RAIO-0418-59636

April 20, 2018

Docket No. 52-048

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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Rockville, MD 20852-2738

SUBJECT: NuScale Power, LLC Response to NRC Request for Additional Information No. 372 (eRAI No. 9364) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 372 (eRAI No. 9364)," dated February 27, 2018

The purpose of this letter is to provide the NuScale Power, LLC (NuScale) response to the referenced NRC Request for Additional Information (RAI).

The Enclosure to this letter contains NuScale's response to the following RAI Questions from NRC eRAI No. 9364:

- 14.03.03-8
- 14.03.03-9
- 14.03.03-10

This letter and the enclosed response make no new regulatory commitments and no revisions to any existing regulatory commitments.

If you have any questions on this response, please contact Steven Mirsky at 240-833-3001 or at smirsky@nuscalepower.com.

Sincerely,

Zackary W. Rad
Director, Regulatory Affairs
NuScale Power, LLC

Distribution: Samuel Lee, NRC, OWFN-8G9A
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Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9364

Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9364

Response to Request for Additional Information
Docket No. 52-048

eRAI No.: 9364
Date of RAI Issue: 02/27/2018

NRC Question No.: 14.03.03-8

10 CFR 52.47(b)(1) requires “The proposed inspections, tests, analyses, and acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a facility that incorporates the design certification has been constructed and will be operated in conformity with the design certification, the provisions of the [Atomic Energy] Act, and the Commission's rules and regulations.” In supporting this requirement, discrepancies have been identified in Tier 1 material. Furthermore, as the Tier 1 material becomes a part of the design certification rule, it is of the utmost importance that this information be free of errors. Below are some specific instances that should be addressed:

a) DCD Tier 1, Table 2.1-4, ITAAC #6 is inconsistent between Tier 1 and Tier 2. Specifically, Tier 2 states that the initial RPV beltline Charpy upper-shelf energy is no less than 75 ft-lb but Tier 1 states greater than 75 ft-lb. The inconsistency is impossible to reconcile in the event that the test results are exactly 75 ft-lb. Correct this inconsistency in the DCD.
b) Tier 1, Page 2.1-1 contains a typographical error: “The SG supports the RCS by suppling part of the RCPB” (should be supplying). Correct the typographical error.
c) ASME Piping ITAAC (Table 2.1-4, ITAAC #1, for instance) needs to have an Acceptance Criteria that relates back to the Design Commitment, namely that the Report exists and concludes that the system meets the requirements of ASME Code Section III. This is also consistent with the Tier 2 discussion in Table 14.3-1. The current Acceptance Criteria wording for Table 2.1-4, ITAAC #1 specifies that a Report meets the Section III requirements for a Report - this has no direct tie to what the Design Commitment entails, namely that the piping system complies with ASME Code Section III requirements. As an example, please see Table 2.2-3 ITAAC #1. Correct the affected ITAAC.
d) The definition of ASME Code presented in Tier 1 Section 1.1 does not contain the provisions for conditions and alternatives contained in 10 CFR 50.55a. A verbatim interpretation of the definition would not allow the phrase “ASME Code” to account for the conditions and alternatives provided in 10 CFR 50.55a. Clarification should be added to indicate that the phrase “ASME Code,” as used in the DCD, means “ASME Code, as endorsed in 10 CFR 50.55a.”

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e) The narrative in Tier 2 Table 14.3-1 for DCD Tier 1 Table 2.8-2 ITAAC #2 is inconsistent with the Tier 1 material, as it discusses seismic Category I equipment rather than Class 1E equipment.

NuScale Response:

Part a) response

Tier 1, Section 2.1.1 Design Commitments; Tier 1, Table 2.1-4, ITAAC #6; and Tier 2 Table 14.3-1, ITAAC 02.01.06 are revised to agree with the minimum RPV beltline Charpy upper-shelf energy stated in Tier 2 Section 5.3.1.5.

Part b) response

The typographical error was corrected in Revision 1 to the DCA. The sentence reads "The SG supports the RCS by supplying part of the RCPB."

