



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 23, 2021

MEMORANDUM TO: Michael I. Dudek, Chief
New Reactor Licensing Branch
Division of New and Renewed Licenses
Office of Nuclear Reactor Regulation

FROM: Alina Schiller, Project Manager */RA/*
New Reactor Licensing Branch
Division of New and Renewed Licenses
Office of Nuclear Reactor Regulation

SUBJECT: PLAN FOR THE REGULATORY AUDIT OF NUSCALE POWER,
LLC, TOPICAL REPORT TR-0915-17772, "METHODOLOGY FOR
ESTABLISHING THE TECHNICAL BASIS FOR PLUME
EXPOSURE EMERGENCY PLANNING ZONES," REVISION 2

By letter dated August 4, 2020, NuScale Power, LCC, (NuScale) submitted Topical Report (TR)-0915-17772, "Methodology for Establishing the Technical Basis for Plume Exposure Emergency Planning Zones," Revision 2 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20217L422) for the U.S. Nuclear Regulatory Commission (NRC) staff's review. The NRC will audit NuScale's preliminary calculations associated with the seismic screening frequency applicability at an example nuclear power plant in support of staff's review of TR-0915-17772. The audit will take place remotely using NuScale's electronic reading room on November 29 – December 17, 2021. There will also be an assessment of the audit's progress on day 5 (i.e., December 3rd) at which point NuScale will make a determination on whether additional audit discussions are needed. The staff will then continue with the audit or close it based upon NuScale's direction. The audit plan is provided as an enclosure.

Docket No. 99902043

Enclosure: Audit Plan

cc w/encl.: DC NuScale Power LLC Listserv

CONTACT: Alina Schiller, NRR/DNRL
(301) 415-8177

SUBJECT: PLAN FOR THE REGULATORY AUDIT OF NUSCALE POWER, LLC, TOPICAL REPORT TR-0915-17772, "METHODOLOGY FOR ESTABLISHING THE TECHNICAL BASIS FOR PLUME EXPOSURE EMERGENCY PLANNING ZONES," REVISION 2 DATED: NOVEMBER 23, 2021

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ADAMS Accession No: ML21327A209

***via email**

NRR-106

OFFICE	NRR/DNRL/NRLB: PM	NRR/DNRL/NRLB: LA	NRR/DRA/APLC: BC
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DATE	11/22/2021	11/22/2021	11/22/2021
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DATE	11/23/2021		

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**U.S. NUCLEAR REGULATORY COMMISSION
PLAN FOR THE REGULATORY AUDIT OF NUSCALE POWER, LLC, TOPICAL REPORT
TR-0915-17772, “METHODODOLOGY FOR ESTABLISHING THE TECHNICAL BASIS FOR
PLUME EXPOSURE EMERGENCY PLANNING ZONES,” REVISION 2**

APPLICANT: NuScale Power, LLC

APPLICANT CONTACT: Liz English
Ross Snuggerud
Mark Shaver
Jeremiah Doyle
Brandon Haley
Amee Gurr

DATE: November 29, 2021–December 17, 2021

LOCATION: Remote Audit (via NuScale’s electronic reading room (eRR))

AUDIT TEAM: Marie Pohida (NRR/DRA/APLC), Team Lead
Shilp Vasavada (NRR/DRA/APLC)
Mihaela Biro (NRR/DRA/APLA)
Elijah Dickson (NRR/DRA/ARCB)
Keith Compton (RES/DSA/AAB)
Todd Smith (NSIR/DPR)
Raymond Hoffman (NSIR/DPR/RLB)

PROJECT MANAGER: Getachew Tesfaye/Alina Schiller (NRR/DNRL/NRLB)

BACKGROUND AND PURPOSE

The purpose of this regulatory audit is for the U.S. Nuclear Regulatory Commission (NRC) staff to exchange information with, review, and provide clarifying feedback on NuScale’s preliminary (back-of-the-envelope) dose-distance relationship calculation for an example small modular nuclear power plant in support of staff’s review of NuScale’s Topical Report TR-0915-17772, “Methodology for Establishing the Technical Basis for Plume Exposure Emergency Planning Zones,” Revision 2 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20217L422).

The NRC staff, following a request for additional information (RAI), has engaged with NuScale to justify the proposed seismic screening criteria in the topical report (LTR). An integrated team of NRC staff experts developed an approach for seismic sequence screening for emergency planning zone (EPZ) sizing purposes for light-water reactor (LWR) small modular reactors (SMRs). The NRC staff communicated options to resolve technical issues, including alternative seismic screening criteria, based on this approach at public meetings on October 27, 2021 and November 4, 2021 (meetings summary at ADAMS Accession No. ML21316A115).

The NRC will specifically audit NuScale’s preliminary calculations associated with the seismic screening frequency applicability at an example nuclear power plant in support of staff’s review of TR-0915-17772.

