RAIO-0717-55147

July 28, 2017

Docket No. 52-048

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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11555 Rockville Pike
Rockville, MD 20852-2738

SUBJECT: NuScale Power, LLC Response to NRC Request for Additional Information No. 56 (eRAI No. 8793) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 56 (eRAI No. 8793)," dated June 09, 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 Questions from NRC eRAI No. 8793:

- 06.02.01-1
- 06.02.01-2

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
Director, Regulatory Affairs
NuScale Power, LLC

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Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 8793

Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 8793

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

eRAI No.: 8793
Date of RAI Issue: 06/09/2017

NRC Question No.: 06.02.01-1

GDC 50, “Containment design basis,” requires in part that the containment be designed so that the containment structure and its internal compartments can accommodate, without exceeding the design leakage rate and with sufficient margin, the calculated pressure and temperature conditions resulting from any loss-of-coolant accident. This margin shall reflect, among other considerations, the conservatism of the calculational model and input parameters.

TR-0516-49084-P, “Containment Response Analysis Methodology Technical Report,” which is referenced in FSAR Chapter 6 and forms the basis for the containment design pressure and temperature, states that containment initial temperature (140 F); this is reflected in the technical specification limiting condition for operation for the ultimate heat sink. This value, however, as stated in FSAR Section 9.2.5.6.1, is based on a temperature sensor at the inlet of the cooling water heat exchangers for the pool, and assumes adequate mixing of the pool. Provide a justification for why the assumed limiting temperature is conservative (i.e., demonstrate pool mixing occurs), or justify why local bay temperatures will not exceed the assumed bulk pool temperature and therefore will not impact the containment heat removal analyses.

NuScale Response:

Technical Specification LCO 3.5.3, “Ultimate Heat Sink,” establishes a maximum “Bulk average temperature” limit of 140 F. This 140 F limit is an analytical limit that was utilized in the containment peak pressure analysis as the initial pool water temperature surrounding the containment vessel. It is also used as an assumption, or is conservative with respect to the limits, in other analyses.

Operating limits on the pool temperature will be established by plant procedures consistent with other limits calculated in accordance with the methodologies described in Technical Specification 5.5.10, “Setpoint Program.” Temperatures at specific locations will be evaluated based on consideration of the location of the temperature sensor, the volume of pool water whose temperature is represented by the sensors, and other physical effects and configuration issues.

Impact on DCA:
There are no impacts to the DCA as a result of this response.

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

eRAI No.: 8793
Date of RAI Issue: 06/09/2017

NRC Question No.: 06.02.01-2

GDC 50, “Containment design basis,” requires in part that the containment be designed so that the containment structure and its internal compartments can accommodate, without exceeding the design leakage rate and with sufficient margin, the calculated pressure and temperature conditions resulting from any loss-of-coolant accident. This margin shall reflect, among other considerations, the conservatism of the calculational model and input parameters.

TR-0516-49084-P, “Containment Response Analysis Methodology Technical Report,” which is referenced in FSAR Chapter 6 and forms the basis for the containment design pressure and temperature, states that containment initial pressure is “bounding high” at 2.0 psia; this is also reflected in the value in FSAR Table 15.0-6, which lists the initial condition range for safety analyses. A further spec says this is varied as an initial condition [(+~2 psia)]. However, there is no basis for these values as either an analytical limit or a technical specification limiting condition for operation. Justify the conservatism in the initial condition used, and provide a basis (such as a technical specification or that it represents a bounding value as a trip setpoint plus uncertainty) for why this value is a limiting value that could not be exceeded during operation as an initial condition, or provide a new value that represents a limiting initial condition. As part of this response, if any values are changed, provide a proposed update to the DC application and corresponding documentation as applicable.

NuScale Response:

The initial containment pressure of 2 psia is conservatively high compared to the normal operating pressure of the containment. Under normal vacuum pump operation, with assumed normal leakage from reactor module valves, the containment pressure is less than 0.02 psia and therefore an initial pressure of 2 psia is two orders of magnitude higher.

In the technical specifications, limiting condition of operation (LCO) 3.4.7 requires that two of the three specified RCS leakage detection instrumentation methods shall be operable. The containment pressure must be maintained below the vapor pressure for the lowest internal containment wall temperature to maintain acceptable containment leakage detection performance using containment pressure monitoring or containment evacuation system (CES)

condensate monitoring (refer to Section 5.2.5.1) . Assuming that the minimum containment inside wall temperature is equal to the reactor pool bulk temperature, FSAR Figure 5.2-3 shows the acceptable containment pressure, for leakage detection, as a function of pool temperature. From Figure 5.2-3, at the normal operating pool temperature of 100F, the containment pressure must be below 1 psia. At the maximum pool temperature of 140F, the containment pressure must be less than 3 psia.

The initial pressure of 2 psia assumed in the containment pressure analysis is two orders of magnitude higher than the expected containment operating pressure, and twice the allowable containment pressure for leakage detection at normal operating pool temperature. The maximum allowable containment pressure supporting leakage detection, at the maximum pool temperature, is 3 psia. The difference of 1 psia is 0.1% of the containment design pressure. The peak containment pressure result presented in the FSAR Section 6.2 is 951 psia. Assuming that an increase of 1 psia in initial containment pressure could result in an estimated 2 psi increase in peak containment pressure, this does not substantively change the margin to the 1000 psia design pressure. Based on the conservatism in the 2 psia initial pressure assumed compared to the expected operating pressure, and the maximum 3 psia initial pressure allowed by the containment leakage technical specification, the conservatism in the 2 psia initial containment pressure is adequate.

Impact on DCA:
There are no impacts to the DCA as a result of this response.