



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

November 26, 2019

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

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

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION REPORT OF THE
REGULATORY FOLLOW-UP AUDIT PERFORMED BETWEEN
JULY 30, 2019, THROUGH SEPTEMBER 25, 2019,
REGARDING THE DESIGN DOCUMENTS FOR NUSCALE
CONTAINMENT ISOLATION VALVES AND REACTOR SAFETY
VALVES

On January 6, 2017, NuScale Power, LLC (NuScale) submitted a design certification (DC) application, for a Small Modular Reactor, to the U.S. Nuclear Regulatory Commission (NRC) (Agencywide Documents Access and Management System (ADAMS) Accession Number ML17013A229). The NRC staff started its detailed technical review of NuScale's DC application on March 15, 2017.

The NRC staff conducted an audit to confirm that the appropriate changes have been completed for the audit items that were assigned the status of confirmatory in the NRC staff's audit report, "NRC Report of the Regulatory Audit of NuScale Power LLC, Design Documents for Containment Isolation Valves and Reactor Safety Valves," dated December 7, 2018 (ADAMS Accession No. ML18331A042). The audit was initiated on July 30, 2019, and ran through September 25, 2019, in accordance with the audit plan in ADAMS (ML19207A299).

The purpose of the audit was to: (1) gain a better understanding of the NuScale design; (2) verify information; (3) identify information that may require docketing to support the basis of the licensing or regulatory decision; and (4) review related documentation and non-docketed information to evaluate conformance with regulatory guidance and compliance with NRC regulations.

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The NRC staff conducted the audit via access to NuScale's electronic reading room. The audit was conducted in accordance with the NRC Office of New Reactors (NRO) Office Instruction NRO-REG-108, "Regulatory Audits."

Docket No. 52-048

Enclosure:
Audit report

cc: NuScale DC ListServ

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 FOR NUSCALE CONTAINMENT ISOLATION VALVES AND REACTOR
 SAFETY VALVES
 DATED: NOVEMBER 26, 2019

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U.S. NUCLEAR REGULATORY COMMISSION

SUMMARY REPORT OF REGULATORY FOLLOW-UP AUDIT

OF THE DESIGN DOCUMENTS FOR NUSCALE CONTAINMENT ISOLATION VALVES

AND REACTOR SAFETY VALVES

NRC Audit Team:

Thomas G. Scarbrough, Sr. Mechanical Engineer (NRC), Audit Lead
John Budzynski, Reactor Systems Engineer (NRC)
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Marieliz Vera, Project Manager (NRC)

NuScale Personnel:

John Fields
Rebecca Norris
Gary McGee

1.0 INTRODUCTION AND BACKGROUND

On January 6, 2017, NuScale Power, LLC (NuScale) submitted a design certification application (DCA) with subsequent revisions (Reference 1) for a small modular reactor (SMR) to the U.S. Nuclear Regulatory Commission (NRC). On March 23, 2017, the NRC staff accepted the DCA for docketing to initiate the NRC review of the NuScale SMR design (Reference 2).

The NRC conducted an initial regulatory audit of NuScale design documents for the containment isolation valves (CIVs) and reactor safety valves (RSVs) during the period from September 4, 2018, to October 31, 2018, by the review of NuScale design documentation in the NuScale electronic reading room (eRR). The NRC staff described the results of the initial audit in a report dated December 7, 2018 (Reference 3).

In a letter dated January 31, 2019, NuScale provided a proposed path forward for resolution of certain follow-up items from the initial regulatory audit of the design documents for the CIVs and RSVs (Reference 4). In its letter dated June 28, 2019 (Reference 5), NuScale notified the NRC staff of the status of the follow-up items from the initial regulatory audit of the design documents for the CIVs and RSVs. On July 30, 2019, the NRC staff issued a plan for this follow-up audit of the NuScale design documentation for the CIVs and RSVs (Reference 6). The NRC staff conducted this audit in accordance with the guidance provided in the Office of New Reactors (NRO)-REG-108, "Regulatory Audits" (Reference 7).

