Comment Response Matrix
Chapter 3

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
1	All – General	All	NuScale does not use the terms "COL action item" or "COL information item" NuScale uses the term "COL Item" in the design certification document. This specific area of review is in all DSRS sections. The proposed text should be used in all DSRS sections.	Replace COL Item description with the following standardized text: COL Items and Certification Requirements and Restrictions. For a DC application, the review will also address COL Items and requirements and restrictions (e.g., interface requirements and site parameters). For a COL application referencing a DC, a COL applicant must address COL Items (referred to as COL license information in certain DCs) included in the referenced design control document (DCD). Additionally, a COL applicant must address requirements and restrictions (e.g., interface requirements and site parameters) included in the referenced DCD.	The staff does not agree with this recommendation. The staff will use language in the DSRS that is consistent with current regulations and guidance. In 10 CFR Part 52, Section II.E of each design certification appendix, "Tier 2" information is defined. This definition includes Combined License (COL) action or information items as matters that must be addressed in the site-specific portion of the final safety analysis report by a Combined License applicant who references the design certification in the appendix. This is further explained in Regulatory Guide 1.206 – Combined License Applications for Nuclear Power Plants, June 2007, Section C, Part III.4 Combined License Action or Information Items. A COL information item is used in the design certification application as items which are deferred to the COL applicant to address. The staff's final safety evaluation report contains a set of COL action items, which are cross-referenced with the COL

Comment # *(Affiliation: NuScale Power, LLC)*	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
					information items in the related DCD. As such, COL information and COL action items are the terms developed by the NRC which have specific meaning for use in an application and a safety evaluation report. The staff will continue to use the terms COL information or COL action item in the DSRS as appropriate.
2	3.3.1 3.3.2 3.4.1 3.4.2 3.5.1.1 3.5.1.2 3.5.1.3 3.5.1.4 3.5.2 3.5.3	I. Areas of Review	A new area of review item has been added to address RTNSS considerations in some of the new DSRS sections. This represents an additional expectation over the SRP equivalent section. This was not consistently added as some new DSRS sections do not address RTNSS considerations. Note that the new material, as written, limits consideration of only RTNSS B SSCs. This language, by	Clarify the new Area of Review items regarding applicable SSCs and provide consistent implementation within the DSRS sections.	For sections 3.3.1, 3.3.2, 3.4.1, 3.4.2, 3.5.1.1, 3.5.1.2, 3.5.1.4, 3.5.2, and 3.5.3, see footnote[1]. Staff does not agree with the comment as it relates to Section 3.5.1.3. Paragraph II.1 already specifies this information, in that "consideration should be given to safety-related or risk significant systems as described in RG 1.115, "Protection Against Turbine Missiles," Revision 2 and DSRS Section 3.2.2.

[1] The NRC Staff determined whether to develop a new DSRS section after considering whether significant differences in the functions, characteristics, or attributes of the NuScale design required major revision of the related SRP section guidance, or whether structures, systems, and components identified in the NuScale design are unique and not addressed by the current SRP. The Staff revisited these criteria after publishing the Draft version of this DSRS section (Issued in June 2015) and determined, based on the most recent NuScale design, that the related SRP section is appropriate to perform the NRC safety review. Therefore, this DSRS section will not be issued as final and the related SRP section will be used for this portion of the NuScale review. Since this comment is on a Draft DSRS Section that is no longer being used, the staff will not provide a specific response to it. In deciding to use the related SRP section, the staff has not necessarily determined that the SRP section is wholly applicable without modification. For example, as the NRC staff gains greater understanding of the NuScale design or if the design changes during the review, the staff would assess whether different or supplemental review criteria are needed.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
			omission, appears to exclude consideration of safety-related and risk significant SSCs. The DSRS should clarify that safety-related, risk significant, and RTNSS B SSC are within the scope of consideration. Standard Review Plan (SRP) Sections 17.4 and 19.3 describe how SSCs are determined to be risk significant or RTNSS-B. SRP Section 3.2 identifies the SSC that are classified as safety- related, risk significant or RTNSS B.		
3	3.3.1 3.3.2	II. Acceptance Criteria, DSRS Acceptance Criteria	The 1.15 importance factor should only be used for safety related, risk significant and RTNSS B SSCs.	Revise the description of importance factor to: I = importance factor equal to 1.15 for safety related, risk significant and RTNSS B SSCs.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
4	3.3.1	I. Areas of Review	Provide a brief explanation of the NuScale design.	Insert new second paragraph: The NuScale light-water small modular reactor (SMR) is a small-size reactor inside a tightly conforming containment (this combination is called a NuScale power module (NPM)) in a below-grade water-filled reactor pool in the reactor building with up to 12 total modules. A refueling bay and the spent fuel pool are also part of the reactor building pool within the reactor building structure. The NPMs are moved to the refueling bay for inspection, refueling and transfer of spent fuel to the spent fuel pool for storage. The reactor building encloses the reactor module pool, the refueling bay, and the spent fuel pool. The pools are below grade. The turbine generator buildings sit above grade on either side of the reactor building. The control building sits next to one end of the reactor building. The radioactive waste building is above grade and sits adjacent to the reactor building at the end opposite from the control building.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
5	3.3.1	I. Areas of Review specific areas of review	Item 3 is better covered generically in Item 1.	Recommend deleting item 3.	See footnote 1
6	3.3.1	I. Areas of Review specific areas of review	COL items are discussed in the DCD. This should be clarified in item 5. This should be standardized in all DSRSs.	Recommend replacing the second paragraph of item 5 with: For a COL application referencing a DC, a COL applicant must address COL items included in the referenced design control document (DCD). Additionally, a COL applicant must address requirements and restrictions (e.g., interface requirements and site parameters) included in the referenced DCD.	See footnote 1
7	3.3.1	I. Areas of Review specific areas of review	Item 6 is better covered generically in Item 1.	Recommend deleting item 6.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
8	3.3.1	I. Areas of Review specific areas of review	Add interface references for 17.4 (determination of risk significance), 19.3 (determination of RTNSS) and 3.2 (classification of SSC)	Replace item 2 with: 2. Review of the classification of safety-related SSCs is performed under SRP Section 3.2. 3. Review of risk significance determination is performed under SRP Section 17.4. 4. Review of RTNSS is performed under SRP Section 19.3.	See footnote 1
9	3.3.1	II. Acceptance Criteria. DSRS Acceptance Criteria	Safety-related, risk significant and RTNSS B SSC outside of safety-related structures must be confirmed to withstand severe wind without the loss of the capability to preform intended safety functions.	Recommend revising item 4 to state: The staff will evaluate and verify that safety-related, risk significant and RTNSS “B” SSCs outside of seismic category I structures are protected against or designed to withstand the effects of severe winds including gusts and sustained winds without loss of the capability to perform their intended safety functions.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
10	3.3.1	III. Review Procedures	During the review of the DC, the NRC reviewer needs to confirm that appropriate COL items are in the DCD.	Recommend revising item 5 to state: For review of a DC application, the reviewer should follow the above procedures to verify that the design, including requirements and restrictions (e.g., interface requirements and site parameters), set forth in the final safety analysis report (FSAR) meets the acceptance criteria. The reviewer should also consider the appropriateness of identified COL items in the DCD. The reviewer may identify additional COL items; however, to ensure these COL items are addressed during a COL application, they should be added to the DCD.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
11	3.3.2	I. Areas of Review	Provide a brief explanation of the NuScale design.	Insert new second paragraph: The NuScale light-water small modular reactor (SMR) is a small-size reactor inside a tightly conforming containment (this combination is called a NuScale power module (NPM)) in a below-grade water-filled reactor pool in the reactor building with up to 12 total modules. A refueling bay and the spent fuel pool are also part of the reactor building pool within the reactor building structure. The NPMs are moved to the refueling bay for inspection, refueling and transfer of spent fuel to the spent fuel pool for storage. The reactor building encloses the reactor module pool, the refueling bay, and the spent fuel pool. The pools are below grade. The turbine generator buildings sit above grade on either side of the reactor building. The control building sits next to one end of the reactor building. The radioactive waste building sits adjacent to the reactor building at the end opposite from the control building.	See footnote 1

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
12	3.3.2	I. Areas of Review specific areas of review	Item 6 is better covered generically.	Recommend deleting item 6.	See footnote 1
13	3.3.2	I. Areas of Review specific areas of review	For consistency with other DSRS sections, the first sentence of item 7 needs to be underlined and joined to the rest of the text.	Underline "Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)" and delete the blank line afterwards.	See footnote 1
14	3.3.2	I. Areas of Review specific areas of review	For consistency with other DSRS sections, the first sentence of item 8 needs to be underlined and joined to the rest of the text.	Underline "COL Items and Certification Requirements and Restrictions" and delete the blank line afterwards.	See footnote 1
15	3.3.2	I. Areas of Review specific areas of review	NuScale does not use the terms "COL action item" or "COL information item."	Recommend deleting the word "action" in all uses in item 8. Use term "COL Item" generically in all DSRS Sections.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
16	3.3.2	I. Areas of Review specific areas of review	COL items are discussed in the DCD. This should be clarified in item 8.	Replace the second paragraph of item 8 with: For a COL application referencing a DC, a COL applicant must address COL items included in the referenced design control document (DCD). Additionally, a COL applicant must address requirements and restrictions (e.g., interface requirements and site parameters) included in the referenced DCD.	See footnote 1
17	3.3.2	I. Areas of Review specific areas of review	Item 9 is better covered generically.	Recommend deleting item 9.	See footnote 1
18	3.3.2	I. Areas of Review specific areas of review	Add interface references for 17.4 (determination of risk significance), 19.3 (determination of RTNSS) and 3.2 (classification of SSC).	Replace item 3 with: 3. Review of the classification of safety- related SSCs is performed under SRP Section 3.2. 4. Review of risk significance determination is performed under SRP Section 17.4. 5. Review of RTNSS is performed under SRP Section 19.3.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
19	3.3.2	II. Acceptance Criteria. DSRS Acceptance Criteria	Editorial	Add subscript to the first sentence in section 3.I.: After hurricane-generated wind effects, W_{wh}, and missile impact effects, W_{mh}, are determined	See footnote 1
20	3.3.2	II. Acceptance Criteria. DSRS Acceptance Criteria	Safety-related, risk significant and RTNSS B SSC outside of safety-related structures must be confirmed to withstand severe wind without the loss of the capability to preform intended safety functions.	Recommend revising item 5 to state: The staff will evaluate and verify that safety-related, risk significant and RTNSS “B” SSCs outside of seismic category I structures are protected from or designed to withstand the effects of the design- basis tornado and hurricane and associated tornado- and hurricane-borne missiles without loss of capability to perform their intended safety functions following guidance in RG 1.76 and RG 1.221 respectively.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
21	3.3.2	III. Review Procedures	During the review of the DC, the NRC reviewer needs to confirm that appropriate COL items are in the DCD.	Revise item 6 to state: For review of a DC application, the reviewer should follow the above procedures to verify that the design, including requirements and restrictions (e.g., interface requirements and site parameters), set forth in the final safety analysis report (FSAR) meets the acceptance criteria. The reviewer should also consider the appropriateness of identified COL items in the DCD. The reviewer may identify additional COL items; however, to ensure these COL items are addressed during a COL application, they should be added to the DCD.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
22	3.3.2	VI. References	The references are inconsistent with the body of text.	Revise the reference to only include: 1. 10 CFR Part 50, Appendix A, GDC 2, "Design Bases for Protection Against Natural Phenomena." 2. American Society of Civil Engineers/Structural Engineering Institute. "Minimum Design Loads for Buildings and Other Structures, ASCE/SEI 7-05," American Society of Civil Engineers, Reston, Virginia, 2006. 3. RG 1.76, Revision 1, "Design-Basis Tornado and Tornado Missiles for Nuclear Power Plants." 4. RG 1.221, Revision 0, "Design Basis Hurricanes and Missiles for Nuclear Power Plants."	See footnote 1
23	3.4.1	I. Areas of Review, Review Interfaces	Item 10 refers to containment internal structures. There are no containment internal structures in the NuScale design.	Revise item 10 to delete reference to containment internal structures and SRP 3.8.3.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
24	3.4.1	I. Areas of Review	Provide a brief explanation of the NuScale design.	Insert new second paragraph: The NuScale light-water small modular reactor (SMR) is a small-size reactor inside a tightly conforming containment (this combination is called a NuScale power module (NPM)) in a below-grade water- filled reactor pool in the reactor building with up to 12 total modules. A refueling bay and the spent fuel pool are also part of the reactor building pool within the reactor building structure. The NPMs are moved to the refueling bay for inspection, refueling and transfer of spent fuel to the spent fuel pool for storage. The reactor building encloses the reactor module pool, the refueling bay, and the spent fuel pool. The pools are below grade. The turbine generator buildings sit above grade on either side of the reactor building. The control building sits next to one end of the reactor building. The radioactive waste building is above grade and sits adjacent to the reactor building at the end opposite from the control building.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
25	3.4.1	I. Areas of Review specific areas of review	Section 10.4.5 does not address flooding from Circulating Water system.	Recommend deleting item 12.	See footnote 1
26	3.4.1	I. Areas of Review specific areas of review	Change items for consistent identification of SSC as "SSCs subject to flood protection."	Reword item 1: “The SSCs subject to flood protection that must be protected against flooding from both external and internal causes."	See footnote 1
27	3.4.1	I. Areas of Review specific areas of review	Change items for consistent identification of SSC as “SSCs subject to flood protection”	Reword item 2: “The location of SSCs subject to flood protection relative to the internal flood level in various buildings, rooms, and enclosures that house these SSCs.”	See footnote 1
28	3.4.1	I. Areas of Review specific areas of review	Flooding can enter a room from any area, not just non-safety areas.	Strike "non-safety" from item 3 3. Possible flow paths from interconnected areas to buildings, rooms, and enclosures that house SSCs subject to flood protection (e.g., leakage through interconnecting doorways).	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
29	3.4.1	I. Areas of Review specific areas of review	COL items are discussed in the DCD. This should be clarified in item 8.	Replace the second paragraph of item 10 with: "For a COL application referencing a DC, a COL applicant must address COL items included in the referenced design control document (DCD). Additionally, a COL applicant must address requirements and restrictions (e.g., interface requirements and site parameters) included in the referenced DCD."	See footnote 1
30	3.4.1	I. Areas of Review specific areas of review	Add interface references for 17.4 (determination of risk significance), 19.3 (determination of RTNSS) and 3.2 (classification of SSC)	Replace item 5 and 6 with: "5. Review of the classification of safety-related SSCs is performed under SRP Section 3.2.6. Review of risk significance determination is performed under SRP Section 17.4.7. Review of RTNSS is performed under SRP Section 19.3."	See footnote 1
31	3.4.1	I. Areas of Review specific areas of review	Existing item 14 has been split into two items (6 and 7) as part of comment 8.	Recommend deleting item 14.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
32	3.4.1	II. Acceptance Criteria. DSRS Acceptance Criteria	Change item 2 for consistent identification of SSC as "SSCs subject to flood protection", to clarify that breaks and cracks are postulated in accordance with SRP 3.6.1 and 3.6.2, and that hurricanes can also cause failures of unqualified SSC.	Revise item 2 to state: 2. The requirements of GDC 4 are met if SSCs subject to flood protection are designed to accommodate the effects of discharged fluid resulting from high and moderate energy line breaks and cracks that are postulated in accordance with SRP Sections 3.6.1 and 3.6.2, as well as from postulated failures of non-seismic and non-tornado/hurricane protected piping, tanks, and vessels	See footnote 1

