

NuScaleTRRaisPEm Resource

From: Cranston, Gregory
Sent: Friday, June 23, 2017 5:55 PM
To: RAI@nuclepower.com
Cc: NuScaleTRRaisPEm Resource; Lee, Samuel; Hart, Michelle; Burkhart, Lawrence; Chowdhury, Prosanta; Markley, Anthony
Subject: Topical Report (TR-0915-17565-P) - Request for Additional Information Letter No. 8800 (eRAI No. 8800)
Attachments: Request for Additional Information No. 8800 (eRAI No. 8800).pdf

Attached please find NRC staff's request for additional information concerning review of the NuScale Topical Report.

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.

Hearing Identifier: NuScale_SMR_DC_TR_Public
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Subject: Topical Report (TR-0915-17565-P) - Request for Additional Information Letter No. 8800 (eRAI No. 8800)
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From: Cranston, Gregory

Created By: Gregory.Cranston@nrc.gov

Recipients:

"NuScaleTRRaisPEM Resource" <NuScaleTRRaisPEM.Resource@nrc.gov>

Tracking Status: None

"Lee, Samuel" <Samuel.Lee@nrc.gov>

Tracking Status: None

"Hart, Michelle" <Michelle.Hart@nrc.gov>

Tracking Status: None

"Burkhart, Lawrence" <Lawrence.Burkhart@nrc.gov>

Tracking Status: None

"Chowdhury, Prosanta" <Prosanta.Chowdhury@nrc.gov>

Tracking Status: None

"Markley, Anthony" <Anthony.Markley@nrc.gov>

Tracking Status: None

"RAI@nuscalepower.com" <RAI@nuscalepower.com>

Tracking Status: None

Post Office: HQPWMSMRS07.nrc.gov

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Options

Priority: Standard

Return Notification: No

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Request for Additional Information No. 8800 (eRAI No. 8800)

Issue Date: 06/23/2017

Application Title: NuScale Topical Report

Operating Company: NuScale

Docket No. PROJ0769

Review Section: 15.00.03 - Design Basis Accidents Radiological Consequence Analyses for Advanced Light Water Reactors

Application Section: TR-0915-17565-P, Rev. 1 "Accident Source Term Methodology"

QUESTIONS

15.00.03-2

10 CFR 52.47(a)(2)(iv) requires that an application for a design certification include a final safety analysis report that provides a description and safety assessment of the facility. The safety assessment analyses are completed, 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, 10 CFR Part 50, Appendix A, GDC 19 for control room radiological habitability, and the requirements related to the technical support center in 10 CFR 50.47(b)(8) and (b)(11) and Paragraph IV.E.8 of Appendix E to 10 CFR Part 50. The radiological consequences of design basis accidents are evaluated against these regulatory requirements and the dose acceptance criteria given in NuScale design specific review standard (DSRS) Section 15.0.3. Regulatory Guide 1.183 provides dose assessment guidance.

NuScale licensing topical report TR-0915-17565-P, Rev.1, "Accident Source Term Methodology," provides a proposed methodology for the performance of design basis accident radiological consequence analyses for the NuScale design. The staff requires the following information to complete its review of the subject topical report to evaluate compliance with the applicable NRC requirements:

The proposed methodology for determining the iodine decontamination factor for the pool during a fuel handling accident is an extrapolation of an equation from the Burley paper ("Evaluation of Fission Product Release and Transport for a Fuel Handling Accident," G. Burley, NRC, Oct. 5, 1997) that forms the underlying basis for the pool iodine decontamination factor given in RG 1.183. As stated on page 16 of the Burley paper, the most important parameters related to the iodine decontamination factor within the pool include the gas bubble dimensions, contact time and partition factor.

- a. The methodology proposed assumes that the range of gas bubble characteristics (e.g., bubble diameter, bubble effective diameter, bubble velocity) is not different at rise heights over 23 feet. Please provide justification for this assumption.
- b. The Burley paper assumed that the time for contact between the pool water and the gas bubbles as they rise to the surface of the pool was short compared to the time it takes to get to an equilibrium iodine concentration. How did you determine if this assumption is applicable to the deeper pool depth for the NuScale design?
- c. What is the basis for applying the partition factor ranges used in the Burley paper to bubble rise heights greater than 23 feet?

15.00.03-3

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On page 33 of the topical report, it states that based on holding all parameters other than depth of water above the fuel fixed, the inorganic iodine decontamination factor is scaled (from 285, as given in RG 1.183 for 23 ft) by a proprietary factor that includes consideration of the water depth. Please provide the derivation of this scaling factor.

15.00.03-4

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The proposed method to determine the iodine effective DF also provides for a sensitivity study based on the inorganic fraction of fuel rod gap iodine assumed to be released to the pool. What is the basis for the implied assumption that the inorganic iodine fraction released from the fuel rod gap in the fuel handling accident would be different for the NuScale fuel than the value given in RG 1.183?