

November 07, 2017

Docket No. 52-048

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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11555 Rockville Pike
Rockville, MD 20852-2738

SUBJECT: NuScale Power, LLC Response to NRC Request for Additional Information No. 217 (eRAI No. 9088) on the NuScale Design Certification Application

REFERENCE: U.S. Nuclear Regulatory Commission, "Request for Additional Information No. 217 (eRAI No. 9088)," dated September 08, 2017

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

The Enclosure to this letter contains NuScale's response to the following RAI Question from NRC eRAI No. 9088:

- 14.03.03-2

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

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

Sincerely,



Zackary W. Rad
Director, Regulatory Affairs
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Enclosure 1: NuScale Response to NRC Request for Additional Information eRAI No. 9088



RAIO-1117-57058

Enclosure 1:

NuScale Response to NRC Request for Additional Information eRAI No. 9088

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

eRAI No.: 9088

Date of RAI Issue: 09/08/2017

NRC Question No.: 14.03.03-2

10 CFR 52.47, "Contents of applications; technical information," specifies the level of design information needed to be submitted to support design certification. 10 CFR 52.47(a)(3)(i) requires that this design information include the principal design criteria for the facility and notes that Appendix A to 10 CFR part 50, general design criteria (GDC), establishes minimum requirements for the principal design criteria for watercooled nuclear power plants. 10 CFR 50, Appendix A, GDC 2 requires SSCs important to safety be designed to withstand appropriate combinations of the effects of normal and accident conditions with the effects of natural phenomena including earthquake. DCD Tier 1, Rev. 0, Table 2.8-2, ITAAC #1 and Table 3.14-2, ITAAC #1 state that the Seismic Category I equipment, including its associated supports and anchorages, withstands design basis seismic loads without loss of its safety-related function(s) during and after an SSE. However, as stated in DCD Tier 1, Sections 2.8.1 and 3.14.1, these ITAAC are specific to mechanical and electrical/I&C equipment such as valves and sensors. These ITAAC do not include other Seismic Category I SSCs such as control rod guide (CRD) tubes and CRD drive shafts. The NRC staff cannot locate a generic ITAAC that cover all Seismic Category I SSCs. Revise an existing ITAAC or add a generic ITAAC that ensures Seismic Category I SSCs including their associated supports and anchorages withstand design basis loads without loss of their function(s) during and after an SSE.

NuScale Response:

Tier 1 Table 2.8-2, item number 1 (ITAAC 02.08.01) is the ITAAC for verification of qualification and installation of Seismic Category I mechanical and electrical/instrumentation and controls (I&C) equipment in module-specific systems.

The components identified as Seismic Category I in Tier 1 Table 2.8-1 are verified by ITAAC 02.08.01. Tier 1 Table 2.8-1 identifies safety-related, Seismic Category I components and nonsafety-related components with an augmented Seismic Category I design requirement. Tier 1 Table 2.8-1 has been revised to identify module-specific equipment to be verified by ITAAC 02.08.01.



The nonsafety-related, Seismic Category I equipment has been included or added in Tier 1 Table 2.8-1 based on the following criteria:

- Nonsafety-related feedwater system and main steam system valves credited in Tier 2 Chapter 15 safety analyses (i.e., feedwater system regulating valve, feedwater system check valves, and secondary main steam isolation valves and bypass valves).
- Nonsafety-related, Seismic Category I equipment located in a reactor module.
- Valve position indicators for safety-related valves.

Tier 1 Table 3.14-2, item number 1 (ITAAC 03.14.01) is the ITAAC for verification of qualification and installation of Seismic Category I equipment in common systems.

The components identified as Seismic Category I in Tier 1 Table 3.14-1 are verified by ITAAC 03.14.01. Tier 1 Table 3.14-1 identifies safety-related, Seismic Category I components and nonsafety-related components with an augmented Seismic Category I design requirement. Tier 1 Table 3.14-1 has been revised to identify common systems equipment to be verified by ITAAC 03.14.01.

