

October 5, 2017

MEMORANDUM TO: Samuel S. Lee, Chief
Licensing Branch 1
Division of New Reactor Licensing
Office of New Reactors

FROM: Anthony W. Markley, Senior Project Manager */RA Gregory V. Cranston for/*
Licensing Branch 1
Division of New Reactor Licensing
Office of New Reactors

SUBJECT: AUDIT PLAN FOR THE REGULATORY AUDIT OF TOPICAL
REPORT TR-0915-17565-P, "ACCIDENT SOURCE TERM
METHODOLOGY" FOR NUSCALE POWER, LLC

By letter dated September 11, 2017, NuScale Power, LLC (NuScale) submitted to the U.S. Nuclear Regulatory Commission (NRC), Revision 2 to Topical Report (TR)-0915-17565-P, "Accident Source Term" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17254B067). Revision 2 to the TR incorporated responses to several requests for additional information (ADAMS Accession Nos. ML17037D39, ML17081A561, ML17205A485, and ML17236A528) that were submitted to NuScale by the NRC staff.

The purpose of the NRC's regulatory audit of TR-0915-17565-P is to review NuScale's use of the ARCON96 methodology for the calculation of offsite atmospheric dispersion factors and its adherence to the guidance provided in Revision 1 to Regulatory Guide 1.145, "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants."

The audit will take place at NuScale's offices, in Rockville, Maryland. The audit is currently scheduled to occur during the week of October 9, 2017, and last for approximately one week. The audit plan is provided as an enclosure.

Docket No. 52-048

Enclosures:

1. Audit Plan
2. Audit Agenda

cc w/encls.: DC NuScale Power, LLC Listserv

CONTACT: Anthony Markley, NRO/DNRL
301-415-3165

SUBJECT: AUDIT PLAN FOR THE REGULATORY AUDIT OF TOPICAL REPORT
TR-0915-17565-P, "ACCIDENT SOURCE TERM METHODOLOGY" FOR
NUSCALE POWER, LLC DATED:

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NRO-002

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U.S. NUCLEAR REGULATORY COMMISSION REGULATORY
AUDIT PLAN FOR THE REGULATORY AUDIT OF TOPICAL REPORT TR-0915-17565-P,
“ACCIDENT SOURCE TERM METHODOLOGY” FOR NUSCALE POWER, LLC

DOCKET NO. PROJ0769

APPLICANT:

NuScale Power LLC (NuScale)

APPLICANT CONTACTS:

Steve Mirsky (NuScale)

DURATION:

October 10 through October 13, 2017

LOCATION:

NuScale Rockville Office
11333 Woodglen Drive, Suite 205
Rockville, MD 20852

AUDIT TEAM:

Brad Harvey (NRO, Audit Lead)
Jason D. White (NRO, Meteorologist)
Anthony W. Markley (NRO, Senior Project Manager)
Supporting staff (as needed)

BACKGROUND

By letter dated September 11, 2017, NuScale, submitted Revision 2 of the licensing Topical Report (TR) “Accident Source Term Methodology,” TR-0915-17565-P, to the U. S. Nuclear Regulatory Commission (NRC) for review and approval (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17254B067). Revision 2 to the TR incorporated responses to several Requests for Additional Information (RAIs) (ADAMS Accession Nos. ML17037D39, ML17081A561, ML17205A485, and ML17236A528) that were submitted to NuScale by the NRC Staff.

Topical Report TR-0915-17565-P describes a generalized methodology for developing accident source terms and performing the corresponding radiological consequence analyses for design-basis Accidents. The TR includes providing the methodology NuScale intends to use to derive

Enclosure 1

the accident release atmospheric dispersion site parameters values at the security owner controlled area fence for the NuScale Design Certification (DC) application. NuScale plans to postulate in its DC application an exclusion area boundary (EAB) and outer boundary of the low population zone (LPZ) that are at the security owner controlled area fence. This TR is also intended to be used by subsequent combined license (COL) applications that references the NuScale design to derive their corresponding site characteristic values.

This audit focuses on evaluating NuScale's use of the ARCON96 computer code methodology (Ref. 1) for calculating offsite atmospheric dispersion values (position 1 in Section 1.2, Scope, of the TR) rather than the computer code PAVAN (Ref. 2). Both PAVAN and ARCON96 are NRC codes approved for calculating relative concentration values (also known as atmospheric dispersion factors or χ/Q values). PAVAN implements the guidance provided in Regulatory Guide (RG) 1.145, "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants," Revision 1, for determining χ/Q values offsite at the EAB and outer boundary of the LPZ whereas ARCON96 implements the guidance provided in RG 1.194, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants," for determining onsite χ/Q values for the control room (CR).

In order to implement the Topical Report TR-0915-17565 methodology, NuScale developed its own version of ARCON96, called NARCON.

To facilitate the NRC staff's safety review of TR-0915-17565-P, the NRC staff is planning an audit at the NuScale office in Rockville, Maryland, that will examine the following calculation packages and supporting documents:

- documentation for the NARCON atmospheric dispersion code
- the calculation (including the NARCON input and output files) being used to update the NuScale Final Safety Analysis Report (FSAR) Tier 1, Table 5.0-1 and Tier 22, Table 2.0-1 accident release χ/Q site parameter values at the security owner controlled area fence

In addition, the NRC staff is planning on executing its own tests cases using the NARCON atmospheric dispersion code.