Part c) response

Tier 1, Table 2.1-4, ITAAC #1 Acceptance Criteria is revised to correlate to the Design Commitment.

Part d) response

The definition of ASME Code in Tier 1, Section 1.1 is revised to include "as endorsed in 10 CFR 50.55a".

Part e) response

The discussion of ITAAC 02.08.02 in Tier 2, Table 14.3-1 was revised in Revision 1 to the DCA and is consistent with Tier 1, Table 2.8-2, ITAAC #2 in that it discusses Class 1E equipment rather than seismic Category I equipment.

Impact on DCA:

Tier 1, Section 1.1 and Section 2.1.1, and Tier 1, Table 2.1-4 and Tier 2, Table 14.3-1 have been revised as described in the response above and as shown in the markup provided in this response.

1.1 Definitions

The definitions below apply to terms that may be used in the design descriptions and associated Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC).

Acceptance Criteria refers to the performance, physical condition, or analysis result for structures, systems, and components (SSC), or program that demonstrates that the design commitment is met.

Analysis means a calculation, mathematical computation, or engineering or technical evaluation. Engineering or technical evaluations could include, but are not limited to, comparisons with operating experience or design of similar SSC.

As-built means the physical properties of an SSC following the completion of its installation or construction activities at its final location at the plant site. In cases where it is technically justifiable, determination of physical properties of the as-built SSC may be based on measurements, inspections, or tests that occur prior to installation, provided that subsequent fabrication, handling, installation, and testing do not alter the properties.

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ASME Code means Section III of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, as endorsed in 10 CFR 50.55a, unless a different section of the ASME Code is specifically referenced.

ASME Code Data Report means a document that certifies that a component or system is constructed in accordance with the requirements of the ASME Code. This data is recorded on a form approved by the ASME.

Component, as used for reference to ASME Code components, means a vessel, concrete containment, pump, pressure relief valve, line valve, storage tank, piping system, or core support structure that is designed, constructed, and stamped in accordance with the rules of the ASME Code. ASME Code Section III classifies a metal containment as a vessel.

Design Commitment means that portion of the design description that is verified by ITAAC.

Design Description means that portion of the design that is certified. Design descriptions consist of a system description, system description tables, system description figures, and design commitments. System description tables and system description figures are only used when appropriate. The system description is not verified by ITAAC; only the design commitments are verified by ITAAC. System description tables and system description figures are only verified by ITAAC if they are referenced in the ITAAC table.

Inspect or **Inspection** means visual observations, physical examinations, or reviews of records based on visual observation or physical examination that compare (a) the SSC condition to one or more design commitments or (b) the program implementation elements to one or more program commitments, as applicable. Examples include walkdowns, configuration checks, measurements of dimensions, or nondestructive examinations. The terms, inspect and inspection, also apply to the review of Emergency Planning ITAAC requirements to determine whether ITAAC are met.

- The CNTS supports the DHRS by closing CIVs for main steam valves and feedwater valves when actuated by MPS for DHRS operation.
- The ECCS supports the RCS by opening the ECCS reactor vent valves and RRVs when their respective trip valve is actuated by MPS.
- The DHRS supports the RCS by opening the DHRS actuation valves on a DHRS actuation signal.
- The CNTS supports the MPS by providing electrical penetration assemblies to route instrument cables for MPS actuation through the CNV.

The NPM performs the following nonsafety-related, risk-significant function that is verified by Inspections, Tests, Analyses, and Acceptance Criteria:

- The CNTS supports the RXB crane by providing lifting attachment points that the RXB crane can connect to so that the NPM can be lifted.

The NPM performs the following nonsafety-related functions that are verified by Inspections, Tests, Analyses, and Acceptance Criteria:

- The CNTS supports the SG by providing structural support for the SG piping.
- The CNTS supports the CRDS by providing structural support for the CRDS piping.
- The CNTS supports the RCS by providing structural support for the RCS piping.
- The CNTS supports the feedwater system by providing structural support for the feedwater system piping.

