NuScaleDCRaisPEm Resource

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Sent: Wednesday, November 01, 2017 4:08 PM
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Subject: Request for Additional Information No. 272 RAI No. 9160 (3.2.1)
Attachments: Request for Additional Information No. 272 (eRAI No. 9160).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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301-415-0546

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Request for Additional Information No. 272 (eRAI No. 9160)

Issue Date: 11/01/2017
Application Title: NuScale Standard Design Certification - 52-048 Operating
Company: NuScale Power, LLC
Docket No. 52-048
Review Section: 03.02.01 - Seismic Classification
Application Section: 3.2.1, 3.7.3, 9.5.1.2.4, appendix 9A

QUESTIONS

03.02.01-4

10 CFR 52.47(a)(2) requires that a standard design certification applicant provide a description and analysis of the structures, systems, and components (SSCs) of the facility, with emphasis upon performance requirements, the bases, with technical justification therefore, upon which these requirements have been established, and the evaluations required to show that safety functions will be accomplished.

While reading the current FSAR, staff finds several occurrences where a bioshield (a concrete/steel structure positioned above the nuclear power module) is mentioned. However, inconsistencies and lack of details in the description of the bioshield leave the staff not fully understanding the function of such a component in the NuScale design:

- There are references to venting of the bioshield (pages 3.7-55, 3C-11), but no drawing/information is provided on what this venting looks like or how it operates.

- On FSAR Tier 2, page 1.2-11, it is mentioned that the “vertical portion goes into the water”. No mention of venting exists.

- The lack of detailed drawings forces the staff to try to infer the location of the lower tip of the vertical shield from a short description of elevations. From FSAR Tier 2, pages 3.7-24 and 3.7-173, the staff concludes that the lower tip of the vertical shield either touches the pool water or is 2 feet above the water. Again there is no mention of how venting is achieved.

The applicant is requested to address the following questions:

A. What is the exact function of the bioshield steel vertical faceplate: fire protection, radiation protection, prevention of foreign material deposition onto the NPMs, release of pressure and heat during normal ops and accident conditions? What foreign material could be deposited onto the NPMs? Why does the design require a vertical face plate? Why does it need to go all the way into the water? Are any functions safety related? Detailed drawings of the bioshield should be provided. The FSAR should checked for consistency accordingly.

03.02.01-5

B. The bioshields are currently classified as nonsafety-related, not risk-significant, Seismic Category II components (FSAR Tier 2, Table 3.2-1, “Classification of Structures, Systems, and Components,” identifies them as B2). Are the vents in the bioshield vertical faceplate considered to provide a nuclear safety function (e.g., do they establish environmental conditions for safety-related components related to safe shutdown)? If the vents are mechanical devices credited for heat and pressure relief in order to establish the environmental conditions for safety related components related to safe shutdown, explain how the current classification is appropriate?

03.02.01-6

C. What is the design of the vent(s)? Is it a simple mechanical damper? What kind of maintenance will be applied to the vents? What kind of lubrication material will be used? Wouldn’t radiation affect the characteristics of the lubricant forcing it to be replaced at certain time intervals?

03.02.01-7

D. How will the vent(s) work when one bioshield is stacked on top of another and how, in this configuration, will the top bioshield be restrained in order to properly respond to seismic activity?

03.02.01-8

E. What happens if the vent fails? What happens if the temperature monitor (under the bioshield) fails? Are there supporting calculations?

03.02.01-9

F. Identify and provide engineering documents which establish currently approved bioshield design. Does ED-F012-3661, rev 2, “BioShield General Arrangement and Details”, 13 Apr 2017, reflect the design?

03.02.01-10

G. If the recommended redesign to the bioshield is to add blowout panels to the vertical plates, at what differential pressure would these panels open? See DD-F010-4444, Rev 0, “Bioshield Re-Design to Support Environmental Qualification Profile”, 2 Sept 2016.