May 10, 2017

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

FROM: Rani Franovich, Senior Project Manager **/RA/**
Licensing Branch 1
Division of New Reactor Licensing
Office of New Reactors

SUBJECT: AUDIT PLAN FOR THE REGULATORY AUDIT OF DESIGN BASIS ACCIDENT RADIOLOGICAL CONSEQUENCE ANALYSES FOR NUSCALE POWER, LLC

NuScale Power, LLC (NuScale) submitted by letter dated December 31, 2016, to the U.S. Nuclear Regulatory Commission (NRC), a Design Control Document for its Design Certification (DC) application of the NuScale design (Agencywide Documents Access and Management System Accession No. ML17013A229). The NRC staff started its detailed technical review of NuScale's DC application on March 27, 2017.

The purpose of the NRC's regulatory audit of design basis accident radiological consequence analyses is to: (1) gain a better understanding of NuScale DBA radiological consequences analysis development, (2) verify information in the DCA and evaluate its conformance with the SRP or technical guidance, and (3) identify any information needed on the docket to support the basis of a reasonable assurance finding.

The audit will take place at NuScale's offices, in Rockville, Maryland, and/or online via NuScale's electronic reading room. The audit is currently scheduled to start on May 10, 2017, and last for approximately 30 days. The audit plan is provided as an enclosure.

Docket No. 52-048

Enclosure:
1. Regulatory Audit of Design Basis Accident Radiological Consequence Analyses

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

CONTACT: Rani Franovich, NRO/DNRL
301-415-7334

AUDIT PLAN FOR THE REGULATORY AUDIT OF DESIGN BASIS ACCIDENT RADIOLOGICAL CONSEQUENCE ANALYSES FOR NUSCALE POWER, LLC

DATED: May 10, 2017

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DATE	5/8/2017	5/10/2017	5/10/2017

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U.S. NUCLEAR REGULATORY COMMISSION REGULATORY AUDIT OF DESIGN BASIS ACCIDENT RADIOLOGICAL CONSEQUENCE ANALYSES AS PART OF THE NUSCALE POWER, LLC DESIGN CONTROL DOCUMENT DESIGN CERTIFICATION

DOCKET NO. 52-048

AUDIT PLAN

APPLICANT:	NuScale Power LLC (NuScale)
APPLICANT CONTACTS:	Jennie Wike (NuScale)
	May 10, 2017, through June 8, 2017
LOCATION:	NuScale Rockville Office 11333 Woodglen Drive, Suite 205 Rockville, MD 20852
AUDIT TEAM:	Michelle Hart (NRO, Audit Lead) Jason Schaperow (NRO) Marie Pohida (NRO) Shawn Campbell (RES) Hossein Esmaili (RES) Larry Burkhart (NRO/RPAC Branch Chief) Rani Franovich (NRO, Project Manager) 1 or 2 Supporting staff as needed

I. BACKGROUND

On January 6, 2017, NuScale, submitted a Design Control Document (DCD) for its Design Certification Application (DCA) of the NuScale design to the NRC for review (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17013A229). On March 15, 2017, the NRC staff accepted the DCA for docketing and initiated its technical review. To facilitate the NRC staff's evaluation of information related to the safety analyses evaluating the radiological consequences of design basis accidents, including control room and technical support center radiological habitability, and to complete its safety review of NuScale DCA Chapters 15.0.3, "Design Basis Accident Radiological Consequence Analyses for Advanced Light Water Reactors," and related portions of 6.4, "Control Room Habitability," and 6.5, "Fission Product Removal and Control Systems," the NRC staff is planning an audit that includes:

- A regulatory audit that will commence on May 10, 2017, and be carried out at NuScale's office in Rockville, Maryland, and via NuScale's Electronic Reading Room (ERR), if available. During this audit the NRC staff will examine the calculation packages and supporting documents that comprise the design basis

Enclosure

accident (DBA) radiological consequence analyses and radiological habitability analyses for the NuScale control room and technical support center.

- Should the NRC staff need to re-examine documents after the audit to determine if a request for additional information (RAI) is needed, arrangements will be coordinated with NuScale as needed. The NRC staff does not anticipate the need to augment the audit report under these circumstances.

II. PURPOSE AND REGULATORY BASIS

The purpose of this audit is for the staff to examine and evaluate non-docketed information to:

1. gain a better understanding of NuScale's DBA radiological consequences analysis development,

2. verify information in the DCA and evaluate its conformance with the SRP or technical guidance, and

3. identify any information needed on the docket to support the basis of a reasonable assurance finding.

Title 10 of the *Code of Federal Regulation* (CFR), Section 52.47(a) states that a DC application must contain a final safety analysis report (FSAR) that describes the facility, presents the design bases and the limits on its operation, and presents a safety analysis of the structures, systems and components and of the facility as a whole. The safety analyses are done, in part, to show compliance with the radiological consequence evaluation factors in 52.47(a)(2)(iv)(A) and 52.47(a)(2)(iv)(B) for offsite doses, 10 CFR 50, Appendix A, GDC 19 for control room radiological habitability, and the requirements related to the technical support center in 10 CFR 50.47(b)(8) and (b)(11) and Paragraph IV.E.8 of Appendix E to 10 CFR Part 50. The radiological consequences of design basis accidents (DBAs) are evaluated against these regulatory requirements and the dose acceptance criteria given in NuScale design specific review standard (DSRS) 15.0.3, "Design Basis Accident Radiological Consequence Analyses for NuScale SMR Design."