The nonsafety-related, Seismic Category I equipment has been included or added in Table 3.14-1 based on the following criteria:

- The nonsafety-related equipment is used to store, support, or move irradiated fuel (i.e., fuel handling machine, reactor building crane, module lifting adapter, and fuel storage racks).
- The non-safety-related equipment is used to support the ultimate heat sink (i.e., UHS pool liner and dry dock liner, UHS water makeup line, and UHS pool level and temperature instruments).

Impact on DCA:

Tier 1 Table 2.8-1 and Table 3.14-1 have been revised as described in the response above and as shown in the markup provided in this response.

Table 2.8-1: Module Specific Mechanical and Electrical/I&C Equipment

Equipment Identifier	Description	Location	EQ Environment	Qualification Program	Seismic Category I	Class 1E	EQ Category ⁽¹⁾
Containment System							
CNV-8	I&C Div I Nozzle <u>CNTS I&C Division I Electrical Penetration Assembly (EPA)</u>	RXB - Top of Module - CNV-6 <u>RXB - Inside Containment</u>	Harsh	Electrical Mechanical	Yes	Yes <u>No</u>	A
CNV-9	I&C Div II Nozzle <u>CNTS I&C Division II Electrical Penetration Assembly (EPA)</u>	RXB - Top of Module - CNV-6 <u>RXB - Inside Containment</u>	Harsh	Electrical Mechanical	Yes	Yes <u>No</u>	A
CNV-15	PZR Heater Power #1 Nozzle <u>CNTS PZR Heater Power #1 Electrical Penetration Assembly (EPA)</u>	RXB - Top of Module - CNV-6 <u>RXB - Inside Containment</u>	Harsh	Electrical Mechanical	Yes	Yes <u>No</u>	A
CNV-16	PZR Heater Power #2 Nozzle <u>CNTS PZR Heater Power #2 Electrical Penetration Assembly (EPA)</u>	RXB - Top of Module - CNV-6 <u>RXB - Inside Containment</u>	Harsh	Electrical Mechanical	Yes	Yes <u>No</u>	A
CNV-17	I&C Channel A Nozzle <u>CNTS I&C Channel A Electrical Penetration Assembly (EPA)</u>	RXB - Top of Module - CNV-6 <u>RXB - Inside Containment</u>	Harsh	Electrical Mechanical	Yes	Yes	A
CNV-18	I&C Channel B Nozzle <u>CNTS I&C Channel B Electrical Penetration Assembly (EPA)</u>	RXB - Top of Module - CNV-6 <u>RXB - Inside Containment</u>	Harsh	Electrical Mechanical	Yes	Yes	A
CNV-19	I&C Channel C Nozzle <u>CNTS I&C Channel C Electrical Penetration Assembly (EPA)</u>	RXB - Top of Module - CNV-6 <u>RXB - Inside Containment</u>	Harsh	Electrical Mechanical	Yes	Yes	A
CNV-20	I&C Channel D Nozzle <u>CNTS I&C Channel D Electrical Penetration Assembly (EPA)</u>	RXB - Top of Module - CNV-6 <u>RXB - Inside Containment</u>	Harsh	Electrical Mechanical	Yes	Yes	A
CNV-37	CRD Power Nozzle <u>CNTS CRD Power Electrical Penetration Assembly (EPA)</u>	RXB - Top of Module - CNV-6 <u>RXB - Inside Containment</u>	Harsh	Electrical Mechanical	Yes	Yes <u>No</u>	A
CNV-38	RPI Group #1 Nozzle <u>CNTS RPI Group #1 Electrical Penetration Assembly (EPA)</u>	RXB - Top of Module - CNV-6 <u>RXB - Inside Containment</u>	Harsh	Electrical Mechanical	Yes	Yes <u>No</u>	A
CNV-39	RPI Group #2 Nozzle <u>CNTS RPI Group #2 Electrical Penetration Assembly (EPA)</u>	RXB - Top of Module - CNV-6 <u>RXB - Inside Containment</u>	Harsh	Electrical Mechanical	Yes	Yes <u>No</u>	A
MS-ISV-1005	MS #1 CIV (MSIV #1)	RXB - Top of Module	Harsh	Electrical Mechanical	Yes	Yes	A B
MS-ISV-2005	MS #2 CIV (MSIV #2)	RXB - Top of Module	Harsh	Electrical Mechanical	Yes	Yes	A B
MS-ISV-1006	MS line #1 Bypass Valve (MSIV Bypass #1)	RXB - Top of Module	Harsh	Electrical Mechanical	Yes	Yes	A B
MS-ISV-2006	MS line #2 Bypass Valve (MSIV Bypass #2)	RXB - Top of Module	Harsh	Electrical Mechanical	Yes	Yes <u>No</u>	A B

