



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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**NUSCALE POWER, LLC – NRC FEEDBACK REGARDING NUSCALE/CARBON FREE
POWER PROJECT WHITE PAPER: VOLCANO HAZARDS ANALYSIS APPROACH
METHODOLOGY (EPID L-2022-LRO-0053)**

SPONSOR AND SUBMITTAL INFORMATION

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Docket/Project No: 99902052

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**Submittal Agencywide Documents Access and Management System (ADAMS) Accession
No.:** ADAMS Accession No. ML22224A196)

Brief Description of the White Paper: The purpose of the white paper, entitled, “Volcano Hazards Analysis Approach Methodology,” is to describe the proposed strategy to perform the volcanic hazards assessments (VHA) for the Carbon Free Power Project (CFPP) site at the Idaho National Laboratory. Specifically, the white paper compares the proposed strategy to the Nuclear Regulatory Commission (NRC) guidance on performing a volcanic hazards analysis presented in Regulatory Guide (RG) 4.26, “Volcanic Hazards Assessment for Proposed Nuclear Power Reactor Sites,” Revision 0.¹ The submittal letter associated with the white paper requested a public meeting during which the staff can share their feedback on the approach.

On September 14, 2022, the NRC staff held a public meeting² at which NuScale/CFPP provided an overview of the white paper content and the approach to completing the volcanic hazards assessment for the proposed site to facilitate additional feedback and discussion with the NRC staff.

REGULATORY ASSESSMENT

The NRC staff is making no regulatory findings on this white paper. The staff’s feedback in this paper has not been subject to formal NRC management and legal review or approval, and its contents are subject to change and should not be interpreted as official agency positions.

The applicable regulations, summarized in RG 4.26, are as follows:

¹ ADAMS Accession No. ML20272A168.

² ADAMD Accession No. ML22257A140.

- 10 CFR Part 50, Appendix A, as it pertains to the consideration of the most severe natural phenomena reported for the site and surrounding area.
- 10 CFR 52.17(a)(1)(vi) and 10 CFR 52.79(a)(1)(iii) requiring early site permit and combined license applicants' technical information in the final safety analysis report include geologic characteristics of the proposed site, including the most severe natural phenomena reported for the site and surrounding area; and
- 10 CFR 100.23(c), as it pertains to investigating the geologic and seismic factors, including volcanic hazards, that might impact the design and operation of the proposed nuclear power plant.

TECHNICAL ASSESSMENT

The NRC staff's technical assessment of the white paper in this section is based on comparing NuScale/CFPP's proposed methodology in the white paper against the staff's guidance in RG 4.26. The staff also provided more feedback in the summary of September 14, 2022, meeting.³

The NuScale/CFPP submitted its volcanic hazards analysis methodology for NRC feedback to support the development of a combined license application at a proposed site at the Idaho National Laboratory within the Eastern Snake River Plain (ESRP). The ESRP is an area with a history of frequent Quaternary (less than 2.5 million years ago) volcanic activity from numerous sources. As such, the prospective applicant will need to address the potential for volcanic hazards at the proposed site.

The staff's review of the white paper focused on how the proposed methodology to conduct the volcanic hazards assessment aligns with the staff guidance in RG 4.26. As clarified by NuScale/CFPP during September 14 public meeting, the white paper focused on the first three steps outlined in Figure 1 of RG 4.26, "Flowchart for an acceptable volcanic hazards assessment." These steps in the white paper address the NuScale/CFPP's initial deterministic screening of volcanic hazards and the application of initial risk insights. The staff noted that although RG 4.26 specifies consideration of volcanic hazards within the 25-mile radius of the site-vicinity, the white paper methodology expands the site-vicinity to a 35-mile radius around the proposed site. During the September 14 public meeting, NuScale/CFPP clarified that this additional 10 miles includes areas of Quaternary volcanism, such as Hell's Half Acre and Craters of the Moon, that might otherwise be excluded from the analysis but may impact the CFPP site. The staff anticipates that CFPP will discuss the additional conservatism introduced by this expanded site-vicinity in its combined license application when submitted.

Regarding NuScale/CFPP plans to use several models to determine the maximum-magnitude hazard, during the September 14 public meeting, NuScale/CFPP further clarified that various modeling efforts support the screening decision as part of Step 3, i.e., to develop initial risk insights. NuScale/CFPP also clarified that the modeling will result in a maximum-magnitude hazard that will be used in the engineering analysis to assess the performance of structures, systems and components that may be affected by the screened-in volcanic hazards. As explained in RG 4.26, Step 2: Screen Volcanic Hazards, the applicant should first determine the maximum-magnitude hazards and understand the likelihood of these events to support the engineering analysis.

³ ADAMS Accession No. ML22265A187.

The staff also understands that NuScale/CFPP intends to pursue the engineering analysis option, instead of performing additional hazards calculations, regardless of modeling results in the screening process. The staff notes that the explanation of screening decisions is identified in RG 4.26 and will be important for the staff's technical review when the combined license application is submitted.

The white paper provides details on the screening approach for volcanic hazards that the applicant plans to use by focusing on the criteria in RG 4.26, notably by Quaternary age then distance from the proposed site. The staff understands that the prioritization approach for modeling will address a wide range of volcanic phenomena by focusing on dominant phenomena first. The staff notes that focusing on the more challenging phenomena should allow an applicant to determine if other phenomena are bounded by the higher priority hazards.

The white paper references the ongoing probabilistic volcanic hazards analysis (PVHA) project for the Idaho National Laboratory Site, which is using the senior seismic hazard analysis committee (SSHAC) process, endorsed in RG 4.26, to perform the PVHA. The staff understands that NuScale/CFPP is coordinating efforts between these two projects, including the sharing of data and information and overlap in participants. The white paper also mentions the consideration of the center, body and range of the technically defensible information, an approach typically used in a SSHAC, however, NuScale/CFPP is not performing a SSHAC. Instead, NuScale/CFPP is leveraging SSHAC concepts in the performance of the VHA for the CFPP site, especially as they relate to the consideration of uncertainties.

Based on the NRC staff's review of the submitted white paper and additional clarifications provided by NuScale/CFPP during the September 14, 2022, public meeting, NuScale/CFPP's approach to perform a volcanic hazards analysis outlined in the white paper appears to be consistent with the guidance in RG 4.26. The staff will evaluate the resulting volcanic hazards assessment as part of the review of CFPP combined license application when submitted.

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