Design Commitments

- The NPM American Society of Mechanical Engineers (ASME) Code Class 1, 2 and 3 piping systems listed in Table 2.1-1 comply with ASME Code Section III requirements.
- The Nuscale Power Module ASME Code Class 1 and 2 components conform to the rules of construction of ASME Code Section III.
- The Nuscale Power Module ASME Code Class CS components conform to the rules of construction of ASME Code Section III.
- Safety-related structures, systems, and components (SSC) are protected against the dynamic and environmental effects associated with postulated failures in high- and moderate-energy piping systems.
- The Nuscale Power Module ASME Code Class 2 piping systems and interconnected equipment nozzles are evaluated for leak-before-break (LBB).

RAI 14.03.03-8

- The RPV beltline material has a Charpy upper-shelf energy of ~~greater than~~ 75 ft-lb minimum.
- The CNV serves as an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment.
- The CIV closure times limit potential releases of radioactivity.
- The length of piping shall be minimized between the containment penetration and the associated outboard CIVs.

RAI 08.01-1, RAI 08.01-1S1, RAI 08.01-2, RAI 14.03.03-8

Table 2.1-4: NuScale Power Module Inspections, Tests, Analyses, and Acceptance Criteria

No.	Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1.	The NuScale Power Module ASME Code Class 1, 2 and 3 piping systems listed in Table 2.1-1 comply with ASME Code Section III requirements.	An inspection will be performed of the NuScale Power Module ASME Code Class 1, 2 and 3 as-built piping system Design Reports required by ASME Code Section III.	The ASME Code Section III Design Reports (NCA-3550) exist and conclude that the ~~for the~~ NuScale Power Module ASME Code Class 1, 2 and 3 as-built piping systems listed in Table 2.1-1 meet the requirements of ASME Code Section III~~, NCA-3550~~.
2.	The NuScale Power Module ASME Code Class 1 and 2 components conform to the rules of construction of ASME Code Section III.	An inspection will be performed of the NuScale Power Module ASME Code Class 1 and 2 as-built component Data Reports required by ASME Code Section III.	ASME Code Section III Data Reports for the NuScale Power Module ASME Code Class 1 and 2 components listed in Table 2.1-2 and interconnecting piping exist and conclude that the requirements of ASME Code Section III are met.
3.	The NuScale Power Module ASME Code Class CS components conform to the rules of construction of ASME Code Section III.	An inspection will be performed of the NuScale Power Module ASME Code Class CS as-built component Data Reports required by ASME Code Section III.	ASME Code Section III Data Reports for the NuScale Power Module ASME Code Class CS components listed in Table 2.1-2 exist and conclude that the requirements of ASME Code Section III are met.
4.	Safety-related SSC are protected against the dynamic and environmental effects associated with postulated failures in high- and moderate-energy piping systems.	An inspection will be performed of the as-built high- and moderate-energy piping systems and protective features for the safety-related SSC.	Protective features are installed in accordance with the as-built Pipe Break Hazard Analysis Report and safety-related SSC are protected against or qualified to withstand the dynamic and environmental effects associated with postulated failures in high- and moderate-energy piping systems.
5.	The NuScale Power Module ASME Code Class 2 piping systems and interconnected equipment nozzles are evaluated for LBB.	An analysis will be performed of the ASME Code Class 2 as-built piping systems and interconnected equipment nozzles.	The as-built LBB analysis for the ASME Code Class 2 piping systems listed in Table 2.1-1 and interconnected equipment nozzles is bounded by the as-designed LBB analysis.
6.	The RPV beltline material has a Charpy upper-shelf energy of ~~greater than~~ 75 ft-lb minimum.	A vendor test will be performed of the Charpy V-Notch specimen of the RPV beltline material.	An ASME Code Certified Material Test Report exists and concludes that the initial RPV beltline material Charpy upper-shelf energy is ~~greater than~~ 75 ft-lb minimum.
7.	The CNV serves as an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment.	A leakage test will be performed of the pressure containing or leakage-limiting boundaries, and CIVs.	The leakage rate for local leak rate tests (Type B and Type C) for pressure containing or leakage-limiting boundaries and CIVs meets the requirements of 10 CFR Part 50, Appendix J.
8.	Containment isolation valve closure times limit potential releases of radioactivity.	A test will be performed of the automatic CIVs.	Each CIV listed in Table 2.1-3 travels from the full open to full closed position in less than or equal to the time listed in Table 2.1-3 after receipt of a containment isolation signal.