2.0 REGULATORY AUDIT BASIS

Title 10 of the *Code of Federal Regulations* (10 CFR), Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Section 47, "Contents of Applications; Technical Information," states the following:

The application must contain a level of design information sufficient to enable the

Commission to judge the applicant's proposed means of assuring that construction conforms to the design and to reach a final conclusion on all safety questions associated with the design before the certification is granted. The information submitted for a design certification must include performance requirements and design information sufficiently detailed to permit the preparation of acceptance and inspection requirements by the NRC, and procurement specifications and construction and installation specifications by an applicant. The Commission will require, before design certification, that information normally contained in certain procurement specifications and construction and installation specifications be completed and available for audit if the information is necessary for the Commission to make its safety determination.

In conducting the review of the NuScale DCA, the NRC staff requested that the applicant make available, design documentation for CIVs and RSVs to be used in the NuScale Power Plant for the NRC staff to confirm the implementation of the provisions in the NuScale DCA Part 2, Tier 2, for the design and qualification of these components.

The information for this follow-up audit supported the NRC staff's review of the following sections of the NRC Standard Review Plan (SRP) or NuScale Design Specific Review Standard:

- Section 3.9.6, "Functional Design, Qualification, and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints;"
- Section 5.2.2, "Overpressure Protection;" and
- Section 6.2.4, "Containment Isolation System."

3.0 OBSERVATIONS AND RESULTS

The NRC staff's regulatory audit was conducted to examine revisions to the design documents for the CIVs and RSVs specified by NuScale at the conclusion of the initial audit and in its follow-up and completion letters. The audit team focused on the areas listed below:

- The updated design documents that address items assigned the status of confirmatory in the CIV/RSV initial audit report dated December 7, 2018.
- Confirm and close audit confirmatory items where completed.

During the initial regulatory audit, the NRC staff reviewed the NuScale design documentation for the Primary Systems Containment Isolation Valves (PSCIVs), Secondary Systems Containment Isolation Valves (SSCIVs), and RSVs in the NuScale eRR. In particular, the NRC staff reviewed the PSCIV, SSCIV, and RSV design documents to determine whether they incorporated the provisions specified in the NuScale DCA. In the initial audit report, the NRC staff described its findings regarding the NuScale design documentation for the CIVs and RSVs to be used in the NuScale Power Plant.

During this follow-up audit from July 30, 2019, to September 25, 2019, the NRC staff reviewed the confirmatory items identified in the initial audit report. The NRC staff describes its review of the remaining items from the initial audit and their resolution below:

Containment Isolation Valves

A. CIV DCA Updates:

1. On September 17, 2018, NuScale provided a proposed DCA Part 2 revision in response to the NRC staff's Request for Additional Information (RAI) 9565, Question 03.09.06-28, regarding the CIV design description (Reference 8). During the NRC staff's initial audit review, NuScale described its actions planned to resolve the NRC staff's comments on the proposed DCA revision. The NRC staff's review of each follow-up action and its resolution are described below:
 - a) During the initial CIV design audit, the NRC staff found that the proposed revision to DCA Part 2, Tier 2, Section 6.2.4.2.2, "Component Description," describing the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (BPV Code), Section III Class of specific PSCIVs was not clear. In particular, the proposed paragraph stated that the PSCIVs in the Control Rod Drive System (CRDS), Containment Evacuation System (CES), and Containment Flooding and Drain System (CFDS) are designed and constructed to Class 1, while a later sentence in the same paragraph stated that these PSCIVs are designed, fabricated, constructed, tested, and inspected in accordance with ASME BPV Code, Section III, Class 2. In its letter dated January 31, 2019, NuScale stated that it would clarify the description in DCA Part 2, Tier 2, Section 6.2.4.2.2, of the ASME BPV Code Class of the specific PSCIVs. In its letter dated June 28, 2019, NuScale stated that this clarification would be provided in the next revision to the DCA. During this follow-up audit, the NRC staff found that Revision 3 to DCA Part 2, Tier 2, states in Section 6.2.4.2.2, that the PSCIVs on the CRDS, CES, and CFDS lines are Quality Group B components and classified as ASME Code Class 2; however, as permitted by ASME BPV Code, Subsection NCA-2134(a), they are constructed and stamped as ASME BPV Code Class 1 valves in accordance with ASME BPV Code, Section III, Subsection NB, because all PSCIVs are intended to be identical. Based on the DCA modification, the NRC staff considers this follow-up item to be resolved and closed for the CIV design audit for the NuScale DCA review.
 - b) During the initial CIV design audit, the NRC staff found that the proposed revision to DCA Part 2, Tier 2, Section 6.2.4.2.2, indicated that a thermal relief valve will be included in the design of the PSCIVs to release excessive pressurization between the two closed ball valves to the containment side of the PSCIV rather than a ball valve design that relieves pressure directly. However, the NRC staff did not find the testing provisions for these thermal relief valves in the DCA. In its letter dated January 31, 2019, NuScale stated that it would update the description of 10 CFR Part 50, Appendix J, containment leakage testing and 10 CFR 50.55a in-service testing (IST) program testing in the DCA to include these provisions for the PSCIV thermal relief valves. In its letter dated June 28, 2019, NuScale stated that this

