NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Tuesday, August 08, 2017 8:07 AM
To: RAI@nuscalepower.com
Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Burkhart, Lawrence; Hart, Michelle; Franovich, Rani
Subject: RE: Request for Additional Information No. 155, RAI 8941 (15.0.3)
Attachments: Request for Additional Information No. 155 (eRAI No. 8941).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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Licensing Branch 1 (NuScale)
Division of New Reactor Licensing
Office of New Reactors
U.S. Nuclear Regulatory Commission
301-415-0546

Hearing Identifier: NuScale_SMR_DC_RAI_Public
Email Number: 177

Mail Envelope Properties (46b696fbe676456f9e571eb72c3d0b54)

Subject: RE: Request for Additional Information No. 155, RAI 8941 (15.0.3)
Sent Date: 8/8/2017 8:06:52 AM
Received Date: 8/8/2017 8:06:54 AM
From: Cranston, Gregory

Created By: Gregory.Cranston@nrc.gov

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Files	**Size**	**Date & Time**	
MESSAGE	560	8/8/2017 8:06:54 AM	
Request for Additional Information No. 155 (eRAI No. 8941).pdf			33184

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Request for Additional Information No. 155 (eRAI No. 8941)

Issue Date: 08/08/2017
Application Title: NuScale Standard Design Certification - 52-048
Operating Company: NuScale Power, LLC
Docket No. 52-048
Review Section: 15.00.03 - Design Basis Accidents Radiological Consequence Analyses for Advanced Light Water Reactors
Application Section: FSAR 15.0.3

QUESTIONS

15.00.03-8

Requirements related to control room habitability, including dose to operators during accidents, are provided in 10 CFR Part 50, Appendix A, GDC 19. Requirements for technical support center (TSC) occupancy and habitability during accidents are provided in 10 CFR 50.47(b)(8) and (b)(11), and Paragraph IV.E.8 of Appendix E to 10 CFR Part 50. NuScale design-specific review standard (DSRS) section 15.0.3 provides additional guidance on the evaluation of TSC radiological habitability, including dose acceptance criteria for dose to TSC occupants. The design basis accident (DBA) dose analyses in the Final Safety Analysis Report (FSAR), Tier 2, Chapter 15, were performed, in part, to show compliance with GDC 19 and the TSC habitability requirements.

The response to RAI letter 13 (eRAI 8774), Question 15.00.03-2, dated 5/24/2017, provided additional information on control room parameters used in the DBA dose analyses. In Question 15.00.03-2, the staff requested that the applicant provide information on the operation of the control room ventilation systems based on intake radiation monitor signals, including intake radiation monitor setpoints for control room isolation and initiation of the control room habitability system (CRHS), intake radiation monitor setpoints for initiation of the control room heating, ventilation and air conditioning (HVAC) system (CRVS) supplemental filtration mode, and the associated CRHS initiation time based on the intake radiation high signal for each DBA. To complete its review of the design certification application, the staff requests the following clarifying and additional information to supplement the response to Question 15.00.03-2.

The response to Question 15.00.03-2 states that the radiation monitor setpoint for control room isolation and CRHS initiation is 10 times the expected radiation out of the filtration unit following a design basis event.

1. Which post-filter radiation monitors listed in FSAR Tables 11.5-1 and 11.5-4 provide the safety-related signal to isolate the main control room and initiate CRHS? Indicate if the control room isolation signal is based on a setpoint for noble gas, iodine, particulate, all three or some combination?

2. For each DBA analyzed in FSAR Chapter 15 for radiological consequences, provide the radiation value associated with 10 times the expected radiation out of the filtration unit following a design basis event, as used to determine the radiation monitor setpoints. Indicate where in the FSAR or its references these values (and how they are calculated) are described, or augment the FSAR text to document the descriptions.

3. For each DBA analyzed for radiological consequences in FSAR Chapter 15, provide (for the case in which main control room isolation and CRHS initiation is affected by a radiation signal) the total time to complete control room isolation and begin to provide clean bottled air to the main control room via the CRHS.

a. This time should include all steps in the process that contribute significantly to the overall process duration, including the time after accident initiation to detect radiation exceeding the setpoint(s), signal

processing time, damper movement, CRHS air supply valve movement, and clearing of any contaminated air in the system downstream of the dampers post-closure.This time should include all steps in the process that contribute significantly to the overall process duration, including the time after accident initiation to detect radiation exceeding the setpoint(s), signal processing time, damper movement, CRHS air supply valve movement, and clearing of any contaminated air in the system downstream of the dampers post-closure.

b. Compare the main control room isolation and CRHS initiation time based on the intake high radiation signal to the 10-minute delay time assumed in the DBA dose analyses and describe any significant effects on the calculated dose results in the main control room.

The response to Question 15.00.03-2 states that the radiation monitor setpoint to redirect air through the CRVS air filtration unit is 10 times background radiation.

1. Provide the total time to complete the initiation of intake air filtration via the CRVS, for each DBA analyzed in FSAR Chapter 15.

a. This time should include all steps in the process that contribute significantly to the overall process duration, including the time after accident initiation for all necessary actions, the time to detect radiation exceeding the setpoint, signal processing time, damper movement, and any change in fan operation.

b. Compare the CRVS filtration initiation time based on radiation signal to the 10-minute delay time assumed in the DBA dose analyses and describe significant effects on the calculated dose results in the main control room and TSC.