Table 2.8-1: Module Specific Mechanical and Electrical/I&C Equipment (Continued)

Equipment Identifier	Description	Location	EQ Environment	Qualification Program	Seismic Category I	Class 1E	EQ Category ⁽¹⁾
FW-ISV-1003	FW #1 CIV (FWIV #1)	RXB - Top of Module	Harsh	Electrical Mechanical	Yes	Yes	A B
FW-ISV-2003	FW #2 CIV (FWIV #1)	RXB - Top of Module	Harsh	Electrical Mechanical	Yes	Yes	A B
FW-ISV-1002	FW line #1 Check Valve	RXB - Top of Module	Harsh	Mechanical	Yes	N/A	A B
FW-ISV-2002	FW line #2 Check Valve	RXB - Top of Module	Harsh	Mechanical	Yes	N/A	A B
CVC-ISV-0334 CVC-ISV-0336	CVC Discharge CIV	RXB - Top of Module	Harsh	Electrical Mechanical	Yes	Yes	A B
CVC-ISV-0329 CVC-ISV-0331	CVC Injection CIV	RXB - Top of Module	Harsh	Electrical Mechanical	Yes	Yes	A B
CVC-ISV-0323 CVC-ISV-0325	CVC PZR Spray CIV	RXB - Top of Module	Harsh	Electrical Mechanical	Yes	Yes	A B
CVC-ISV-0401 CVC-ISV-0403	RPV High Point Degas CIV	RXB - Top of Module	Harsh	Electrical Mechanical	Yes	Yes	A B
RCCW-ISV-0184 RCCW-ISV-0185	RCCW Supply CIV	RXB - Top of Module	Harsh	Electrical Mechanical	Yes	Yes	A B
RCCW-ISV-0190 RCCW-ISV-0191	RCCW Return CIV	RXB - Top of Module	Harsh	Electrical Mechanical	Yes	Yes	A B
CE-ISV-0101 CE-ISV-0102	CE CIV	RXB - Top of Module	Harsh	Electrical Mechanical	Yes	Yes	A B
CFD-ISV-0129 CFD-ISV-0130	CFDS CIV	RXB - Top of Module	Harsh	Electrical Mechanical	Yes	Yes	A B
None <u>CNT-SKD-501</u> <u>CNT-SKD-502</u>	Hydraulic Skid for valve reset	RXB - 100' <u>RXB - 120'</u>	Harsh	Electrical Mechanical	Yes	No	A
PE-0021A PE-0021B PE-0021C PE-0021D	Containment Pressure Transducer (Narrow Range)	RXB - CNV 5 - CNV 6 <u>RXB - Inside Containment</u>	Harsh	Electrical	Yes	Yes	A
PE-0022A PE-0022B	Containment Pressure Transducer (Wide Range)	RXB - CNV 5 - CNV 6 <u>RXB - Inside Containment</u>	Harsh	Electrical	Yes	Yes <u>No</u>	A

Table 2.8-1: Module Specific Mechanical and Electrical/I&C Equipment (Continued)

