

## NuScaleDCRaisPEm Resource

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**Sent:** Wednesday, February 21, 2018 11:34 AM  
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**Subject:** Request for Additional Information No. 370 RAI No. 9404 (10.3.6)  
**Attachments:** Request for Additional Information No. 370 (eRAI No. 9404).pdf

Attached please find NRC staff's request for additional information concerning review of the NuScale Design Certification Application.

Please submit your technically correct and complete response within 60 days of the date of this RAI to the NRC Document Control Desk.

If you have any questions, please contact me.

Thank you.

Prosanta Chowdhury, Project Manager  
Licensing Branch 1 (NuScale)  
Division of New Reactor Licensing  
Office of New Reactors  
U.S. Nuclear Regulatory Commission  
301-415-1647

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## **Request for Additional Information 370 (eRAI 9404)**

Issue Date: 02/21/2018

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 10.03.06 - Steam and Feedwater System Materials

Application Section:

### **QUESTIONS**

10.03.06-5

#### **Regulatory Basis**

Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix A, General Design Criterion (GDC) 1 requires that structures, systems, and components (SSCs) important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed.

GDC 4 requires that SSCs important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents.

10 CFR 52.47(a)(9) requires an applicant for a standard design certification to “[identify and describe] all differences in design features, analytical techniques, and procedural measures proposed for the design and those corresponding features, techniques, and measures given in the SRP acceptance criteria.”

#### **Follow-up to RAI 9066, Question 10.3.6-1**

Below is a follow-up RAI to NuScale’s letter, “NuScale Power, LLC Response to NRC Request for Additional Information No. 243 (eRAI No. 9066) on the NuScale Design Certification Application,” Question 10.03.06-1 (ADAMS Accession No. ML17326B393). This topic was discussed, and a follow-up RAI was requested by NuScale, during a public meeting on February 7, 2018 (Meeting Notice, ADAMS Accession No. ML18003A665).

The staff agrees with NuScale’s statement that DCD Tier 2, FSAR, Sections 3.6.3.1.1 and 5.4.1.2 describe the material composition of the safety-related portion of the steam and feedwater piping that are part of the steam generator system (SGS), decay heat removal system (DHRS), and containment system (CNTS). However, the staff’s understanding is that since these portions of steam and feedwater piping are part of the SGS, DHRS, and CNTS, they are also discussed in DCD Tier 2, FSAR, Sections 5.4.1.5 and 6.1.1.

NuScale’s response cites Section I of SRP 10.3.6, which states:

The materials selection, fabrication, and fracture toughness of American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (hereafter "the Code"), Section III, Class 2 and 3 pressure boundary components of the steam and feedwater systems are reviewed to verify they meet the relevant requirements of the Commission’s regulations.

NuScale's response cites NSAC-202L-R2, which is used to justify the removal of the flow accelerated corrosion (FAC) program for the safety-related portions of the MSS and CFWS. NuScale's response then uses the combination of SRP 10.3.6 Section I and NSAC-202L-R2 to remove the discussion of the FAC program from DCD Tier 2, FSAR, Section 10.3.6.3. Furthermore, NuScale's response states, "With the susceptibility for an increased rate of FAC removed, the necessity to identify and control the material specifications of the upstream, non-safety-related components to the same degree as the safety-related components is considered unnecessary."

The staff disagrees with NuScale's revisions and statement as the FAC program should also consider non-safety systems. The staff further disagrees with removing a system from consideration without screening it using the guidance of Generic Letter 89-08 and NSAC-202L-R3 (the revision cited in the FSAR). The staff cannot make a safety finding on removal of these systems as not every component material is listed.

The FAC program is related to the Maintenance Rule, 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," which states, in part:

(a)(1) Each holder of an operating license for a nuclear power plant under this part and each holder of a combined license under part 52 of this chapter after the Commission makes the finding under § 52.103(g) of this chapter, shall monitor the performance or condition of structures, systems, or components, against licensee-established goals, in a manner sufficient to provide reasonable assurance that these structures, systems, and components, as defined in paragraph (b) of this section, are capable of fulfilling their intended functions. These goals shall be established commensurate with safety and, where practical, take into account industrywide operating experience. When the performance or condition of a structure, system, or component does not meet established goals, appropriate corrective action shall be taken. For a nuclear power plant for which the licensee has submitted the certifications specified in § 50.82(a)(1) or 52.110(a)(1) of this chapter, as applicable, this section shall only apply to the extent that the licensee shall monitor the performance or condition of all structures, systems, or components associated with the storage, control, and maintenance of spent fuel in a safe condition, in a manner sufficient to provide reasonable assurance that these structures, systems, and components are capable of fulfilling their intended functions.

(b) The scope of the monitoring program specified in paragraph (a)(1) of this section shall include safety related and nonsafety related structures, systems, and components, as follows:

(2) Nonsafety related structures, systems, or components:

(i) That are relied upon to mitigate accidents or transients or are used in plant emergency operating procedures (EOPs); or

(ii) Whose failure could prevent safety-related structures, systems, and components from fulfilling their safety-related function; or

(iii) Whose failure could cause a reactor scram or actuation of a safety-related system.

