RAIO-0618-60514

June 18, 2018

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. 461 (eRAI No. 9503) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 461 (eRAI No. 9503)," dated May 02, 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 Enclosure to this letter contains NuScale's response to the following RAI Question from NRC eRAI No. 9503:

- 15-15

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 Paul Infanger at 541-452-7351 or at pinfanger@nuscalepower.com.

Sincerely,

Zackary W. Rad
Director, Regulatory Affairs
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Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9503

Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9503

NuScale Power

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

eRAI No.: 9503
Date of RAI Issue: 05/02/2018

NRC Question No.: 15-15

General Design Criterion (GDC) 10, "Reactor design," in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix A, requires that the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits (SAFDLs) are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences (AOOs).

The containment acceptance criteria for an AOO event classification in Final Safety Analysis Report (FSAR) Table 15.0-2 is given as N/A. The staff notes that Inadvertent Operation of Emergency Core Cooling System, FSAR Section 15.6.6, states, "The spurious opening of a single [emergency core cooling system (ECCS)] valve is not expected to occur during the lifetime of a module. However the event is conservatively categorized as an AOO, as indicated in Table 15.0-1."

The staff notes that during a spurious opening on an ECCS valve, the containment would serve as both a fission product barrier and a means to transfer heat to the ultimate heat sink (and therefore, PDCs 38, 44, and 50 may also be applicable to this event). Therefore, it is unclear to the staff why containment pressure for AOOs is listed as N/A instead of an acceptance criteria consistent with that listed for infrequent events and postulated accidents, given that containment performance in this AOO scenario, as well as other AOOs that result in ECCS actuation within 72 hours, is directly linked to ensuring the SAFDL acceptance criteria are met. Please explain this apparent discrepancy and update the FSAR, as appropriate based on the response to this request.

NuScale Response:

Final Safety Analysis Report (FSAR) section 6.2.1.1 states that the overall containment vessel (CNV) peak pressure resulting from inadvertent opening of an emergency core cooling system (ECCS) valve is 951 psia. Further, pressure retaining components that comprise the CNTS (which includes the CNV) have a design pressure of at least 1000 psia and 550 degrees F, which bound the calculated pressure and temperature conditions for any design basis event (DBE). These results demonstrate that the CNV design provides margin to the most limiting

Anticipated Operational Occurrence (AOO), i.e. and inadvertent ECCS valve opening.

Therefore, it is not necessary to duplicate this information in FSAR Table 15.0-2. However, to enhance clarity, NuScale has modified FSAR Table 15.0-2 to indicate that AOO acceptance criteria for containment pressure is found in FSAR Chapter 6.

Impact on DCA:

FSAR Table 15.0-2 has been revised as described in the response above and as shown in the markup provided in this response.

RAI 15-15

Table 15.0-2: Acceptance Criteria-Thermal Hydraulic and Fuel

Classification	Fuel Clad(1)	RCS Pressure	Main Steam System Pressure	Containment	Event Progression
AOO	Fuel cladding integrity shall be maintained by ensuring that minimum DNBR remains above the 95/95 DNBR limit.	≤ 110% of system design pressure	≤ 110% of system design pressure	~~N/A~~Peak pressure ≤ design pressure(4)	An AOO should not develop into a more serious plant condition without other faults occurring independently. Satisfaction of this criterion precludes the possibility of a more serious event during the lifetime of the plant.
IE	Fuel cladding integrity will be maintained if the minimum DNBR remains above the 95/ 95 DNBR limit. If the minimum DNBR does not meet these limits, then the fuel is assumed to have failed.	≤ 120% of system design pressure	≤ 120% of system design pressure	Peak pressure ≤ design pressure(4)	Shall not, by itself, cause a consequential loss of required functions of systems needed to cope with the fault, including those of the RCS and the reactor containment system.
Postulated Accidents(2),(3)	Fuel cladding integrity will be maintained if the minimum DNBR remains above the 95/ 95 DNBR limit. If the minimum DNBR does not meet these limits, then the fuel is assumed to have failed.	≤ 120% of system design pressure	≤ 120% of system design pressure	Peak pressure ≤ design pressure(4)	Shall not, by itself, cause a consequential loss of required functions of systems needed to cope with the fault, including those of the RCS and the reactor containment system.
Special Event (SBO)	Core cooling	refer to Section 8.4	N/A	N/A	N/A

Notes:

(1) Minimum critical heat flux ratio (CHFR) is used instead of minimum DNBR, as described in Section 4.4.2.

(2) See Table 15.0-3 for acceptance criteria for the Rod Ejection Accident.

(3) See Table 15.0-4 for acceptance criteria for Loss of Coolant Accidents.

(4) See Section 6.2.1.1 for containment pressure design limits.