Equipment Identifier	Description	Location	EQ Environment	Qualification Program	Seismic Category I	Class 1E	EQ Category ⁽¹⁾
ZSO-1006B	SG1 Steam Supply CIV/ MS Bypass Isolation Valve Open Position Sensor	RXB - Top of Module	Harsh	Electrical	Yes	No	A
ZSC-2005A	SG2 Steam Supply CIV/ MSIV Close Position Sensor	RXB - Top of Module	Harsh	Electrical	Yes	No	A
ZSO-2005A	SG2 Steam Supply CIV/ MSIV Open Position Sensor	RXB - Top of Module	Harsh	Electrical	Yes	No	A
ZSC-2005B	SG2 Steam Supply CIV/ MSIV Close Position Sensor	RXB - Top of Module	Harsh	Electrical	Yes	No	A
ZSO-2005B	SG2 Steam Supply CIV/ MSIV Open Position Sensor	RXB - Top of Module	Harsh	Electrical	Yes	No	A
ZSC-2006A	SG2 Steam Supply CIV/ MS Bypass Isolation Valve Close Position Sensor	RXB - Top of Module	Harsh	Electrical	Yes	No	A
ZSO-2006A	SG2 Steam Supply CIV/ MS Bypass Isolation Valve Open Position Sensor	RXB - Top of Module	Harsh	Electrical	Yes	No	A
ZSC-2006B	SG1SG2 Steam Supply CIV/ MS Bypass Isolation Valve Close Position Sensor	RXB - Top of Module	Harsh	Electrical	Yes	No	A
ZSO-2006B	SG1SG2 Steam Supply CIV/ MS Bypass Isolation Valve Open Position Sensor	RXB - Top of Module	Harsh	Electrical	Yes	No	A
Steam Generator System							
None	SG Tubes and Tube Supports	RXB - Inside Containment	N/A	N/A	Yes	N/A	N/A
None	Steam Plenums	RXB - Inside Containment	N/A	N/A	Yes	N/A	N/A
RPV43 RPV44 RPV45 RPV46	Feedwater Plenums	RXB - Inside Containment	N/A	N/A	Yes	N/A	N/A
None	Flow Restrictors	RXB - Inside Containment	N/A	N/A	Yes	N/A	N/A
SG-PSV-1002 SG-PSV-2002	Thermal Relief Valves	RXB - Inside Containment	N/A	N/A	Yes	N/A	N/A
Control Rod Drive System							
CRDS-CRD-0001 to 0016	Control Rod Drive Coils	RXB-CNV-5	Harsh	Electrical	Yes	No	A

Table 2.8-1: Module Specific Mechanical and Electrical/I&C Equipment (Continued)

Equipment Identifier	Description	Location	EQ Environment	Qualification Program	Seismic Category I	Class 1E	EQ Category ⁽¹⁾
CRDS-ZS-0001A to 0016A CRDS-ZS-0001B to 0016B	Rod Position Indication (RPI) Coils	RXB-CNV-5 <u>RXB - Inside Containment</u>	Harsh	Electrical	Yes	No	B
None	CRDM Control Cabinet	RXB-126'	Harsh	Electrical	Yes	No	A
None	Rod Position Indication Cabinets (Train A/B)	RXB-126'	Harsh	Electrical	Yes	No	B
None	CRDM Power & Rod Position Indication Cables	RXB-Top of Module 126'-CNV-5-CNV-6	Harsh	Electrical	Yes	No	B
CRDS-0100-HBBX-N CRDS-0200-HBBX-N CRDS-FHS-0101 to 0116 CRDS-FHS-0201 to 0216 CRDS-PSV-0221	CRDS Cooling Water Piping and Pressure Relief Valve	RXB-CNV-5-CNV-6	Harsh	Mechanical	Yes	N/A	B
None	<u>Control Rod Drive Shafts</u>	<u>RXB - Inside Containment</u>	N/A	N/A	Yes	N/A	N/A
None	<u>Control Rod Drive Latch Mechanism</u>	<u>RXB - Inside Containment</u>	N/A	N/A	Yes	N/A	N/A
None	<u>CRDM Pressure Boundary (Latch Housing, Rod Travel Housing, Rod Travel Housing Plug)</u>	<u>RXB - Inside Containment</u>	N/A	N/A	Yes	N/A	N/A
Control Rod Assembly							
None	<u>All components</u>	<u>RXB - Inside Containment</u>	N/A	N/A	Yes	N/A	N/A
Neutron Source Assembly							
None	<u>Primary and secondary neutron source rodlets</u>	<u>RXB - Inside Containment</u>	N/A	N/A	Yes	N/A	N/A
None	<u>Spider body, hub or coupling housing</u>	<u>RXB - Inside Containment</u>	N/A	N/A	Yes	N/A	N/A

