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

February 20, 2018

MEMORANDUM TO: Samuel S. Lee, Chief
Licensing Branch 1
Division of New Reactor Licensing
Office of New Reactors

FROM: Marieliz Vera, Project Manager ***/RA/***
Licensing Branch 1
Division of New Reactor Licensing
Office of New Reactors

SUBJECT: SUMMARY OF THE NOVEMBER 7, 2017, CATEGORY 1 PUBLIC TELECONFERENCE WITH NUSCALE POWER, LLC DESIGN CERTIFICATION APPLICATION REQUESTS FOR ADDITIONAL INFORMATION RESPONSES FOR QUESTIONS 8928, 8932, 8936, 8933 AND 8935 FOR CHAPTER 3, SECTION 3.7.2, "SEISMIC SYSTEM ANALYSIS, " AND 3.7.3, "SEISMIC SUBSYSTEM ANALYSIS"

The U.S. Nuclear Regulatory Commission (NRC) held a Category 1 public teleconference on November 7, 2017, to discuss the NuScale Power, LLC (NuScale) Design Certification, request for additional information (RAI) responses to RAI Questions 8928, 8932, 8936, 8934, 8933, and 8935 for Chapter 3, Section 3.7.2, "Seismic System Analysis," and 3.7.3, "Seismic Subsystem Analysis." 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. ML17292A956. This meeting notice was also posted on the NRC public Website.

The meeting agenda and list of participants can be found in Enclosures 1 and 2, respectively. The technical issues discussed are included in Enclosure 3.

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

Summary:

The purpose of this meeting was to discuss RAI response 8928 (ML17276B458), 8932 (ML17271A239), 8936 (ML17276B886), 8933 (ML17277A312) and 8935 (ML17279B156). The NRC staff discussed the feedback for RAI 8928 and recognized that some questions might be answered on RAI 9160 (ML17307A096), issued November 1, 2017. The NRC staff will decide on a course of action after receiving the response for RAI 9160. RAI Questions 3.9.4-1, 3.9.4-2, 3.9.4-4 will be addressed by NuScale with supplemental RAI responses. A discussion on the response to Question 3.7.2-9 will be sent to NuScale as a follow up RAI.

No comments from members of the public were received.

Docket No. 52-048

Enclosures:
1. Meeting Agenda
2. List of Attendees
3. Comments presented by NRC staff

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

SUBJECT: SUMMARY OF THE NOVEMBER 7, 2017, CATEGORY 1 PUBLIC TELECONFERENCE WITH NUSCALE POWER, LLC DESIGN CERTIFICATION APPLICATION REQUESTS FOR ADDITIONAL INFORMATION RESPONSES FOR QUESTIONS 8928, 8932, 8936, 8933 AND 8935 FOR CHAPTER 3, SECTION 3.7.2, "SEISMIC SYSTEM ANALYSIS, " AND 3.7.3, "SEISMIC SUBSYSTEM ANALYSIS" DATE: 2/20/2018

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**U.S. NUCLEAR REGULATORY COMMISSION**

**CATEGORY 1 PUBLIC TELECONFERENCE WITH NUSCALE POWER, LLC**

**DESIGN CERTIFICATION APPLICATION REQUEST FOR**

**ADDITIONAL INFORMATION RESPONSES 8928, 8932, 8936, 8933, AND 8935 FOR CHAPTER 3, SECTIONS 3.7.2, "SEISMIC SYSTEM ANALYSIS," AND 3.7.3, "SEISMIC SUBSYSTEM ANALYSIS"**

**November 7, 2017**

**1:00 p.m. – 2:00 p.m.**

**AGENDA**

| **Public Meeting** | |
|---|---|
| 1:00-1:10 | Introductions and identification of topics |
| 1:10-1:50 | Discussion of the Request for Additional Information Responses 8928, 8932, 8936, 8933, and 8935 |
| 1:50-2:00 | Public - Questions and Comments |

**U.S. NUCLEAR REGULATORY COMMISSION**

**CATEGORY 1 PUBLIC TELECONFERENCE WITH NUSCALE POWER, LLC**

**DESIGN CERTIFICATION APPLICATION REQUEST FOR**

**ADDITIONAL INFORMATION RESPONSES 8928, 8932, 8936, 8933, AND 8935 CHAPTER 3, SECTION 3.7.2, "SEISMIC SYSTEM ANALYSIS," AND 3.7.3, "SEISMIC SUBSYSTEM ANALYSIS"**