clarification would be provided in the next revision of DCA Part 2, Tier 2, Section 3.9.6.3.2, "Valve Testing," and Section 6.2.4.2.2. During this follow-up audit, the NRC staff found that Revision 3 to DCA Part 2, Tier 2, Section 6.2.4.2.2, specifies that the PSCIV design provides for 10 CFR Part 50, Appendix J, testing; and references DCA Part 2, Tier 2, Section 3.9.6.3.2, for the testing of these components. In addition, the NRC staff found that DCA Part 2, Tier 2, Section 3.9.6.3.2, specifies that the NuScale power-operated valve (POV) skid-mounted components are tested in accordance with the criteria of ISTC-1200(b) of the *ASME Operation and Maintenance of Nuclear Power Plants*, Division 1, OM Code: Section IST (ASME OM Code). Based on these DCA modifications, the NRC staff considers this follow-up item to be resolved and closed for the CIV design audit for the NuScale DCA review.

- c) During the initial CIV design audit, the NRC staff found that the proposed revision to DCA Part 2, Tier 2, Section 6.2.4.2.2, indicated that the PSCIVs and SSCIVs are designed and qualified for torque closure using pneumatic pressure to provide sufficient wedging and sealing to prevent reopening and unseating for each ball valve for the extended time period for the design-basis and beyond-design-basis functions assumed for each individual ball valve. However, the NRC staff did not find a description of this design feature of the PSCIVs and SSCIVs in the DCA. In its letter dated January 31, 2019, NuScale stated that it would update the DCA to indicate how the CIVs will be qualified to hold the valve closed for the time period specified for its design-basis or beyond-design-basis functions. In its letter dated June 28, 2019, NuScale stated that these clarifications would be included in DCA Part 2, Tier 2, Section 5.4.3.2.1, "Components," for the Decay Heat Removal System (DHRS) valves and Section 6.2.4.2.2 for the CIVs. During this follow-up audit, the NRC staff found that Revision 3 to DCA Part 2, Tier 2, Section 6.2.4.2.2, specifies that the PSCIVs and SSCIVs are designed and qualified such that torque closure using pneumatic pressure provides sufficient mechanical wedging to provide sealing that prevents reopening and unseating of each ball valve for the extended time period for the design-basis and beyond-design-basis functions assumed for each individual ball valve. In addition, the NRC staff found that Revision 3 to DCA Part 2, Tier 2, Section 5.4.3.2.1, specifies that the DHRS actuation valves are designed and qualified for torque opening using pneumatic pressure to provide sufficient mechanical force to utilize seat and actuator friction to prevent reclosing of the ball valve for the time period required to meet their design-basis and beyond-design-basis functions. Based on these DCA modifications, the NRC staff considers this follow-up item to be resolved and closed for the CIV design audit for the NuScale DCA review.
- d) During the initial CIV design audit, the NRC staff found that the proposed revision to DCA Part 2, Tier 2, Section 6.2.4.2.2, did not address the potential for thermal binding of the CIVs as a result of cooling by the reactor pool. In its letter dated January 31, 2019, NuScale stated that it would update the DCA to include provisions to avoid thermal binding of the CIVs by reactor pool cooling. In its letter dated June 28, 2019, NuScale stated that the DCA would be updated to address potential thermal binding and pressure locking

of CIVs. During this follow-up audit, the NRC staff found that Revision 3 to DCA Part 2, Tier 2, Section 6.2.4.2.2, specifies that the PSCIV design includes an integral thermal relief device and provisions to preclude pressure locking, and that the SSCIV designs include provisions to preclude thermal binding and pressure locking. Based on these DCA modifications, the NRC staff considers this follow-up item to be resolved and closed for the CIV design audit for the NuScale DCA review.