Table 2.1-4: NuScale Power Module Inspections, Tests, Analyses, and Acceptance Criteria (Continued)

No.	Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
15.	The DHRS safety-related valves change position under design differential pressure.	A test will be performed of the DHRS safety-related valves.	Each DHRS safety-related valve listed in Table 2.1-2 strokes fully open and fully closed by remote operation.
16.	The RCS safety-related check valves change position under design differential pressure and flow.	A test will be performed of the RCS safety-related check valves.	Each RCS safety-related check valve listed in Table 2.1-2 strokes fully open and closed under forward and reverse flow conditions, respectively.
17.	The RCS safety-related excess flow check valves change position under excess flow conditions.	A test will be performed of the RCS safety-related excess flow check valves.	Each RCS safety-related excess flow check valve listed in Table 2.1-2 strokes fully closed under excess flow conditions.
18.	The CNTS safety-related hydraulic-operated valves fail to their safety-related position on loss of electrical power under design differential pressure.	A test will be performed of the CNTS safety-related hydraulic-operated valves.	Each CNTS safety-related hydraulic-operated valve listed in Table 2.1-2 fails to its safety-related position on loss of motive power.
19.	The ECCS safety-related RRVs and RVVs fail to their safety-related position on loss of electrical power to their corresponding trip valves under design differential pressure.	A test will be performed of the ECCS safety-related RRVs and RVVs.	Each ECCS safety-related RRV and RVV listed in Table 2.1-2 fails open on loss of electrical power to its corresponding trip valve.
20.	The DHRS safety-related hydraulic-operated valves fail to their safety-related position on loss of electrical power under design differential pressure.	A test will be performed of the DHRS safety-related hydraulic-operated valves.	Each DHRS safety-related hydraulic-operated valve listed in Table 2.1-2 fails open on loss of motive power.
21.	The CNTS safety-related check valves change position under design differential pressure and flow.	A test will be performed of the CNTS safety-related check valves.	Each CNTS safety-related check valve listed in Table 2.1-2 strokes fully open and closed under forward and reverse flow conditions, respectively.
22.	i. ~~The~~A CNTS containment electrical penetration assembly~~ies~~ is~~are~~ rated to withstand fault currents for the time required to clear the fault from its power source. OR ii. A CNTS containment electrical penetration assembly is rated to withstand the maximum fault current for its circuits without a circuit interrupting device.	i. An analysis will be performed of the CNTS as-built containment electrical penetration assembly~~ies~~.	i. A circuit interrupting device coordination analysis exists and concludes that the current carrying capability for each~~the~~ CNTS containment electrical penetration assembly~~ies~~ listed in Table 2.1-3 is greater than the analyzed fault currents for the time required to clear the fault from its power source. OR ii. An analysis of the CNTS containment penetration maximum fault current exists and concludes the fault current is less than the current carrying capability of the CNTS containment electrical penetration

Table 14.3-1: Module-Specific Structures, Systems, and Components Based Design Features and Inspections, Tests, Analyses, and Acceptance Criteria Cross Reference[(1)] (Continued)