Table 2.8-1: Module Specific Mechanical and Electrical/I&C Equipment (Continued)

Equipment Identifier	Description	Location	EQ Environment	Qualification Program	Seismic Category I	Class 1E	EQ Category ⁽¹⁾
Reactor Coolant System							
None	Reactor Safety Valve Position Indicator	RXB - CNV-5 RXB - Inside Containment	Harsh	Electrical	Yes	No	B
RCS-PSV-0003A RCS-PSV-0003B	Reactor Safety Valves	RXB - CNV-5 RXB - Inside Containment	Harsh	Electrical Mechanical	Yes	N/A	A
PE0013A PE0013B PE0013C PE0013D	Narrow Range Pressurizer Pressure Elements	RXB - CNV-4 CNV-5 RXB - Inside Containment	Harsh	Electrical	Yes	Yes	A
PE0014A PE0014B PE0014C PE0014D	Wide Range RCS Pressure Elements	RXB - CNV-4 CNV-5 RXB - Inside Containment	Harsh	Electrical	Yes	Yes	A
LE0015A LE0015B LE0015C LE0015D	RCS Level PZR/RPV Level Elements	RXB - Top of Module CNV-5 CNV-6 RXB - Top of Module RXB - Inside Containment	Harsh	Electrical	Yes	Yes	A
TE0005A TE0005B TE0005C TE0005D TE0006A TE0006B TE0006C TE0006D <u>TE0007A</u> <u>TE0007B</u> <u>TE0007C</u> <u>TE0007D</u>	Narrow Range RCS Hot Leg Temperature Elements	RXB - CNV-3 RXB - Inside Containment	Harsh	Electrical	Yes	Yes	A

Table 2.8-1: Module Specific Mechanical and Electrical/I&C Equipment (Continued)

Equipment Identifier	Description	Location	EQ Environment	Qualification Program	Seismic Category I	Class 1E	EQ Category ⁽¹⁾
TE0008A TE0008B TE0008C TE0008D	Wide Range RCS Hot Leg Temperature Elements	RXB - CNV-3 RXB - Inside Containment	Harsh	Electrical	Yes	Yes	A
TE0011A TE0011B TE0011C TE0011D	Wide Range RCS Cold Leg Temperature Elements	RXB - CNV-2 RXB - Inside Containment	Harsh	Electrical	Yes	Yes	A
FE0012A FE0012B FE0012C FE0012D	RCS Flow Transmitter (Ultrasonic)	RXB - CNV-2 RXB - Inside Containment	Harsh	Electrical	Yes	Yes	A
RCS-HT-0001A RCS-HT-0001B	PZR Heaters	RXB - Inside Containment	N/A	N/A	Yes	No	N/A
RCS-CKV-0323 RCS-CKV-0332 RCS-CKV-0333 RCS-CKV-0400	RCS Check Valves and Excess Flow Check Valves	RXB - Inside Containment	N/A	N/A	Yes	N/A	N/A
Chemical and Volume Control System							
CVC-AOV-0101	DWS Supply Isolation Valve	RXB - 50'	Harsh	Electrical Mechanical	Yes	Yes	A B
CVC-AOV-0119	DWS Supply Isolation Valve	RXB - 50'	Harsh	Electrical Mechanical	Yes	Yes	A B
CVC-ZSO-0101 CVC-ZSC-0101	DWS Supply Isolation Valve Position Indication	RXB - 50'	Harsh	Electrical	Yes	No	A
CVC-ZSO-0119 CVC-ZSC-0119	DWS Supply Isolation Valve Position Indication	RXB - 50'	Harsh	Electrical	Yes	No	A
CVC-AOV-0339	Discharge Spoolpiece Drain Valve	RXB - 50'	Harsh	Electrical Mechanical	Yes	Yes	A
CVC-AOV-0342	Discharge PSS Isolation Valve	RXB - 50'	Harsh	Electrical Mechanical	Yes	Yes	A
CVC-CHK-0353	Spray Check Valve	RXB - Top of Module	Harsh	Mechanical	Yes	N/A	A-B

