

October 7, 2016

Mr. Thomas Bergman
Vice President, Regulatory Affairs
NuScale Power, LLC
1100 NE Circle Boulevard, Suite 200
Corvallis, OR 97330

SUBJECT: SUMMARY OF OBSERVATIONS RELATED TO A STAFF PREAPPLICATION
READINESS ASSESSMENT OF A POTENTIAL NUSCALE POWER, LLC
DESIGN CERTIFICATION APPLICATION

Dear Mr. Bergman:

On September 29, 2016, the U.S. Nuclear Regulatory Commission (NRC) staff completed a pre-application readiness assessment (hereinafter "readiness assessment") of the draft application and supporting documents that NuScale Power, LLC (NuScale), intends to submit as part of the NuScale Design Certification Application (DCA). The readiness assessment was conducted at the NuScale office in Rockville, Maryland. The plan for the readiness assessment can be found in the Agencywide Documents Access and Management System (ADAMS) under Accession No. ML16229A232. As discussed at the exit meeting on September 29, 2016, this letter is a high level summary of the readiness assessment. A more detailed summary of the staff's readiness assessment observations will be forwarded to you separately.

This readiness assessment was performed to understand the level of detail in the NuScale draft DCA and to identify any major information gaps or technical deficiencies relevant to the NRC's decision whether to accept the DCA for review when it is formally submitted. A secondary purpose was to identify areas of the draft DCA for which clarifications or supplemental information could preclude or minimize major staff requests for additional information. The NRC's assessment of readiness does not predetermine whether the tendered application will be docketed.

The NuScale DCA is scheduled for submittal at the end of 2016. With its novel design, NuScale represents the first small modular reactor application that may be submitted for NRC staff review. As such, pre-application engagement has been beneficial for NRC staff in understanding the anticipated design and providing regulatory perspectives.

NRC staff made two over-arching observations from the readiness assessment as described in more detail below. The first observation is that substantial information gaps currently exist in the draft DCA. The second observation is that even for the sections of the draft DCA that were available during the readiness assessment, the NRC staff identified many areas that were not technically sufficient or complete.

At the entrance meeting for the readiness assessment, NuScale acknowledged numerous information gaps in the draft DCA. The NRC staff confirmed this during the readiness

assessment and explained, during daily debriefs and the exit meeting, that many of the docketing items and major RAIs identified by the staff may have been associated with open items (OIs) identified by NuScale. However, NRC was not privy to NuScale's characterization of its OIs and therefore could not confirm that the items were, in fact, the same. For this reason, there may be overlap between the NRC's observations and NuScale's OIs.

Regarding the first observation, the NRC staff identified gaps where significant information was missing, such as missing figures and tables with entries of "TBD." While these gaps were particularly prevalent in the area of Reactor Systems, similar gaps were identified in Instrumentation and Controls, Radioactive Waste Management, Radiation Protection, Containment, Accident Analysis, Technical Specifications, and Inspections, Tests, Analyses and Acceptance Criteria. Additionally, referenced documents, such as Technical Reports, were not included or were not referenced with the specificity needed for use in a design certification, in accordance with the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR), Section 52.47, "Contents of applications; technical information." Observations regarding insufficient references to Technical Reports include:

1. Section 4.2, "Fuel System Design," was not adequately supported with information from the Fuel and Control Rod Assembly Design Technical Report.
2. Section 15.6.5, "Loss-of-Coolant Accidents (LOCA) Resulting from Spectrum of Postulated Piping Breaks within the Reactor Coolant Pressure Boundary," was not adequately supported with information from the Long Term Cooling Technical Report.
3. Section 9.1.1, "Criticality Safety of Fresh and Spent Fuel Storage and Handling," was not adequately supported with information from the Spent Fuel Rack Design Technical Report.

The volume of missing information precluded the NRC staff from assessing the readiness of the application in these areas.

Regarding the second observation, the NRC staff observed that many sections of the NuScale draft DCA did not include sufficient technical information or bases to support assertions and conclusions given in the application. Examples of these observations include:

1. There was insufficient technical information regarding Appendix A, "General Design Criteria (GDC)," to 10 CFR Part 50, GDC 27, "Combined reactivity control systems capability." There were multiple statements regarding the ability of the design to achieve and maintain safe shutdown in various sections of the draft DCA that conflicted with Section 15.0.4, "Evaluation of a Return to Power." Additionally, Section 4.3.1.5 of the draft DCA described two differing analytical assumptions: one involving achieving initial shutdown with the highest worth control rod assembly (CRA) assumed to be stuck out of the core, and the other involving maintaining long-term shutdown through insertion of *all* CRAs and a postulated return to power.
2. Accidental torsion in building design for earthquakes did not appear to be considered in the draft DCA as required by American Society of Civil Engineers 7-10, "Minimum Design Loads for Buildings and Other Structures," and stated in NRC Design Specific Review Standard Section 3.7.2.II.11.

3. There was insufficient technical information regarding 10 CFR 50, Appendix A, GDC 4, "Environmental and dynamic effect design bases," in that there did not appear to be a description or analysis for how structures, systems, and components would be protected from turbine missiles.

Two additional readiness assessment areas (Topical Reports (TR) and Exemption Requests) were identified by NRC staff as not complete or lacking sufficient technical justification to support the NuScale positions or conclusions.

NuScale has indicated its plans to submit multiple TRs prior to the end of calendar year 2016. NuScale should be aware that all TRs referenced in the DCA must be submitted prior to or with the DCA before the NRC staff can accept the DCA for docketing. TRs that have not yet been submitted include, *Non-LOCA Transient Analysis Methodology*, *LOCA Analysis Methodology*, *Subchannel Analysis Methodology*, and *Rod Ejection Methodology*.

As an example in the area of Exemption Requests, Section 7.7, "Exemption Requests," indicates NuScale would be seeking an exemption from GDC 52, "Capability for containment leakage rate testing," but states only that containment integrated leakage rate testing is not required to meet the underlying purpose of the rule. The technical basis provided is not sufficient to enable the staff to evaluate the exemption request.

In summary, and based on the observations noted herein, the NRC staff concludes that the draft DCA is incomplete and lacks information that would be necessary for the staff to conduct a detailed technical review. While the results of the readiness assessment do not predetermine whether a tendered application will be docketed when submitted in the future, the staff's observations support a determination that the draft NuScale DCA would need to be substantially revised to add the technical information to the application in order to meet the threshold for docketing. A detailed letter covering all observations will be forwarded separately.

If you have any questions or concerns, please contact Ms. Rani Franovich at 301-415-7334 or Rani.Franovich@nrc.gov.

Sincerely,
/RA/

Frank M. Akstulewicz, Director
Division of New Reactor Licensing
Office of New Reactors

Project No.: PROJ0769

cc: NuScale listserv

3. There was insufficient technical information regarding 10 CFR 50, Appendix A, GDC 4, "Environmental and dynamic effect design bases," in that there did not appear to be a description or analysis for how structures, systems, and components would be protected from turbine missiles.

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Project No.: PROJ0769
 cc: NuScale listserv

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