2. During the NRC staff's initial audit, the NRC staff found that the diagrams of the CIVs include internal subcomponent valves (such as relief and check valves) that perform safety functions for the proper performance of the CIV actuators, nitrogen gas cylinders, and hydraulic lines. However, the NRC staff did not find the IST provisions for these CIV internal valves in the DCA. During the initial audit, NuScale stated that it would revise the DCA to identify these CIV internal valves and specify the applicable IST testing of those valves consistent with the ASME OM Code provisions, such as skid-mounted components where appropriate. In its letter dated January 31, 2019, NuScale stated that it would update the DCA to identify the CIV internal valves and specify the applicable IST testing of the valves. In its letter dated June 28, 2019, NuScale stated that DCA Part 2, Tier 2, would be updated in Sections 3.9.6.3.2 and 6.2.4.2.2 to resolve this issue. During this follow-up audit, the NRC staff found that Revision 3 to DCA Part 2, Tier 2, Section 6.2.4.2.2, indicates that the CIVs have internal valves, and references Section 3.9.6.3.2 for testing of these components. In addition, the NRC staff found that DCA Part 2, Tier 2, Section 3.9.6.3.2, specifies that the POV skid-mounted components are tested in accordance with the criteria of paragraph ISTC-1200(b) of the ASME OM Code. Based on these DCA modifications, the NRC staff considers this follow-up item to be resolved and closed for the CIV design audit for the NuScale DCA review.
3. During the NRC staff's initial audit review of PSCIV Design Specification EQ-A010-2235, NuScale indicated that when both valves are closed a solid water condition exists in the CIV body. To address this condition, NuScale stated that a thermal relief check valve device will be installed that will vent liquid to the containment vessel side of the valve if an overpressure condition exists. During its initial audit review, the NRC staff did not find this PSCIV design feature described in the DCA. In its letter dated January 31, 2019, NuScale stated that it would revise the DCA to include provisions for the PSCIV thermal relief device. In its letter dated June 28, 2019, NuScale stated that it would revise DCA Part 2, Tier 2, Sections 3.9.6.3.2 and 6.2.4.2.2, to address this issue. During this follow-up audit, the NRC staff found that Revision 3 to DCA Part 2, Tier 2, Section 6.2.4.2.2, specifies that the PSCIV design includes an integral thermal relief device with testing requirements addressed in Section 3.9.6.3.2. In addition, the NRC staff found that DCA Part 2, Tier 2, Section 3.9.6.3.2, specifies that the POV skid-mounted components are tested in accordance with the criteria of paragraph ISTC-1200(b) of the ASME OM Code. Based on these DCA modifications, the NRC staff considers this follow-up item to be resolved and closed for the CIV design audit for the NuScale DCA review.
4. During the NRC staff's initial audit review of SSCIV Design Specification EQ-A010-2224, NuScale indicated that the design of the valve obturator should assure that the force required to open the valve is within the capacity of the actuator under all design conditions. NuScale noted that the qualification requirements will ensure that the