**LIST OF ATTENDEES**

**November 7, 2017**

| NAME | AFFILIATION |
|---|---|
| Marieliz Vera | U.S. Nuclear regulatory Commission (NRC) |
| Manas Chakravorty | NRC |
| Robert Roche | NRC |
| Pravin Patel | NRC |
| Vaughn Tomas | NRC |
| Kyra Perkins | NuScale Power, LLC (NuScale) |
| Josh Parker | NuScale |
| Marty Bryan | NuScale |
| Jennie Wike | NuScale |
| Tom Ryan | NuScale |
| Nicholas Brown | NuScale |
| Jeremy Aartun | NuScale |
| Mohsen Azadbakht | NuScale |
| Giulio Leon Flores | NuScale |
| Andre L'Eplattenier | NuScale |
| Pat Davis | Public |
| Sarah Fields | Public |

**U.S. NUCLEAR REGULATORY COMMISSION**

**CATEGORY 1 PUBLIC TELECONFERENCE**

**WITH NUSCALE POWER, LLC DESIGN CERTIFICATION APPLICATION**

**REQUEST FOR ADDITIONAL INFORMATION RESPONSES 8928, 8932, 8936, 8933, AND 8935 REGARDING CHAPTER 3, SECTION 3.7.2, "SEISMIC SYSTEM ANALYSIS," AND 3.7.3, "SEISMIC SUBSYSTEM ANALYSIS"**

November 7, 2017

**Request of Additional Information No. 8928**

RAI 03.07.03-2:

The U.S. Nuclear Regulatory Commission (NRC) staff evaluated the NuScale Power, LLC (NuScale) response to RAI 8928, Question 03.07.03-2 and concluded that response is inadequate. The staff disagree with the classification of the bioshield. The staff requested addition information in RAI 9160 related to bioshield classification, design function, and detailing. Upon discussion and resolution of the RAI 9160, this RAI will be addressed. The bioshield classification will determine use of Chapter J of American Institute of Steel Construction (AISC) 360 code for welded connections.

RAI 03.07.03-3:

The NRC staff evaluated NuScale's response to RAI 8928, Question 03.07.03-3 and concluded that response is inadequate. The NRC staff disagree with the response that states, "there is no impact to the FSAR as a result of the RAI response." The applicant should include critical information of the bioshield design such as member, member properties, welds, blowout panel design etc., in the final safety analysis report (FSAR). The staff has issued RAI 9160 related to bioshield design.

RAI 03.07.03-4:

The staff evaluated NuScale's response to RAI 8928, Question 03.07.03-3 and concluded that the following response is inadequate:

a) The bolt classification will be determine based on the RAI 9160 resolution. In addition bolt capacity vs demand for seismic II/I should be discuss in FSAR.

b) Bolt spacing is described. However, missing bolts edge distance, bolt torque and how the bolts would be secured when bioshied stacked on top the adjacent NPM. The staff request to show details in the FSAR. The resolution of the RAI 9160 will determine what additional detail required. The staff need sketch or add additional detail on FSAR figure showed on Tier 2 page 3.7-366.

Note: Instructure Response Spectra is missing for CSDRS-HF. See Page 3.7-368 that have to be included in FSAR. This was discussed at the public meeting.

The NRC staff disagree with the response that states “there is no impact to the FSAR as a result of the RAI response.” The FSAR requires revision.

RAI 03.07.03-5:

The NRC staff reviewed the applicant response dated October 3, 2017, and found it to be acceptable. The reactor building cooling removal from the FSAR Section 3.7.3, Section 3.8.4.1.13 and FSAR Tier 2, Tables 3.7.3-1 through 3.7.3-7 is acceptable for the same reason as discussed in the staff review of the RAI 03.07.03-1. Thus, this item will be tracked as a confirmatory item pending the update to the next revision of the FSAR.

**RAI No. 8932**

RAI 03.07.02-2:

The NRC staff evaluated the applicant’s response and overall, considered the response to be adequate. However, the NRC staff finds the applicant did not provide any markup that will augment the FSAR with the information provided in applicant’s RAI response. The NRC staff believes it is necessary that the RAI response be summarized and included in the FSAR explaining the basis of concluding that coarse finite elements in the Reactor Building (RXB) and Control Building (CRB) models do not negatively affect the wave passage frequencies and thus no impact on seismic demand results. Thus, the applicant is requested to address staff’s concern in a supplemental or revised RAI response. Based on the review above, RAI 8932, Question 03.07.02-2 will be tracked as an Open Item.

RAI 03.07.02-3:

The NRC staff reviewed the applicant response and concluded the following:

Part (a) – the NRC staff considered the applicant response to be acceptable.