ITAAC No.	System	Discussion	DBA	Internal/External Hazard	Radiological	PRA & Severe Accident	FP
02.01.05	NPM	Section 3.6.3, Leak-Before-Break Evaluation Procedures, describes the application of the mechanistic pipe break criteria, commonly referred to as leak-before-break (LBB), to the evaluation of pipe ruptures. The LBB analysis eliminates the need to consider the dynamic effects of postulated pipe breaks for high-energy piping that qualify for LBB. An analysis, which includes material properties of piping and welds, stress analyses, leakage detection capability, and degradation mechanisms, confirms that the as-designed LBB analysis is bounding for the ASME Code Class 2 as-built piping listed in Tier 1 Table 2.1-1 and interconnected equipment nozzles. A summary of the results of the plant specific LBB analysis, including material properties of piping and welds, stress analyses, leakage detection capability, and degradation mechanisms is provided in the as-built LBB analysis report.	X				
02.01.06	NPM	Section 5.3.1.5, Fracture Toughness, discusses the fracture toughness properties of the reactor pressure vessel (RPV) beltline material and the Material Surveillance Program. A Charpy V-Notch test of the RPV beltline material specimen is performed by the vendor to ensure that the initial RPV beltline Charpy upper-shelf energy is ~~no less than~~ 75 ft-lb minimum.	X				
02.01.07	NPM	Section 6.2.6, Containment Leakage Testing, provides a discussion of the leakage testing requirements of the containment vessel (CNV), which serves as an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment. As discussed in Section 6.2.6, the NuScale CNV is exempted from the integrated leak rate testing specified in the General Design Criterion (GDC) 52. In accordance with Table 14.2-43, a preoperational test demonstrates that the leakage rate for local leak rate tests (Type B and Type C) for pressure containing or leakage-limiting boundaries and containment isolation valves (CIVs) meet the leakage acceptance criterion of 10 CFR Part 50, Appendix J.	X				

NuScale Power

Response to Request for Additional Information
Docket No. 52-048

eRAI No.: 9364
Date of RAI Issue: 02/27/2018

NRC Question No.: 14.03.03-9

10 CFR 52.47(b)(1) requires “The proposed inspections, tests, analyses, and acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a facility that incorporates the design certification has been constructed and will be operated in conformity with the design certification, the provisions of the [Atomic Energy] Act, and the Commission's rules and regulations.” In supporting this requirement, the Tier 2 material provides important clarifications to the Tier 1 material and should therefore be as clear as possible with respect to referenced information. The staff notes that references to Tables in the narrative discussion for DCD Tier 2, Table 14.3-1 do not specify Tier 1 or Tier 2. This may provide confusion to a user of this document. For instance, “In accordance with Table 14.2-63, a preoperational test demonstrates that the ECCS safety-related valves listed in Table 2.1-2 stroke fully open…,” refers to both a Table in Tier 2 and Tier 1 without differentiation. Please provide clarification to the language in the DCD.

NuScale Response:

Note 1 is added to Tier 2, Table 14.3-1 to clarify that any references in Table 14.3-1 to sections, figures, and tables refer to Tier 2 unless the reference specifically states Tier 1 sections, figures, or tables.

Note 1 is also added to Tier 2, Table 14.3-2 to clarify that any references in Table 14.3-2 to sections, figures, and tables refer to Tier 2 unless the reference specifically states Tier 1 sections, figures, or tables.

Impact on DCA:

Tier 2, Tables 14.3-1 and 14.3-2 have been revised as described in the response above and as shown in the markup provided in this response.

RAI 08.01-1S1, RAI 08.01-2, RAI 14.03.03-6, RAI 14.03.03-7, RAI 14.03.03-8, RAI 14.03.03-9

Table 14.3-1: Module-Specific Structures, Systems, and Components Based Design Features and Inspections, Tests, Analyses, and Acceptance Criteria Cross Reference[(1)]

ITAAC No.	System	Discussion	DBA	Internal/External Hazard	Radiological	PRA & Severe Accident	FP
02.01.01	NPM	As required by ASME Code Section III NCA-1210, each ASME Code Class 1, 2 and 3 component (including piping systems) of a nuclear power plant requires a Design Report in accordance with NCA-3550. NCA-3551.1 requires that the drawings used for construction be in agreement with the Design Report before it is certified and be identified and described in the Design Report. It is the responsibility of the N Certificate Holder to furnish a Design Report for each component and support, except as provided in NCA-3551.2 and NCA-3551.3. NCA-3551.1 also requires that the Design Report be certified by a registered professional engineer when it is for Class 1 components and supports, Class CS core support structures, Class MC vessels and supports, Class 2 vessels designed to NC-3200 (NC-3131.1), or Class 2 or Class 3 components designed to Service Loadings greater than Design Loadings. A Class 2 Design Report shall be prepared for Class 1 piping NPS 1 or smaller that is designed in accordance with the rules of Subsection NC. NCA-3554 requires that any modification of any document used for construction, from the corresponding document used for design analysis, shall be reconciled with the Design Report. An ITAAC inspection is performed of the NuScale Power Module ASME Code Class 1, 2 and 3 as-built piping system Design Report to verify that the requirements of ASME Code Section III are met.	X				