valve strokes under all design conditions to demonstrate that the valve can perform its intended safety function and is free from adverse design deficiencies (such as pressure locking or thermal binding). During its initial audit review, the NRC staff did not find this SSCIV design feature described in the DCA. In its letter dated January 31, 2019, NuScale stated that the DCA would be updated to provide the SSCIV design details to prevent pressure locking and thermal binding. In its letter dated June 28, 2019, NuScale stated that changes were being made to DCA Part 2, Tier 2, Section 6.2.4.2.2, to resolve this follow-up item. During this follow-up audit, the NRC staff found that Revision 3 to DCA Part 2, Tier 2, Section 6.2.4.2.2, specifies that the SSCIV designs include provisions to preclude thermal binding and pressure locking. For example, Section 6.2.4.2.2 specifies that when the Feedwater Isolation Valves (FWIVs) are actuated to close, the Feedwater (FW) check valves close first. The FWIVs then close and fluid between the FWIVs and FW check valves could then heat up. The design overpressure for this condition is taken into consideration in the dual valve design. As the fluid heats and expands, the pressure increase is relieved passively through a small port in the check valve disk. Testing requirements for this passive overpressure feature are addressed by check valve exercise testing in DCA Part 2, Tier 2, Section 3.9.6.3.2. The closed exercise test will verify that the valve is within a flow range that ensures that the valve is closed, and that the disk port is clear and passing fluid. DCA Part 2, Tier 2, Section 3.9.6.1, "Functional Design and Qualification of Pumps, Valves, and Dynamic Restraints," specifies that the functional design and qualification of NuScale safety-related valves is performed in accordance with ASME Standard QME-1-2007, "Qualification of Active Mechanical Equipment Used in Nuclear Power Plants," as accepted in NRC Regulatory Guide 1.100 (Revision 3), "Seismic Qualification of Electrical and Active Mechanical Equipment and Functional Qualification of Active Mechanical Equipment for Nuclear Power Plants." In addition, DCA Part 2, Tier 2, Section 3.9.6.3, "Inservice Testing of Valves," specifies that valves meeting the ASME OM Code scope are subject to the IST requirements of Subsection ISTC, "Inservice Testing of Valves in Light-Water Reactor Nuclear Power Plants," of the ASME OM Code. The NRC staff notes that the NRC regulations in 10 CFR 50.55a, incorporate by reference, the ASME OM Code with conditions. Based on the DCA modifications, the NRC staff considers this follow-up item to be resolved and closed for the CIV design audit for the NuScale DCA review.

B. CIV Design Specification Updates

1. During the NRC staff's initial audit review of PSCIV Design Specification EQ-A010-2235, and SSCIV Design Specification EQ-A010-2224, NuScale indicated that Open Design Issue ODI-16-0221 (Reactor module loading specification for mechanical loads) remained open. In its letter dated January 31, 2019, NuScale stated it would provide audit documentation demonstrating that the CIVs accommodate piping mechanical and thermal design loads. In its letter dated June 28, 2019, NuScale stated that the SSCIV and PSCIV mechanical and thermal design loading had been updated in its revised specifications. In this follow-up audit, the NRC staff confirmed that PSCIV Design Specification EQ-A010-2235, had been revised to remove ODI-16-0221 and to indicate that loads at piping/nozzle connection points will be developed as part of the piping analysis. The NRC staff also confirmed that a NuScale Engineering Change Notice (ECN) had been prepared for SSCIV Design Specification EQ-A010-2224,

to indicate that the specification will be revised to update the loading and load combinations, and to ensure that all applicable loads are considered. Therefore, the NRC staff considers this follow-up item to be resolved and closed for the CIV design audit for the NuScale DCA review.

2. During the NRC staff's audit review of PSCIV Design Specification EQ-A010-2235, and SSCIV Design Specification EQ-A010-2224, NuScale indicated that the purpose of the design specifications is to communicate design requirements to the valve vendor. NuScale noted that the vendor will document the hydraulic actuator sizing and setting of the CIVs in its design documents. In its letter dated January 31, 2019, NuScale stated that it would provide vendor documentation including CIV actuator sizing and settings for audit. In its letter dated June 28, 2019, NuScale stated that the CIV actuator sizing and setting design development calculations were available for audit. In this follow-up audit, the NRC staff confirmed that PSCIV Design Specification EQ-A010-2235 and SSCIV Design Specification EQ-A010-2224 include valve data sheets that specify the valve service conditions and valve and actuator type. The NRC staff notes that a combined license (COL) applicant for a NuScale Power Plant will be responsible for the implementation of the actuator sizing and setting of the plant-specific CIVs. Therefore, the NRC staff considers this follow-up item to be closed for the CIV design audit for the NuScale DCA review.

