RAIO-0617-54716

June 28, 2017

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 Response to NRC Request for Additional Information No. 25 (eRAI No. 8813) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 25 (eRAI No. 8813)," dated May 19, 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 Question from NRC eRAI No. 8813:

- 19-1

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 Darrell Gardner at 980-349-4829 or at dgardner@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. 8813

Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 8813

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

eRAI No.: 8813
Date of RAI Issue: 05/19/2017

NRC Question No.: 19-1

10 CFR 52.47(a)(27) states that a DC application must contain a Final Safety Analysis Report (FSAR) that includes a description of the design-specific probabilistic risk assessment (PRA) and its results. In accordance with the Statement of Consideration (72 FR 49387) for the revised 10 CFR Part 52, the staff reviews the information contained in the applicant's FSAR Chapter 19, and issues requests for additional information (RAI) and conducts audits of the complete PRA (e.g., models, analyses, data, and codes) to obtain clarifying information as needed. The staff uses guidance contained in Standard Review Plan (SRP) Chapter 19.0 Revision 3, "Probabilistic Risk Assessment and Severe Accident Evaluation for New Reactors." In accordance with SRP Chapter 19.0 Revision 3, the staff determines whether:

"The PRA reasonably reflects the as-designed, as-built, and as-operated plant, and the PRA maintenance program will ensure that the PRA will continue to reflect the as-designed, as-built, and as-operated plant, consistent with its identified uses and applications."

The staff has reviewed the information in the FSAR and examined additional clarifying information from the audit of the complete PRA and determined that it needs additional information to confirm that the PRA reasonably reflects the as-designed plant. Specifically, the staff is unclear if the emergency core cooling system (ECCS) model includes all important failure modes for systems, structures and components (SSCs) identified as risk significant by the applicant. Based on its review the staff believes that the potential failure of the inadvertent actuation block (IAB) feature is not explicitly modeled in the ECCS-T01 top event (reactor vent valves and reactor recirculation valves open). If the IAB fails closed, the ECCS main valve would fail to open. The staff has confirmed that the IAB failing to close is modeled for spurious opening of the ECCS main valve.

a) The staff requests the applicant to explain how the IAB failing closed when ECCS actuation is called upon is accounted for in the model.

b) Similarly, the staff requests the applicant to explain how it reached the conclusion that ECCS trip line plugging as an ECCS failure mode is not credible based on its design and the cleanliness of the reactor coolant.

NuScale Response:

a.) As stated in FSAR Table 19.1-7 for top event “ECCS-T01,” the ECCS includes an inadvertent actuation block (IAB) for each ECCS valve that prohibits the valve from opening until the differential pressure between the RPV and CNV is low; this feature is designed to preclude an ECCS valve from opening at power. The IAB is a normally open valve that is not required to change state upon receipt of a non-spurious ECCS actuation signal. The probability of it spuriously closing followed by insufficient differential pressure to overcome the spring force is negligible, and is therefore excluded from the ECCS-T01 fault tree. Consistent with the ASME/ANS PRA standard, the IAB spurious closure failure mode was screened from the model logic and not included in the ECCS-T01 fault tree.

b.)The ECCS valves and subcomponents such as trip lines will be qualified for their operating environments, which includes consideration of the working fluid. The working fluid for the ECCS valve (including the trip line) is supplied by the CVCS, which is consistent with the reactor coolant chemistry requirements discussed in FSAR Section 5.2.3.2.1 and clear of foreign contaminates. The design of the ECCS valves includes a small control chamber inlet orifice that will act to further prevent particulate matter from entering the trip line. While this fluid will contain soluble boron, the high differential pressure for draining the line is expected to clear any potential plugging. Consequently, in the context of ECCS valve reliability, trip line plugging is not considered a credible failure mechanism in the PRA. RAI 8820 requests that NuScale provide a detailed FMEA for the ECCS valves and their valve components; the FMEA will address this potential failure mechanism.

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