RAIO-0219-64586

February 18, 2019

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. 513 (eRAI No. 9643) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 513 (eRAI No. 9643)," dated December 18, 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. 9643:

- 04.04-5

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. 9643

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NuScale Response to NRC Request for Additional Information eRAI No. 9643

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

eRAI No.: 9643
Date of RAI Issue: 12/18/2018

NRC Question No.: 04.04-5

10 CFR 50.36(c)(2)(ii)(B) requires that a technical specification limiting condition for operation (LCO) be established for a “process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.”

In response to RAI 8773, Question 4.4-2 and RAI 9174, Question 16-37, NuScale provided updates to FSAR Section 4.4.5.2 and NuScale Generic Technical Specifications (GTS) LCO 3.4.1 to provide a surveillance of the reactor coolant system (RCS) flow during power ascension to confirm that the RCS loop resistance used in the thermal-hydraulic design and Chapter 15 transient and accident analyses remains bounding. Additionally, the updates to NuScale GTS Bases B.3.4.1 clarifies that:

For a given RCS flow resistance, RCS pressure and temperature in combination with THERMAL POWER establish the flow through the RCS including the reactor core.

NRC staff accepted these responses because they addressed the concern regarding potential sources of uncertainty impacting flow resistance (e.g., component misalignment, foreign material, analysis assumptions, etc.). The updated LCO 3.4.1 however, does not address the potential for secondary side perturbations and changes in axial flux shape to impact natural circulation characteristics (i.e., the thermal centers of the steam generator and reactor core). NRC staff expects that these factors affecting natural circulation also directly impact the amount of energy stored within the RCS, and that the loss-of-coolant accident (LOCA) analysis is sensitive to this parameter.

Accordingly, NRC staff requests that NuScale provide either:

(1) evidence that the current GTS provide adequate surveillance of NuScale Power Module (NPM) conditions such that operation within the bounds of the safety analysis is ensured, or

(2) modifications to NuScale GTS and GTS Bases to ensure that any changes to secondary side conditions or changes in axial flux shape do not result in operation of the NPM outside the bounds of the safety analysis.

NuScale Response:

Surveillance requirement SR 3.4.1.3 is included in LCO 3.4.1 to ensure that all initial condition parameters are within the safety analyses bases. FSAR Table 15.0-6 provides the initial condition ranges that are accounted for in the safety analyses. The key parameters among those listed in Table 15.0-6 which impact the amount of stored energy in the reactor coolant system (RCS) are: core power, RCS average temperature, pressurizer pressure, and RCS flow. Adequate surveillance to maintain the module within these safety analysis boundaries is provided by the combination of SR 3.4.1.1, SR 3.4.1.2, SR 3.4.1.3, and the actively monitored and controlled power level.

Secondary side perturbations that may affect the steam generator thermal center, such as a change in main steam pressure or steam superheat, are limited by the analytical operating ranges of the secondary side, identified in LCO 3.3.1, and adequately surveilled via SR 3.3.1.1. The reactor core axial flux shape is limited to the ranges identified in LCO 3.2.2, and adequately surveilled with SR 3.2.2.1. These surveillances sufficiently limit the allowable change in thermal center difference to ensure that changes to RCS flow are bounded.

The Core Operating Limits Report (COLR) value used as confirmation in SR 3.4.1.3 accounts for the secondary side perturbations and axial flux shape ranges which can potentially impact natural circulation flow rate. These allowable range fluctuations will be accounted for as uncertainties, such that the SR 3.4.1.3 confirmation of flow rate at operating conditions will be within the range specified in the COLR.

In summary, the current Generic Technical Specifications provide adequate surveillance of the NuScale power module through surveillances for LCO 3.4.1, LCO 3.2.2, and LCO 3.3.1 to ensure the stored energy of the RCS is within the bounds of the safety analyses.

Impact on DCA:

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