

NuScaleDCRaisPEm Resource

From: Cranston, Gregory
Sent: Saturday, August 19, 2017 7:40 AM
To: RAI@nuscalepower.com
Cc: NuScaleDCRaisPEm Resource; Lee, Samuel; Chowdhury, Prosanta; Martinez Navedo, Tania; Som, Swagata; Tabatabai, Omid
Subject: Request for Additional Information No. 190, RAI 9038 (8.3.2)
Attachments: Request for Additional Information No. 190 (eRAI No. 9038).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.

Gregory Cranston, Senior Project Manager
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: 213

Mail Envelope Properties (5c4731549e624073b173a3338df9f48c)

Subject: Request for Additional Information No. 190, RAI 9038 (8.3.2)
Sent Date: 8/19/2017 7:40:04 AM
Received Date: 8/19/2017 7:40:07 AM
From: Cranston, Gregory

Created By: Gregory.Cranston@nrc.gov

Recipients:

"NuScaleDCRaisPEm Resource" <NuScaleDCRaisPEm.Resource@nrc.gov>
Tracking Status: None
"Lee, Samuel" <Samuel.Lee@nrc.gov>
Tracking Status: None
"Chowdhury, Prosanta" <Prosanta.Chowdhury@nrc.gov>
Tracking Status: None
"Martinez Navedo, Tania" <Tania.MartinezNavedo@nrc.gov>
Tracking Status: None
"Som, Swagata" <Swagata.Som@nrc.gov>
Tracking Status: None
"Tabatabai, Omid" <Omid.Tabatabai-Yazdi@nrc.gov>
Tracking Status: None
"RAI@nuscalepower.com" <RAI@nuscalepower.com>
Tracking Status: None

Post Office: HQPWMSMRS07.nrc.gov

Files	Size	Date & Time
MESSAGE	560	8/19/2017 7:40:07 AM
Request for Additional Information No. 190 (eRAI No. 9038).pdf		96823

Options

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

Request for Additional Information No. 190 (eRAI No. 9038)

Issue Date: 08/19/2017

Application Title: NuScale Standard Design Certification - 52-048

Operating Company: NuScale Power, LLC

Docket No. 52-048

Review Section: 08.03.02 - DC Power Systems (Onsite)

Application Section: DSRS 8.3.2 DC Power System (Onsite)

QUESTIONS

08.03.02-2

FSAR Tier 2 states in Section 8.3.2.1.1, "Highly Reliable Direct Current Power System," that the EDSS-C serves plant common loads summarized in Table 8.3-4, "Highly Reliable Direct Current Power System – Common Nominal Loads."

The EDSS-C serves plant common loads which are summarized in FSAR Tier 2 Table 8.3-4.

QUESTION: A footnote to FSAR Table 8.3-4 states: "Charger-only loads are de-energized by MPS/PPS at the onset of the battery duty cycle." Please clarify what is meant by "charger-only loads."

08.03.02-3

FSAR Tier 2 states in Section 8.3.2.1.1, "Highly Reliable Direct Current Power System," that the EDSS-MS for an NPM provides electrical power for the MPS, other loads associated with that NPM. These loads are provided in FSAR Tier 2 Table 8.3-5, "Highly Reliable Direct Current Power System – Module Specific Nominal Loads."

QUESTION: A footnote to FSAR Table 8.3-5 states: "Charger-only loads are de-energized by MPS/PPS at the onset of the battery duty cycle." Please clarify what is meant by "charger-only loads."

08.03.02-4

In FSAR Tier 2, Table 8.3-7, "Highly Reliable Direct Current Power System Failure Modes and Effects Analysis," NuScale provided an evaluation of EDSS component failures. The evaluation assumed that each component single failure occurs concurrently with the unavailability of the redundant EDSS channel. The results show that no failure prevents safety-related functions from being achieved and maintained. Additionally, under operating conditions, wherein all EDSS channels and divisions are available, no single failure results in inadvertent actuation of safety-related functions.

QUESTION: The NuScale application states that there is no safety-related AC or DC power. However, the previous paragraph states: "The results show that no failure prevents safety-related functions from being achieved and maintained." (emphasis added). Please explain what is meant by "safety-related" functions, if related to AC or DC power.

08.03.02-5

In FSAR Tier 2 Table 8.3-7, "Highly Reliable Direct Current Power System Failure Modes and Effects Analysis," under the Battery Charger Failure Mode of Erratic output, the following is stated: "Redundant charger able to compensate on affected channel/division. The EDSS may operate at abnormal voltage levels."

QUESTION: Explain the function of the communication link between the two paralleled chargers.

08.03.02-6

In FSAR Tier 2, Table 8.3-7, "Highly Reliable Direct Current Power System Failure Modes and Effects Analysis," under the Battery Charger Failure Mode of Loss of blocking functionality, the following is stated: "Redundant charger available to compensate on affected channel/division. Assumes forward current flow is not permitted through affected charger."

QUESTION: Please clarify the statement: "Assumes forward current flow is not permitted through affected charger." Did 'forward current' actually mean 'backward current' that is not permitted from the battery to the charger upon failure of the affected charger?]

08.03.02-7

In the FSAR Tier 2, Section 8.3.2.2.2, regarding GDC 2, the applicant stated as follows: The EDSS structures, systems, and components are principally located in the CRB and RXB, which are designed to withstand the effects of and function following natural phenomena such as earthquakes, tornadoes, hurricanes, floods, and externally-generated missiles.

QUESTION: Please explain what is meant by "principally located" in the Control Building (CRB) and Reactor Building (RXB). In Reference 8.3-1 [NuScale Power, LLC, "Safety Classification of Passive Nuclear Power Plant Electrical Systems," TR-0815-16497-P, Rev.0], Table 3-2, "Augmented design, qualification, and quality assurance provisions," the following is stated: "[t]he highly reliable DC electrical systems (including the batteries) are housed in SC-I structures designed to provide protection from environmental hazards." Clarify whether any components of EDSS will be located in buildings which are not environmentally qualified (i.e., outside the CRS and RXB).