



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 21, 2018

MEMORANDUM TO: Samuel S. Lee, Chief
Licensing Branch 1
Division of Licensing, Sitting, and
Environmental Assessment,
Office of New Reactors

FROM: Marieliz Vera, Project Manager */RA/*
Licensing Branch 1
Division of Licensing, Sitting, and
Environmental Assessment,
Office of New Reactors

SUBJECT: SUMMARY OF THE MAY 29, 2018, CATEGORY 1 PUBLIC
TELECONFERENCE WITH NUSCALE POWER, LLC DESIGN
CERTIFICATION APPLICATION SECTION 3.7 "SEISMIC
DESIGN," AND 3.8, "DESIGN OF CATEGORY I STRUCTURES"

The U.S. Nuclear Regulatory Commission (NRC) held a Category 1 public teleconference on May 29, 2018, to discuss Final Safety Analysis Report Tier 2, Chapter 3, "Design of Structures, Systems, Components and Equipment." Sections 3.7, "Seismic Design" and 3.8, "Designs of Category I Structures," of the NuScale Power, LLC (NuScale) Design Certification. Participants included personnel from NuScale and members of the public.

The public meeting notice can be found in the Agencywide Documents Access and Management Systems under Accession No. ML18136A534. This meeting notice was also posted on the NRC public Web site.

The meeting agenda and list of participants can be found in Enclosures 1 and 2, respectively.

CONTACT: Marieliz Vera, NRO/DNRL
301-415-5861

Summary:

The purpose of this meeting was to discuss the responses for Requests for Additional Information (RAI) 8934, Question 03.07.02-15 (ML18127B711), 8936, Question 03.07.02-7 (ML18031B204), 8970, Question 03.08.04-10 (ML18031A915) 8963, Question 03.08.05-12 (ML18074A257) and RAI Question 03.08.05-13 (ML18094B105).

First NRC staff discussed RAI 8934, Question 03.07.02-15 regarding the hydrodynamic pressure accounting for 3D fluid-structure interaction (FSI) effects of ultimate heat sink pool. The staff asked for NuScale to clarify if the methodology of FSI correction for foundation is the same as that for walls, and the staff will provide written feedback on other technical issues addressed in the RAI response prior to next bi-weekly meeting. NuScale will submit a supplemental response addressing the staff comments.

NuScale asked for further clarification on NRC Feedback for RAI 8936, Question 03.07.02-7S1 (Enclosure3). The staff indicated that NuScale should provide specific clarification questions on the feedback. This item will be discussed on the next public meeting.

For RAI 8970, Question 03.08.04-10, the NRC staff asked NuScale to clarify whether, American National Standards Institute/ American Society of Civil Engineers 8 was used as per N690-12, Section NA3 for the design evaluations of stainless steel members, assemblies and connections as per N690-12, Section NA3 (e.g., for the evaluation of ASTM A479, Type UNS S21800 bolts) and if not used, to provide justification for the use of alternative criteria. NuScale will submit a supplemental response addressing the staff comments.

With respect to the staff's request for wall in-structure response spectra (ISRS) as per NRC Feedback for RAI 8974, Question 03.08.04-23, NuScale committed to submit a supplemental response addressing the lack of safety-related equipment attached to the Reactor Building (RXB) walls, and description of their change process for equipment that may need to be attached to the RXB walls, including the development of wall ISRS used for the design or qualification of such equipment with consideration of the amplified out-of plane response near the center of the wall.

RAI 8963, Question 03.08.05-12: Applicant is requested to incorporate the information (as markups) that was provided in its response on October 17, 2017 (ML17290B267), to the final safety analysis report (FSAR). Furthermore, the applicant is also requested to incorporate a similar information (as markups) in tabular format for the Control Building (CRB) to the FSAR. NuScale will submit a supplemental response addressing the staff comments.

RAI 8963, Question 03.08.05-13: Applicant did not provided sufficient information in its response on October 17, 2017 (ML17290B267). In its supplemental response on April 4, 2018 (ML18094B106 and ML18094B107, Enclosure 1), the applicant only listed five (5) types of "design checks" for the RXB and CRB resulted from 50 percent reduced soil stiffness to the entire free-field of soil below the triple-building model. However, it is not clear to the staff whether the listed "design checks" include all possible combinations; e.g.; "Maximum Foundation bottom tilt angle of the RXB," was not considered. Furthermore, the applicant did not provided the results of these "design checks," in its markups to the FSAR; and whether these "design checks" were considered in the final design and/or needed to be considered in the load combinations of RXB and CRB foundations. NuScale will submit a supplemental response addressing the staff comments.

For RAI 8963, Question 03.08.05-22, the discussion of staff feedback was postponed for the next meeting.

Docket No. 52-048

Enclosures:

1. Meeting Agenda
2. List of Attendees

cc w/encls.: DC NuScale Power, LLC Listserv

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U.S. NUCLEAR REGULATORY COMMISSION

CATEGORY 1 PUBLIC TELECONFERENCE WITH NUSCALE POWER, LLC

DESIGN CERTIFICATION APPLICATION SECTION 3.7, "SEISMIC DESIGN," AND 3.8,

"DESIGN OF CATEGORY I STRUCTURES"

May 29, 2018

11:00 p.m. – 12:00 p.m.