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
33	3.4.1	II. Acceptance Criteria Technical Rational	Need to clarify that hurricanes can also cause failure of SSC.	Recommend revising item 1 to state: Compliance with GDC 2 requires that SSCs important to safety be designed to withstand the effects of natural phenomena such as earthquakes, tornados, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions. Meeting the requirements of GDC 2 is necessary to ensure that flooding due to failures of non-seismic and non-tornado/hurricane protected piping, tanks, and vessels does not affect the ability of the plant to shut down safely and remain in safe shutdown condition. The application of GDC 2 to this DSRS section ensures that consideration is given to full-circumferential ruptures of non-seismic moderate energy piping. These ruptures are not considered in SRP Section 3.6.2, which only applies to normal conditions, not seismic events. However, internal flooding caused by seismically- induced full-circumferential ruptures should be considered.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
34	3.4.1	III. Review Procedures	There is no DSRS section for 3.6.1	Revise 4th paragraph of item 4 to state: The environmental effects of piping failures are assessed in accordance with SRP Section 3.6.1, and the determination of mechanistic rupture locations and the resulting dynamic effects are evaluated in accordance with SRP Section 3.6.2.	See footnote 1
35	3.4.1	III. Review Procedures	The NRC review action to determine which SSC should be protected against flooding should be based on DCD Table 3.2-2.	Revise item 3 to state: An evaluation of the SSCs in the DCD Section 3.2 that are safety-related, risk significant or RTNSS-B and should be protected against floods or flood conditions.	See footnote 1
36	3.4.1	III. Review Procedures	Need to clarify that hurricanes can also cause failure of SSC.	Revise first sentence of first paragraph of item 5 to state: 5. An assessment of the potential flooding of SSCs subject to flood protection due to the operation of the fire protection system and the postulated pipe failures in accordance with SRP Section 3.6.2, as well as postulated failures of non-seismic and non-tornado/hurricane protected piping, tanks, and vessels.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
37	3.4.1	III. Review Procedures	Flooding can enter a room from any area, not just non safety areas.	Strike “nonsafety-related” from item 8.A review of plant arrangement and layout drawings to determine if equipment or components subject to flood protection are located within individual compartments or cubicles which act as positive barriers against possible means of flooding, and if barriers or other means of physical separation are utilized between redundant safety- related trains. The review also will identify possible flow paths from interconnected areas to rooms that house SSCs subject to flood protection (e.g., leakage through interconnecting doorways).	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
38	3.4.1	III. Review Procedures	Clarify expectations for design figures relied upon to mitigate the effects of flooding.	Revise item 9 to state: A review of the design features (including classification as safety-related, risk significant or RTNSS B) that will be used to mitigate the effects of internal flooding (e.g., adequate drainage, sump pumps, etc.), if these features are relied upon to ensure adequate time to perform a safe shutdown. Only seismically-qualified systems should be assumed to be available to mitigate the effects of the flooding from non-seismic systems.	See footnote 1
39	3.4.1	III. Review Procedures	During the review of the DC, the NRC reviewer needs to confirm that appropriate COL items are in the DCD.	Revise item 6 to state: For review of a DC application, the reviewer should follow the above procedures to verify that the design, including requirements and restrictions (e.g., interface requirements and site parameters), set forth in the final safety analysis report (FSAR) meets the acceptance criteria. The reviewer should also consider the appropriateness of identified COL items in the DCD. The reviewer may identify additional COL items; however, to ensure these COL items are addressed during a COL	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				application, they should be added to the DCD.	
40	3.4.1	IV. Evaluation Findings	Clarify that safety-related, risk significant and RTNSS B SSC must be considered and addressed.	Recommend revising the second paragraph as follows: The internal flood protection review includes all safety- related, risk significant and RTNSS “B” SSCs. Based on the review of the applicant's proposed design criteria, design bases, and safety classifications for SSCs, the staff concludes that the design of the facility for flood protection conforms to the requirements as set forth in 10 CFR Part 50, Appendix A, GDC 2 and GDC 4. This conclusion is based on the applicant having met these requirements with respect to protection of SSCs subject to flood protection from the effects of external and internal flooding by:	See footnote 1
41	3.4.1	IV. Evaluation Findings	Include tornado/hurricane as a potential cause of non-protected piping tank or vessel failure and that any interconnected area can be a flooding path.	Revise item 1 as follows: Identifying all possible sources of internal flooding, including all pipe breaks or cracks postulated in SRP Sections 3.6.1 and 3.6.2 for seismically qualified high energy and moderate energy	See footnote 1

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				lines, full circumferential breaks of non-seismic moderate energy piping, failures of non- seismic and non-tornado/hurricane protected piping, tanks, and vessels, backflow through drains, and operation of the fire protection system. The application also considers possible flow paths from interconnected areas into areas containing SSCs subject to flood protection.	
42	3.4.1	IV. Evaluation Findings	clarify that safety-related, risk significant and RTNSS B SSC must be considered and addressed	Revise item 2 as follows: Using a method that has been reviewed and found acceptable by the staff to protect safety-related, risk significant and RTNSS-B SSCs from flooding by external and internal causes. The design includes the separation of redundant trains of safety-related, risk significant and RTNSS-B SSCs, the use of protective barriers and enclosures wherever necessary, the placement of safety- related, risk significant and RTNSS-B SSCs above internal flood levels, and an analysis that shows that any SSCs subject to flood protection will retain their safety function if submerged.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
43	3.4.2	I. Areas of Review	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Revise the first paragraph to: The following areas are related to the design of **structures, systems, and components (SSCs)** to withstand the effects of the highest flood level from external sources including tsunamis and other sources (e.g., dam breaks, storm surges, etc.) and groundwater level specified for the plant. These areas are reviewed to ensure conformance with Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix A, General Design Criterion (GDC) 2.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
44	3.4.2	I. Areas of Review	provide a brief explanation of the NuScale design	Insert new second paragraph: The NuScale light-water small modular reactor (SMR) is a small-size reactor inside a tightly conforming containment (this combination is called a NuScale power module (NPM)) in a below-grade water-filled reactor pool in the reactor building with up to 12 total modules. A refueling bay and the spent fuel pool are also part of the reactor building pool within the reactor building structure. The NPMs are moved to the refueling bay for inspection, refueling and transfer of spent fuel to the spent fuel pool for storage. The reactor building encloses the reactor module pool, the refueling bay, and the spent fuel pool. The pools are below grade. The turbine generator buildings sit above grade on either side of the reactor building. The control building, with the control room below grade, sits next to one end of the reactor building. The radioactive waste building sits	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				adjacent to the reactor building at the end opposite from the control building.	
45	3.4.2	I. Areas of Review Review Interfaces	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Replace item 5 with: 5. Review of the classification of safety- related SSCs is performed under SRP Section 3.2. 6. Review of risk significance determination is performed under SRP Section 17.4. 7. Review of RTNSS is performed under SRP Section 19.3.	See footnote 1
46	3.4.2	I. Areas of Review Review Interfaces	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Recommend revising item 6 to state: Review of consideration of the applicable external flood load for all seismic Category I structures and other safety-related, risk significant, and RTNSS-B SSCs is discussed under DSRS Section 3.8.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
47	3.4.2	I. Areas of Review specific areas of review	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Reword item 1 The data of the highest flood, tsunami and groundwater levels. Appropriate loading to account for flood, tsunami and groundwater on **SSCs subject to external flood protection** is established.	See footnote 1
48	3.4.2	I. Areas of Review specific areas of review	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Reword item 2 2. The analysis procedures that are utilized to transform the static and dynamic effects of the highest flood level, probable maximum tsunami, and highest groundwater level into effective loads applied to **SSCs subject to external flood protection** are reviewed.	See footnote 1
49	3.4.2	II. Acceptance Criteria. DSRS Acceptance Criteria	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Revise 2nd paragraph to state: The design of a **SSC** that must withstand the effects of the highest flood, maximum probable tsunami, and highest groundwater levels is acceptable if the relevant requirements of GDC 2, “Design Bases for Protection against Natural Phenomena,” are complied with. The criteria necessary to meet	See footnote 1

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				the relevant requirements of GDC 2 are as follows:	
50	3.4.2	II. Acceptance Criteria Technical Rational	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Recommend revising third paragraph to state: This DSRS guides the review of analysis procedures for the determination of static and dynamic loadings due to natural flooding phenomena. These loadings are to be used in the design of safety-related, risk significant, and RTNSS-B SSCs to ensure their capability to withstand flood effects without loss of their safety functions.	See footnote 1
51	3.4.2	IV. Evaluation Findings	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Recommend revising the third paragraph as follows: The applicant has met the requirements of GDC 2 with respect to the SSCs' capability to withstand the effects of the highest flood, probable maximum tsunami and highest groundwater levels so that their design reflects:	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
52	3.4.2	IV. Evaluation Findings	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Replace the ninth paragraph with the following: The use of these procedures provides reasonable assurance that, in the event of floods, tsunami or high groundwater, the structural integrity of the plant seismic Category I structures will not be impaired and safety-related, risk significant, and RTNSS-B SSCs will be adequately protected and expected to perform necessary safety functions, as required, thus satisfying the requirement of item 3 listed above.	See footnote 1
53	3.4.2	IV. Evaluation Findings	Editorial	In the tenth paragraph: Change “For an application” to “For a COL application”	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
54	3.4.2	VI. References	The references do not align with the content of this DSRS section.	Replace the references with the following: 1. 10 CFR Part 50, Appendix A, General Design Criterion 2, "Design Bases for Protection Against Natural Phenomena." 2. U.S. Army Coastal Engineering Research Center, "Shore Protection Manual," Volume I. Vicksburg, MS. June 2002, reprinted from 1973 edition. 3. U.S. Army Corps of Engineers. Coastal Engineering Manual, Part II, Chapter 1, "Water Wave Mechanics," EM 1110-2-1100. Washington, DC. April 30, 2002. 4. U.S. Army Coastal Engineering Research Center, "Shore Protection Manual," Vol. II. Vicksburg, MS. June 2002, reprinted from 1973 edition.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
55	3.5.1.1	I. Areas of Review	Provide a brief explanation of the NuScale design.	Insert new second paragraph: The NuScale light-water small modular reactor (SMR) is a small-size reactor inside a tightly conforming containment (this combination is called a NuScale power module (NPM)) in a below-grade water- filled reactor pool in the reactor building with up to 12 total modules. A refueling bay and the spent fuel pool are also part of the reactor building pool within the reactor building structure. The NPMs are moved to the refueling bay for inspection, refueling and transfer of spent fuel to the spent fuel pool for storage. The reactor building encloses the reactor module pool, the refueling bay, and the spent fuel pool. The pools are below grade. The turbine generator buildings sit above grade on either side of the reactor building. The control building, with the control room below grade, sits next to one end of the reactor building. The radioactive waste building sits adjacent to the reactor building at the end opposite from the control building.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
56	3.5.1.1	I. Areas of Review Review Interfaces	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Replace item 4 with: 4. Review of the classification of safety- related SSCs is performed under SRP Section 3.2. 5. Review of risk significance determination is performed under SRP Section 17.4.	See footnote 1
57	3.5.1.1	II. Acceptance Criteria. DSRS Acceptance Criteria	Because of the identification of risk significant and RTNSS-B SSC, the term 'non-safety-related" is being replaced in several DSRS sections with "non-safety" this section is changed so that the use of "non-safety" is standardized in the NuScale DSRS.	Replace the last sentence in item 1 with: If the combined probability is greater than 10-7 per year, SSCs subject to missile protection and any **non-safety** SSCs whose failure could affect an intended safety function of the SSCs subject to missile protection should be protected by using one or more of the six methods listed below.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
58	3.5.1.1	III. Review Procedures	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Recommend revising item 3 as follows: The reviewer determines whether an SSC is required to be protected against internally-generated missiles. SRP Sections 3.2.2, 17.4, and 19.3 provide guidance on the identification of the SSCs subject to missile protection. SSCs that meet this criterion or by their failure could have adverse effects on safety functions should be protected from the effects of internally-generated missiles. Review of the effects of internally-generated missiles on structures is a primary responsibility under DSRS Section 3.5.3:	See footnote 1
59	3.5.1.1	III. Review Procedures	Because of the identification of risk significant and RTNSS-B SSC, the term 'non-safety-related" is being replaced in several DSRS sections with "non-safety." this section is changed so that the use of "non-safety" is standardized in the NuScale DSRS	Recommend revising item 5 as follows: The reviewer determines whether non-safety SSCs are protected from internally-generated missiles by whether their failure by a missile impact could prevent surrounding SSCs from performing their required safety function.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
60	3.5.1.2	I. Areas of Review	Provide a brief explanation of the NuScale design.	Insert new second paragraph: The NuScale light-water small modular reactor (SMR) is a small-size reactor inside a tightly conforming containment (this combination is called a NuScale power module (NPM)) in a below-grade water-filled reactor pool in the reactor building with up to 12 total modules. A refueling bay and the spent fuel pool are also part of the reactor building pool within the reactor building structure. The NPMs are moved to the refueling bay for inspection, refueling and transfer of spent fuel to the spent fuel pool for storage. The reactor building sits above the reactor module pool, the refueling bay, and the spent fuel pool. The pools are below grade. The turbine generator buildings sit above grade on either side of the reactor building. The control building, with the control room below grade, sits next to one end of the reactor building. The radioactive waste building is above grade and sits adjacent to the reactor building at the end opposite from the control building.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
61	3.5.1.2	I. Areas of Review Review interfaces	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Replace item 3 and 4 with: 3. Review of the classification of safety-related SSCs is performed under SRP Section 3.2.4. Review of risk significance determination is performed under SRP Section 17.4.5. Review of d RTNSS is performed under SRP Section 19.3.	See footnote 1
62	3.5.1.2	I. Areas of Review Paragraph 2	This scope of this section includes SSCs inside containment while this paragraph refers to only SSCs outside containment.	Change "….SSCs outside containment, are subject to missile protection." to "…SSCs inside containment, are subject to protection from missiles generated inside the containment."	See footnote 1
63	3.5.1.2	II. Acceptance Criteria. DSRS Acceptance Criteria	Because of the identification of risk significant and RTNSS-B SSC, the term 'non-safety-related" is being replaced in several DSRS sections with "non-safety." this section is changed so that the use of "non-safety" is standardized in the NuScale DSRS	Replace the last sentence in item 1 with: If the combined probability is greater than 10-7 per year, SSCs subject to missile protection and any **non-safety** SSCs whose failure could affect an intended safety function of the SSCs subject to missile protection should be protected by using one or more of the six methods listed below.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
64	3.5.1.2	III. Review Procedures	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Recommend revising item 3 as follows: The reviewer determines whether an SSC is required to be protected against internally-generated missiles. SRP Sections 3.2.2, 17.4, and 19.3 provide guidance on the identification of the SSCs subject to missile protection. SSCs that meet this criterion or by their failure could have adverse effects on safety functions should be protected from the effects of internally-generated missiles. Review of the effects of internally-generated missiles on structures is a primary responsibility under DSRS Section 3.5.3:	See footnote 1
65	3.5.1.2	III. Review Procedures	Due to the design of the NuScale containment, maintenance equipment will not be intentionally left inside containment.	Delete item 5	See footnote 1

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
66	3.5.1.2	IV. Evaluation Findings	Due to the design of the NuScale containment, maintenance equipment will not be intentionally left inside containment.	Delete item 3	See footnote 1
67	3.5.1.3	I. Areas of Review	provide a brief explanation of the NuScale design	Replace the first paragraph with the following: General Design Criterion 4 (GDC 4), "Environmental and Dynamic Effects Design Bases," of Appendix A to Title 10 of the Code of Federal Regulations (10 CFR) Part 50 requires that structures, systems, and components (SSCs) important to safety shall be designed to accommodate the effects of and to be compatible with environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of- coolant accidents. These SSCs shall be appropriately protected against dynamic effects including, among others, the effects of missiles. The NuScale light- water small modular reactor (SMR) is a small-size reactor inside a tightly conforming containment (this combination is called a NuScale power module	Staff does not agree with the comment. There is no justification for including a brief explanation of the NuScale design that does not pertain to the subject of turbine missiles. Therefore, information that does not pertain to the DSRS issue of turbine missiles will not be included. The DSRS section currently provides information on the NuScale plant configuration of multiple turbine units (up to 12 units maximum) at one site, and requires the effect of missiles from each turbine much be considered in the evaluation. The proposed wording does not incorporate information related to the number of turbine units and that each one must be considered for evaluation and therefore the proposed wording would also change the scope of review.