Failure of the safety or non-safety related portions of the steam and power conversion systems would cause a reactor trip and actuate the ESF systems. Therefore, the staff disagrees with NuScale's basis for removing the FAC program from the DCD.

Revise the DCD to re-include the text related to the FAC program in Section 10.3.6.3, including COL Item 10.3-2, as revised in in letter dated June 26, 2017 [ADAMS Accession No. ML17177A686].

10.03.06-6

#### **Follow-up to RAI 9066, Question 10.3.6-2**

Below is a follow-up RAI to NuScale's letter, "NuScale Power, LLC Response to NRC Request for Additional Information No. 243 (eRAI No. 9066) on the NuScale Design Certification Application," Question 10.03.06-2 (ADAMS Accession No. ML17326B393). This topic was discussed, and a follow-up RAI was requested by NuScale, during a public meeting on February 7, 2018 (Meeting Notice, ADAMS Accession No. ML18003A665).

The staff agrees with NuScale's statement that DCD Tier 2, FSAR, Sections 3.6.3.1.1 and 5.4.1.2 describe the material composition of the safety-related portion of the steam and feedwater piping that are part of the steam generator system (SGS), decay heat removal system (DHRS), and containment system (CNTS). However, the staff's understanding is that since these portions of steam and feedwater piping are part of the SGS, DHRS, and CNTS, they are also discussed in DCD Tier 2, FSAR, Sections 5.4.1.5 and 6.1.1.

DCD, Tier 2, Section 10.3.6 states that Section 10.3.6 discusses the non-safety related portions of the steam and power conversion systems and cites DCD Tier 2, Table 10.3-5. As written, the last paragraph in DCD Tier 2, FSAR, Section 10.3.6.2, discusses stainless steel or nickel based alloy in the non-safety related portions of the steam and power conversion systems. Per NuScale's RAI response and Table 10.3-5, these systems do not contain stainless steel or nickel based alloys, so the last paragraph in Section 10.3.6.2 is unclear. NuScale's reply did not respond to the staff's question.

Revise Section 10.3.6 to only discuss the non-safety related portions of the steam and power conversion systems since other DCD sections discuss the safety related portions (SGS, DHRS, CNTS) and clarify 10.3.6.2 in regards to stainless steel or nickel-based alloy materials in these non-safety related portions. Differentiating the DCD in this manner would be in accordance with the guidance in SRP 10.3.6 to evaluate materials for systems that perform the same function as steam and feedwater systems.

10.03.06-7

#### **Follow-up to RAI 9066, Question 10.3.6-3**

Below is a follow-up RAI to NuScale's letter, "NuScale Power, LLC Response to NRC Request for Additional Information No. 243 (eRAI No. 9066) on the NuScale Design Certification Application," Question 10.03.06-3 (ADAMS Accession No. ML17326B393). This topic was discussed, and a follow-up RAI was requested by NuScale, during a public meeting on February 7, 2018 (Meeting Notice, ADAMS Accession No. ML18003A665).

The staff agrees with NuScale's statement that DCD Tier 2, FSAR, Sections 3.6.3.1.1 and 5.4.1.2 describe the material composition of the safety-related portion of the steam and feedwater piping that are part of the steam generator system (SGS), decay heat removal system (DHRS), and containment system (CNTS). However, the staff's understanding is that since these portions of steam and feedwater piping are part of the SGS, DHRS, and CNTS, they are also discussed in DCD Tier 2, FSAR, Sections 5.4.1.5 and 6.1.1.

NuScale's response states that the portion of the steam and power conversion system discussed in DCD Tier 2, FSAR, Section 10.3.6 is non-safety related. Therefore, NuScale states, "the nonsafety related portions of steam and power conversion systems are beyond the scope of the cleanliness requirements described in Subparts 2.1 and 2.2 of ASME NQA-1."

However, NuScale's response acknowledges that, "the cleanliness of the non-safety-related portions of steam and power conversion systems described in DCD Tier 2, FSAR, Section 10.3.6 could impact the downstream, safety-related portions of the CNTS or DHRS."

To justify the above statement, NuScale states:

NuScale considers the materials of the safety-related portions of the CNTS and DHRS in conjunction with the secondary water chemistry control program to be adequate protection from contamination originating in the non-safety steam and power conversion systems from impacting safety-related portions of the CNTS or DHRS.

In order for the staff to make a safety finding that the CNTS and DHRS can perform their safety-related function, the staff requests that NuScale revise the DCD to include the justification from their letter.

The staff notes that NuScale's response does not specifically address the SGS. Therefore, in order for the staff to make a safety finding regarding the integrity of the SGS, the staff requests that NuScale revise the DCD to include the justification from their letter. The justification should include how this meets the NuScale SG Program using NEI 97-06 and EPRI Steam Generator Management Program guidance.