Enclosure

REGULATORY BASES

This regulatory audit is based on the following:

- Title 10 of the *Code of Federal Regulations* (CFR) 50.47, “Emergency plans”
- 10 CFR Part 50, Appendix E, “Emergency Planning and Preparedness for Production and Utilization Facilities”
- NUREG-0396/EPA 520/1-78-016, “Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants,” (ADAMS Accession No. ML051390356)
- Regulatory Guide 1.174, “An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis,” Revision 3 (ADAMS Accession No. ML17317A256)
- U.S. Nuclear Regulatory Commission, “Use of Probabilistic Risk Assessment Methods in Nuclear Activities: Final Policy Statement,” Federal Register (60 FR 42622)
- The Staff Requirements Memorandum (SRM) to SECY-04-0118, “Plan for the Implementation of the Commission's Phased Approach to Probabilistic Risk Assessment Quality”
- NUREG-1855, Revision 1: Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decisionmaking, Final Report (ADAMS Accession No. ML17062A466)

REGULATORY AUDIT SCOPE

The audit team will review NuScale’s preliminary dose-distance relationship calculation for an example small modular nuclear power plant using the methodology in NuScale’s TR-0915-17772. The staff’s review will focus on providing clarifying feedback on the calculation.

The NRC staff will provide clarification on its approach on screening seismic events based on an occurrence frequency threshold for EPZ sizing purposes for LWR SMRs discussed in the public meeting on October 27, 2021.

INFORMATION AND OTHER MATERIAL NECESSARY FOR THE REGULATORY AUDIT

To support the regulatory audit, NRC staff requests relevant material to discuss the following:

Topic 1: NuScale’s Preliminary (Back-of-the-Envelope) Dose-Distance Relationship Calculation

1. Details of the NuScale’s preliminary dose-distance relationship calculation for an example nuclear power plant using the methodology in NuScale’s TR-0915-17772, including answers to the following questions:

- a. Whether the example nuclear power plant is an operational U.S. LWR or a SMR? Provide details of the example plant, including location, the nuclear steam supply system, and containment type.
- b. What assumptions were made in performing the preliminary dose-distance relationship calculation?
- c. What was the source term used for the calculation and what is the basis for using the selected source term (e.g., the accident sequence or scenario or scenario class used to define the source term)?
- d. Is the source term consistent with the release category(ies) in the NuScale Severe Accident Mitigation Design Alternatives report (ADAMS Accession No. ML20224A512)? If not, provide the basis for choosing a different source term?
- e. What were the meteorological parameters used for the calculation and what was the basis for using the selected parameters?
- f. What is the dose limit used for the calculation and how was it determined to be either “more severe” or “less severe” consistent with the methodology in NuScale’s TR-0915-17772?
- g. What is the occurrence frequency of the sequence or scenario or class of scenarios that provided the source term used in the preliminary calculation?
- h. What is the release frequency used in the calculation and how was it determined? What is its relationship to the selected source term?
- i. What is the approach and basis for calculating the probability of exceedance of the selected dose acceptance criteria?
- j. What potential analytical margins exist in the source term? Are there other inputs that can impact the dose-distance calculation?

Topic 2: Screening of Seismic Events

- a. Is the seismic screening threshold based on the approach developed by the NRC staff expected to be limited to only NuScale-specific seismic design characteristics (such as the certified design response spectrum and plant-level fragility)?
- b. Is a design- and site-specific seismic screening threshold based on the approach developed by the NRC being considered as an option?

Topic 3: Appendix A, Appendix B, and Appendix C

- a) Please provide the appropriate source term (MELCOR) and dose (MACCS) output files supporting the example calculations.

LOGISTICS

The audit will be conducted using NuScale's eRR. The audit entrance meeting is scheduled for November 29, 2021. The audit is scheduled to begin on November 29, 2021, and end by December 17, 2021. There will also be an assessment of the audit's progress on day 5 (i.e., December 3rd) at which point NuScale will make a determination on whether additional audit discussions are needed. The staff will then continue with the audit or close it based upon NuScale's direction. The general format of the audit will include reviewing documents and discussions with the NuScale staff. The audit exit meeting will be scheduled at a later date.

SPECIAL REQUESTS

NuScale will determine (on December 3rd) on whether additional audit discussions are warranted or whether NuScale will retract the LTR.

DELIVERABLES

The NRC audit team will issue a regulatory audit summary report within 90 days after the completion of the audit that will be placed on the docket and in ADAMS. The audit outcome could also identify any additional information to be reviewed in a follow-up audit or submitted separately for making regulatory decisions. If the audit outcome identifies additional needed information, the NRC will identify the need for RAIs or schedule a follow-up audit by December 17, 2021.

REFERENCES

1. Letter from NuScale Power, LLC, "NuScale Power, LLC Submittal of "Methodology for Establishing the Technical Basis for Plume Exposure Emergency Planning Zones," TR-0915-17772, Revision 2, August 4, 2020, ADAMS Accession No. ML20217L422.
2. LIC-111, "Regulatory Audits," October 31, 2019, ADAMS Accession No. ML19226A274.