NuScale Power™

LO-0517-53935

May 26, 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 Submittal of Changes to Final Safety Analysis Report Section 3.5.1.3, Turbine Missiles

During an April 21, 2017 public teleconference with Mr. Greg Cranston, Mr. Matt Mitchell, and Mr. John Honcharik of your staff, NuScale Power, LLC (NuScale) discussed potential updates to Final Safety Analysis Report (FSAR) Section 3.5.1.3, Turbine Missiles. The Enclosure to this letter provides the living FSAR page incorporating revisions to Section 3.5.1.3 in redline/strikeout format. NuScale will provide this change as part of a future revision to the NuScale Design Certification Application.

This letter makes no regulatory commitments or revisions to any existing regulatory commitments.

Please feel free to contact Jennie Wike at 541-360-0539 or at jwike@nuscalepower.com if you have any questions.

Sincerely,

Zackary W. Rad
Director, Regulatory Affairs
NuScale Power, LLC

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Enclosure: "Changes to NuScale Final Safety Analysis Report Section 3.5.1.3, Turbine Missiles"

## Enclosure:

"Changes to NuScale Final Safety Analysis Report Section 3.5.1.3, Turbine Missiles"

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A control rod drive mechanism (CRDM) housing failure, sufficient to create a missile from a piece of the housing or to allow a control rod to be ejected rapidly from the core, is non-credible. The CRDM housing is a Class 1 appurtenance per ASME Section III.

### 3.5.1.3 Turbine Missiles

The turbine generator building layout in relation to the overall site layout is shown on Figure 1.2-2. Safety related and risk significant SSCs for the design are located principally within the RXB and CRB. The turbine generator rotor shafts are physically oriented such that the RXB and CRB are ~~[[~~within~~]]~~ the turbine low-trajectory hazard zone and considered to be ~~[[~~unfavorably~~]]~~ oriented with respect to the NPMs, as defined by RG 1.115, Revision 2. Safety-related and risk-significant SSCs within the reactor and control building are protected from the effects of turbine missiles by limiting the generation of missiles from the turbine generators to be less than 10-5 consistent with Table 1 of RG 1.115.

COL Item 3.5-1: A COL applicant that references the NuScale Power Plant certified design will provide a missile analysis for the turbine generator which demonstrates that the probability of a turbine generator producing a low trajectory turbine missile is less than $10^{-5}$.

Section 10.2 describes the turbine generator requirements for turbine rotor integrity, including rotor material fracture toughness, overspeed protection, and inspection and testing. The turbine rotor inspection program along with the low probability of turbine missile generation provide assurance that safety related and risk significant SSCs are protected from the adverse effects of turbine missiles, consistent with GDC 4.

COL Item 3.5-2: A COL applicant that references the NuScale Power Plant certified design will address the effect of turbine missiles from nearby or co-located facilities.

### 3.5.1.4 Missiles Generated by Tornadoes and Extreme Winds

Hurricane and tornado generated missiles are evaluated in the design of safety-related structures and risk-significant SSC outside those structures. The missiles used in the evaluation are assumed to be capable of striking in all directions and conform to the Region I missile spectrums presented in Table 2 of RG 1.76, Rev. 1, "Design-Basis Tornado and Tornado Missiles for Nuclear Power Plants" for tornado missiles and Table 1 and Table 2 of RG 1.221, Rev. 0, "Design-Basis Hurricane and Hurricane Missiles for Nuclear Power Plants," for hurricane missiles. These spectra are based on the design basis tornado and hurricane defined in Section 3.3.2 and represent probability of exceedance events of $1 \times 10^{-7}$ per year for most potential sites.

The selected missiles include

- A massive high-kinetic-energy missile that deforms on impact, such as an automobile.

  The "automobile" missile is 16.4 feet by 6.6 feet by 4.3 feet with a weight of 4000 lbs. and a $C_D A/m$ (drag coefficient x projected area/mass) of 0.0343 $ft^2/lb$.