## NuScaleDCRaisPEm Resource

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| **Sent:** | Wednesday, July 05, 2017 3:19 PM |
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| **Subject:** | Request for Additional Information No. 79, RAI 8812 |
| **Attachments:** | Request for Additional Information No. 79 (eRAI No. RAI_8812).pdf |

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

Please submit your 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
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# Request for Additional Information No. 79 (eRAI No. 8812)

Issue Date: 07/05/2017
Application Title: NuScale Standard Design Certification - 52-048
Operating Company: NuScale Power, LLC
Docket No. 52-048
Review Section: 19 - Probabilistic Risk Assessment and Severe Accident Evaluation
Application Section: 19

QUESTIONS

19-15

10 CFR 52.47(a)(2) states that it is expected that the standard plant will reflect through its design, construction, and operation, an extremely low probability for accidents that could result in the release of radioactive fission products. 10 CFR 52.47(a)(4) states that each design certification application (DCA) must contain an Final Safety Analysis Report (FSAR) that includes an analysis and evaluation of the design and performance of systems, structures and components (SSCs) with the objective of assessing the risk to public health and safety resulting from operation of the facility and including determination of the margins of safety during normal operations and transient conditions anticipated during the life of the facility, and the SSCs provided for the prevention of accidents and the mitigation of the consequences of accidents. 10 CFR 52.47(a)(27) states that a DC application must contain an FSAR that includes description of the design-specific probabilistic risk assessment (PRA) and its results.

SRP 19.0 Revision 3 states:
"For passive plant designs, the staff reviews the applicant's use of the PRA to identify "nonsafety-related," SSCs that require regulatory treatment (i.e., to support the RTNSS [Regulatory Treatment of Nonsafety Systems] program). Specifically this includes the following evaluations performed by the applicant as described in SRP 19.3:
A. Evaluation of the risk significance of nonsafety systems using the Focused PRA
B. Evaluation of uncertainties associated with assumptions made in the PRA models of passive systems
C. PRA initiating event frequency evaluation."

SRP 19.0 Revision 3 also states
"The reviewer assures that the applicant has (1) identified all key T-H [Thermal-Hydraulic] parameters that could affect the reliability of a passive system and introduce uncertainty into the determination of success criteria, and (2) accounted for the uncertainty in the analyses that establish the success criteria."

The staff reviewed NuScale report, ER-P010-3777-A, "Passive System Reliability Probabilistic Risk Assessment Report". The staff also reviewed FSAR Table 19.1-11, "Phenomena Affecting Emergency Core Cooling System Passive Performance," and FSAR Table 19.1-12, "Phenomena Affecting Decay Heat Removal System Passive Performance." Non-condensable gas is listed in each table as a key phenomena.

1. Regarding non-condensable gases in the containment vessel (CNV), the NRELAP base model assumes a noncondensable quality of 90 percent air at 1 psia in the CNV. FSAR Table 7.1-4, "Engineered Safety Feature Actuation System Functions," states that the Containment System Isolation (CSI) High Narrow Range Containment Pressure is 9.5 psia. Please document in Chapter 19 of the FSAR the impact on passive system reliability with the Nuscale design being operated at higher CNV pressure up to 9.5 psia and associated higher amounts of non-condensable gas.

2. Regarding gas accumulation in the Decay Heat Removal System (DHRS), FSAR Section 5.4 states that the DHRS has two liquid level switches at the split in the steam piping. In the passive system reliability report, the volume between these switches and the DHRS actuation valves that can fill with non-condensable gas coming out of solution during normal operation is 3.9842 cubic feet. FSAR Section 5.4

states that DHRS performance assumes a bounding mass of non-condensable gas to be 0.422 kg. Please explain in Chapter 19 of the FSAR how the assumed mass of gas in the passive system reliability report corresponds to the volume of gas discussed in FSAR Section 5.4.