

## NuScaleDCRaisPEm Resource

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**From:** Cranston, Gregory  
**Sent:** Tuesday, July 25, 2017 9:57 AM  
**To:** RAI@nuscalepower.com  
**Cc:** NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Widrevitz, Dan; Baval, Bruce; Mitchell, Matthew  
**Subject:** RE: Request for Additional Information No. 107, RAI 8984 (5.3.1)  
**Attachments:** Request for Additional Information No. 107 (eRAI No. 8984).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.

Gregory Cranston, Senior Project Manager  
Licensing Branch 1 (NuScale)  
Division of New Reactor Licensing  
Office of New Reactors  
U.S. Nuclear Regulatory Commission  
301-415-0546

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**From:** Cranston, Gregory

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## **Request for Additional Information No. 107 (eRAI No. 8984)**

Issue Date: 07/25/2017

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 05.03.01 - Reactor Vessel Materials

Application Section:

### QUESTIONS

#### 05.03.01-1

NuScale DCD Section 5.3.1 does not explicitly require or note that the manufacturer or installer is required to certify, by application of the appropriate American Society of Mechanical Engineers (ASME) Code Symbol and completion of appropriate data report in accordance with ASME Code Section III, Article NCA-8000, that the materials used to comply with the requirements of ASME Code Section III, Article NB-2000, and that the fabrication or installation complies with the requirements of ASME Code Section III, Article NB-4000. The staff notes that DCD Section 5.3.1 traces the application of the ASME Code at a very high level making verification of adequacy difficult.

The staff requests that the applicant revise the section to more clearly and logically delineate ASME Code requirements such as noted above. A level of citation detail commensurate with the level of detail found in NUREG-0800, Section 5.3.1, "Standard Review Plan – Reactor Vessel Materials," would be considered appropriate. Traceability and verification of materials is critical to ensure the adequacy of the final vessel in addition to supporting emergent needs of the licensee post-installation.

#### 05.03.01-2

NuScale DCD Section 5.3.1.6 cites reactor vessel surveillance capsule lead factors ranging between 1.5 to 4.5. This range of lead factors is inconsistent with ASTM E-185-82, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactors Vessels," which permits lead factors between 1 and 3. The use of ASTM E-185-82 for the development of a reactor vessel surveillance program is invoked by 10 CFR Part 50, Appendix H. In addition all lead factors used in DCD Table 5.3-5 are 4.3 implying that all capsules will be positioned to achieve the same high lead factor.

Nuclear power plant licensees have typically implemented a range of lead factors with the highest lead factor capsules being removed first to provide early access to measured irradiated material properties. Lower lead factor capsules then ensured capture of data based on a longer period of operational conditions. The incorporation of some surveillance capsules with lower lead factors ensures that data on reactor vessel embrittlement is being gathered from samples which represent the actual reactor vessel material conditions as closely as practicable.

The staff requests that the applicant justify the intent to design the location of surveillance capsules to achieve lead factors greater than 3 as cited in DCD Section 5.3.1.6 and revise the DCD accordingly. In addition the staff requests that the applicant address the suitability of a 100% high lead factor program.