

NuScaleDCRaisPEm Resource

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Sent: Tuesday, June 20, 2017 12:13 PM
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Subject: Request for Additional Information No. 68, RAI 8740
Attachments: Request for Additional Information No. 68 (eRAI No. 8740).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.

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Request for Additional Information No. 68 (eRAI No. 8740)

Issue Date: 06/20/2017

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 14.02 - Initial Plant Test Program - Design Certification and New License Applicants

Application Section: 14.02

QUESTIONS

14.02-1

Title 10 of the *Code of Federal Regulations* (10 CFR) Section 52.47, "Contents of applications; technical information," requires that an application for a design certification must include performance requirements and design information sufficiently detailed to permit its acceptance by the U.S. Nuclear Regulatory Commission (NRC). Specifically, §52.47(a)(2)(iii), states, in part, that the NRC will take into consideration the following reactor design characteristics that include, "the extent to which the reactor incorporates unique, unusual or enhanced safety features having a significant bearing on the probability or consequences of accidental release of radioactive materials." In addition, 52.47(c)(2) states, in part, that "an application for certification of a nuclear power reactor design that differs significantly from the light-water reactor designs or uses simplified, inherent, passive, or other innovative means to accomplish its safety functions must provide an essentially complete nuclear power reactor design and must meet the requirements of 10 CFR 50.43(e)." 10 CFR 50.43(e) states:

"Applications for a design certification, combined license, manufacturing license, or operating license that propose nuclear reactor designs which differ significantly from light-water reactor designs that were licensed before 1997, or use simplified, inherent, passive, or other innovative means to accomplish their safety functions, will be approved only if:

- (1)(i) The performance of each safety feature of the design has been demonstrated through either analysis, appropriate test programs, experience, or a combination thereof;
 - (ii) Interdependent effects among the safety features of the design are acceptable, as demonstrated by analysis, appropriate test programs, experience, or a combination thereof; and
 - (iii) Sufficient data exist on the safety features of the design to assess the analytical tools used for safety analyses over a sufficient range of normal operating conditions, transient conditions, and specified accident sequences, including equilibrium core conditions; or
- (2) There has been acceptable testing of a prototype plant over a sufficient range of normal operating conditions, transient conditions, and specified accident sequences, including equilibrium core conditions."

Regulatory Guide (RG) 1.68, Section B, states, in part, that "if the facility is using first-of-a-kind (FOAK) SSCs [structures, systems, and components] that are new, unique, or special design feature in the facility, then the in-plant functional testing requirements needed to verify their performance should be identified at an early date to permit the test requirements to be appropriately accounted for in the final test design."

In addition, Design-Specific Review Standard (DSRS) 14.2 states, in part, the design certification applicant would provide design and test acceptance criteria for preoperational, low power, and power ascension tests that are unique, unusual, FOAK design features or enhanced safety features.

Currently, in NuScale's Design Certification Application (DCA) Section 14.2.3.3, "Testing of First-of-a-Kind Design Features," the description includes a portion on FOAK testing. The DCA states, "The NuScale Power Plant contains design features which are new and unique and have not been tested previously; therefore, testing of these design features is treated as FOAK." The only FOAK test the applicant addresses is the reactor internals vibration testing required per RG 1.20, "Comprehensive Vibration Assessment Program for Reactor Internals During Preoperation and Initial Startup Testing." At a minimum, the emergency core cooling system, decay heat removal system, high pressure containment, and some instrumentation (for example, Reactor Coolant System flow) are new and unique and have not been previously tested or reviewed by the NRC.

- 1) Provide the requisite FOAK tests for Section 14.2.3.3 and the test abstracts for Section 14.2.12, "Individual Test Descriptions," for new and unique design features that have not been previously tested or reviewed by the NRC.

Previously approved DC that included design features, which are new and unique and have not been tested previously, included in their initial test program FOAK tests that were only to be performed a limited number of times, typically called First Plant Only Tests (FPOTs). These FPOTs were performed to confirm proper operation of the new design or to confirm testing of prior smaller applications or scale model testing is valid for the full sized plant.

- 2) NuScale should also identify: 1) if any tests are FPOTs; 2) if NuScale is proposing any tests for only the first plant (or module); and, 3) provide the basis for not performing the test on every plant (or module).