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				(NPM)) in a below-grade water-filled reactor pool in the reactor building with up to 12 total modules. A refueling bay and the spent fuel pool are also part of the reactor building pool within the reactor building structure. The NPMs are moved to the refueling bay for inspection, refueling and transfer of spent fuel to the spent fuel pool for storage. The reactor building sits above the reactor module pool, the refueling bay, and the spent fuel pool. The pools are below grade. The turbine generator buildings sit above grade on either side of the reactor building. The control building, with the control room below grade, sits next to one end of the reactor building. The radioactive waste building is above grade and sits adjacent to the reactor building at the end opposite from the control building. The NuScale plant configuration consists of individual turbine units for each NPM. These turbines will be approximately 50 MWe and there may be up to 12 units (six on either side of the Reactor Building) at one site. The effect of missiles from each turbine must be considered in the	

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				evaluation. Turbines significantly different from the current 1,800 revolutions per minute units used in nuclear plants will be reviewed on a case-by-case basis.	
68	3.5.1.3	I. Areas of Review Review Interfaces	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Replace item 5 with: 5. Review of the classification of safety- related SSCs is performed under SRP Section 3.2. 6. Review of risk significance determination is performed under SRP Section 17.4. 7. 7. Review of the classification of safety-related SSCs is performed under SRP Section 3.2.2.	Staff does not agree with the comment. Paragraph II.1 already specifies this information, in that "consideration should be given to safety-related or risk significant systems as described in RG1.115, "Protection Against Turbine Missiles," Revision 2 and DSRS Section 3.2.2."

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
69	3.5.1.3	I. Areas of Review specific areas of review	The (relatively) small turbines used for individual NPMs can be designed with housings that preclude or contain missiles. NuScale intends to utilize a COL item directing applicants to confirm selected turbines are not missile sources.	Insert new sentence in item 1 as shown: The primary review areas include the evaluation of the turbine missile generation probability and/or the evaluation of missile barriers. **Due to the relatively small size of the NuScale steam turbines, the turbine missile generation evaluation may show the turbine rotors may not penetrate the housing, precluding the generation of turbine missiles.** It should be noted that plants that use barriers to protect all essential SSCs specified in RG 1.115, would not have to rely on the turbine missile generation	The staff does not agree that a change is necessary. The proposed change states that one possible barrier for turbine missiles could be the turbine housing. This is already allowed by the DSRS in that the applicant has to provide the information and missile analysis that the barrier (turbine housing, building wall, etc.) can withstand turbine missiles, thereby precluding the generation of turbine missile.
70	3.5.1.3	I. Areas of Review specific areas of review	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Revise the second sentence of item 1. 1. Steam turbines have rotors that rotate at relatively high speeds during normal reactor operation. The failure of a rotor may result in the generation of high energy missiles that could affect **safety- related, risk-significant or RTNSS-B** SSCs.	The staff agrees with this comment and has revised the DSRS accordingly to include turbines rotors in the area of review.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
71	3.5.1.3	II. Acceptance Criteria Article 2 DSRS Acceptance Criteria	There is no Reheat Steam system in the NuScale design.	Delete reference to “reheat steam intercept and stop valves”	The staff has revised the DSRS accordingly. Since the NuScale design has not been submitted to the NRC staff for review and is still subject to change, if there are differences between the scope of the DSRS and the applicable design details then the staff will use the SRP for guidance.
72	3.5.1.3	II. Acceptance Criteria Article 5.C DSRS Acceptance Criteria	There is no Reheat Steam system in the NuScale design.	Delete reference to “reheat steam intercept and stop valves”	The staff has revised the DSRS accordingly. Since the NuScale design has not been submitted to the NRC staff for review and is still subject to change, if there are differences between the scope of the DSRS and the applicable design details then the staff will use the SRP for guidance.
73	3.5.1.3	II. Acceptance Criteria Article 5.C.i DSRS Acceptance Criteria	There is no Reheat Steam system in the NuScale design.	Delete reference to “one reheat intercept valve, one reheat stop valve”	The staff has revised the DSRS accordingly. Since the NuScale design has not been submitted to the NRC staff for review and is still subject to change, if there are differences between the scope of the DSRS and the applicable design details then the staff will use the SRP for guidance.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
74	3.5.1.3	II. Acceptance Criteria Article 5.C.ii DSRS Acceptance Criteria	There is no Reheat Steam system in the NuScale design.	Delete reference to “reheat steam intercept and stop valves”	The staff has revised the DSRS accordingly. Since the NuScale design has not been submitted to the NRC staff for review and is still subject to change, if there are differences between the scope of the DSRS and the applicable design details then the staff will use the SRP for guidance.
75	3.5.1.3	II. Acceptance Criteria Article 5.C.iii DSRS Acceptance Criteria	There is no Reheat Steam system in the NuScale design.	Delete reference to “reheat steam intercept and stop valves”	The staff has revised the DSRS accordingly. Since the NuScale design has not been submitted to the NRC staff for review and is still subject to change, if there are differences between the scope of the DSRS and the applicable design details then the staff will use the SRP for guidance.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
76	3.5.1.3	II. Acceptance Criteria. DSRS Acceptance Criteria	The (relatively) small turbines used for individual NPMs can be designed with housings that preclude or contain missiles. NuScale intends to utilize a COL item directing applicants to confirm selected turbines are not missile sources. Also revised SSCs to include RTNSS-B by referring to SSCS subject to turbine missile protection"	Revise the first sentence of item 3 to state: 3. The staff believes that, **if the turbine casing does not serve to arrest or contain missiles,** maintaining an acceptably low missile generation probability, P1, by means of a suitable program of periodic testing and inspection is a reliable method for ensuring that the objective of precluding generation of turbine missiles (and hence the possibility of damage to **SSCs subject to missile protection by those missiles**) can be met.	No revision to the DSRS was made. The proposed change states that one possible barrier for turbine missiles could be the turbine casing. This is already allowed by the DSRS in that the applicant has to provide the information and missile analysis that the barrier (casing, walls, etc.) can withstand turbine missiles.
77	3.5.1.3	II. Acceptance Criteria. DSRS Acceptance Criteria	The (relatively) small turbines used for individual NPMs can be designed with housings that preclude or contain missiles. NuScale intends to utilize a COL item directing applicants to confirm selected turbines are not missile sources.	Recommend revising the first paragraph of item 5 to state: 5. Applicants are expected to commit to the following program if turbines are obtained from manufacturers that have not submitted, or received NRC approval for, reports either demonstrating that missiles are not credible, or describing their methods and procedures for calculating turbine missile generation probabilities:	The staff does not agree with the comment. The proposed change states that one possible barrier for turbine missiles could be the turbine casing. This is already allowed by the DSRS in that the applicant has to provide the information and missile analysis that the barrier (casing, walls, etc.) can withstand turbine missiles.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
78	3.5.1.3	II. Acceptance Criteria. DSRS Acceptance Criteria	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Replace the element (b) in the first paragraph of item 1 with: (b) the probability of ejected missiles perforating intervening barriers and striking **SSCs subject to missile protection,** P2; and	The staff agrees with this comment and has revised the DSRS accordingly.
79	3.5.1.3	II. Acceptance Criteria. DSRS Acceptance Criteria	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Replace the last sentence in the third paragraph of item 1 with: Similarly, a reasonably accurate specification of the damage probability, P3, is complicated by difficulties associated with defining the missile impact energy required to render SSCs subject to missile protection unavailable to perform their safety functions and with postulating sequences of events that would follow a missile-producing turbine failure.	The staff agrees with this comment and has revised the DSRS accordingly.
80	3.5.1.3	II. Acceptance Criteria. DSRS Acceptance Criteria	The NuScale design may have up to 12 Nuclear Power Modules (NPMs). Each NPM has its own containment.	In the seventh paragraph of item 1: replace “containment” with “any NPM”	The staff agrees with this comment and has revised the DSRS accordingly.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
81	3.5.1.3	II. Acceptance Criteria. DSRS Acceptance Criteria	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	In the seventh paragraph of item 1: Replace “safety-related or risk significant” with “safety-related, risk significant or RTNSS- B.”	The staff agrees with this comment and has revised the DSRS accordingly.
82	3.5.1.3	II. Acceptance Criteria. DSRS Acceptance Criteria	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Recommend revising first sentence of item 6 as follows: 6. An applicant may propose to install barriers or to take credit for existing structures or features as barriers as a method to meet the requirements of GDC 4 for protecting SSCs subject to turbine missile protection.	The staff agrees with this comment, but has revised the sentence to use “for protecting SSCs important to safety as well as risk-significant or RTNSS-B SSCs” rather than the suggested “for protecting SSCs subject to turbine missile protection.”
83	3.5.1.3	II. Acceptance Criteria Technical Rational	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Recommend revising first sentence of item 2 as follows: 2. The protection of SSCs subject to turbine missile protection from the effects of turbine missiles is discussed in this DSRS section.	The staff agrees with this comment and has revised the DSRS accordingly.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
84	3.5.1.3	II. Acceptance Criteria Technical Rational	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Revise item 3 to state: 3. Meeting the requirements of GDC 4 provides assurance that **SSCs subject to turbine missile protection** will be protected from the effects of turbine missiles and will be capable of performing their intended safety or risk significant function.	The staff agrees with this comment and has revised the DSRS accordingly.
85	3.5.1.3	III. Review Procedures	The (relatively) small turbines used for individual NPMs can be designed with housings that preclude or contain missiles. NuScale intends to utilize a COL item directing applicants to confirm selected turbines are not missile sources.	Revise the second sentence in item 4: 4. Compare the applicant's turbine missile generation probability based on the applicant's input with the acceptance criteria described in Subsection II. Review the applicant's methods and analyses to determine that the probability of turbine missile generation **(including analyses demonstrating the turbine casing will arrest or contain missiles)** is acceptable.	The staff does not agree with the comment. This is standard NRC language.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
86	3.5.1.3	III. Review Procedures	The NuScale design may have up to 12 Nuclear Power Modules (NPMs). Each NPM has its own containment.	in item 3 replace “the containment” with “any NPM”	The staff agrees with this comment and has revised the DSRS accordingly.
87	3.5.1.3	III. Review Procedures	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	In item 3 Replace “safety-related or risk significant” with “safety-related, risk significant or RTNSS- B.”	The staff agrees with this comment and has revised the DSRS accordingly.
88	3.5.1.3	III. Review Procedures	NuScale does not use the terms “COL action item” or “COL information item” NuScale uses COL items in the design certification document. This specific area of review is in all DSRS sections. The proposed text should be used in all DSRS sections.	Replace item 6 with: For review of a DC application, the reviewer should follow the above procedures to verify that the design, including requirements and restrictions (e.g., interface requirements and site parameters), set forth in the final safety analysis report (FSAR) meets the acceptance criteria. The reviewer should also consider the appropriateness of identified COL items in the DCD. The reviewer may identify additional COL items; however, to ensure these COL items are	The staff does not agree with this recommendation. The staff will use language in the DSRS that is consistent with current regulations and guidance. In 10 CFR Part 52, Section II.E of each design certification appendix defines “Tier 2” information. This definition includes Combined License (COL) action or information items as matters that must be addressed in the site-specific portion of the final safety analysis report by a Combined License applicant who references the design certification in the appendix. This is further explained in Regulatory Guide

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				addressed during a COL application, they should be added to the DCD.	1.206 – Combined License Applications for Nuclear Power Plants, June 2007, Section C, Part III.4 Combined License Action or Information Items. A COL information item is used in the design certification application as items which are deferred to the COL applicant to address. The staff's final safety evaluation report contains a set of COL action items, which are cross-referenced with the COL information items in the related DCD. As such, COL information and COL action items are the terms developed by the NRC which have specific meaning for use in an application and a safety evaluation report. The staff will continue to use the terms COL information or COL action item in the DSRS as appropriate.

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
89	3.5.1.3	VI. References	The references are incorrect in this DSRS.	Replace all references with: 1. 10 CFR Part 50, Appendix A, General Design Criterion 4, "Environmental and Dynamic Effects Design Bases." 2. Regulatory Guide 1.115, "Protection Against Low-Trajectory Turbine Missiles." 3. NUREG-1048, Supplement No. 6, "Safety Evaluation Report Related to the Operation of Hope Creek Generating Station," July 1986 (includes Appendix U, "Probability of Missile Generation in General Electric Nuclear Turbines"). 4. NUREG/CR-1884, "Observations and Comments on the Turbine Failure at Yankee Atomic Electric Company, Rowe, Massachusetts," March 1981. 5. Preliminary Notification of Event or Unusual Occurrence, PNO-111-81-104, "Circle in the Hub of the Eleventh Stage Wheel in the Main Turbine," Monticello Nuclear Power Station, November 24, 1981. 6. Letter from C. Rossi (NRC) to J. Martin (Westinghouse Electric Corporation), "Approval for Referencing of Licensing Topical Reports WSTG-1-P, May 1981, 'Procedures for Estimating the Probability of Steam Turbine Disc Rupture From Stress Corrosion	PARTIALLY CHANGED The references in this DSRS 3.5.1.3 and DSRS 10.2.3 are incorrect. However, the references are different than the ones proposed. The correct references have been updated in DSRS 3.5.1.3 and 10.2.3.