The NRC staff must have sufficient information to ensure that the applicant has adequately summarized the DBA radiological consequence analyses and provided sufficient information to allow an independent analysis to be performed for the facilities under review as outlined in Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," Section C.I.15.6.5, "Radiological Consequences."

III. REGULATORY AUDIT SCOPE

The specific scope of this audit will include the following topics:

- DBA radiological consequence analyses methods, assumptions, and input parameters.

- DBA radiological source terms.

- Fission product transport and removal.

- Control room radiological habitability and modeling of control room.
- Technical support center (TSC) radiological habitability.
- Implementation of topical report TR-0915-17565-P, Rev.1 methodology.
- Severe accident analyses and calculations supporting DBA radiological consequence analyses.
- Development of the source term and radiological consequence analysis for the Maximum Hypothetical Accident (MHA).

IV. DOCUMENTS/INFORMATION NECESSARY FOR THE AUDIT

NuScale should make available documents pertaining to topic areas listed in Attachment A. The audit team expects to look at portions of many of these documents.

V. SPECIAL REQUESTS

The NRC staff requests the documents associated with topic areas listed in Attachment A be available to NRC auditors in the ERR to the extent possible. Use of the ERR allows multiple auditors to examine the same document at the same time, which improves the efficiency of the audit.

VI. AUDIT ACTIVITIES AND DELIVERABLES

The NRC audit team is expected to consist of one individual from the Radiation Protection and Accident Consequences Branch (RPAC), Michelle Hart, covering the technical areas identified in the assessment of DBA radiological consequences and control room and TSC habitability. The task assignments are shown in Table 1, "Reviewer Assignments." Depending upon how much effort is needed in a given area, additional NRC team members may be assigned to ensure adequate coverage of important technical elements. NuScale will be notified of any additional NRC team members at the time of identification.

The NRC staff acknowledges the proprietary 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(s).

A non-public entrance meeting will be conducted the first day of the audit, and a non-public exit meeting will be held approximately one month after the audit is completed to present audit results to NuScale representatives. An audit report will be prepared to document the results of the audit. This report will be made publicly available in ADAMS.

The audit will assist the NRC staff in determining if RAIs will be necessary to complete the licensing review of NuScale's FSAR Chapters 6.4, 6.5, and 15.0.3, or other related information reviewed to prepare the NRC staff's safety evaluation report.

The agenda for the audit is presented in Attachment B of this audit plan. If necessary, any circumstances related to the conductance of the audit will be communicated to the NRC project manager, Rani Franovich, at 301-415-7334 or rlf2@nrc.gov.

Table 1 – Reviewer Assignments

Staff	Topic Area
Michelle Hart	DBA radiological consequence analyses DBA source terms Fission product transport and removal Control room and TSC radiological habitability analyses Implementation of TR-0915-17565-P, Rev.1 methodology
Jason Schaperow	DBA source terms Fission product transport and removal Implementation of TR-0915-17565-P, Rev.1 methodology Severe accidents
Marie Pohida	Severe accidents
Shawn Campbell	Fission product transport and removal Implementation of TR-0915-17565-P, Rev.1 methodology
Hossein Esmaili	DBA source terms Fission product transport and removal Severe accidents

ATTACHMENT A

Documents Supporting DBA Radiological Consequence Analyses

- Documents supporting the development of the design basis source term (DBST) for the MHA.
- Level 2 PRA documents that support the selection of the source term design basis accident (STDBA) scenarios.
- Documentation of calculations used to develop the DBST for the MHA, to include calculations using MELCOR and STARNAUA.
- DBA radiological consequence analysis calculation packages, including evaluation of control room and TSC radiological habitability.
- Core radionuclide inventory calculations.
- Coolant radionuclide concentration calculations.
- Calculation packages documenting the analysis of control room direct dose from gamma radiation (shine dose) from any source.
- Calculation packages documenting the analysis of direct dose from gamma radiation (shine dose) to the site boundary.
- Calculation packages used as basis for the radiation source for control room and offsite direct dose calculations (i.e., radiation source in containment atmosphere used for equipment qualification).
- Supporting DBA calculation input/output files, including spreadsheets, if not detailed in calculation packages.

ATTACHMENT B

AUDIT AGENDA

NuScale DCD Chapters 15.0.3, 6.4, and 6.5
"DBA Radiological Consequence Analyses" Regulatory Audit

May 10, 2017

1:00 p.m. – 1:15 p.m. Entrance Meeting …… [NRC/NuScale]

1:15 p.m. – 4:00 p.m. NRC Review of Documents ……. [NRC/NuScale]

4:00 p.m. – 4:30 p.m. NRC Staff Caucus …….. [NRC]

4:30 p.m. – 5:00 p.m. Summary of the Day and Action Items ..... [NRC/NuScale]

May 11 – June 7, 2017

9:00 a.m. – 4:00 p.m. NRC Review of Documents ……..... [NRC/NuScale]

4:00 p.m. – 4:30 p.m. NRC Staff Caucus …….……... [NRC]

4:30 p.m. – 5:00 p.m. Debrief (as needed) ……..... [NRC/NuScale]

June 8, 2017

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