Reactor Safety Valves

A. RSV Design Specification Updates

1. During the NRC staff's initial audit review of RSV Design Specification EQ-A010-2179, the NRC staff found that the design specification did not indicate the valve size. In its letter dated January 31, 2019, NuScale stated that it would revise the design specification to include the valve size. In its letter dated June 28, 2019, NuScale stated that the design specification had been updated to specify the valve size and type. During this follow-up audit, the NRC staff confirmed that RSV Design Specification EQ-A010-2179 indicates that the RSVs are 3-inch pilot-operated pressure relief valves. Therefore, the NRC staff considers this follow-up item to be resolved and closed for the RSV design audit for the NuScale DCA review.
2. During the NRC staff's audit review of RSV Design Specification EQ-A010-2179, NuScale indicated that ODI-15-0220, "Pressure and temperature for pneumatic leak testing and hydrostatic testing," ODI-15-0329, "Minimum reactor pool temperature," ODI-15-0472, "Inservice examination requirements," ODI-16-0021, "Reactor module nozzle loads," and ODI-16-0684, "Pressure and temperature curves for prototype and qualification testing," were open. In its letter dated January 31, 2019, NuScale stated that it would close the open items or provide documentation demonstrating that the RSV design adequately addresses these items. In its letter dated June 28, 2019, NuScale stated that ODI-15-0220 had been removed from the RSV design specification because hydrostatic testing is required in the RSV design specification and there is no pneumatic actuator for the RSV. NuScale stated that ODI-15-0329 remains in the RSV design

specification because the document revision to include the pool temperature is pending. NuScale stated that ODI-15-0472 has been completed and removed from the RSV design specification. NuScale stated that ODI-16-0021 has been replaced by ODI-19-0008 to provide a more complete description of the required design loading. NuScale stated that ODI-16-0684 has been completed and removed from the RSV design specification. During this follow-up audit, the NRC staff found that the RSV Design Specification EQ-A010-2179 has been revised to update these assumptions. For ODI-19-0008, RSV Design Specification EQ-A010-2179 requires that the forces and moments at all piping/nozzle connection points for valves will be consolidated into a loading specification to provide necessary design inputs for valve analysis. As this audit focused on the functional capability of the RSVs, closure of ODI-19-0008 is not necessary for the completion of this audit. The NRC staff noted that a COL applicant for a NuScale Power Plant will be responsible for finalizing the assumptions for transportation configuration, lowest service temperature, and nozzle mechanical and thermal loads for the RSVs. Therefore, the NRC staff considers this follow-up item to be resolved and closed for the RSV design audit for the NuScale DCA review.

B. RSV Diagram Updates

1. During the initial audit, the NRC staff found that Target Rock Drawing No. 14Z539-RSV2 indicated an RSV actuation time of 2 seconds. RSV Design Specification EQ-A010-2179 in Section 3.9.5, "Stroke Time," requires that the RSV fully open within 1 second after exceeding the lift setpoint. In its letter dated January 31, 2019, NuScale stated that it would update the RSV design drawing to reflect an actuation time of 1 second. In its letter dated June 28, 2019, NuScale stated that RSV design drawing had been updated to specify an actuation time of 1 second. During this follow-up audit, the NRC staff confirmed that NuScale has prepared an ECN to specify that the Target Rock drawing will be updated to require a 1 second actuation time. Therefore, the NRC staff considers this follow-up item to be resolved and closed for the RSV design audit for the NuScale DCA review.
2. During the initial audit, the NRC staff found that Target Rock Drawing No. 14Z539-RSV2 (April 17, 2015), "Reactor Safety Valve 3-inch Class 1500 Inlet – 4-inch Class 600 Outlet," referenced the 2007 Edition of ASME BPV Code. NuScale FSAR Tier 2, Section 5.2.1, "Compliance with Codes and Code Cases," and RSV Design Specification EQ-A010-2179, specify that the 2013 Edition of the ASME BPV Code is the BPV Code of record for the NuScale design certification. In its letter dated January 31, 2019, NuScale stated that it would revise the RSV diagram to specify the correct edition for the ASME BPV Code of record. In its letter dated June 28, 2019, NuScale stated that the RSV design drawing indicates compliance with the ASME BPV Code (2013 Edition), Section III, Subsection NB. During this follow-up audit, the NRC staff confirmed that NuScale has prepared an ECN to specify that the RSV diagram will be updated to reference the 2013 Edition of the ASME BPV Code, Section III, Subsection NB. Therefore, the NRC staff considers this follow-up item to be resolved and closed for the RSV design audit for the

NuScale DCA review.