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				Cracking,' March 1974, 'Analysis of the Probability of the Generation and Strike of Missiles from a Nuclear Turbine,' WSTG-2-P, May 1981, 'Missile Energy Analysis Methods for Nuclear Steam Turbines,' and WSTG-3-P, July 1984, 'Analysis of the Probability of a Nuclear Turbine Reaching Destructive Overspeed,'" February 2, 1987. 7. NUREG-0887, Supplement No. 3, "Safety Evaluation Report Related to the Operation of Perry Nuclear Power Plant, Units 1 and 2," April 1983.	
90	3.5.1.4	I. Areas of Review	Provide a brief explanation of the NuScale design.	Insert new second paragraph: The NuScale light-water small modular reactor (SMR) is a small-size reactor inside a tightly conforming containment (this combination is called a NuScale power module (NPM)) in a below-grade water-filled reactor pool in the reactor building with up to 12 total modules. A refueling bay and the spent fuel pool are also part of the reactor building pool within the reactor building structure. The NPMs are moved to the refueling bay for inspection, refueling and transfer of spent fuel to the spent fuel	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				pool for storage. The reactor building encloses the reactor module pool, the refueling bay, and the spent fuel pool. The pools are below grade. The turbine generator buildings sit above grade on either side of the reactor building. The control building, with the control room below grade, sits next to one end of the reactor building. The radioactive waste building sits adjacent to the reactor building at the end opposite from the control building.	
91	3.5.1.4	I. Areas of Review Review Interfaces	Reference to section 19.3 should be separate from the reference to section 3.5.2. it is deleted here and added as a new item in the next comment	Revise item 1 to state: 1. Reviews of those SSCs that should be protected against missile impact are performed under DSRS Section 3.5.2, "Structures, Systems, and Components to be Protected from Externally-Generated Missiles."	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
92	3.5.1.4	I. Areas of Review Review Interfaces	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	ADD new items 4 5 and 6 as shown: 4. Review of risk significance determination is performed under SRP Section 17.4. 5. Review of RTNSS determination is performed under SRP Section 19.3. 6. Review of the classification of safety- related SSCs is performed under SRP Section 3.2.2.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
93	3.5.1.4	I. Areas of Review specific areas of review	NuScale does not use the terms "COL action item" or "COL information item" NuScale uses COL items in the design certification document. This specific area of review is in all DSRS sections. The proposed text should be used in all DSRS sections	Replace item 3 with the following standardized text: COL Action Items and Certification Requirements and Restrictions. For a DC application, the review will also address COL action items and requirements and restrictions (e.g., interface requirements and site parameters). For a COL application referencing a DC, a COL applicant must address COL action items (referred to as COL license information in certain DCs) included in the referenced design control document (DCD). Additionally, a COL applicant must address requirements and restrictions (e.g., interface requirements and site parameters) included in the referenced DCD.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
94	3.5.1.4	III. Review Procedures	NuScale does not use the terms "COL action item" or "COL information item" NuScale uses COL items in the design certification document. This specific area of review is in all DSRS sections. The proposed text should be used in all DSRS sections	Replace item 9 with: For review of a DC application, the reviewer should follow the above procedures to verify that the design, including requirements and restrictions (e.g., interface requirements and site parameters), set forth in the final safety analysis report (FSAR) meets the acceptance criteria. The reviewer should also consider the appropriateness of identified COL items in the DCD. The reviewer may identify additional COL items, however, to ensure these COL items are addressed during a COL application, they should be added to the DCD.	See footnote 1
95	3.5.2	I. Areas of Review	Provide a brief explanation of the NuScale design.	Insert new second paragraph: The NuScale light-water small modular reactor (SMR) is a small-size reactor inside a tightly conforming containment (this combination is called a NuScale power module (NPM)) in a below-grade water- filled reactor pool in the reactor building with up to 12 total modules. A refueling bay and the spent fuel pool are also part of the reactor building pool within the reactor building structure. The NPMs are moved	See footnote 1

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				to the refueling bay for inspection, refueling and transfer of spent fuel to the spent fuel pool for storage. The reactor building encloses the reactor module pool, the refueling bay, and the spent fuel pool. The pools are below grade. The turbine generator buildings sit above grade on either side of the reactor building. The control building, with the control room below grade, sits next to one end of the reactor building. The radioactive waste building sits adjacent to the reactor building at the end opposite from the control building.	
96	3.5.2	I. Areas of Review Review Interfaces	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Replace item 3 with new items 3, 4 and 5 as shown: 3. Review of risk significance determination is performed under SRP Section 17.4. 4. Review of RTNSS determination is performed under SRP Section 19.3. 5. Review of the classification of safety- related SSCs is performed under SRP Section 3.2.2.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
97	3.5.2	II. Acceptance Criteria. DSRS Acceptance Criteria	Specific acceptance criteria appear to have been inadvertently deleted. It has been restored with reference to UHS removed (as has been done throughout 3.5.2	Insert new second paragraph: Acceptance is based on the design meeting the guidelines of Regulatory Guide (RG) 1.13 as to the capability of spent fuel pool systems and structures to withstand the effects of externally- generated missiles and to prevent missiles from contacting stored fuel assemblies; RG 1.115 as to the protection of SSCs subject to missile protection from the effects of turbine missiles; and RG 1.117 as to the protection of SSCs subject to missile protection from the effects of tornado missiles.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
98	3.5.2	II. Acceptance Criteria. DSRS Acceptance Criteria	Reference to the UHS made in the SRP has been removed from most locations in the development of the DSRS. (NuScale does not have a UHS structure outside the reactor building.) Reference needs to be removed from this section as well.	Delete two sentences from the center of item 1 as shown below: 1. 10 CFR Part 50, Appendix A, GDC 2 establishes requirements for the capability of SSCs important to safety to withstand the effects of natural phenomena without the loss of their safety functions. Application of GDC 2 determines whether the chosen design basis reflects the importance of the safety functions to be performed. RG 1.13 describes a method acceptable to the NRC staff for protecting spent fuel pool systems and structures from externally-generated missiles and preventing mechanical damage to the spent fuel by designing the facility to prevent externally-generated missiles from contacting the spent fuel within the pool. To properly designate SSCs to be protected from externally-generated missiles, the applicant should identify the systems and structures that prevent mechanical damage to the spent fuel. ~~The ultimate heat sink constitutes the source of water supply necessary to safely operate, shut down, and cool down a nuclear plant. Because the ultimate heat sink is important~~	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				~~to safety, its SSCs subject to missile protection should be identified and their safety functions secured. Protecting the ultimate heat sink from externally-generated missiles ensures that the system can perform its safety functions.~~ Protecting SSCs subject to missile protection from externally- generated missiles should secure the following safety functions: maintenance of the integrity of the spent fuel pool mitigation of the potential release of fission products and preservation of the capability of the ultimate heat sink to maintain the plant in a safe condition.	

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
99	3.5.2	III. Review Procedures	All DSRS Sections should consider safety-related, risk significant and RTNSS-B SSC. This text is revised to reflect that generic philosophy.	Revise item 3 as shown: 3. The first step in the review of SSCs requiring protection against externally generated missiles is to ensure the equipment needed to perform a safety- related, function or a risk-significant, or RTNSS B function have been identified as “SSCs subject to missile (externally-generated) protection”. RG 1.115, RG 1.117, and SRP Section 19.3 provide guidance for identification of the “SSCs subject to missile (externally generated) protection.” RG 1.115 describes methods acceptable to the NRC staff for identification and protection of SSCs subject to missile protection from the effects of missiles generated by turbine failure. RG 1.117 describes a method acceptable to the NRC staff for determining which SSCs should be protected from external missiles generated by extreme winds. SRP Sections 17.4 and 19.3 as related to augmented design standards provides guidance on the identification of the risk- significant and RTNSS B SSCs subject to missile protection.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
100	3.5.2	III. Review Procedures	Because risk significant and RTNSS B are considered as well as safety-related, the term "non safety-related SSC' is being revised to "non-safety SSC"	Revise the first sentence of item 5:5. The reviewer determines whether the failure of **non-safety** SSCs as a result of a missile could prevent SSCs subject to missile protection from externally-generated missiles from completing their safety function.	See footnote 1
101	3.5.3	I. Areas of Review	provide a brief explanation of the NuScale design	Insert new second paragraph: The NuScale light-water small modular reactor (SMR) is a small-size reactor inside a tightly conforming containment (this combination is called a NuScale power module (NPM)) in a below-grade water-filled reactor pool in the reactor building with up to 12 total modules. A refueling bay and the spent fuel pool are also part of the reactor building pool within the reactor building structure. The NPMs are moved to the refueling bay for inspection, refueling and transfer of spent fuel to the spent fuel pool for storage. The reactor building encloses the reactor module pool, the refueling bay, and the spent fuel pool. The pools are below grade. The turbine generator buildings sit above grade on either side of the reactor building. The control	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				building, with the control room below grade, sits next to one end of the reactor building. The radioactive waste building sits adjacent to the reactor building at the end opposite from the control building.	
102	3.5.3	I. Areas of Review Review Interfaces	DSRS sections were not prepared for SRP sections 3.5.1.5 and 3.5.1.6	Revise 2nd to last paragraph in item 1 A as follows: Other types of missiles are specified in DSRS Sections 3.5.1.1 **through 3.5.1.4 and SRP Sections 3.5.1.5 and** 3.5.1.6.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
103	3.5.3	IV. Evaluation Findings	Clarification on barriers, when credited, protect SSCs.	Revise fourth paragraph as follows: The use of these procedures provides reasonable assurance that in the event of design basis missiles striking seismic Category I structures or other missile shields and barriers, the structural integrity of the structures, shields, and barriers will not be impaired or degraded to an extent that will result in a loss of required protection. ~~**Seismic Category I**~~ SSCs protected by these barriers are, therefore, adequately protected against the effects of missiles and will perform their intended safety functions. Conformance with these procedures is an acceptable basis for satisfying, in part, the requirements of GDC 2 and 4.	See footnote 1
104	3.5.3	IV. Evaluation Findings	NuScale does not use the terms "COL action item" or "COL information item" NuScale uses COL items in the design certification document.	Revise fifth paragraph as follows: For DC and COL reviews, the findings will also summarize the staff's evaluation of requirements and restrictions (e.g., interface requirements and site parameters) and COL ~~**action**~~ items relevant to this DSRS section.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
105	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria	The NuScale DSRS appears to be based on the mPower DSRS. The mPower DSRS was based on SRP Revision 3. Subsequently, SRP Revision 4 was issued. The proposed NuScale DSRS does not include many improvements which were made in SRP Revision 4. As an example, the discussion of enveloping response spectra at all damping values used was removed between SRP Revision 3 and Revision 4 but remains in the proposed NuScale DSRS. Since SASSI modeling only uses 5% damping, it should not be reintroduced.	Revise the NuScale DSRS to be consistent with the improvements to SRP Revision 4.	The staff has updated the DSRS to reflect the changes between Rev 3 and Rev 4 as needed for the NuScale DSRS.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
106	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria	Discussion of enveloping response spectra at all damping values used was removed between SRP Rev. 3 and Rev. 4. Since SASSI modeling only uses 5% damping, it should not be reintroduced.	Revise the 4th paragraph of (current) item 1.A.ii as follows: The free-field design response spectra (also referred to as the CSDRS for a DC) are usually developed for the 5% damping value. ~~**In the seismic analysis and design, the applicant needs to define the free-field design response spectra corresponding to all damping values to be used.**~~ For the case of RG 1.60 response spectra, Tables 1 and 2 of RG 1.60 provide amplification factors at four frequencies for calculating response spectra corresponding to different damping values. For the case of the free- field design response spectra that are different from RG 1.60 response spectra, procedures to calculate response spectra for damping values other than 5% can utilize the latest available data and methods, such as those in PEER Report 2012/01 or NUREG/CR-6728. The procedures used are reviewed by the staff on a case-by-case basis.	The sentence in question has been deleted, consistent with the response to the previous comment.
107	3.7.1	II. Acceptance Criteria DSRS	The clarification that V and D represented peak ground velocity and peak ground displacement was added to	Revise the 2nd paragraph of item 1.B as follows:	The staff has clarified the text.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
		Acceptance Criteria	SRP Rev. 4. This correction was not made in the NuScale DSRS.	For linear structural analyses, the total duration of the ground motion time histories should be long enough such that adequate representation of the Fourier components at low frequency is included in the time history. The corresponding stationary phase strong-motion duration should be consistent with the longest duration of strong motion from the earthquakes defined in SRP Section 2.5.2 at low and high frequency and as presented in NUREG/CR-6728. The strong motion duration is defined as the time required for the Arias Intensity to rise from 5% to 75%. The uniformity of the growth of this Arias Intensity should be reviewed. The minimum acceptable strong motion duration should be six seconds. In addition to the duration for site-specific analysis, the ratios V/A and AD/V2 (A, V, D are PGA, **peak** ground velocity, and **peak** ground displacement, respectively) should be consistent with the characteristic values for the magnitude and distance of the appropriate controlling events defining the uniform hazard response spectra. These parameters should be	

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				consistent with the values determined for the low and high frequency events described in Appendix D of RG 1.208.	
108	3.7.1	I. Areas of Review	provide a brief explanation of the NuScale design	Insert new second paragraph: The NuScale light-water small modular reactor (SMR) is a small-size reactor inside a tightly conforming containment (this combination is called a NuScale power module (NPM)) in a below-grade water- filled reactor pool in the reactor building with up to 12 total modules. A refueling bay and the spent fuel pool are also part of the reactor building pool within the reactor building structure. The NPMs are moved to the refueling bay for inspection, refueling and transfer of spent fuel to the spent fuel pool for storage. The reactor building sits encloses the reactor module pool, the refueling bay, and the spent fuel pool. The pools are below grade. The turbine generator buildings sit above grade on either side of the reactor building. The control building, with the control room below grade, sits next to one end of the reactor building. The radioactive waste building sits adjacent to the reactor building at	The "areas of review" subsection introduces the issues that will be reviewed under this section. The request is not applicable to the "areas of review" subsection, and the staff has not identified other subsections that need to be changed. No changes to the text have been made.

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				the end opposite from the control building.	
109	3.7.1	I. Areas of Review specific areas of review	The use of the CSDRS for standard plant design should be introduced as early in the DSRS as possible. Also, there will not be non-standard plants, so reference to COL applicants that do not reference a DC needs to be removed.	Reword the first paragraph of item 1.A as follows: A. Design Response Spectra. For a standard plant design, the design response spectra used for design certification (DC) can be a smooth- shaped broadband spectrum consistent with the conditions postulated for the standard design. The postulated seismic design response spectra will become the certified seismic design response spectra (CSDRS) when the design is certified by the Commission under 10 CFR Part 52. For a combined license (COL) application, the site specific design response spectra are typically developed from the site-specific ground motion response spectra (GMRS).	The staff agrees with the comment and has made the requested clarification to the text with some minor modifications.
110	3.7.1	I. Areas of Review specific areas of review	since the DSRS is NuScale specific, delete references to iPWRS	Reword 10th paragraph of 1.A as follows: For structures with either surface or shallowly embedded foundations, the seismic input motions to the SSI analyses can typically be placed at the free ground surface or at the foundation level using the	Reference to iPWR removed. Text revised.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				guidance in this DSRS Section, as supplemented by DC/COL-ISG-017. However, the input motions defined at locations other than the foundation level may not be appropriate for deeply embedded structures. ~~**such as those encountered in iPWRs**~~**.** In these situations, the seismic input should only be specified at the foundation level as FIRS.	