Table 14.3-1: Module-Specific Structures, Systems, and Components Based Design Features and Inspections, Tests, Analyses, and Acceptance Criteria Cross Reference[(1)] (Continued)

ITAAC No.	System	Discussion	DBA	Internal/External Hazard	Radiological	PRA & Severe Accident	FP
02.08.09	EQ	Section 3.11, Environmental Qualification of Mechanical and Electrical Equipment, presents information to demonstrate that the CNTS electrical penetration assemblies, including its connection assemblies, located in a harsh environment are qualified by type test or a combination of type test and analysis to perform its safety-related function under design basis harsh environmental conditions, experienced during normal operations, anticipated operational occurrences, DBAs, and post-accident conditions in accordance with 10 CFR 50.49. As defined in IEEE-Std-572-2006, IEEE Standard for Qualification of Class 1E Connection Assemblies for Nuclear Power Generating Stations, a connection assembly is any connector or termination combined with related cables or wires as an assembly. The qualification method employed for the equipment is the same as the qualification method described for that type of equipment in Section 3.11. The ITAAC verifies that: (1) an equipment qualification record form exists for the CNTS electrical penetration assemblies listed in Tier 1 Table 2.8-1and addresses connection assemblies; (2) the equipment qualification record form concludes that the CNTS electrical penetration assemblies, including its connection assemblies, performs its safety-related function under the environmental conditions specified in Section 3.11 and the equipment qualification record form; and (3) the required post-accident operability time for the CNTS electrical penetration assemblies in the equipment qualification record form is in agreement with Section 3.11. After installation in the plant, an ITAAC inspection is performed to verify that the CNTS electrical penetration assemblies listed in Tier 1 Table 2.8-1, including its connection assemblies, is installed in its design location in a configuration bounded by the equipment qualification record form.	X				

Note:
1. References to Sections, Figures and Tables in Table 14.3-1 refer to Tier 2 unless the reference specifically states Tier 1 Sections, Figures or Tables

RAI 09.01.04-1, RAI 09.05.01-6, RAI 14.03.02-1, RAI 14.03.02-2, RAI 14.03.03-1, RAI 14.03.03-6, RAI 14.03.03-7, RAI 14.03.03-8, RAI 14.03.09-1, RAI 14.03.09-2, RAI 14.03.09-3, RAI 14.03.12-2, RAI 14.03.12-3

Table 14.3-2: Shared/Common Structures, Systems, and Components and Non-Structures, Systems, and components Based Design Features and Inspections, Tests, Analyses, and Acceptance Criteria Cross Reference[(1)]

ITAAC No.	System	Discussion	DBA	Internal/External Hazard	Radiological	PRA & Severe Accident	FP
03.01.01	CRH	Testing is performed on the CRE in accordance with RG 1.197, "Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors," Revision 0, to demonstrate that air exfiltration from the CRE is controlled. RG 1.197 allows two options for CRE testing; either integrated testing (tracer gas testing) or component testing. Section 6.4 Control Room Habitability, describes the testing requirements for the CRE habitability program. Section 6.4 provides the maximum air exfiltration allowed from the CRE. In accordance with Table 14.2-18, a preoperational test using the tracer gas test method demonstrates that the air exfiltration from the CRE does not exceed the assumed unfiltered leakage rate provided in Table 6.4-1: Control Room Habitability System Design Parameters for the dose analysis. Tracer gas testing in accordance with ASTM E741 will be performed to measure the unfiltered in-leakage into the CRE with the control room habitability system (CRHS) operating.			X		
03.01.02	CRH	The CRHS valves are tested by remote operation to demonstrate the capability to perform their function to transfer open and transfer closed under preoperational temperature, differential pressure, and flow conditions. In accordance with Table 14.2-18, a preoperational test demonstrates that each CRHS valve listed in Tier 1 Table 3.1-1 strokes fully open and fully closed by remote operation under preoperational test conditions. Preoperational test conditions are established that approximate design-basis temperature, differential pressure, and flow conditions to the extent practicable, consistent with preoperational test limitations.			X		