4.0 CONCLUSION

Based on this audit review, the NRC staff has determined that NuScale has resolved the follow-up items identified in the initial NRC staff's audit report for the NuScale CIV and RSV design documentation. The NRC staff concludes, as required by the NRC regulations in 10 CFR 52.47, that information normally contained in procurement specifications and construction and installation specifications for the NuScale CIVs and RSVs, are sufficiently complete for the Commission to make a safety determination regarding the NuScale DCA. The NRC staff also concludes that the NuScale design documentation for the CIVs and RSVs is consistent with the provisions in the NuScale DCA. During its review of a COL application for a NuScale Power Plant, the NRC staff might conduct regulatory audit activities to review the design specifications for plant-specific CIVs and RSVs.

5.0 DOCUMENTS REVIEWED BY THE NRC STAFF

- NuScale Standard Plant Design Certification Application, Revision 3, ADAMS Accession No. ML19241A315, dated August 22, 2019.
- NuScale Design Specification EQ-A010-2235, "ASME Design Specification for Primary Systems Containment Isolation Valves," Revision 3, dated June 3, 2019.
- NuScale Design Specification EQ-A011-2179, "ASME Design Specification for Reactor Safety Valves," Revision 1, dated May 30, 2019.
- NuScale Engineering Change Notice ECN-A010-7340, "Preclude FWIV Pressure Locking," Revision 0, dated June 12, 2019, and ECN-A010-7099, "Update Specification to Address NRC ASME Design Specification and CIV/RSV Audit Items," Revision 0, dated May 29, 2019, for NuScale Design Specification EQ-A010-2224, "ASME Design Specification for Secondary Systems Containment Isolation Valves," Revision 1, dated December 20, 2017.
- NuScale Engineering Change Notice ECN-A030-6979, "Revise RSV Actuation Time to 1 Second Maximum," Revision 0, dated April 24, 2019, for Target Rock "Reactor Safety Valve 3-inch Class 1500 inlet 4-inch Class 600 outlet," Drawing Number 14Z539-RSV2, dated April 17, 2015.

6.0 REFERENCES

1. NuScale Standard Plant Design Certification Application, Revision 3, ADAMS Accession No. ML19241A315, dated August 22, 2019.
2. NRC Letter, "NuScale Power, LLC – Acceptance of an Application for Standard Design Certification of a Small Modular Reactor," ADAMS Accession No. ML17074A087, dated March 23, 2017.
3. NRC Report of the Regulatory Audit of NuScale Power LLC, Design Documents for Containment Isolation Valves and Reactor Safety Valves, ADAMS Accession No. ML18331A042, dated December 7, 2018.

4. NuScale Letter, "NuScale Power, LLC Submittal of Resolution Plans for Containment Isolation Valves and Reactor Safety Valves Design Document Audit Follow-Up Items," ADAMS Accession No. ML19031C973, dated January 31, 2019.
5. NuScale Letter, "NuScale Power's Status Update for Containment Isolation Valves and Reactor Safety Valves Design Document Audit Follow-Up Items," ADAMS Accession No. ML19179A183, dated June 28, 2019.
6. NRC Plan for Regulatory Audit of the NuScale Power, LLC, Containment Isolation Valves and Reactor Safety Valves, ADAMS Accession No. ML19207A299, dated July 30, 2019.
7. NRO-REG-108, "Regulatory Audits," ADAMS Accession No. ML081910260, dated April 2, 2009.
8. NuScale Letter, "NuScale Power, LLC Response to NRC Request for Additional Information No. 495 (eRAI No. 9565) on the NuScale Design Certification Application," ADAMS Accession No. ML18260A299, dated September 17, 2018.