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
111	3.7.1	I. Areas of Review specific areas of review	Discussion of enveloping response spectra at all damping values used was removed between SRP Rev. 3 and Rev. 4. Since SASSI modeling only uses 5% damping, it should not be reintroduced.	Reword 2nd paragraph of 1.B as follows: When an appropriate recorded or specified time history is not available as input ground motion for seismic system analysis, the three spatial components of artificial time histories may be generated from the design response spectra for the purpose of carrying out a time history analysis of the SSCs. In demonstrating the statistical independence of the three components of ground motion, the correlation coefficients between the time histories are reviewed. The response spectra obtained from such artificial time histories of ground motion should generally envelop the design response spectra **~~for all damping values to be used~~.** The procedures used to generate response spectra from the artificial time histories and the comparisons of these response spectra with the design response spectra are reviewed.	The staff agrees with the comment and changed the text to eliminate the phrase "for all damping values to be used."

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
112	3.7.1	I. Areas of Review specific areas of review	Since CSDRS was defined earlier in the DSRS (see above comment) item 4 needs to be updated	Replace item 4 with: 4. Review Considerations for DC and COL Applications. For a DC application, the CSDRS are reviewed. The input or control location for the CSDRS is also reviewed. For a COL application referencing a certified design, the demonstration that the CSDRS, when transferred to the foundation level, envelops the site-specific FIRS is reviewed.	The staff has reviewed the requested change and finds that this paragraph is consistent with the SRP and there is no need to change the text. The concept of CSDRS can be reiterated here.
113	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria	Appendix S requires the PGA of the SSE to be greater than 0.1. this is not a "minimum peak PGA"	Revise the first sentence of the second paragraph of section 1.A. to: According to Appendix S to 10 CFR Part 50, the ~~**minimum peak**~~ PGA for the horizontal component of the SSE at the foundation level in the free-field should be 0.1g or higher.	The staff clarifies that the requirement is to have a minimum of 0.1g as the PGA for the input motion. The staff finds the text, as written, adequate to convey this requirement. Hence, no changes to the text have been made in response to this comment.
114	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria	There will not be non-standard plants, so reference to COL applicants that do not reference a DC needs to be removed.	Delete item i from section 1.A.	The staff agrees and has removed the reference to the non-standard design. Therefore paragraph 1.A.i has been removed.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
115	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria	There will not be non-standard plants, so reference to COL applicants that do not reference a DC needs to be removed.	The first sentence of the second paragraph of (current) item 1.A.ii needs to be reworded to delete the reference item i: In addition, for a DC application, the CSDRS needs to envelop the minimum required spectrum at the foundation level.	Paragraph 1.A.ii renumbered as 1.A.i. and the text is modified as requested.
116	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria	Design time histories need to be developed for the CSDRS in the DC.	Revise first sentence of 1.BB. Design Time Histories. The **CSDRS,** SSE and OBE design ground motion time histories can be either real time histories or artificial time histories.	CSDRS has been added to the text in Paragraph 1.B.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
117	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria 1. Design Ground Motion. B. Design Time Histories Option 1: Single Set of Time Histories ii. Approach 2 item (c)	This paragraph was revised in the SRP between Rev. 3 (March 2007) and Rev. 4 (Dec 2014). However, the Rev. 3 version was retained in the DSRS, and should be updated to be consistent with the SRP Rev. 4 issued Dec 2014	Replace item (c) with (c) The computed 5% damped response spectrum of the acceleration time history should not fall more than 10% below the target response spectrum at any one frequency. To prevent response spectra in large frequency windows from falling below the target response spectrum, the response spectra within a frequency window of no larger than +10% centered on the frequency should be allowed to fall below the target response spectrum. This corresponds to response spectra at no more than 9 adjacent frequency points defined in (b) above from falling below the target response spectrum.	The staff accepts the requested change as it is consistent with Revision 4 of the SRP section. This change has been made in the text of the DSRS with minor modifications.
118	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria	Preparation of PSD plots should be identified as an additional step in Option 1 Approach 2.	In 1.B.Option 1.ii, revise the step numbers in the first sentence as shown: ii. Approach 2. For Approach 2, the design ground motion time histories that are generated to match or envelop the design response spectra should comply with Steps (a) through ~~**(d)**~~**(e)** below.	The staff accepts this requested change as it assists the user. The text has been changed to include this as a separate step.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
119	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria	Preparation of PSD plots should be identified as an additional step in Option 1 Approach 2.	Recommend splitting 1.B.option 1.ii (d) into two steps as shown:(d) The computed 5% damped response spectrum of the acceleration time history should not exceed the target response spectrum at any frequency by more than 30% (a factor of 1.3) in the frequency range of interest. **(e)** In addition, the power spectrum density of the accelerogram needs to be computed and shown to not have significant gaps in energy at any frequency over this frequency range.	The staff accepts the suggestion and has made this change to the text as discussed in the previous response.
120	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria	The expectation that criteria in items (a) and (b) of approach 2 be satisfied was changed from "need to be" to "should be" in Rev. 4 of the SRP. Because Option 2 is used for multiple time histories, some allowance should be available for minor deviations. The wording in SRP Rev. 4 is sufficient to achieve that.	In 1.B.Option 2, revise the text in the second to last paragraph as shown: When implementing Approach 2, the criteria in paragraphs (a) and (b) of this approach ~~**need to**~~ **should** be satisfied for each of the time histories.	The staff accepts the suggestion and has made this change to the text.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
121	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria	Preparation of PSD plots should be identified as an additional step in Option 1 Approach 2.	In 1.B.Option 2, revise the step numbers in the last sentence of the second paragraph as shown: The criteria in paragraphs **(c), (d) and (e)** of this approach can be satisfied by utilizing the results for the average of the suite of multiple time histories.	The staff agrees with the comment and has revised the text accordingly.
122	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria 1. Design Ground Motion. B. Design Time Histories Option 2: Multiple Sets of Time Histories item 3	This paragraph was revised in the SRP between Rev. 3 (March 2007) and Rev. 4 (Dec 2014). However, the Rev. 3 version was retained in the DSRS, and should be updated to be consistent with the SRP Rev. 4 issued Dec 2014.	Replace Item 3 with: 3. Supporting Media for Seismic Category I Structures. To be acceptable, the description of supporting media for each seismic Category I structure should include foundation embedment depth, depth of soil over bedrock, soil layering characteristics, design groundwater elevation, dimensions of the structural foundation, total structural height, and soil properties (such as shear wave velocity, shear modulus, material damping including strain-dependent effect as well as Poisson's ratios, and density as a function of depth). If the minimum shear wave velocity of the supporting foundation material is less than 1,000 fps, additional studies need to be performed which consider the average shear wave velocity, and	The staff accepts the requested change. Text change to include "potential" to qualify settlement.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				its degree of variability addressing potential impact of soft soil on the SSI analyses, potential settlements, and design of foundation elements.	
123	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria 1. Design Ground Motion. B. Design Time Histories Option 2: Multiple Sets of Time Histories item 4Ai	This paragraph was revised in the SRP between Rev .3 (March 2007) and Rev. 4 (Dec 2014). However, the Rev. 3 version was retained in the DSRS, and should be updated to be consistent with the SRP Rev. 4 issued Dec 2014.	Replace paragraph 4.A. i with: i. Site- specific FIRS and PBRS are reviewed separately under this DSRS Section for adequacy. For a COL application referencing an ESP and DC, the FIRS and PBRS are included in the COL application. The COL review should include determination of the PBRS at the surface and associated deterministically defined soil columns needed for determining the adequacy of the check on performance goal. The FIRS with the consistent soil columns together form the design basis that is used for the seismic analysis of the facilities.	The staff does not agree with this request. This is a design specific element that the staff introduced specific to the NuScale design. The SRPs are used verbatim where applicable but the DSRS complements the SRP where design deviations from LWRs demand different intermediate steps to demonstrate the fulfillment of the requirements.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
124	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria 1. Design Ground Motion. B. Design Time Histories Option 2: Multiple Sets of Time Histories item 4Aiii	This paragraph was revised in the SRP between Rev. 3 (March 2007) and Rev. 4 (Dec 2014). However, the Rev. 3 version was retained in the DSRS, and should be updated to be consistent with the SRP Rev. 4 issued Dec 2014.	Replace paragraph 4.A. iii with: iii. Confirm that COL items contained in the DC have been met. This includes seismic design parameters such as soil layering assumptions used in the certified design, range of soil parameters, shear wave velocity values, and minimum soil bearing capacity. A technical justification for all deviations from the range of values used in the standard plant design should be provided.	Because the content is the same in Revision 3 and Revision 4, no change was made.
125	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria 1. Design Ground Motion. B. Design Time Histories Option 2: Multiple Sets of Time Histories item 4Aiv	This paragraph was revised in the SRP between Rev. 3 (March 2007) and Rev. 4 (Dec 2014). However, the Rev. 3 version was retained in the DSRS, and should be updated to be consistent with the SRP Rev. 4 issued Dec 2014.	Replace second paragraph of 4.A. iv with: v. The PBSRS are generated using the soil profiles for which the performance- based FIRS are generated. The properties of the individual realizations of the soil column consist of at least 60 or more randomized soil profiles similar to those used in the PSHA process and reviewed under SRP Section 2.5.2 and as described in DC/COL-ISG-017. From this set of randomized columns, three individual soil columns are generated with individual layer	Because the content of DSRS paragraphs 4.A.iv and 4.A.v is the same as the content of paragraph 4.A.iv in revision 4 of the SRP, no change has been made. Paragraphs 4.A.iv and 4.A.v of the DSRS together represent the Paragraph 4.A.iv of the SRP Rev 4. Splitting the content of SRP Paragraph 4.A.iv into two paragraphs assists the user in keeping focus to two distinct review considerations in separate steps.

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				properties (shear wave velocity and iterated hysteretic damping) selected at the best estimate (BE), lower bound (LB) at minus one-standard deviation values, and upper bound (UB) at plus one standard deviation values. For SSI analyses, the LB and UB profiles may be modified to ensure that they satisfy the criteria of COV in velocity properties as described in DSRS Section 3.7.2. These individual soil columns are to be used in deterministic site response and SSI analyses described in DSRS Section 3.7.2. Free-field response spectra are then generated at the ground surface from the FIRS input at the foundation level for each of these three deterministic soil profiles. The envelope of these three spectra (BE, LB, and UB) should equal or exceed the corresponding PBSRS. If the envelope spectra do not equal or exceed the PBSRS, additional soil profiles can be developed for which SSI analyses are to be performed, or, the input time histories may be modified in accordance with DC/COL-ASG-017, Section 5.2 – Position on Site-Consistent Seismic Input	

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				and Soil Profiles Properties for the SSI Analysis.	
126	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria 1. Design Ground Motion. B. Design Time Histories Option 2: Multiple Sets of Time Histories item 4Avi	This paragraph was revised in the SRP between Rev. 3 (March 2007) and Rev. 4 (Dec 2014). However, the Rev. 3 version was retained in the DSRS, and should be updated to be consistent with the SRP Rev. 4 issued Dec 2014	Replace paragraph vi with: When the site- specific FIRS and the CSDRS are determined at different elevations, the CSDRS-consistent spectra should be calculated at the foundations of each seismic Category I structure. For each seismic Category I structure foundation, if the CSDRS-consistent spectra at the foundation level envelop the site-specific FIRS at the foundation level, the standard design is acceptable for that site, assuming no other issue is identified during the review process. If not, then proceed to step viii.	The staff does not agree that a revision is necessary to provide additional clarity.
127	3.7.1	II. Acceptance Criteria DSRS Acceptance Criteria	There will not be non-standard plants, so reference to COL applicants that do not reference a DC needs to be removed.	Delete items 4.C and 4.D entirely	The staff agrees and the text has been modified.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
128	3.7.1	III. Review Procedures	There will not be non-standard plants, so reference to COL applicants that do not reference a DC needs to be removed.	Replace item 3.A with the following: A. Design Response Spectra. For the DC, the CSDRS (for the OBE and SSE) for applicable damping values are checked to ensure that the CSDRS are in accordance with the acceptance criteria as given in Subsection II.1.A.i of this DSRS Section. Any deviations from the acceptance criteria applicable to the development of the CSDRS that have not been adequately justified are identified, and the applicant is informed of the need for additional technical justification.	The staff agrees and the text has been modified.
129	3.7.1	III. Review Procedures	The CSDRS is used of DC application, not the SSE which is site specific.	Revise the first sentence of item 4 as follows: 4. Percentage of Critical Damping Values. The specific percentage of critical damping values for the OBE and SSE **(CSDRS for DC Applications)** used in the analyses of seismic Category I SSCs are checked to ensure that the damping values are in accordance with the acceptance criteria as given in Subsection II.2 of this DSRS Section.	The staff revised the text as follows: "----the OBE and SSE (CSDRS for DC applications) used in the analyses of Seismic Category I SSCs are checked to ensure that the damping values are in accordance with the acceptance criteria as given in Subsection II.2 of this DSRS Section." to accommodate the request.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
130	3.7.1	IV. Evaluation findings	This section was revised in the SRP between Rev. 3 (March 2007) and Rev. 4 (Dec 2014). However, the Rev. 3 version was retained in the DSRS, and should be updated to be consistent with the SRP Rev. 4 issued Dec 2014	Replace paragraphs ,4,5 with the following: The applicant has met the relevant requirements of GDC 2 and 10 CFR Part 50, Appendix S by appropriate consideration for the most severe earthquake recorded for the site with an appropriate margin and considerations for two levels of earthquakes -the SSE and OBE. The applicant has met these requirements by the use of the methods and procedures as follows: The seismic design response spectra (OBE and SSE) applied in the design of seismic Category I SSCs meet or exceed the free-field response spectra provided in SRP Section 2.5.2. For the plant subject to Appendix S of 10 CFR Part 50, the horizontal component of the SSE ground motion in the free-field at the foundation level of the structures is based on an appropriate response spectrum with a PGA of at least 0.1g. The appropriate response spectrum associated with this minimum PGA should be a smooth broadband response spectrum (e.g., RG 1.60, or other appropriate shaped spectra, if justified). The percentage of	The difference in language between the SRP Rev 4 and the DSRS is specific to the NuScale design being evaluated. Thus, the staff is making no changes to the DSRS in response to this comment.

