NuScaleDCRaisPEm Resource

From: Chowdhury, Prosanta
Sent: Wednesday, March 21, 2018 5:41 PM
To: Request for Additional Information
Cc: Lee, Samuel; Cranston, Gregory; Markley, Anthony; Dudek, Michael; Williams, Stephen; NuScaleDCRaisPEm Resource
Subject: Request for Additional Information No. 397 eRAI No. 9238 (11.05)
Attachments: Request for Additional Information No. 397 (eRAI No. 9238).pdf

Attached please find NRC staff's request for additional information (RAI) 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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301-415-1647

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Request for Additional Information No. 397 (eRAI No. 9238)

Issue Date: 03/21/2018
Application Title: NuScale Standard Design Certification - 52-048
Operating Company: NuScale Power, LLC
Docket No. 52-048
Review Section: 11.05 - Process and Effluent Radiological Monitoring Instrumentation and Sampling Systems
Application Section: 11.5

QUESTIONS

11.05-2

Clarification of Type E variables for Control room HVAC

Regulatory Basis: 10 CFR Part 50 Appendix A, GDC 19; RG 1.97

GDC 19 requires operating reactor licensees to provide a control room from which (1) actions can be taken to maintain the nuclear power unit in a safe condition under accident conditions, and (2) operators shall be provided adequate protection such that radiation exposures shall not exceed 5 rem TEDE as defined in §50.2 for the duration of the accident. Consistent with this criterion, the staff finds the application does not contain sufficient information about the control room monitors (i.e., specifically for how airborne radioactivity conditions will be monitored in the control room) and staff is unable to determine that the NuScale design would have the monitoring required to ensure dose limits are not exceeded.

Background:

In DCA Tier 2, Section 6.4.3.2, NuScale credits the control room HVAC radiation monitors for performing automatic actions taken by the control room habitability system. The upstream monitors change the airflow through the control room ventilation system to pass the airflow through the supplemental air filtration unit if radiation levels exceed specified limits. The downstream monitors are there to isolate the control room ventilation system if the air supply remains radioactive after passing through the filtration system. According to DCA section 6.4.3.2, on a high radiation signal, this downstream monitor is responsible for the isolation of the control room, and for opening of the bottled air supply to provide the control room with an emergency air supply.

In DCA Tier 2, Table 1.9-2, the applicant committed to follow RG 1.97 Rev. 4, which endorses the IEEE 497-2002's Type E standard that states that a Type E variable will "monitor radiation levels and radioactivity in the control room and selected plant areas where access may be required for plant recovery." The staff's review of DCA Table 1.9-2 showed that the applicant deviated from the IEEE 497-2002 Type E variable definition and has not accounted for how airborne radioactivity conditions (i.e., beta energies associated with particulates, radioiodines, and noble gasses) will be monitored in the control room. These beta energies have significant safety implications as they are the major contributors to the 5 rem TEDE dose limit specified in GDC 19 for control room operators. The staff's review also identified that in DCA section 7.1.1.2.2, the definition for Type E variables provided by the applicant omitted the language of "the control room and" from the variable selection criteria.

Upon examination, the staff's review of the radiation monitors in the control room identified that there is an area monitor provided in the control room design which is specified as a Type E variable. However, according to DCA Section 12.3, Table 12.3-10, this fixed area radiation monitor measures only gamma radiation and would not detect beta emitting radionuclides. To satisfy the type E variable monitor definition, the staff has determined that the applicant needs to have the ability to detect both beta and gamma energies associated with particulates, radioiodines, and noble gases in the control room as credited in DCA Tier 2, Table 1.9-2, in which NuScale commits to RG 1.97, Rev. 4.

Key Issue:

The staff has determined that the application does not adequately describe control room monitors that are capable of appropriately characterizing the radioactivity conditions in the control room (e.g., a way to monitor the beta energies associated with particulates, radioiodines, and noble gasses which are the major contributors to the 5 rem TEDE dose limit specified in GDC 19). As a result the staff determined the application deviates from the committed guidance contained in RG 1.97 and may not meet the requirements of GDC 19.

Questions:

1. The staff requests that the applicant provide a monitor that characterizes the control room radiation and radioactivity levels, ensuring it monitors beta and gamma radiations, or requests the applicant justify why the currently existing monitor in the design would meet the guidance specified in RG 1.97 which endorses the IEEE 497-2002's Type E variable standard.

2. The staff requests that the applicant provide changes to DCA section 7.1.1.2.2 to correct the stated definition of the Type E variables, which omits "the control room and," to be in conformity with IEEE 497-2002.

The staff requests that the necessary updates to the DCA be provided as markups in response to this RAI.