## NuScaleDCRaisPEm Resource

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| **From:** | Cranston, Gregory |
| **Sent:** | Saturday, May 19, 2018 4:10 PM |
| **To:** | Request for Additional Information |
| **Cc:** | Lee, Samuel; Franovich, Rani; Karas, Rebecca; Schmidt, Jeffrey; NuScaleDCRaisPEm Resource; Thurston, Carl |
| **Subject:** | Request for Additional Information No. 481 eRAI No. 9368 (15) |
| **Attachments:** | Request for Additional Information No. 481 (eRAI No. 9368).pdf |

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

The NRC Staff recognizes that NuScale has preliminarily identified that the response to one or more questions in this RAI is likely to require greater than 60 days. NuScale is expected to provide a schedule for the RAI response by email within 14 days.

If you have any questions, please contact me.

Thank you.

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# Request for Additional Information No. 481 (eRAI No. 9368)

Issue Date: 05/19/2018
Application Title: NuScale Standard Design Certification - 52-048
Operating Company: NuScale Power, LLC
Docket No. 52-048
Review Section: 15.06.03 - Radiological Consequences of Steam Generator Tube Failure (PWR) 07/1981
Application Section: 15.6.3

QUESTIONS

15.06.03-4

Title 10 of the Code of Federal Regulations (10 CFR) 52.47(a)(2)(iv) requires that an application for a design certification include a final safety analysis report (FSAR) that provides a description and safety assessment of the facility. The safety assessment analyses are done, in part, to show compliance with the radiological consequence evaluation factors in 52.47(a)(2)(iv)(A) and 52.47(a)(2)(iv)(B) for offsite doses; and 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 19 for control room radiological habitability. The radiological consequences of design basis accidents are evaluated against these regulatory requirements and the dose acceptance criteria given in Standard Review Plan (SRP) Section 15.0.3. NRC staff needs to ensure that a suitably conservative estimate is determined for the radiological release associated with the steam generator tube rupture event (SGTR). In addition, 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 54, "Piping systems penetrating containment," requires piping systems penetrating primary reactor containment to be provided with leak detection, isolation, and containment capabilities having redundancy, reliability, and performance capabilities that reflect the importance to safety of isolating these piping systems.

Steam generator (SG) overfilling is a major concern for an SGTR related to the potential loss of secondary side integrity and extended radioactivity releases to the atmosphere. As a result of the 1982 SGTR event at the Ginna Plant, the NRC questioned equipment capability and assumptions used in FSAR analyses and issued Generic Letter 89-19.

As indicated by the applicant in FSAR Tier 2, Section 15.6.3.1, "[t]he design of the helical coil steam generators (HCSGs), described in Section 5.4, is different from the design of SGs in conventional pressurized water reactors [PWRs] because primary coolant is located on the outside, or shell side, of the tubes." In addition, the staff notes that the inventory of the SGs is also very small, so the radiological consequences of a SGTR could be more severe than for conventional PWRs. The mitigation of the SGTR event is dependent upon closure of the main steam isolation valve (MSIV) or the secondary MSIV, depending on the single active failure assumed.

It is not clear to the staff that NuScale's submitted limiting case sequence of events and assumptions would maximize the RCS mass release prior to the secondary main steam isolation valve closing. The maximum RCS mass release affects the input to the dose analysis and establishes potentially the worst conditions (e.g., quality) in which the MSIV and secondary MSIV are required to close. In response to RAI 8794 the applicant indicated that the MSIV and secondary MSIV are designed to close in steam and liquid conditions but did not provide sufficient detail and justification for the staff to make a regulatory finding.

Therefore, the applicant is requested to provide additional information justifying that a conservative RCS mass release prior to the closure of secondary MSIV is calculated,

including uncertainties in friction and form losses in the tubes, inlet orifices and tube sheet, and that the MSIV and secondary MSIV will close under the worst expected steam generator failure conditions.