AGENDA

Public Meeting	
11:00-11:05am	Welcome and Introductions
11:05-11:55am	Discussion of the Request for Additional Information (RAI) 8934, 8970 and 8963
11:55-12:00pm	Public - Questions and Comments

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DESIGN CERTIFICATION APPLICATION SECTION 3.7, "SEISMIC DESIGN," AND 3.8,

"DESIGN OF CATEGORY I STRUCTURES"

LIST OF ATTENDEES

May 29, 2018

NAME	AFFILIATION
Marieliz Vera	U.S. Nuclear regulatory Commission (NRC)
Manas Chakravorty	NRC
John Ma	NRC
Ata Istar	NRC
Bhagwat Jain	NRC
Robert Roche-Rivera	NRC
Vaughn Thomas	NRC
Alissa Neuhausen	NRC
Pravin Patel	NRC
George Wang	NRC
Sunwoo Park	NRC
Marty Bryan	NuScale Power, LLC (NuScale)
Josh Parker	NuScale
Evren Ulku	NuScale
Andre L'Eplattenier	NuScale
Giulio Flores	NuScale
Craig Harwood	NuScale
Tom Ryan	NuScale
Kirsten McKay	NuScale
Ed Heald	NuScale
Jeremy Aartun	NuScale
Wayne Massie	NuScale
Mohsin Kahn	NuScale
Marvin Lewis	Public
Sarah Fields	Public

U.S. NUCLEAR REGULATORY COMMISSION

CATEGORY 1 PUBLIC TELECONFERENCE WITH NUSCALE POWER, LLC

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Staff Feedback on Request Additional for Information 8936

Question 03.07.02-07

In response to Request for Additional Information (RAI) 8936, Question 03.07.02-7, the applicant provided information concerning the validation and verification (V&V) of the computer programs mentioned in Design Control Document (DCD) Tier 2, Section 3.7.5. The staff reviewed the RAI response and identified the following issues that need to be addressed by the applicant:

- (a) The applicant stated in the RAI response that the software V&V covers the full range of parameters used in NuScale design-basis seismic demand calculations including the discretization and aspect ratio of finite elements, Poisson's ratio, frequencies of analysis, and other parameters pertinent to seismic system analyses. However, the staff identified no such information included in the RAI response. Tables 8 through 16 in the RAI response cover 30 test cases developed from 9 different problems and the applicant states that these problems are designed to check the capabilities of SASSI2010 under various conditions. The staff notes that these test cases address certain aspects of SASSI2010; however, it appears that they do not specifically address those parameters mentioned in the staff's RAI question.

The applicant is requested to provide in its supplemental or revised RAI response information pertaining to SASSI2010 V&V for the range of parameters used in NuScale seismic demand calculations including the evaluation of (1) mesh size of finite elements, (2) aspect ratio of finite elements, (3) Poisson's ratio, (4) frequencies of analysis, and (5) other pertinent capabilities of the program such as the maximum number of interaction nodes, the maximum number of soil layers, accuracy of interpolated transfer functions, and accuracy of the Extended Subtraction Method (ESM) employed. The applicant should also describe the acceptance criteria used in its V&V process. The staff recognize that studies of certain parameters may be captured in separate RAI responses (e.g., finite element mesh sensitivity, aspect ratio, ESM validation) and, in such cases, the applicant may provide appropriate references to these RAIs.

- (b) In the RAI response, the applicant included Tables 8 through 16 covering 9 problems and 30 test cases considered for SASSI2010 V&V. These tables include descriptions of the test cases analyzed, such as the element types, model configurations, and excitations applied. However, the methods and results of verification for test cases analyzed are not provided in the tables. The applicant is requested to provide in the tables the methods and results for V&V test cases analyzed, or provide references to documentations that contain such information.

- (c) Table 17 of the RAI response describes comparison of dynamic characteristics between the SASSI2000 and SAP2000 models. The applicant indicates that Problem 10, Cases 1 and 2 deal with a nuclear reactor building and control building, respectively. The staff notes the topic on the comparison of SASSI2010 and SAP2000 models is discussed in DCD Tier 2, Section 3.7.2.1.2.6. However, the staff finds the information about the reactor and control building SASSI models in Table 17 of the RAI response is similar to but not quite the same as the information about the corresponding models presented in DCD Tier 2, Tables 3.7.2-1 and 3.7.2-9. The applicant is requested to clarify if the reactor and control building models described in Table 17 of the RAI response represent the models used in design-basis seismic demand calculations for the NuScale RXB and CRB; if not, justify how the findings from analysis cases described in Table 17 of the RAI response apply to the comparison of SASSI2010 and SAP2000 models for NuScale RXB and CRB.

In Table 17 of the RAI response, the applicant states that the models used in SASSI2010 Verification Problem 10 is described in "Reference 14 of ERF010-6084, Rev. 0"; however, the source is not identified. Please provide the source of the reference as appropriate.

- (d) In DCD Tier 2, Section 3.7.5, the applicant states that software validation and verification was performed in accordance with the NuScale Quality Assurance program. The applicant should make calculations and documentations pertaining to the validation and verification of computer programs discussed in DCD Tier 2, Section 3.7.5 available for staff's regulatory audit as necessary.

Based on above review, RAI 8936 Question 03.07.02-7 will be tracked as an open item and the applicant should address staff's concern in its supplemental or revised RAI response.