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Sent: Thursday, September 14, 2017 11:47 AM
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Subject: Request for Additional Information No. 227, RAI 8845 (6.4)
Attachments: Request for Additional Information No. 227 (eRAI. No. 8845).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.

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Office of New Reactors
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Request for Additional Information No. 227 (eRAI. No. 8845)

Issue Date: 09/14/2017
Application Title: NuScale Standard Design Certification - 52-048
Operating Company: NuScale Power, LLC
Docket No. 52-048
Review Section: 06.04 - Control Room Habitability System
Application Section: 6.4

QUESTIONS

06.04-2

Demonstration of the Control Room Habitability System (CRHS) function with a nonsafety-related system

10 CFR Part 50, Appendix A, GDC 19 requires that a control room shall be provided from which actions can be taken to operate the nuclear power unit safely under normal conditions and to maintain it in a safe condition under accident conditions, including loss-of-coolant accidents. Furthermore, IEEE Std. 603, Section 4, states that "the design basis shall be consistent with the requirements of ANSI/ANS 51.1-1983." ANSI/ANS 51.1, Section 4.16 states that the main control room shall be occupied for any mode of normal operation or event and its equipment shall be safety class 3 (SC-3).

In FSAR Section 6.4.1, NuScale states that the CRHS is a nonsafety-related system designed to provide clean breathing air to the control room envelope and maintain a positive control room pressure for habitability and control of radioactivity when conditions prohibit the CRVS from fulfilling these functions. Furthermore, in FSAR 6.4.4, NuScale states that the classification of CRHS as nonsafety-related is consistent with the definition in 10 CFR 50.2.

Per 10 CFR 50.2, "safety-related structures, systems and component" means those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:

(1) The integrity of the reactor coolant pressure boundary

(2) The capability to shut down the reactor and maintain it in a safe shutdown condition; or

(3) The capability to prevent or mitigate the consequences of accidents of accidents which could result in potential offsite exposures comparable to the guideline exposures …

NuScale design does not credit any operator actions to mitigate design basis events. Specifically, in the DCA FSAR Section 15.0.0.6.4, the applicant states that the plant is placed in a safe state automatically upon event initiation for at least 72 hours. As such, the operators should not perform any safety-related functions within that time period. Per RG 1.139, "Guidance for Residual Heat Removal," Regulatory Position 1.c, "the systems should be capable of bringing the reactor to a cold-shutdown condition within 36 hours," i.e., below 420 F per SECY-94-084, "safe shutdown." Further, NuScale indicates that the design is in compliance with IEEE Std. 603, Section 4, which states that "the design basis shall be consistent with the requirements of ANSI/ANS 51.1-1983." ANSI/ANS 51.1, Section 4.16 states that the main control room shall be occupied for any mode of normal operation or event and its equipment shall be safety class 3 (SC-3).

1. The DHRS, considering cooling transition into ECCS cooling, is capable of cooling RCS to 420 degree-F (FSAR 5.4.3.3.4). The containment flood and drain system (CFDS) is the only system able to cool the 12 modules to cold shutdown condition. Since CFDS operation requires manual operator action from the MCR, the NRC staff requests NuScale to explain how NuScale's design can achieve cold shutdown without operator action.

2. Explain how the methodology used to develop safety classification of NuScale electrical system as described in, NuScale Topical Report TR-0815-16497-P, Rev.0, conforms to the guidance provided in IEEE Standard (Std.) 603-1998 and ANSI/ANS 51.1, Section 4.16, that is, for it be safety class 3.

3. SECY-94-084 states that "the duration of an accident" to meet GDC 19 has typically been assumed to be 30 days, explain how the NuScale main control room remains available and habitability is ensured for this duration.

4. SECY-94-084 (and associated SRM) indicate that advanced light water reactor designs with a passive system for control room habitability (pressurization system) shall be safety-related. Please explain how the CRHS design meets the Commission guidance.

5. Provide an explanation of how CRHS operability is verified during operation and the periodicity of the verification.