PURPOSE AND REGULATORY BASIS

PURPOSE

The purpose of the NRC's regulatory audit of TR-0915-17565-P is to review NuScale's use of the ARCON96 methodology and the NARCON computer code for the calculation of offsite atmospheric dispersion factors and its adherence to the guidance provided in Revision 1 to RG 1.145, "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants." This methodology is intended to be used to support certification of the NuScale design and any subsequent COLs applications that reference the NuScale design

REGULATORY REQUIREMENTS

For DC applicants, the regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) 52.47(a)(2)(iv) state that a DC application must contain an assessment of the plant design

features intended to mitigate the radiological consequences of accidents, which includes consideration of postulated site meteorology, to evaluate the offsite radiological consequences at the EAB and LPZ. Regulation 10 CFR 52.47(a)(1) also requires a DC applicant to provide site parameters postulated for the design. Site parameters are the postulated physical, environmental and demographic features of an assumed site and are specified in a DC. A DC typically contains site parameters related to accident release χ/Q values at the EAB and LPZ.

Regulation 10 CFR 52.79(d)(1) requires a COL application referencing a DC to provide information sufficient to demonstrate that the characteristics of the site fall within the site parameters specified in the DC. Site characteristics are the actual physical, environmental and demographic features of a site and are specified in an early site permit or in a FSAR for a COL. A COL submittal referencing a DC typically contains site characteristics related to accident release χ/Q values at the EAB and LPZ for comparison against the corresponding DC site parameters.

RELEVANT GUIDANCE

NUREG-0800 (Ref. 3) supplies detailed review guidance that the staff finds acceptable in meeting the applicable regulatory requirements. In particular, the NUREG-0800 section that contains guidance relevant to this review is Section 2.3.4, Revision 3, "Short-term Atmospheric Dispersion Estimates for Accident Releases," March 2007.

RG 1.145, "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants," Revision 1, November 1982, provides guidance on appropriate dispersion models for estimating offsite relative air concentrations (χ/Q values) as a function of downwind direction and distance (i.e., at the EAB and LPZ) for various short-term time periods (up to 30 days) after an accident.

RG 1.194, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants," June 2003, discusses acceptable approaches for estimating short-term (i.e., 2 hours to 30 days post-accident) average χ/Q values in the vicinity of buildings at CR ventilation air intakes and at other locations of significant air in-leakage to the CR envelope due to postulated design-basis accidental radiological airborne releases.

RG 1.23, "Meteorological Monitoring Programs for Nuclear Power Plants," Revision 1, March 2007, includes guidance on the measurement and processing of onsite meteorological data for use as input to atmospheric dispersion models in support of plant licensing and operation.

NUREG/CR-6331 (Ref. 1) is the user's manual for the NRC-sponsored ARCON96 dispersion model, which is referenced in RG 1.194.

NUREG/CR-2858 (Ref. 2) is the user's manual for the NRC-sponsored PAVAN dispersion model, which implements the guidance provided in RG 1.145.

AUDIT ACTIVITIES AND DELIVERABLES

The NRC audit team is expected to consist of individuals from the Meteorology and Oceanography Team within the Hydrology and Meteorology Branch, and additional NRC staff, as needed. NuScale will be notified of any additional NRC audit team members at the time of identification.

The NRC staff will conduct this audit in accordance with the guidance provided in NRO-REG-108, "Regulatory Audits. The NRC staff acknowledges the proprietary and sensitive nature of the information requested and will handle it appropriately throughout the audit. While the NRC staff will take notes, the NRC staff will not remove hard copy or electronic files from the audit site.

A non-public entrance meeting will be conducted the first day of the audit, and a non-public exit meeting will be held after the audit is completed to present audit results to NuScale. Additional non-public audit status meetings/teleconferences will occur to ensure efficient communications between the NRC and NuScale staff regarding progress of the audit and identify issues that have been closed or will be resolved by another mechanism such as RAIs or public meetings.

The audit will assist the NRC staff in determining if RAIs will be necessary to complete the licensing review of TR-0915-17565-P and other related information reviewed to prepare the NRC staff's Safety Evaluation Report. An audit report will be prepared to document the results of the audit. This report will be made publicly available in ADAMS.

The agenda for the audit is presented in Attachment A of this audit plan. If necessary, any circumstances related to the conductance of the audit will be communicated to the NRC project manager, Anthony Markley, at 301-415-3165 or Anthony.Markley@nrc.gov.

REFERENCES

NRC, "Atmospheric Relative Concentrations in Building Wakes," NUREG/CR-6331, Revision 1, May 1997.

NRC, "PAVAN: An Atmospheric Dispersion Program for Evaluating Design-Basis Accidental Releases of Radioactive Materials from Nuclear Power Stations," NUREG/CR-2858, November 1982.

NRC, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," NUREG-0800, June 2007.

AUDIT AGENDA

October 10, 2017

2:00 p.m. – 2:30 p.m. Entrance Meeting [NRC/NuScale]
2:30 p.m. – 3:00 p.m. NRC Review of Documents [NRC/NuScale]

October 11, 2017

3:00 p.m. – 4:30 p.m. Audit/status meeting.....
[NRC/NuScale]

October 12, 2017

3:00 p.m. – 4:30 p.m. Audit/status meeting.....
[NRC/NuScale]

October 13, 2017

3:00 p.m. – 4:30 p.m. Exit Meeting to Discuss Audit Results.....
[NRC/NuScale]