RAIO-1217-57931

December 28, 2017

Docket No. 52-048

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

SUBJECT: NuScale Power, LLC Supplemental Response to NRC Request for Additional Information No. 144 (eRAI No. 8979) on the NuScale Design Certification Application

REFERENCES:
1. U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 144 (eRAI No. 8979)," dated August 05, 2017
2. NuScale Power, LLC Response to NRC "Request for Additional Information No. 144 (eRAI No.8979)," dated September 29, 2017

The purpose of this letter is to provide the NuScale Power, LLC (NuScale) supplemental response to the referenced NRC Request for Additional Information (RAI).

The Enclosure to this letter contains NuScale's supplemental response to the following RAI Question from NRC eRAI No. 8979:

- 03.03.01-1

This letter and the enclosed response make no new regulatory commitments and no revisions to any existing regulatory commitments.

If you have any questions on this response, please contact Marty Bryan at 541-452-7172 or at mbryan@nuscalepower.com.

Sincerely,

Jennie Wike
Manager, Licensing
NuScale Power, LLC

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Enclosure 1: NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 8979

Enclosure 1:

NuScale Supplemental Response to NRC Request for Additional Information eRAI No. 8979

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Response to Request for Additional Information
Docket No. 52-048

eRAI No.: 8979
Date of RAI Issue: 08/05/2017

NRC Question No.: 03.03.01-1

10 CFR 50, Appendix A, GDC 2 requires, in part, that SSCs important to safety shall be designed to withstand the effects of natural phenomena such as tornadoes and hurricanes without loss of capability to perform their safety functions.

In DCD Section 3.3.1.2 “Determination of Severe Wind Forces,” and 3.3.2.2 “Determination of Tornado and Hurricane Forces,” the applicant defines several factors used in the determination of wind, tornado, and hurricane forces.

a. The applicant states that the velocity pressure coefficient used is not less than 0.85; however, the SRP Section 3.3.1 recommends a velocity pressure coefficient of not less than 0.87. The staff requests the applicant to justify the use of a velocity pressure coefficient of less than 0.87.

b. The applicant defines z as the building height. The staff requests the applicant to provide a reference for the building height, i.e. “above the ground level”.

c. The applicant states that the gust-effect factor, G, is greater than or equal to 0.85. The staff requests the applicant to clarify if the gust factor is greater than 0.85 and if so, was it calculated using the formula in ASCE 7-05.

d. The applicant defines Cp as the external pressure coefficient equal to 1.0; however, the coefficient for the leeward walls and side walls could be negative and/or different values. Also, the applicant defines GCp as the internal pressure coefficient equal to 0.18, however, the value could be positive or negative as determined in ASCE 7-05. Therefore, the staff requests the applicant to clarify if the values are computed in accordance with ASCE 7-05.

NuScale Response:

As discussed during a public meeting with the NRC Staff on November 29, 2017, the wording "or greater" is removed from FSAR Tier 2, Sections 3.3.1.2 and 3.3.2.2. This editorial change is a supplement to NuScale's original response to RAI 8979 Question 03.03.01-1.

Impact on DCA:

FSAR Tier 2, Sections 3.3.1.2 and 3.3.2.2 have been revised as described in the response above and as shown in the markup provided in this response.

where,

RAI 03.03.01-1

K_z = velocity pressure exposure coefficient evaluated at height "z", as defined in ASCE/SEI 7-05, Table 6-3, but not less than 0.875. For simplicity and conservatism, z is assumed to be the building height,

K_{zt} = topographic factor equal to 1.0,

K_d = wind directionality factor equal to 1.0,

V_w = maximum wind speed equal to 145 mph, and

I = importance factor equal to 1.15 for the RXB, CRB, and RWB.

Design wind loads on the RXB, CRB, and RWB are determined in conformance with ASCE/SEI 7-05 (Reference 3.3-1), Equation 6-17:

$$p=qGC_p - q_i (GC_{pi}) (lb/ft^2)$$

where,

RAI 03.03.01-1S1

G = gust factor equal to 0.85 ~~or greater~~,

C_p = external pressure coefficient equal to 1.0,

GC_{pi} = internal pressure coefficient equal to 0.18,

q = velocity pressure, and

q_i = internal velocity pressure.

3.3.2 Extreme Wind Loads (Tornado and Hurricane Loads)

3.3.2.1 Design Parameters for Extreme Winds

Tornado wind loads include loads caused by the tornado wind pressure, tornado atmospheric pressure change effect, and tornado-generated missile impact. Hurricane wind loads include loads due to the hurricane wind pressure and hurricane-generated missiles.

The parameters for the design basis tornado are the most severe tornado parameters postulated for the continental United States as identified in RG 1.76, Rev. 1.

RAI 02.03.01-2

- Maximum wind speed ..... 230 mph
- ~~Maximum t~~Translational speed..... 46 mph

RAI 03.03.01-1S1

G = gust factor equal to 0.85~~ or greater~~,

C_p = external pressure coefficient equal to 1.0,

GC_{pi} = internal pressure coefficient equal to 0.18 for the hurricane,

q = velocity pressure, and

q_i = internal velocity pressure.

Internal pressure from the tornado is the design parameter for maximum pressure drop.

3.3.2.3 Combination of Forces

The most adverse of the following combinations are considered for the total hurricane or tornado load:

$W_t = W_p$

$W_t = W_w + 0.5\,W_p + W_m$

where,

W_t = total load,

W_w = load from wind effect,

W_p = load from tornado atmospheric pressure change effect ($W_p = 0$ for hurricanes), and

W_m = load from missile impact effect.

RAI 03.03.01-2

~~3.3.3 Interaction of Non-Seismic Category I Structures with Seismic Category I Structures~~

~~A failure of a nearby structure could adversely affect the Seismic Category I RXB and Seismic Category I portions of the CRB. These nearby structures are assessed (or analyzed if necessary) as described below to ensure that there is no credible potential for adverse interactions. Figure 1.2-2 provides a site plan showing the plant layout. The non-Seismic Category I structures that are adjacent to the Seismic Category I RXB and CRB are:~~

- ~~RWB (Seismic Category II), adjacent to RXB~~
- ~~CRB above elevation 120' (Seismic Category II), above Seismic Category I CRB and adjacent to RXB~~
- ~~[[North and South Turbine Generator Buildings (Seismic Category III), adjacent to RXB]]~~