

## NuScaleDCRaisPEm Resource

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**From:** Cranston, Gregory  
**Sent:** Tuesday, August 28, 2018 11:12 AM  
**To:** Request for Additional Information  
**Cc:** Lee, Samuel; Samaddar, Sujit; Jain, Bhagwat; Tabatabai, Omid; Chowdhury, Prosanta; NuScaleDCRaisPEm Resource  
**Subject:** Request for Additional Information No. 500 eRAI No. 9563 (14.3.2)  
**Attachments:** Request for Additional Information No. 500 (eRAI No. 9563).pdf

Attached please find NRC staff's request for additional information (RAI) 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.

**Hearing Identifier:** NuScale\_SMR\_DC\_RAI\_Public  
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**Options**

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## Request for Additional Information No. 500 (eRAI No. 9563)

Issue Date: 08/28/2018

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 14.03.02 - Structural and Systems Engineering - Inspections, Tests, Analyses, and Acceptance Criteria

Application Section: 14.03.02

### QUESTIONS

#### 14.03.02-3

10 CFR Part 52, Section 52.54, "Issuance of standard design certification," paragraph (a) states that the Commission may issue a standard design certification in the form of a rule for the design if the Commission determines that, among other things, "There is reasonable assurance that the standard design conforms with the provisions of the Act, and the Commission's regulations." When certified, the Appendix to Part 52 that constitutes the standard design certification will include or reference information that is approved and certified by the staff. This information, designated as Tier 1, generally includes, but is not limited to, design descriptions for significant aspects of the design. Tier 1 information is derived from the broader set of information contained in Tier 2, the Design Control Document (DCD), but is generally limited to the subset of the most safety significant information needed to support the staff's approval basis. Therefore, the staff's reasonable assurance finding for design certification relies, on the applicant's DCD Tier 1 and DCD Tier 2 information.

10 CFR 52.47(a)(2) requires, in part, that a design certification application include a description and analysis of the structures of the facility, with emphasis upon performance requirements, the bases, with technical justification therefore, upon which these requirements have been established, and the evaluations required to show that safety functions will be accomplished. When evaluating the acceptability of this information for seismic Category I structures, the staff's review focuses on a subset of structural information that includes seismic analysis methods, key dimensions of seismic Category I structures, and design of "critical sections." The use of critical sections in the design of safety-related structures is a risk-informed graded approach to achieve the reasonable assurance of safety. In lieu of the safety review of a large number of structural component designs, the staff performs a detailed review of a limited number of critical sections described in Section 3.8 of the DCD that contributed to the overall risk significance of the structures. This approach provides the staff with reasonable assurance of the overall safety performance of the structures based on the successful performance of these limited but critical risk significant locations.

10 CFR 52.47(b)(1), requires that a DC application contain the proposed inspections, tests, analyses, and acceptance criteria (ITAAC) that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a plant that incorporates the design certification is built and will operate in accordance with the design certification, the provisions of the Atomic Energy Act, and the NRC's regulations. SRP Section 14.3, and in particular, Sections 14.3.2 and Appendix C provide guidance in developing design descriptions, figures, and ITAAC for structural related items. SRP acceptance criterion 14.3.2.II.2 states that the design description, figures (including key dimensions), and ITAAC should be developed and grouped by systems and building structures. The building structures review checklist in Appendix C of SRP Section 14.3 states that design descriptions for building structures should provide enough dimensions for the COL applicant or licensee to develop dynamic models for the seismic analyses. Examples of these dimensions include overall building dimensions, thickness of walls and floor slabs, thickness of foundation mat, etc.

Therefore, the applicant is requested to incorporate DCD Tier 1 Design Descriptions, including characteristics of the seismic analysis and design of "critical sections" for seismic Category I structures. This information needs to be designated as Tier 1 information to support the staff's reasonable assurance finding. The information to be included in NuScale DCD Tier 1, based on DCD Tier 2, Rev. 1, is given below. This list provides examples and does not constitute a complete set of items to be included in DCD Tier 1. The information to be included in DCD Tier 1 may be in the form of text, tables, and/or figures, which are based on the design presented in DCD Tier 2.

1. Provide plans, elevations and cross-sections with dimensions for the Reactor Building (RXB), including the ultimate heat sink pool, and Control Building (CRB) which will remain invariant for each applicant of the NuScale design and will support the structural

## ITAAC

2. Provide descriptions of the structural design for the ultimate heat sink pool, the reactor pool, refueling area pool and spent fuel pool, including the confinement provided by the liner and leak detection system components such as leak chase channels.
3. Identification of the Concrete Code, and Structural Steel Code with editions used in the design of safety related structures (e.g., ACI-349, and ANSI/AISC-N690; with the applicable editions/dates identified).
4. List of critical sections corresponding to reinforced concrete members and structural steel members for the RXB and CRB, locations of the critical section, key dimensions and other design attributes [e.g. demand over capacity ratios or, concrete compressive strength and area of steel per unit length, thickness/size and material specification (for steel members)].
5. A summary description of the seismic analysis methods that are used for the seismic Category I structures. Additionally, a summary description of the seismic response (e.g., ISRS, forces and moments, and deformation) and respective locations that are needed by a COL applicant for comparing against the responses from the site-specific dynamic evaluation.
6. Clarify that ITAAC for the CRB underground tunnel are included in ITAAC for CRB.