumptions. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

REFERENCES

1. FSAR Chapter 15, “Transient and Accident Analysis.”

BASES

ACTIONS (continued)

B.1

With two CVCS isolation valves in one or more penetration flow paths inoperable, the affected penetration flow path must be isolated within 1 hour. The method of isolation must include the use of at least one isolation device that cannot be adversely affected by a single active failure. Isolation devices that meet this criterion are a closed and deactivated automatic valve, a closed manual valve, and a blind flange.

The 1 hour Completion Time is consistent with the ACTIONS of LCO 3.6.2. In the event the affected penetration is isolated in accordance with Required Action B.1, the affected penetration must be verified to be isolated on a periodic basis per Required Action A.2, which remains in effect. This periodic verification is necessary to assure leak tightness of containment and that penetrations requiring isolation following an accident are isolated. The Completion Time of once per 31 days for verifying each affected penetration flow path is isolated is appropriate considering the fact that the devices are operated under administrative controls and the probability of the misalignment is low.

C.1 and C.2

If the Required Actions and associated ~~c~~Completion Times are not met, the unit must be brought to a MODE or condition in which containment isolation requirement no longer applies. To achieve this status, the unit must be brought to at least MODE 2 within 6 hours and MODE 3 with RCS hot temperature < 200ºF within 48 hours. The allowed Completion Times are reasonable to reach the required unit conditions from full power conditions in an orderly manner.

SURVEILLANCE REQUIREMENTS

SR 3.4.6.1

This SR verifies adequate pressure in the accumulators required for CVCS isolation valve OPERABILITY. The pressure limits required for OPERABILITY, including consideration of temperature effects on those limits, applicable to the valve accumulators are established and maintained in accordance with the INSERVICE TESTING PROGRAM. The Frequency is controlled under the Surveillance Frequency Control Program.

BASES

APPLICABLE SAFETY ANALYSES (continued)

of the containment vessel. The design ensures that in the event of a loss of primary coolant to the containment vessel, sufficient coolant will be returned to the reactor vessel to ensure that the core remains cooled and covered at all times. Actuation of the system ensures that pressure differences between the containment vessel and the reactor pressure vessel are minimized sufficiently to allow hydraulic head of the fluid in containment to establish flow to the reactor vessel via an open RRV.

The ECCS system includes an inadvertent actuation block (IAB) feature. The IAB safety function is to permit the RVVs and RRVs to open only when appropriate conditions exist as described in the safety analysis.

ECCS satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

This LCO establishes the minimum conditions necessary to ensure that ECCS valves will be available to meet the initial conditions assumed in the safety analyses. Two RVVs and one RRV provide the safety function of the safety analyses for LOCA and SGTF events. Loss of any system component eliminates the redundancy provided to meet its safety function.

APPLICABILITY

The ECCS is relied upon to provide a passive response to loss of coolant accidents in MODES 1 and 2, and in MODE 3 when not PASSIVELY COOLED. Additionally, the valves are ensured to open when power is removed when the module is disconnected at the operating position as part of the refueling process. In MODE 4 and 5 core cooling is provided by passive conduction through the containment vessel or direct communication and contact of the core with the ultimate heat sink. Therefore the ECCS valves are not required to be OPERABLE in MODE 4 or 5.

ACTIONS

A.1

To meet the ECCS safety function at least two RVVs must open. If a single RVV is inoperable it eliminates the redundancy of this safety system. The valve must be restored to OPERABLE. A completion time of 72 hours is reasonable based on the probability of a LOCA or LTOP condition occurring during this period, the reliability of the other RVVs, and the ability of the system to cope with this event using the chemical volume control system and the containment flooding and drain system.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.1.2

Verifying that the open actuation time of each RVV and RRV is within limits is required to demonstrate OPERABILITY. The open actuation time test ensures that the valve will open in a time period less than or equal to that assumed in the safety analysis. The opening times are as specified in the INSERVICE TESTING PROGRAM. One RVV is designed to be actuated by either division of the MPS and its actuation time must be tested from each division without dependence on the other. A Note is provided indicating that the SR is not required to be met for a valve that is open. This Note is necessary to allow a valve to be credited with performing its safety function when it may not be able to satisfy the SR requirements. When an ECCS valve is open it has performed its safety function.

Frequency of this SR is in accordance with the INSERVICE TESTING PROGRAM.

SR 3.5.1.3

Verification of the inadvertent actuation block function ensures that opening of the RVVs and RRVs is blocked when the RCS and the CNV is at or near operating pressure conditions. ~~The IAB safety function is to prevent inadvertent opening of the RVVs and RRVs as described in the safety analysis.~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.5.1.4

Verification of the inadvertent actuation block setpoint ensures that opening of the RVVs and RRVs will not be prevented when the difference between the RCS and the CNV pressures has been reduced to the appropriate level. ~~The safety function of the IAB is to allow RVVs and RRVs to operate when RCS and CNV pressure conditions are appropriate, as described in the safety analysis.~~

Frequency of this SR is in accordance with the INSERVICE TESTING PROGRAM

REFERENCES

1. FSAR Section 6.3, "Emergency Core Cooling System."

2. FSAR Chapter 15, "Transient and Accident Analysis."