Table 14.3-2: Shared/Common Structures, Systems, and Components and Non-Structures, Systems, and components Based Design Features and Inspections, Tests, Analyses, and Acceptance Criteria Cross Reference[(1)] (Continued)

ITAAC No.	System	Discussion	DBA	Internal/External Hazard	Radiological	PRA & Severe Accident	FP
03.18.01	RM	Section 11.5.2.2.9, Containment Flooding and Drain System, discusses the operation of the containment flooding and drain system (CFDS). For each high radiation signal listed in Tier 1 Table 3.18-1, the CFDS automatically aligns the components identified in Tier 1 Table 3.18-1 to the required positions identified in the table. In accordance with the information presented in Table 14.2-42, a preoperational test demonstrates the CFDS automatically aligns the components identified in Tier 1 Table 3.18-1 to the required positions identified in the table upon initiation of a real or simulated CFDS high radiation signal from 6B-CFD-RT-1007.			X		
03.18.02	RM	Section 11.5.2.2.15, Balance-of-Plant Drain System, discusses the operation of the BPDS. For each high radiation signal listed in Tier 1 Table 3.18-1, the BPDS automatically aligns the components identified in Tier 1 Table 3.18-1 to the required positions identified in the table. In accordance with the information presented in Table 14.2-24, a preoperational test demonstrates the BPDS automatically aligns the components identified in Tier 1 Table 3.18-1 to the required positions identified in the table upon initiation of a real or simulated BPDS high radiation signal from 6B-BPD-RIT-0552.			X		
03.18.03	RM	Section 11.5.2.2.15, Balance-of-Plant Drain System, discusses the operation of the BPDS. For each high radiation signal listed in Tier 1 Table 3.18-1, the BPDS automatically aligns the components identified in Tier 1 Table 3.18-1 to the required positions identified in the table. In accordance with the information presented in Table 14.2-24, a preoperational test demonstrates the BPDS automatically aligns the components identified in Tier 1 Table 3.18-1 to the required positions identified in the table upon initiation of a real or simulated BPDS high radiation signal from 6B-BPD-RIT-0529.			X		

Note:

1. References to Sections, Figures and Tables in Table 14.3-2 refer to Tier 2 unless the reference specifically states Tier 1 Sections, Figures or Tables.

NuScale Power™

Response to Request for Additional Information
Docket No. 52-048

eRAI No.: 9364
Date of RAI Issue: 02/27/2018

NRC Question No.: 14.03.03-10

10 CFR 52.6 requires, in part, that information provided to the Commission by an applicant for a standard design certification be complete and accurate in all material respects. Guidance in SRP 14.3.3 suggests that the reviewer ensure that all Tier 1 information is consistent with Tier 2 information and that ASME code classification, safety classification, and seismic classification of the piping systems should be indicated clearly on the figures or described in the design descriptions and consistent with DCD Tier 2, Section 3.2. The reviewer should also ensure that system boundaries and interfaces are indicated clearly in Tier 1 and that the figures are in accordance with the legends.

DCD Tier 2, Figure 3.6-1, “Piping Systems Associated with the NuScale Power Module,” appears inconsistent with both DCD Tier 1, Figure 2.1-1 and DCD Tier 1, Table 2.1-1, “NuScale Power Module Piping Systems.” Specifically, the classification of the piping systems between the containment isolation valves and the NPM flange connection are depicted as ASME B31.1 in Tier 2, but appear to be ASME Code Section III Class 3 in Tier 1. Additionally, the DHRS penetrations are depicted as penetrations in the CNV head in Tier 2, but are depicted as penetrations in the CNV shell in Tier 1. Correct these inconsistencies.

NuScale Response:

Tier 2, Figure 3.6-1 was deleted as shown in Revision 1 to the DCA. Tier 2, Figure 6.6-1 shows the lines that interface with the CNV.