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				critical damping values used in the seismic analysis of seismic Category I SSCs is in conformance with RG 1.61. The design time history used for seismic design of seismic Category I plant SSCs is adjusted in amplitude and frequency content to obtain response spectra that envelop the design response spectra specified for the site and also exhibits sufficient energy in the frequency range of interest. Conformance with the recommendations of SRP Section 2.5.2 and RG 1.61 ensures that the seismic inputs to the analysis of seismic Category I SSCs are adequately defined so as to form a conservative basis for the design of such SSCs to withstand seismic loadings. The CSDRS used in the certified design of seismic Category I SSCs meet the requirements of Appendix S to 10 CFR Part 50 by either: (1) demonstrating that the CSDRS meet or exceed the site-specific FIRS reviewed under this DSRS Section and meet or exceed the minimum required response spectrum specified in 10 CFR Part 50, Appendix S, or (2) showing that the design resulting from application of the	

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				CSDRS is still adequate to resist design demands resulting from the analysis conducted using the site- specific FIRS	
131	3.7.1	IV. Evaluation findings	There will not be non-standard plants, so reference to COL applicants that do not reference a DC needs to be removed. NuScale does not use the terms "COL action item" or "COL information item" NuScale uses COL items in the design certification document.	Recommend deleting the 6th paragraph. Revise 7th paragraph as follows: For DC and COL reviews, the findings will also summarize the staff's evaluation of requirements and restrictions (e.g., interface requirements and site parameters) and COL **~~action~~** items relevant to this DSRS section	The Staff agrees with the comment to the extent it suggests deleting guidance on non-standard plants, and the text has been revised accordingly. For the reasons given in response to comment 1, the Staff disagrees with the comment to the extent it suggests changing "COL action items" to "COL items."
132	3.7.1	IV. Evaluation findings	barriers, when credited, protect SSC	Revise fourth paragraph as follows: The use of these procedures provides reasonable assurance that in the event of design basis missiles striking seismic Category I structures or other missile shields and barriers, the structural integrity of the structures, shields, and barriers will not be impaired or degraded to an extent that will result in a loss of required protection. **~~Seismic Category I~~** SSCs protected by these barriers are,	The comment is not clearly stated and the issue of missile impact is not mentioned in DSRS section 3.7.1. Hence no action is taken in this section.

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				therefore, adequately protected against the effects of missiles and will perform their intended safety functions. Conformance with these procedures is an acceptable basis for satisfying, in part, the requirements of GDC 2 and 4.	
133	3.7.2	II. Acceptance Criteria DSRS Acceptance Criteria	Acceptance criteria item 4 "Soil structure Interaction" is approximately 8 pages long and has multiple numbered and lettered lists as well as bulleted lists.	The NRC should consider restructuring the item for consistency.	The DSRS acceptance criteria is consistent with the specific items listed in the Areas of Review in Section I of the DSRS. These criteria represents staff's detailed guidance on meeting the relevant requirements of the NRC's regulations. As such, the DSRS in this regard need not be changed.
134	3.7.2	I. Areas of Review	Provide a brief explanation of the NuScale design.	Insert new second paragraph: The NuScale light-water small modular reactor (SMR) is a small-size reactor inside a tightly conforming containment (this combination is called a NuScale power module (NPM)) in a below-grade water- filled reactor pool in the reactor building with up to 12 total modules. A refueling bay and the spent fuel pool are also part of the reactor building pool within the reactor building structure. The NPMs are moved to the refueling bay for inspection, refueling and transfer	As discussed in response to comment 108, the "areas of review" subsection is not the appropriate subsection to include this information, and the staff has not identified other subsections that need to be changed. No changes have been made.

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				of spent fuel to the spent fuel pool for storage. The reactor building encloses the reactor module pool, the refueling bay, and the spent fuel pool. The pools are below grade. The turbine generator buildings sit above grade on either side of the reactor building. The control building, with the control room below grade, sits next to one end of the reactor building. The radioactive waste building sits adjacent to the reactor building at the end opposite from the control building.	
135	3.7.2	I. Areas of Review Review Interfaces	Supporting media (soil profiles) are also developed and discussed in section 3.7.1	Revise item 3 as follows: 3. The design ground motion (response spectra and time histories) **and supporting media (soil profiles) are** reviewed under DSRS Section 3.7.1.	The NRC agrees with the comment and has incorporated the suggested revision.
136	3.7.2	I. Areas of Review Review Interfaces	Containment is not a structure. DSRS Section 3.8.2 applies to containment.	Revise item 5 as follows: 5. The design of seismic Category I structures for all applicable load combinations is reviewed under DSRS Sections **3.8.4 and** 3.8.5.	The staff agrees that for this design the containment is more like a vessel than a structure. Hence the requested modifications have been incorporated in the text of the DSRS.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
137	3.7.2	I. Areas of Review Review Interfaces	CSDRS is the design motion for the DC	Revise the last paragraph of section I as follows: The review of the design ground motion **(certified seismic design response spectra (CSDRS),** safe shutdown earthquake (SSE); operating basis earthquakes (OBE), if applicable), the generic-site or site-specific soil properties, and the SSI analyses is an integral part of the overall review process for seismic Category I structures.	No change is necessary. Changing the order of the CSDRS and SSE does not provide any further clarification. For a COL application the staff uses both the CSDRS and the site-specific SSE.
138	3.7.2	II. Acceptance Criteria DSRS Acceptance Criteria	Containment is not a structure. DSRS sections 3.8.2 and 3.8.3 apply to containment.	Revise 2.A as follows: A. A summary of modal masses, effective masses, natural frequencies, mode shapes, and modal and total responses for the seismic Category I structures ~~**(including the containment structure)**~~, or a summary of the total responses if the method of direct integration is used.	The staff agrees that containment is not a structure, and the reference to containment has been eliminated. Instead, a reference to the reactor power module has been made, which is a structure.
139	3.7.2	II. Acceptance Criteria DSRS Acceptance Criteria	Containment is not a structure. DSRS sections 3.8.2 and 3.8.3 apply to containment.	Revise 2.C.iv third paragraph Further guidance on consideration of concrete cracking in the analysis and design of seismic Category I structures is provided in the acceptance criteria for design and analysis procedures	The NRC staff understands that NuScale's comment is intended to apply to the acceptance criteria in Section II.3.C.iv. With this understanding, the staff agrees and the text has been revised accordingly.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				presented in DSRS Sections **3.8.4 and 3.8.5**.	
140	3.7.2	II. Acceptance Criteria DSRS Acceptance Criteria	There are no existing structures.	Revise 2.C.iv 6th paragraph (first sentence) For ~~existing structures or~~ site-specific designs, where it is not desirable to utilize the approach described above, a seismic analysis can be performed based on the best estimates of the stiffness properties of the structural members.	The NRC staff understands that NuScale's comment is intended to apply to the acceptance criteria in Section II.3.C.iv. With this understanding, the staff agrees and the text has been revised accordingly.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
141(a)[2]	3.7.2		The SASSI methodology that uses interior nodes in the excavated volume is called extended subtraction method in the version of SASSI currently being used.	Revise item (2) in the portion of section 4 discussing justification for not using DM as follows: (2) The limitations of the SM can be mitigated by constraining sufficient interior nodes (as interaction nodes) of the excavated soil volume. This approach is known as the **extended or** modified subtraction method (MSM). The effect of these additional constraints is to shift the frequencies of the spurious vibration modes above the frequency range of interest to the SSI analysis.	The staff agrees with the comment and has revised the name of the method to reflect that the subtraction method has been modified or extended.

[2] NuScale submitted two comments numbered 141. They are presented here as 141(a) and 141(b).

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
141(b)[2]	3.7.2	IV. Evaluation Findings	Containment is not a structure. DSRS sections 3.8.2 and 3.8.3 apply to containment.	Revise the second paragraph in item 4 as shown: The applicant has met the requirements of item 1 listed above by use of the acceptable seismic design parameters per DSRS Section 3.7.1. The combination of earthquake-resultant loads with those resulting from normal and accident conditions in the design of seismic Category I structures as specified in DSRS Sections **3.8.4 and 3.8.5** will result in conformance with item 2 listed above.	The staff agrees and deleted reference to DSRS Section 3.8.2
142	3.7.2	IV. Evaluation Findings	It is not necessary to identify buried piping as "outside containment."	Revise the 4th paragraph in item 4 as follows: The review also included criteria and seismic analysis procedures for seismic Category I buried piping ~~**outside containment**~~ and above-ground seismic Category I tanks.	Staff agrees and the text has been revised accordingly.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
143	3.7.2-	3.7.2-6 Bullet #7 (top of page)	We are performing a full-scope seismic PRA, not just a seismic margin analysis (we convolute the seismic hazard with the equipment fragilities). The ISG-20 reference still applies.	Change "Review of the Probabilistic Risk Assessment" to "Review of the Seismic Probabilistic Risk Assessment" because the review should only pertain to seismic risk, not for all accidents. Change title of ISG-20 title in quotes to "Implementation of a Probabilistic Risk Assessment-Based Seismic Margin Analysis for New Reactors" to match the phrasing on the NRC site http://www.nrc.gov/reading-rm/doc- collections/isg/col-app-design-cert.html	The staff has added "Seismic" after the third word in the sentence for the reasons given by the commenter. However, the stated title of the ISG has not been changed because it correctly reflects the ISG's revised title.

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
144	3.7.3	I. Areas of Review	Provide a brief explanation of the NuScale design.	Insert new second paragraph: The NuScale light-water small modular reactor (SMR) is a small-size reactor inside a tightly conforming containment (this combination is called a NuScale power module (NPM)) in a below-grade water-filled reactor pool in the reactor building with up to 12 total modules. A refueling bay and the spent fuel pool are also part of the reactor building pool within the reactor building structure. The NPMs are moved to the refueling bay for inspection, refueling and transfer of spent fuel to the spent fuel pool for storage. The reactor building encloses the reactor module pool, the refueling bay, and the spent fuel pool. The pools are below grade. The turbine generator buildings sit above grade on either side of the reactor building. The control building, with the control room below grade, sits next to one end of the reactor building. The radioactive waste building sits adjacent to the reactor building at the end opposite from the control building.	As discussed in response to comment 108, the “areas of review” subsection is not the appropriate subsection to include this information and the staff has not identified other subsections that need to be changed. No changes have been made.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
145	3.7.3	I. Areas of Review Review interfaces	Supporting media (soil profiles) are also developed and discussed in section 3.7.1	Revise item 3 as follows: 3. The development of the design earthquake ground motion (response spectra and time histories) **and supporting media (soil profiles) are** reviewed under DSRS Section 3.7.1.	The staff concludes that the text as written provides appropriate guidance for review interfaces. No changes have been made.
146	3.7.3	I. Areas of Review Review interfaces	Due to the NuScale design, DSRS sections 3.8.2 and 3.8.3 do not apply to structures.	Revise item 5 as follows: 5. The design of seismic Category I structures for all applicable load combinations is reviewed under DSRS Sections **3.8.4 and** 3.8.5.	The staff agrees and the suggested changes to the text have been incorporated.
147	3.7.3	VI. References	The references are inconsistent with the body of text.	Revise the reference to include: 1. 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities.” 2. 10 CFR Part 50, Appendix A, General Design Criterion 2, "Design Bases for Protection Against Natural Phenomena." 3. 10 CFR Part 50, Appendix S, "Earthquake Engineering Criteria for Nuclear Power Plants." 4. 10 CFR Part 52, “Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants.”	The list of references is updated consistent with SRP revision 4 and the body of the text in DSRS 3.7.3.

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				5. ASCE 4-98, "Seismic Analysis of Safety-Related Nuclear Structures and Commentary," American Society of Civil Engineers, [Section 3.5.2 for buried pipes and conduits, and Section 3.5.4 for above-ground vertical tanks]. 6. ASCE Report, “Seismic Response of Buried Pipes and Structural Components,” American Society of Civil Engineers, 1983. 7. DC/COL-ISG-020, "Interim Staff Guidance on Seismic Margin Analysis for New Reactors Based on Probabilistic Risk Assessment," March 15, 2010. 8. Haroun, M. A., and Housner, G. W., "Seismic Design of Liquid Storage Tanks," Journal of the Technical Councils, ASCE, Vol. 107, No. TC1, pp. 191-207, 1981. 9. IEEE Standard 344-1987, “IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations, Appendix D,” Test Duration and Number of	

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				Cycles," Institute of Electrical and Electronics Engineers, June 1987. 10. NUREG-1061, "Report of the U.S. Nuclear Regulatory Commission Piping Review Committee; Volume 4: Evaluation of Other Loads and Load Combinations," December 1984. 11. NUREG/CR-1161, "Recommended Revisions to Nuclear Regulatory Commission Seismic Design Criteria," May 1980. 12. SRM SECY 93-087, Staff Requirement Memorandum: "SECY-93- 087 - Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor (ALWR) Designs" (ADAMS Accession Number ML003708056). 13. TID-7024, "Nuclear Reactors and Earthquakes," Division of Reactor Development, U.S. Atomic Energy Commission, August 1963.	

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				14. Veletsos, A. S., "Seismic Effects in Flexible Liquid Storage Tanks," Proceedings of Fifth World Conference on Earthquake Engineering. Rome. 1974. 15. Veletsos, A. S., "Seismic Response and Design of Liquid Storage Tanks," Guidelines for the Seismic Design of Oil and Gas Pipeline Systems, Technical Council on Lifeline Earthquake Engineering, pp. 255-370 and 443-461. ASCE: Reston, VA. 1984. 16. Veletsos, A. S., and Yang, J. Y., "Earthquake Response of Liquid Storage Tanks," Advances in Civil Engineering Through Engineering Mechanics, Proceedings of the Engineering Mechanics Division Specialty Conference, pp. 1-24, 1977. ASCE, Raleigh, North Carolina 17. Veletsos, A. S., and Y. Tang, Y., "The Effects of Soil-Structure Interaction on Laterally Excited Liquid-Storage Tanks," EPRI Technical Report NP-6500 (Interim Report).	

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
148	3.8.2	All	The NuScale design does not include internal structures within the containment. With the addition of the new DSRS Section 3.8.2, the existing SRP Section 3.8.3 should no longer be considered applicable for the NuScale design.	Update the DSRS Matrix to identify SRP Section 3.8.3 as N/A.	Staff agrees and identified in the "NuScale Design-Specific Review Standard Scope and Safety Review Matrix" that SRP Section 3.8.3 is not applicable to the NuScale design because it does not include internal structures.
149	3.8.4	II. Acceptance Criteria DSRS Acceptance Criteria	Item 4.m combines consideration of leakage into the building and leakage out of the pool. Because the methodology to address Reactor Pool leakage and groundwater inleakage are different, they should be separate elements.	Split item 4.M into two as shown: M. To be acceptable, the design of the RXB and pool structure should also include design details to prevent and monitor potential leakage from the pool. N. The design should address potential leakage into the seismic category I structures due to groundwater.	The staff made this separation as requested.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
150	3.8.4	I. Areas of Review	Provide a brief explanation of the NuScale design.	Insert new second paragraph: The NuScale light-water small modular reactor (SMR) is a small-size reactor inside a tightly conforming containment (this combination is called a NuScale power module (NPM)) in a below-grade water-filled reactor pool in the reactor building with up to 12 total modules. A refueling bay and the spent fuel pool are also part of the reactor building pool within the reactor building structure. The NPMs are moved to the refueling bay for inspection, refueling and transfer of spent fuel to the spent fuel pool for storage. The reactor building encloses the reactor module pool, the refueling bay, and the spent fuel pool. The pools are below grade. The turbine generator buildings sit above grade on either side of the reactor building. The control building, with the control room below grade, sits next to one end of the reactor building. The radioactive waste building sits adjacent to the reactor building at the end opposite from the control building.	The staff agrees and added the second paragraph.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
151	3.8.4	I. Areas of Review specific areas of review	The discussion of the reactor building does not align with current design.	Revise the first paragraph of 1.A as follows: The reactor building (Reactor Building) houses the systems and components required for plant operation and shutdown, and it provides protection and access for service to the NPMs for activities such as fuel loading and unloading. A substantial portion of the Reactor Building is below grade with a portion of the structure including the roof, side walls and crane above grade. The Reactor Building houses all of the NPMs, spent fuel pool, fuel handling areas, remote shutdown station, and safety- related, important to safety systems and components, and other non-safety plant components.	The staff agrees and has modified the text to incorporate the information suggested.
152	3.8.4	I. Areas of Review specific areas of review 1. A. Reactor Building	Corrected description: the Reactor Building is constructed of reinforced concrete.	Revise the first sentence of the second paragraph of 1.A as follows: The Reactor Building is a seismic Category I structure constructed of reinforced concrete.	The Reactor Building is a reinforced concrete Seismic Category I structure. The staff has made this change to the text.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
153	3.8.4	I. Areas of Review specific areas of review 1. A. Reactor Building	Corrected description: the Reactor Building is constructed of reinforced concrete.	Revise the first sentence of the fourth paragraph of 1.A as follows: The staff's review identifies the types of concrete structures associated with the Reactor Building and examines their structural and functional characteristics.	The staff does not agree with this request. The text as edited is appropriate.
154	3.8.4	I. Areas of Review specific areas of review 1. A. Reactor Building	Corrected description: this is a mat foundation - no rock anchors and waterproof membrane and settlement monitoring systems are expected.	Revise the seventh paragraph of 1.A as follows: The review encompasses general information related to the Reactor Building, including special features such as sump and drain areas, seismic gaps between the Reactor Building and adjacent building/structural elements (internal and exterior), subfoundation drainage system (if applicable), use of waterproofing membrane (if applicable), and Reactor Building settlement monitoring systems (if applicable).	The staff does not agree with this comment. The text will remain as is. However, the staff made changes to the text on "rock anchors." The staff does not know the design details to exclude the other items. Note: The comment should read "sixth paragraph of 1.A."
155	3.8.4	I. Areas of Review specific areas of review 1. A. Reactor Building	Corrected description: the Reactor Building is constructed of reinforced concrete.	Delete eighth paragraph - for steel structure	Staff agrees with the suggested change. The staff deleted the paragraph. Note: The comment should read "seventh paragraph."

