RAIO-0118-58434

January 30, 2018

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. 291 (eRAI No. 9233) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 291 (eRAI No. 9233)," dated December 05, 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. 9233:

- 05.02.03-17

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 Carrie Fosaaen at 541-452-7126 or at cfosaaen@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. 9233

Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9233

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NuScale Power™

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

eRAI No.: 9233
Date of RAI Issue: 12/05/2017

NRC Question No.: 05.02.03-17

On August 3, 2017, the applicant docketed a supplement to the design certification document (Accession No. ML17215A977 in the U.S. Nuclear Regulatory Commission's Agencywide Documents Access and Management System), which included changes to Section 5.2.3.2.1 in Tier 2 of the FSAR, "Reactor Coolant Chemistry." The revised FSAR text was reviewed by the staff and found to be vague. The applicant shall address the following items and provide sufficient justification or sufficient revisions to the FSAR to provide the staff with a licensing basis that the requirements of GDC 4 are met.

a. In the docketed supplement the applicant added a statement to Section 5.2.3.2.1 that the water chemistry program is "based on" industry guidelines. In this case, the industry guidelines are the Electric Power Research Institute (EPRI) Pressurized Water Reactor Primary Water Chemistry Guidelines (EPRI Guidelines). The applicant does not use consistent terminology regarding the applicability of the EPRI Guidelines. If the applicant's use of the EPRI Guidelines is uniform across systems than, for consistency with other statements in the FSAR, this statement should be revised to make it clear that the water chemistry program is "in accordance with" the EPRI Guidelines. The term "based on" implies that there may be exceptions or alternatives. If there are exceptions or alternatives to the EPRI Guidelines, then they should be identified and justified.
b. In the docketed supplement the applicant added the following statement to Section 5.2.3.2.1: "The frequency of sampling water chemistry varies (e.g., continuous, daily, weekly, or as needed) based on plant operating conditions and the EPRI water chemistry guidelines." This statement could be interpreted to imply that the frequency of sampling may deviate from the EPRI Guidelines. A different interpretation is that the applicant will follow the EPRI Guidelines which includes guidance on adjusting the sampling frequency based upon the operating mode. Revise the FSAR to clarify the intent of term "based on" in the cited sentence. The applicant may revise this statement to state, for example, "The frequency of sampling water chemistry varies (e.g., continuous, daily, weekly, or as needed) in accordance with the EPRI Guidelines which specify different water chemistry sampling frequencies based on plant operating conditions."

NuScale Response:

The August 3, 2017 docketed supplement to Section 5.2.3.2.1: states that *"The water chemistry program is based on industry guidelines as described in Electric Power Research Institute Technical Report 3002000505, Pressurized Water Reactor Primary Water Chemistry Guidelines, (Reference 5.2-3)."* The industry guidelines as described in Chapter 4 of the EPRI PWR Primary Water Chemistry Guidelines provide the direction for the development of an optimized, site specific primary water chemistry program. This optimization process includes the assessment of chemistry parameters, limits, and sampling frequencies for implementation into the chemistry control program. The Guidelines define three elements of the water chemistry program. The elements are categorized as "mandatory", "shall" and "recommended" specifications. The EPRI PWR Primary Water Chemistry Guidelines defines these categories as follows:

- Guideline elements designated as "mandatory" are important to primary system pressure boundary integrity or fuel-cladding integrity and should not be deviated from by any utility.

- Guideline elements designated as "shall" are important to long-term primary system pressure boundary reliability or fuel-cladding reliability but could be subject to legitimate deviations due to plant differences and special situations.

- Guideline elements designated as "recommendations" are good or best practice that utilities should try to implement when practical.

The "mandatory" and "shall" elements are those elements that affect pressure boundary integrity and fuel cladding integrity. Those chemistry elements are listed as control parameters and are contained in Tables 3-3, 3-7, and 3-8 of the EPRI Guidelines. Lithium is also defined as a control parameter; compliance with the principles in Table 3-1, also in Chapter 3 of the EPRI Guidelines is defined as a "shall" requirement. All diagnostic parameters are designated as "recommendations." They are listed in Tables 3-5, 3-6, and 3-9 in Chapter 3 of the EPRI Guidelines. Additional "recommendations" listed in the EPRI Guidelines include consideration of operation in the upper portion of the 25 to 50 cc/kg hydrogen band, consideration of zinc injection into the RCS, and increased sampling to address potential resin ingress, changes in RCS lithium, and changes in RCS hydrogen respectively.

In addition, the EPRI PWR Primary Water Chemistry Guidelines address deviations to the elements above, as shown below.

"*Deviations to mandatory and shall requirements shall be handled in accordance with the guidance in the current revision of the Steam Generator Management Program (SGMP) Administrative Procedures. Additionally, these Guidelines recommend that any exception to monitoring of a diagnostic (recommended) parameter be documented in the Strategic Water Chemistry Plan."*

COL item 5.2-4 requires an applicant that references the NuScale Power Plant design certification to develop and implement a Strategic Water Chemistry Plan. The plant specific primary water chemistry program will be controlled by plant procedures that implement the “shall” and “recommended” requirements of the EPRI Guidelines. Sample frequencies will vary due to plant operating conditions. They may also vary due to the plant or utility chemistry program optimization process directed by the EPRI Guidelines. In that case, any deviations to the “shall” or “recommended” elements cited in the EPRI Guidelines, including sample frequencies, will be identified, evaluated, and documented as directed by the EPRI Guidelines.

Also see the response to NuScale RAI 9117 - 10.04.06-3 for a similar discussion related to primary water chemistry and implementation of the EPRI Guidelines. Based on the discussion above, no changes are required to the NuScale FSAR.

Impact on DCA:

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