The classification of piping systems between the containment isolation valves and the NPM flange connection depicted in Tier 2, Figure 6.6-1 agree with the classification of the piping contained in Tier 1, Table 2.1-1. A previously self-identified change to Tier 1, Table 2.1-1 is attached showing appropriate classifications of the piping systems.

Tier 1, Figure 2.1-1 shows the containment system boundaries, and is not intended to depict a physical location of CNV penetrations. No change to Tier 1, Figure 2.1-1 is needed.

Impact on DCA:

A change to Tier 1, Table 2.1-1 was approved and has been revised as described in the response above and as shown in the markup provided in this response.

RAI 10.03-1

Table 2.1-1: NuScale Power Module Piping Systems

Piping System Description	ASME Code Section III Class	High/ Moderate Energy	Evaluated for LBB	Length of Containment Piping (ft)
Outside CNV				
CNTS reactor coolant system injection line from valves CVC-ISV-0331 & CVC-ISV-0329 at CNV nozzle CNV6 to NPM disconnect flange	3	High	No	0 (see Note 1)
CNTS reactor coolant system pressurizer spray line from valves CVC-ISV-0325 & CVC-ISV-0323 at CNV nozzle CNV7 to NPM disconnect flange	3	High	No	0 (see Note 1)
CNTS reactor coolant system discharge line from valves CVC-ISV-0334 & CVC-ISV-0336 at CNV nozzle CNV13 to NPM disconnect flange	3	High	No	0 (see Note 1)
CNTS reactor coolant system RPV high point degasification line from valves CVC-ISV-0401 & CVC-ISV-0403 at CNV nozzle CNV14 to NPM disconnect flange	3	High	No	0 (see Note 1)
CNTS containment evacuation line from valves CE-ISV-0101 & CE-ISV-0102 at CNV nozzle CNV10 to NPM disconnect flange	N/A~~3~~	No	No	0 (see Note 1)
CNTS flood and drain line from valves CFD-ISV-0130 & CFD-ISV-0129 at CNV nozzle CNV11 to NPM disconnect flange	N/A~~3~~	No	No	0 (see Note 1)
CNTS control rod drive mechanism cooling water supply line from valves RCCW-ISV-0185 & RCCW-ISV-0184 at CNV nozzle CNV12 to NPM disconnect flange	N/A~~3~~	No	No	0 (see Note 1)
CNTS control rod drive mechanism cooling water return line from valves RCCW-ISV-0190 & RCCW-ISV-0191 at CNV nozzle CNV05 to NPM disconnect flange	N/A~~3~~	No	No	0 (see Note 1)
CNTS steam generator #1 feedwater line from valves FW-ISV-1003 & FW-CKV-1002 at CNV nozzle CNV1 to NPM disconnect flange	N/A~~2~~	High	No	0 (see Note 1)
CNTS steam generator #2 feedwater line from valves FW-ISV-2003 & FW-CKV-2002 at CNV nozzle CNV2 to NPM disconnect flange	N/A~~2~~	High	No	0 (see Note 1)
CNTS steam generator #1 steam line from CNV nozzle CNV3 ~~to NPM disconnect flange including~~ to and including valves MS-ISV-1005 & MS-ISV-1006	2	High	No	4
CNTS steam generator #2 steam line from CNV nozzle CNV4 ~~to NPM disconnect flange including~~ to and including valves MS-ISV-2005 & MS-ISV-2006	2	High	No	4
DHRS #1 lines from steam generator #1 steam line to DHRS Passive Condenser A including valves DHR-HOV-1002A and DHR-HOV-1002B	2	High	No	N/A
DHRS #1 condensate line from DHRS Passive Condenser A to CNV nozzle CNV22	2	High	No	N/A
DHRS #2 lines from steam generator #2 steam line to DHRS Passive Condenser B including valves DHR-HOV-2002A and DHR-HOV-2002B	2	High	No	N/A
DHRS #2 condensate line from DHRS Passive Condenser B to CNV nozzle CNV23	2	High	No	N/A