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
156	3.8.4	I. Areas of Review specific areas of review	Corrected description: only a portion of the Reactor Building is below ground.	Revise the first sentence of I.B as follows: The reactor pool is part of a large reinforced concrete pool inside the Reactor Building which is located below the ground level.	The staff does not agree with the suggested change. Text will remain as is.
157	3.8.4	I. Areas of Review specific areas of review 1. C. Fuel Handling and Reactor Maintenanc e Areas	Recommend revising description to more closely match actual single open pool with areas designated for refueling, drydock, spent fuel.	Revise second and third sentences of 1.C. as follows: The pool inside the Reactor Building includes the following areas: the spent fuel pool, refueling pool, reactor pool, and the dry dock. The refueling pool is contiguous with the reactor pool, which permits the transfer of the NPM while under the pool water.	The staff agreed and revised the suggested text.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
158	3.8.4	I. Areas of Review specific areas of review 1. Add New Item for CRB after C.	Add Control Building to description.	After 1.C, add a new 1.D, and renumber the subsequent sections: D. Control Building The control room and technical support center are located in the Control Building. The staff reviews this building as a separate structure. This building is made of reinforced concrete, with a steel weather enclosure over the roof. The staff reviews the general arrangement of the structural walls, columns, floors, roof, and any removable sections.	The staff agrees and the text has been added as requested. Furthermore, text was revised as follows based on the NuScale information provided in a presentation on June 9 and 16, 2016, to state: "The main control room (MCR), central alarm station (CAS), technical support center (TSC), tunnel to reactor building (underground connection by airlock adjacent to MCR) and control room habitability systems (at floor below the MCR) are located in the control building."
159	3.8.4	I. Areas of Review specific areas of review	There currently two Cat I structures (the Reactor Building and CRB). No other SR cat I structures are expected. However, we know there will be one Cat II structure (the RWB). This section should align better with the NuScale Design	Retitle the section formerly I.D and now 1.E as: "Other CSDRS/SSE Seismically Designed Structures and Systems" and replace the first paragraph Other structures, that do not contain safety- related systems or components, but may be important to safety because of other design provisions should be described. These structures are usually made of either reinforced concrete or structural steel, or a combination of the two. The descriptive information reviewed for such structures is similar to that reviewed for the Reactor Building.	Staff agrees with the requested changes. Text revised to address change.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
160	3.8.4	I. Areas of Review specific areas of review	Clarify that special structures will be site specific.	Revise the first sentence of the third paragraph of the section formerly I.D and now 1.E (Other Structures) as follows: Further, the reviewer may encounter **site specific** special structures that are not located in the immediate vicinity of the site.	Staff agrees with the suggested change and has clarified the statement.
161	3.8.4	I. Areas of Review specific areas of review	Not using safety class masonry walls.	Revise 1.F Masonry Walls to read as follows: Masonry walls should not be used to support safety-related structures. If they are, they will be reviewed on a case-by case basis.	Since staff does not have the final design application, this provision is not eliminated. No changes to the text.
162	3.8.4	I. Areas of Review specific areas of review	The NPM is not rigidly connected to the Reactor Building structure. The discussion of abnormal loads in item E is sufficient.	Recommend deleting paragraph 3.F	Since the staff does not have the final design application. This provision is not eliminated. No changes to the text.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
163	3.8.4	I. Areas of Review specific areas of review	Clarify that the Reactor Building has capacity for up to 12 NPMs and that RXM installation sequence will be a COL applicant consideration	Replace the last paragraph in section 3: Because the reactor building design provides locations for up to twelve NPMs operating simultaneously, the loads due to the individual and multiple NPMs considered in the design are reviewed. The loads reviewed for the COL Applicant include the loads developed based on the various combinations of NPMs which should consider the number of NPMs and possible locations of the NPMs over the entire life of the plant.	The staff agrees with the suggestion and has modified the statement to include the requested information.
164	3.8.4	I. Areas of Review specific areas of review 4. Design and Analysis Procedures	Reference to App B for ACI 349 without giving code year is incomplete. It is the clear the Appendix labeled "Anchoring to Concrete" is intended. This is now App D, in 2006 and 2013, and since a code year is not given it is reasonable to assume the current code is intended, and this should be identified for clarity	Replace item 4.G with the following: G. Steel embedments (reviewed on the basis of "Anchoring to Concrete", Appendix D to ACI 349-06 or 349-12, formerly Appendix B to ACI 349 -01, with additional criteria provided by RG 1.142 and RG 1.199).	The staff edited 4.G to address the concern.

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
165	3.8.4	I. Areas of Review specific areas of review	NuScale uses the building name Radioactive Waste Building (RWB)	Replace the last paragraph in section 4: The reviews of the design and analysis procedures used for other structures that are important to safety are reviewed against applicable staff guidance (e.g., RG 1.143 for the RWB).	Staff agrees with the suggested change. Text revised.
166	3.8.4	I. Areas of Review specific areas of review	Delete masonry wall item	Delete item 8. Masonry Walls and renumber items 9 and 10 to items 8 and 9.	Since staff does not have the final design application, this provision is not eliminated. No changes to the text.
167	3.8.4	I. Areas of Review Review Interfaces	There may not be loads generated because of pressure under accident conditions in the building, since the building is not a containment. Add modifier "if any" to callout of such loads.	Replace the first sentence of item 3 with the following: 3. Determination of loads generated because of pressure under accident conditions, if any, is performed in accordance with DSRS Section 6.2.1.	Since staff does not have the final design application, this provision is not eliminated. No changes to the text.
168	3.8.4	II. Acceptance Criteria DSRS Acceptance Criteria 4. Design and Analysis Procedures	Reference to App B for ACI 349 without giving code year is incomplete. It is the clear the Appendix labeled "Anchoring to Concrete" is intended. This is now App D, in 2006 and 2013, and since a code year is not given it is reasonable to assume the current code is	Replace last sentence in item 4.A with the following: The design and analysis of anchors (steel embedments) used for component and structural supports on concrete structures are acceptable if found in accordance with "Anchoring to Concrete", Appendix D to ACI 349-06 or 349-12, formerly	The staff agrees and the text has been modified to reflect the requested clarification.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
			intended, and this should be identified for clarity	Appendix B to ACI 349 -01, as supplemented by RG 1.199.	
169	3.8.4	II. Acceptance Criteria DSRS Acceptance Criteria 4. Design and Analysis Procedures	Delete masonry wall item.	Delete item 4.I. Relabel later items.	The staff does not agree with this request. Since staff does not have the final design application, this provision is not eliminated. No changes to the text.
170	3.8.4	II. Acceptance Criteria DSRS Acceptance Criteria	Delete masonry wall item.	Delete item 8. Masonry Walls and renumber items 9 and 10 to items 8 and 9.	The staff does not agree with this request. Since staff does not have the final design application, this provision is not eliminated. No changes to the text.
171	3.8.4	III. Review Procedures	Delete masonry wall item	Delete item 10. Masonry Walls and renumber item 11 to item 10.	The staff does not agree with this request. Since staff does not have the final design application, this provision is not eliminated. No changes to the text.
172	3.8.4	VI References	The references are inconsistent with the body of text.	Revise the reference to include: 1. 10 CFR 50.55a, “Codes and Standards.” 2. 10 CFR 50.65, “Monitoring the Effectiveness of Maintenance at Nuclear Power Plants.”	The staff agrees with the comment. The reference list has been modified to the current SRP revision with additional references of RGs 1.70, 1.199 and 1.206.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				3. 10 CFR Part 50, Appendix A, General Design Criterion 1, "Quality Standards and Records." 4. 10 CFR Part 50, Appendix A, General Design Criterion 2, "Design Bases for Protection Against Natural Phenomena." 5. 10 CFR Part 50, Appendix A, General Design Criterion 4, "Environmental and Dynamic Effects Design Bases." 6. 10 CFR Part 50, Appendix A, General Design Criterion 5, "Sharing of Structures, Systems, and Components." 7. 10 CFR Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants." 8. 10 CFR Part 50, Appendix S, "Earthquake Engineering Criteria for Nuclear Power Plants." 9. 10 CFR Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants."	

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				10. ACI 349, "Code Requirements for Nuclear safety-related Concrete Structures," American Concrete Institute. 8. ANSI/AISC N690-1994, including Supplement 2 (2004), "Specification for the Design, Fabrication and Erection of Steel Safety-Related Structures for Nuclear Facilities." 9. ASCE 4-98, "Seismic Analysis of Safety-Related Nuclear Structures and Commentary," American Society of Civil Engineers (Section 3.5.3.2 for embedded walls and Sections 3.5.3.1 through 3.5.3.3 for earth retaining walls). 10. ASME Boiler and Pressure Vessel Code, Section III, Division 2, "Code for Concrete Reactor Vessels and Containments," ASME. 11. NUREG/CR-6486, "Assessment of Modular Construction for Safety-Related Structures at Advanced Nuclear Power Plants," March 1997.	

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				12. RG 1.206, “Combined License Applications for Nuclear Power Plants (LWR Edition).” 13. RG 1.69, “Concrete Radiation Shields For Nuclear Power Plants.” 14. RG 1.70, “Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants.” 15. RG 1.91, “Evaluations of Explosions Postulated to Occur on Transportation Routes Near Nuclear Power Plants.” 16. RG 1.115, “Protection Against Low Trajectory Turbine Missiles.” 17. RG 1.127, “Inspection of Water- Control Structures Associated with Nuclear Power Plants.” 18. RG 1.136, "Design Limits, Loading Combinations, Materials, Construction, and Testing of Concrete Containments." 19. RG 1.142, “Safety-Related Concrete Structures for Nuclear Power Plants.”	

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				20. RG 1.143, "Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in LWR Plants." 21. RG 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." 22. RG 1.199, "Anchoring Components and Structural Supports in Concrete." 23 SEI/ASCE 37, "Design Loads on Structures During Construction," American Society of Civil Engineers, 2002. 24. Wood, J. H., "Earthquake-induced Soil Pressures on Structures." EERL Report 73-05, Earthquake Engineering Research Laboratory, California Institute of Technology, 1973.	

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
173	3.8.4	Appendix A	Not using safety-related masonry walls. Altered earlier text to say evaluate on case by case basis if needed. If it is retained, should at least delete Reference B ACI 531 (now covered in ACI 530) and Reference H UBC (superseded by Reference D IBC).	Delete contents of Appendix A "Criteria for Safety-Related Masonry Wall Evaluation". , and label as "Not Used"	The staff does not agree with this request. Since staff does not have the final design application, this provision is not eliminated. No changes to the text.
174	3.8.5	III. Acceptance Criteria DSRS Acceptance Criteria 4. Design and Analysis Procedures	The described "other loads" are not concerns for the NuScale design. Since these are examples of information that section 3.8.2 might develop, they can be deleted.	Revise Item 3 as follows: 3. Loads and Load Combinations. The specified loads and load combinations used in the design of seismic Category I foundations are acceptable if found to be in accordance with those combinations described in Subsection II.3 of DSRS Section 3.8.4. Other loads described in Subsection II.3 of DSRS Section 3.8.2, that may affect the Reactor Building foundation, also need to be considered. These loads include, if applicable, loss-of-coolant accidents (LOCAs), containment internal flooding, hydrodynamic loads such as those due to safety relief valve actuation, and loads associated with combustible gas generation from a metal- water reaction of	The staff does not agree in the absence of a complete design. No change made.

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				the fuel cladding. Also to be included are loads that are induced by the proposed construction sequence and by the differential settlements of the soil under and to the sides of the structures.	
175	3.8.5	I. Areas of Review	provide a brief explanation of the NuScale design	Insert new second paragraph: The NuScale light-water small modular reactor (SMR) is a small-size reactor inside a tightly conforming containment (this combination is called a NuScale power module (NPM)) in a below-grade water-filled reactor pool in the reactor building with up to 12 total modules. A refueling bay and the spent fuel pool are also part of the reactor building pool within the reactor building structure. The NPMs are moved to the refueling bay for inspection, refueling and transfer of spent fuel to the spent fuel pool for storage. The reactor building encloses the reactor module pool, the refueling bay, and the spent fuel pool. The pools are below grade. The turbine generator buildings sit above grade on either side of the reactor building. The control building, with the control room	The staff does not agree to provide a brief explanation of the NuScale design in section providing guidance related to foundation.

