



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001**

MEMORANDUM TO: Walter Kirchner, Lead
NuScale Subcommittee
Advisory Committee on Reactor Safeguards

FROM: Gregory Halnon, Member
Advisory Committee on Reactor Safeguards

SUBJECT: INPUT FOR ACRS REVIEW OF THE NUSCALE STANDARD
DESIGN APPROVAL (SDA) APPLICATION – SAFETY
EVALUATION REPORT FOR CHAPTER 2, “SITE
CHARACTERISTICS AND SITE PARAMETERS”

In response to the Subcommittee’s request, I have reviewed the NRC staff’s safety evaluation report (SER) provided to support ACRS review of the SDA application, and the associated section of the applicant’s submittal for Chapter 2, “Site Characteristics and Site Parameters.” The following is my recommended course of action concerning further review of this chapter and the staff’s associated safety evaluation.

Background

Draft SER Chapter 2, “Site Characteristics and Site Parameters,” documents the staff’s review of the final safety analysis report (FSAR) regarding the envelope of site data describing an adequate siting for a NuScale US460. In general, this chapter serves as a construction reference mark for many of the parameters required for site selection and construction. SDA applications do not contain general descriptions of site characteristics because this information is site specific and addressed by the Combined License (COL) or Early Site Permit (ESP) applicant. The prospective COL applicant will be required to design and license the plant within the site parameters provided in the SDA. An ESP applicant will either choose a site where the specific parameters are within the FSAR parameters or obtain an exemption for the specific case. Alternatively, new analyses to demonstrate the acceptability of the site-specific values may be required as part of the license application if the bounding parameters are not met.

SER Summary

The SER documents the staff’s evaluation of the applicant’s site parameters provided in Chapter 2. The site parameters provided in the SDA FSAR reference primarily back to the NuScale certified design as well as generally accepted technical reports and previously approved topical reports. As stated in the Background section of this memorandum, this chapter serves as construction reference marks for the designers of a specific plant location. Site parameters presented in this chapter provide for a reasonable number of sites that may be considered for a COL application. Additionally, where applicable, an adequate technical basis was presented for each site parameter. There is reasonable assurance the chapter provides for compliance with applicable regulations and standards, including Title 10 of the *Code of Federal*

Regulations (10 CFR) Part 52, Subpart E, “Standard Design Approvals,” specifically 10 CFR 52.137(a). Based on the above determinations, the NRC staff found that the descriptions and discussions of NuScale’s SDA FSAR is sufficient and meet the applicable regulatory requirements and guidance, and acceptance criteria, for the issuance of an SDA.

Concerns

I did not identify any specific deficiencies in my review. One condition not addressed in the SER is the effects of climate change for future applicants. It is important that a site-specific probable maximum precipitation study (PMP) using the most recently issued National Oceanic and Atmospheric Administration (NOAA) hydrometeorological study be used in future COL/ESP siting analyses. In 2021, the Infrastructure Investment and Jobs Act provided funding to NOAA to update the decades old PMP estimates contained in the Hydrometeorological Reports (HMR)¹. The staff stated during the March 19, 2024, subcommittee meeting that future COL applicants will have the option of using a site-specific precipitation study or use the generic regional study (i.e., HMR-51/52), primarily because the HMR studies are very conservative, and the plant does not heavily rely on flood protection (as does the present light-water reactor fleet). Nevertheless, given the narrative surrounding climate change, the recently issued Government Accountability Office (GAO) report, GAO-24-106326, “Nuclear Power Plants: NRC Should Take Actions to Fully Consider the Potential Effects of Climate Change,” and the fact that NOAA will be updating the HMR studies, it seems relevant to ensure more contemporary precipitation data is used in siting a reactor. The SDA will be valid for 15 years and recent climate data suggests weather studies will reflect more realistic and contemporary precipitation rates and potentially erode some of the conservatism stated to be in the present data. The GAO report was issued after the subcommittee meeting; however, it is relevant to the recommendation section below. The third GAO recommendation states, in part, that the NRC should ensure guidance provides for use of recent climate data into relevant processes, including climate projections.

Recommendation

As lead reviewer for NuScale SDA application, Chapter 2, I initially recommended consideration of a statement requiring a site-specific precipitation study with the use of the most contemporary NOAA HMR report (or equivalent) to ensure climate change is accounted for in the meteorological sections impacting the design. This would have ensured, at least until the changing climate is better understood or stabilized, the site’s flooding analyses remain conservative. The staff provided a roadmap at the April 3, 2024, ACRS full Committee meeting on how current meteorological data would be considered in a site-specific flooding analysis. Even though the plant parameter is based on the older HMR study, new sites will use RG 1.59, Revision 3 (presently DG-1290) or an equivalent method², which calls for the most recent precipitation data since the HMR was issued. This roadmap should be acceptable to ensure

¹ NuScale used NOAA’s HMR 52, “Application of Probable Maximum Precipitation Estimates – United States East of the 105th Meridian” which was issued in 1982. It contained storms up to the 1970’s. It is widely believed the storms in recent times have become more severe in both frequency and intensity. An updated HMR as a result of the Infrastructure Investment and Jobs Act will provide for more accurate results and possibly a change in building and site design/elevation parameters.

² Regulatory guides are not substitutes for regulations and compliance with them is not required. Methods and solutions that differ from those set forth in regulatory guides will be deemed acceptable if they provide a basis for the findings required for the issuance or continuance of a permit or license by the Commission.

more contemporary precipitation data is utilized in siting a new reactor that references the NuScale US460 SDA. I recommend no further review of this chapter during the SDA application review.

References

1. U. S. Nuclear Regulatory Commission, "Safety Evaluation of NuScale SDAA Chapter 2, 'Site Parameters and Site Characteristics'," February 9, 2024 (ML24040A063).
2. NuScale Power, LLC, "Standard Design Approval Application, Part 2, Chapter 2, 'Site Parameters and Site Characteristics'," Revision 1, October 31, 2023 (ML23304A320).
3. National Oceanic and Atmospheric Administration (NOAA), "Hydrometeorological Report 52, 'Application of Probable Maximum Precipitation Estimates - United States East of the 105th Meridian'," August 1982.
4. U. S. Government Accountability Office, GAO-24-106326, "Nuclear Power Plants: NRC Should Take Actions to Fully Consider the Potential Effects of Climate Change," April 2, 2024.
5. U. S. Government Publishing Office, "117th Congress Public Law 58, 'Infrastructure Investment and Jobs Act'," November 15, 2021.
6. U. S. Nuclear Regulatory Commission, Draft Regulatory Guide DG-1290, "Design-Basis Floods for Nuclear Power Plants," February 28, 2022 (ML19289E561).

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