RAIO-0918-61932

September 25, 2018

Docket: PROJ0769

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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SUBJECT: NuScale Power, LLC Response to NRC Request for Additional Information No. 9513 (eRAI No. 9513) on the NuScale Topical Report, "Non-Loss of Coolant Accident Analysis Methodology," TR-0516-49416, Revision 1

REFERENCES:

1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 9513 (eRAI No. 9513)," dated May 08, 2018
2. NuScale Topical Report, "Non-Loss of Coolant Accident Analysis Methodology," TR-0516-49416, Revision 1, dated August 2017
3. NuScale Power, LLC Response to NRC "Request for Additional Information No. 9513 (eRAI No. 9513)," dated July 09, 2018
4. NuScale Power, LLC Response to NRC "Request for Additional Information No. 9513 (eRAI No. 9513)," dated August 28, 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. 9513:

- 15.00.02-16

The response to the majority of eRAI 9513 questions were previously provided in Reference 3 and 4. This completes all responses to eRAI 9513.

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. 9513

Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9513

Response to Request for Additional Information
Docket: PROJ0769

eRAI No.: 9513
Date of RAI Issue: 05/08/2018

NRC Question No.: 15.00.02-16

GDC 10 requires that the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that SAFDLs are not exceeded during any condition of normal operation, including the effects of AOOs. In addition, GDC 15 requires that the RCS and associated auxiliary, control, and protection systems shall be designed with sufficient margin to assure that the design conditions of the RCPB are not exceeded during any condition of normal operation, including AOOs.

TR-0516-49416-P supports the conclusions relative to GDC 10 and 15 in the NuScale FSAR. TR Section 7.1.6.1, “Initial Conditions,” provides a general description of how the various initial conditions may be biased to maximize the consequences of a transient or accident with respect to the various acceptance criteria. The staff notes that this section of the TR does not include the steam generator (SG) heat transfer bias, despite the fact that it is applied in most of the event-specific methodologies in TR Section 7.2 and in many sections of the FSAR. To provide a basis for the biases that are applied to SG heat transfer, to support the staff’s GDC 10 and 15 finding, add a discussion of the SG heat transfer bias to TR Section 7.1.6.1.

NuScale Response:

Section 7.1.6.1 of the Non-LOCA LTR (TR-0516-49416-P) was revised to include a discussion of the biasing for the SG tubes heat transfer coefficient as indicated at the end of this response. The relevant discussion was placed between the discussions for the initial feedwater temperature and the initial reactor coolant system flow rate.

Impact on Topical Report:

Topical Report TR-0516-49416, Non-Loss of Coolant Accident Analysis Methodology, has been revised as described in the response above and as shown in the markup provided in this response.

Initial Steam Generator Pressure

The initial SG pressure is biased to either end of the range centered at the nominal value after consideration for any control system deadband and system/sensor measurement uncertainty.

As an example, consider a control system deadband and system/sensor measurement uncertainty of ± 35 psi for SG pressure. For this situation, the initial SG pressure is set to either -35 psi or +35 psi relative to the nominal pressure for the core power level of interest.

Steam Generator Tubes Heat Transfer Coefficient

The initial heat transfer coefficient for the SG tubes is biased to either end of the range centered at the nominal value from -30 percent to +30 percent.

As an example, consider a range of -30 percent to +30 percent relative to the nominal heat transfer coefficient for the SG tubes. For this situation, the initial heat transfer coefficient is set to either -30 percent or +30 percent of the nominal heat transfer coefficient.

Initial Feedwater Temperature

The initial feedwater temperature is biased to either end of the range centered at the nominal value after consideration for any control system deadband and system/sensor measurement uncertainty.

As an example, consider a control system deadband and system/sensor measurement uncertainty of ± 10 degrees F for feedwater temperature. For this situation, the initial feedwater temperature is set to either -10 degrees F or +10 degrees F relative to the nominal temperature for the core power level of interest.

Initial Reactor Coolant System Flow Rate

The initial RCS flow rate is biased to either end of the range expected for normal operation.

As an example, consider a normal operational range of 535 kg/s to 690 kg/s for RCS flow rate at 100 percent RTP. For this situation, the initial RCS flow rate is set to either 535 kg/s or 690 kg/s.

Initial Volume Weighted Core Average Fuel Temperature

The initial volume weighted core average fuel temperature is biased to either end of the range expected assuming limiting power histories, power shapes, and core burnups.

As an example, consider a BOC range of 960 degrees F to 1065 degrees F for volume weighted core average fuel temperature. For this situation, the initial fuel temperature is set to either 960 degrees F or 1065 degrees F.