Part (b) & (c) – overall the NRC staff considered the response to be acceptable. However, as the applicant acknowledged in the RAI response, there are certain exceptions (e.g., Table 3.7.2-19 shows a cut-off frequency of 72 hertz (Hz) for Soil Type 7 with the CSDRS; Table 3.7.2-21 shows a cut-off frequency of 52 Hz for Soil Type 9 with the CSDRS-HF). The applicant did not provide any markup to revise the FSAR to clarify these discrepancies. Therefore, the applicant is requested to revise the FSAR to address the identified inconsistencies.

Part (d) – the staff considered the response to be acceptable because the applicant added a legend to the figure that clarifies the confusion the staff pointed out. However, the staff further identified that the SASSI2010 triple building model in Figure 3.7.2-67 also needs a similar legend.

Based on the review above, RAI 8932 Question 03.07.02-3 will be tracked as an Open Item and the applicant should address staff’s concern in a supplemental or revised RAI response.

**RAI No. 8936**

RAI 03.07.02-9:

The staff reviewed the applicant's approach provided in response to RAI 8936, Question 03.07.02-9, dated October 3, 2017 (ML17276B886) to address the accidental torsion by increasing the horizontal element forces by 5 percent in lieu of increasing the eccentricity by 5 percent as stated in the DSRS 3.7.2. The staff finds that the response contains insufficient basis for the assumption that increasing the horizontal element forces by 5 percent is equivalent to increasing the eccentricity by 5 percent and its applicability to the global floor level that involves the story shear and 5 percent of the floor plan dimension as the eccentricity. Therefore, the applicant is requested to demonstrate through quantitative illustrative examples that its approach is equivalent to or more conservative than one that follows the DSRS.

Based on the review above, RAI 8936, Question 03.07.02-9 will be tracked as an Open Item and the applicant should address staff's concern in a supplemental or revised RAI response.

**RAI No. 8933**

03.07.02-19:

The NRC staff reviewed the applicant's response and found it to be acceptable. However, the applicant did not propose to augment the FSAR by adding the information provided in the RAI response. The NRC staff believes that information provided should be included in the FSAR for appropriate description of the models used in seismic demand calculations. Therefore the applicant is requested to revise the FSAR to include applicable information provided in this RAI response. Accordingly, RAI 8933, Question 03.07.02-19 will be tracked as an Open Item pending the applicant's update to the staff's concern in a supplemental or revised RAI response.

RAI 03.07.02-20:

The staff reviewed the applicant's response and concluded the following:

Part (a) – The NRC staff's review of this portion of the RAI response finds that the applicant adequately address the staff's concern. However, the staff needs to confirm and verify applicant's calculations of NPM lift-off and the floor support design for potential NPM impact loading through an audit.

Further, the NRC staff could not verify the descriptions of the structural elements comprising the NPM floor support design contained in the RAI response against FSAR Figures 3B-48 to 3B-50. Therefore the NRC staff requests the applicant to describe the NPM floor support design along with supporting Figures and provide such Figures in the response and FSAR, and provide FSAR markups as applicable.

Part (b) – The NRC staff finds the applicant's response adequately addressed staff's question and thus is acceptable. However, the applicant did not propose to include the tables showing the interface boundary conditions in the FSAR. The NRC staff believes that the tables should be included for adequate description of the models involved in seismic demand calculations. Therefore, the applicant is requested to augment the FSAR by including the two tables (Table 1 and Table 2) provided in the RAI response. Thus, RAI 8933, Question 03.07.02-20 will be tracked as an Open Item.

**RAI No. 8935**

RAI 03.07.02-24:

The NRC staff reviewed the applicant's response and concluded that the applicant needs to provide further clarification. In the RAI response and the associated FSAR markup, the applicant indicated that, while the RXB and CRB are designed for both the CSDRS and CSDRS-HF, other Category I SSCs are designed only for the CSDRS. The staff believes that this clarification should also be included in the FSAR Tier 1, Table 5.0-1. The applicant should also provide the definition of the term, "safe shutdown earthquake (SSE)" used in the FSAR Tier 1 document (e.g., Sections 2.8, 3.14.1, etc.) and clarify the basis of the "design basis seismic loads" (i.e., based on both the CSDRS and CSDRS-HF or only the CSDRS) for applicable SSCs.

Accordingly, RAI 8935, Question 03.07.02-24 will be tracked as an Open Item pending the applicant's update to the NRC staff's concern in a supplemental or revised RAI response.