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				below grade, sits next to one end of the reactor building. The radioactive waste building sits adjacent to the reactor building at the end opposite from the control building.	
176	3.8.5	I. Areas of Review specific areas of review	NuScale will not have Seismic category I intake structures or cooling towers.	Revise item B. The foundations for other seismic Category I structures (for example, the Control Building), which may be one or a combination of several foundation types, are reviewed to an extent similar to that of the Reactor Building foundation. The review also includes the foundations of structures that may be important to safety, which because of other design provisions are not classified as seismic Category I (e.g., radioactive waste building).	No change was made to the text. The statement at issue does not assume the NuScale design has those seismic category I structures, only that if it did, those structures would be subject to the review.
177	3.8.5	I. Areas of Review specific areas of review	Use "NPM" versus "containment."	Revise third sentence in item 3 DSRS Section 3.8.2, Subsection I.3 details such loads for NPMs that may impose loads on the Reactor Building foundation.	Staff agrees and changes made to the text.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
178	3.8.5	I. Areas of Review specific areas of review	NuScale does not use a single foundation for multiple structures.	Delete the last paragraph in item 4.	The attributes for the foundation design provided in this paragraph would apply to, both, single and multiple foundation mats. However, changes were made to the text to address the issue raised in this comment.
179	3.8.5	III. Acceptance Criteria DSRS acceptance Criteria 4. Design and Analysis Procedures	NuScale does not have a steel foundation.	Delete item 4.C - leave blank or renumber subsequent items.	Staff agrees and modification to the text has been made in II.4.C.
180	3.8.5	III. Acceptance Criteria DSRS Acceptance Criteria	ECCS actuation floods containment. This load will be considered.	Replace paragraph 4.B (second 4.B) with: B. After an Emergency Core Cooling System (ECCS) actuation the sudden increase in temperature may produce a localized nonlinear transient temperature gradient across the Reactor Building foundation. The analysis should consider the effects of such loads.	Staff agrees and changes were made to the text in II.4.C

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
181	3.8.5	III. Acceptance Criteria DSRS acceptance Criteria	Groundwater inleakage can occur for both the Reactor Building and CRB.	Revise paragraph 4.O as follows: O. To be acceptable, the design of the foundation should also include design details to prevent and monitor **potential leakage from the pool and potential groundwater leakage into the seismic category I structures**.	II.4.O was edited to include the effect of ground water leakage into "control building" as well.
182	3.8.5	VI. References	The references are inconsistent with the body of text.	Revise the reference to include: 1. 10 CFR 50.55(a), "Codes and Standards."2. 10 CFR 50.65, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants."3. 10 CFR Part 50, Appendix A, General Design Criterion 1, "Quality Standards and Records."4. 10 CFR Part 50, Appendix A, General Design Criterion 2, "Design Bases for Protection Against Natural Phenomena."5. 10 CFR Part 50, Appendix A, General Design Criterion 4, "Environmental and Dynamic Effects Design Bases."6. 10 CFR Part 50, Appendix A, General Design Criterion 5, "Sharing of Structures, Systems and Components."7. 10 CFR Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants."8. 10 CFR Part 50, Appendix S,	The references have been revised to reflect those of the current revision of the SRP.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
				"Earthquake Engineering Criteria for Nuclear Power Plants."9. 10 CFR Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants."10. ACI 349, "Code Requirements for Nuclear Safety-Related Concrete Structures."11. ANSI/AISC N690-1994 including Supplement 2 (2004), "Specification for the Design, Fabrication and Erection of Steel Safety-Related Structures for Nuclear Facilities."12. ASME Boiler and Pressure Vessel Code, Section III, Division 2, "Code for Concrete Reactor Vessels and Containments."13. RG 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants: LWR Edition."14. RG 1.127, "Inspection of Water-Control Structures Associated with Nuclear Power Plants."15. RG 1.142, "Safety-Related Concrete Structures for Nuclear Power Plants."16. RG 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants."17. RG 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)."	

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
183	3.11	Section I, Review Interfaces, Item 2	NuScale Design has Decay Heat Removal System. Replace “Residual Heat Removal function” with “Decay Heat Removal System”.	Replace “Residual Heat Removal function” with “Decay Heat Removal System”	Staff agrees and made suggested changes to the text.
184	3.11	Section I, Review Interfaces, Item 7	The for section states “… several sections of DSRS Chapter 3.” The section references in A, B and C are DSRS and SRP sections.	Recommend to change “DSRS” to “DSRS and SRP”	Staff agrees and made suggested change to the text.
185	3.11	Section I. AREAS OF REVIEW Item 6	This item in section I of other DSRS has been revised in most section of the DSRS sections; however other section have not added the detail that has been added to the end of the original SRP text.	Recommend removing the added text: “The DCD Tier 1 should include ITAAC to verify the environmental qualification for important to safety mechanical, electrical, and instrumentation and control (I&C) equipment, including digital I&C equipment, are capable of performing their design safety functions under all normal environmental conditions, anticipated operational occurrences, and accident and post-accident environmental conditions. For such ITAAC, the Design Commitment column should specify that mechanical, electrical, and I&C, including digital I&C equipment identified in the applicable Tier 1 table will be	Staff agrees and made suggested changes to the text (i.e., staff deleted suggested text from Section I Areas of Review, Item 6, “Inspections, Tests, Analyses, and Acceptance Criteria”).

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				environmentally qualified such that each mechanical, electrical, and I&C equipment, including digital I&C equipment are capable of performing their design safety functions under all normal environmental conditions, anticipated operational occurrences, and accident and post- accident environmental conditions. The Inspections, Tests, and Analyses column should specify that tests or type tests of the mechanical, electrical, and I&C, including digital I&C equipment listed in the applicable Tier 1 table that will be conducted to demonstrate that the mechanical, electrical, and I&C, including digital I&C equipment are capable of performing their design safety functions under all normal environmental conditions, anticipated operational occurrences, and accident and post- accident environmental conditions. The Acceptance Criteria column should specify that when a test report exists and concludes that the mechanical, electrical, and I&C equipment , including digital I&C equipment listed in the applicable Tier 1 table will be conducted to	

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
				demonstrate that the mechanical, electrical, and I&C equipment , including digital I&C equipment are capable of performing their design safety functions under all normal environmental conditions, anticipated operational occurrences, and accident and post-accident environmental conditions. Applicable sections of the DCD Tier 1 should specify ITAAC to verify the environmental qualification for important to safety mechanical, electrical, and I&C equipment, including digital I&C equipment are capable of performing their design safety functions under all normal environmental conditions, anticipated operational occurrences, and accident and post-accident environmental conditions."	
186	3.11	Section II, DSRS Acceptance Criteria, Item 23	2nd Para (1) evaluation …… design life ……. qualification" is not clearly consistent with 10 CFR 50.49. Design life is not clearly defined. In order to eliminate the confusion of design, qualified and	2nd Para "(1) evaluation …… design life ……. qualification" should be replaced with " (1) evaluation of environmental qualification results to establish activities to support continued environmental qualification for the entire time an item is installed in the plant;" for consistency with 10CFR50.49	Staff agrees and made suggested changes to the text.

Comment # (Affiliation: NuScale Power, LLC)	DSRS Section	Paragraph, Item, or Page	Comment / Basis	Commenter Recommendation	NRC Staff Technical Resolution
			installed life, the word design life should be deleted.		
187	3.11	Section II, DSRS Acceptance Criteria	NuScale intends to use IEEE STD C62.45 1992 and 2002 as endorsed by RG 1.180 and RG 1.204 respectively. Currently the use of 1.204 for the lightning protection system is excluded from the DSRS section.	Recommendation is to add an acceptance criteria item such as "RG 1.204, "GUIDELINES FOR LIGHTNING PROTECTION OF NUCLEAR POWER PLANTS," provides guidance acceptable to the staff for determining the environmental design and qualification of the lightning protection system."	Staff agrees and made suggested changes to the text. The commenter suggestion has been added in Section II, "Acceptance Criteria," "DSRS Acceptance Criteria" as new item 17.
188	3.11	Section II. DSRS Acceptance Criteria, Item 1	The text "NUREG-0588 … applicable to existing plants ……. program. For Future Plants," should be deleted as NUREG- 0588 is for the existing plants and does not apply for NuScale design. NUREG- 0588 is not an Acceptance Criteria for NuScale design.	The text "NUREG-0588 … applicable to existing plants ……. program. For Future Plants," should be deleted.	Staff agrees with the comment. NUREG-0588 was developed to provide interim staff guidance until rulemaking could be developed (i.e. 10 CFR 50.49). DSRS text has been revised accordingly.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
189	3.11	Section II. DSRS Acceptance Criteria, Item 17	NuScale design does not include containment spray system; therefore, the discussion regarding chemical composition of spray is not applicable.	NuScale design does not include containment spray system; therefore, the discussion regarding chemical composition of spray should be removed.	Staff agrees with the comment. There is no provision for any system to add post-accident chemicals to the containment, there is not any power system equipment located inside containment and there is no room inside containment to place any such equipment. DSRS text has been revised accordingly.
190	3.11	Section II. DSRS Acceptance Criteria, Item 19, Para 2	Para 2 States that "the reviewer confirms that the applicant has (1) identified safety-related mechanical equipment located in harsh or mild environment area, including its required operating time…." NuScale will identify mechanical equipment located in harsh or mild environment and operating times will be identified for equipment located in harsh environment.	Recommend rewording "…The reviewer confirms that the applicant has (1) identified safety-related mechanical equipment located in harsh or mild environment areas and operating times for equipment located in harsh environment areas……."	Staff agrees and made suggested changes to the text.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
191	3.11	Section II. DSRS Acceptance Criteria, Item 2	Year "2003" Is added after IEEE Std. 323. This implies that the staff is expecting EQ program including harsh environment qualification should be in accordance with IEEE Std. 323-2003. The RG 1.89, Revision 1 endorses IEEE 323-1974 for harsh environment qualification. The RG 1.209 endorses IEEE 323-2003 for computer based systems in mild environment.	Please clarify if the citation to IEEE 323- 2003 is intended to apply to electrical equipment important to safety that must function during or following exposure to harsh accident conditions. Otherwise, it is recommended that "2003" be deleted from this item 2.	Staff agrees with the comment. The 2003 version applies to computer systems etc. in mild environments. Any safety-related power systems equipment will have to meet the 1974 version, which is much stricter. The DSRS text has been revised accordingly.
192	3.11	Section II. DSRS Acceptance Criteria, Item 9	This item States that RG 1.153, Rev 1, endorses IEEE Std. 603-1991. NuScale intends to use the guidance of RG 1.153, Rev 1 and IEEE STD 603-2009 to identify the safety systems and functional design criteria for the qualification effort.	This is an informative comment for the staff to review current versions of the guidance documents.	No change is necessary as the Commenter Suggestion states that Comment 192 is informative for the staff to review the current versions of guidance documents.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
193	3.11	Section V. Implementation	The comment concerns…" These regulations require ……. against Standard Review Plan (SRP) revision in effect six months before ……" The staff has accepted DSRS as an alternative method for evaluating whether an application complies with NRC regulations. The NuScale application is based on DSRS or SRP. Certain sections such as 3.9.6 do not have NuScale Specific DSRS.	Replace "Standard Review Plan (SRP)" with "DSRS or SRP."	The Staff disagrees and did not make the suggested change. The language at Section V, "Implementation," is standard language across the DSRS sections. Likewise, this sentence cites regulations that reference the SRP, not the DSRS. Therefore, the suggested change was not incorporated.
194	3.11	Section VI. REFERENCES	References to RG 1.152 and 1.153 are missing. NuScale intends to use IEEE STD C62.45 1992 and 2002 as endorsed by RG 1.180 and RG 1.204.	Add the references to 1.152 and 1.153 in Section VI. Recommend adding a reference to RG 1.204.	Staff agrees and made suggested changes to the text.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
195	3.11	Section VI. REFERENCES, Item 20	RG 1.40, Rev 1: This regulatory Guide is applicable only to reactor designs that use continuous-duty Class 1E motors. NuScale design does not use continuous-duty Class 1E motors. NuScale does not intend to use RG 1.40, Rev 1.	Recommend deleting the reference if the criterion for continuous duty Class 1E motors is removed.	Staff agrees with the comment. The NuScale design is predicated on the fact that no such motors will be part of the fully passive design. DSRS text has been revised accordingly.
196	3.11	Section VI. REFERENCES, Item 21	RG 1.63, Rev. 3: Endorses IEEE 317- 1983. This was reaffirmed in 2003, but not revised. The regulatory position C of RG 1.63 Rev. 3 endorses Section 5.4 of IEEE 741-1986. IEEE 741-1986 is superseded by IEEE 741-1997. NuScale intends to use IEEE 741-1986, IEEE 741-2007 and IEEE 317-1983.	This is an informative comment for the staff to review current versions of the guidance documents.	No change is necessary as the Commenter Suggestion states that Comment 196 is informative for the staff to review the current versions of guidance documents.
197	3.11	Section VI. REFERENCES, Item 22	RG 1.73, Rev 1: Endorses IEEE 382- 2006. The item 22 states that IEEE 382-1972 is endorsed.	Recommend revising the year of the IEEE standard to reflect the current guidance provided in Regulatory Guide 1.73, Revision 1.	Staff agrees and made suggested changes to the text.

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
198	3.11	Section VI. REFERENCES, Item 26	RG 1.156 Rev 1: Endorses IEEE 572- 2006. The item 26 states that IEEE 572-1985 is endorsed.	Recommend to revise the year of the IEEE standard to reflect the current guidance provided in Regulatory Guide 1.156, Revision 1.	Staff agrees and made suggested changes to the text.
199	3.13	Evaluation Findings item 1	"Unlike conventional LWRs which use low alloy steels such as SA-540 Grade B23 or B24 for RPV closure studs, NuScale RPV closure studs will be fabricated from a high strength steel alloy. Because RG 1.65 is not intended for high strength steel alloys closure studs, and because NuScale design requires RPV closure studs to be immersed in water during refuel, regulatory positions 1(a)(i) and 2(b) of RG 1.65 Rev 1 do not apply to NuScale RPV closure studs".	Change the wording to "…applicable guidance in RG 1.65…"	See footnote 1
200	3.13	Page 10 last paragraph of III.3.B Mechanical Testing, Special Process and Controls	This paragraph should refer to References 9 through 14.	Change "….References 4 through 9 " to "….References 9 through 14 "	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
201	3.13	Page 9 3rd paragraph of III.3.A Materials Selection	Editorial	"Mpa" should be "MPa"	See footnote 1
202	3.13	Review Procedures, Item 3A, Third paragraph	RG Guide 1.65 Position C.1(a)i is not applicable to the austenitic materials that NuScale intends to use for the reactor closure studs due to the Reactor and Containment Vessels being submerged in borated water. The NuScale Reactor studs will be subjected to submerged condition in borated water for 60 years.	Recommend removing this paragraph since it is not an applicable requirement for the NuScale design.	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
203	3.13	Review Procedures, Item 3B, second paragraph	“Unlike conventional LWRs which use low alloy steels such as SA-540 Grade B23 or B24 for RPV closure studs, NuScale RPV closure studs will be fabricated from a high strength steel alloy. Because RG 1.65 is not intended for high strength steel alloys closure studs, and because NuScale design requires RPV closure studs to be immersed in water during refuel, regulatory positions 1(a)(i) and 2(b) of RG 1.65 Rev 1 do not apply to NuScale RPV closure studs”.	Change the wording to "….the applicable recommendations in RG 1.65…"	See footnote 1

Comment # *(Affiliation: NuScale Power, LLC)*	**DSRS Section**	**Paragraph, Item, or Page**	**Comment / Basis**	**Commenter Recommendation**	**NRC Staff Technical Resolution**
204	3.13	Review Procedures, Item 3B, second paragraph	“Unlike conventional LWRs which use low alloy steels such as SA-540 Grade B23 or B24 for RPV closure studs, NuScale RPV closure studs will be fabricated from a high strength steel alloy. Because RG 1.65 is not intended for high strength steel alloys closure studs, and because NuScale design requires RPV closure studs to be immersed in water during refuel, regulatory positions 1(a)(i) and 2(b) of RG 1.65 Rev 1 do not apply to NuScale RPV closure studs”.	Change the wording to "applicable regulatory positions of RG 1.65…"	See footnote 1