Table 2.8-1: Module Specific Mechanical and Electrical/I&C Equipment (Continued)

Equipment Identifier	Description	Location	EQ Environment	Qualification Program	Seismic Category I	Class 1E	EQ Category ⁽¹⁾
EVC-CKV-0352	Injection Check Valve	RXB - Top of Module	Harsh	Mechanical	Yes	N/A	A-B
Emergency Core Cooling System							
ECC-HOV-0101A ECC-HOV-0101B ECC-HOV-0101C	Reactor Vent Valve	RXB - CNV-5 <u>RXB - Inside Containment</u>	Harsh	Mechanical	Yes	Yes <u>No</u>	A
ECC-ZSC-0101A ECC-ZSO-0101A ECC-ZSC-0101B ECC-ZSO-0101B ECC-ZSC-0101C ECC-ZSO-0101C ECC-ZSC-0108 ECC-ZSO-0108	RVV Position Indication	RXB - CNV-5 <u>RXB - Inside Containment</u>	Harsh	Electrical	Yes	No	A
ECC-HOV-0104A ECC-HOV-0104B	Reactor Recirculation Valve	RXB - CNV-2 <u>RXB - Inside Containment</u>	Harsh	Mechanical	Yes	Yes <u>No</u>	A
ECC-ZSC-0104A ECC-ZSO-0104A ECC-ZSC-0104B ECC-ZSO-0104B	RRV Position Indication	RXB - CNV-2 <u>RXB - Inside Containment</u>	Harsh	Electrical	Yes	No	A
ECC-SV-0102A ECC-SV-0102B ECC-SV-0102C ECC-SV-0107	RVV Trip Valve	RXB - Pool	Harsh	Electrical Mechanical	Yes	Yes	A B
ECC-SV-0105A ECC-SV-0105B	RRV Trip Valve	RXB - Pool	Harsh	Electrical Mechanical	Yes	Yes	A B

Table 2.8-1: Module Specific Mechanical and Electrical/I&C Equipment (Continued)

Equipment Identifier	Description	Location	EQ Environment	Qualification Program	Seismic Category I	Class 1E	EQ Category ⁽¹⁾
ECC-ZSC-0102A ECC-ZSO-0102A ECC-ZSC-0102B ECC-ZSO-0102B ECC-ZSC-0102C ECC-ZSO-0102C ECC-ZSC-0107 ECC-ZSO-0107 ECC-ZSC-0105A ECC-ZSO-0105A ECC-ZSC-0105B ECC-ZSO-0105B	Trip Valve Position Indication <u>RVV Trip Valve Position Indication</u>	RXB - Pool	Harsh	Electrical	Yes	No	A
<u>ECC-ZSC-0105A</u> <u>ECC-ZSO-0105A</u> <u>ECC-ZSC-0105B</u> <u>ECC-ZSO-0105B</u>	<u>RRV Trip Valve Position Indication</u>	<u>RXB - Pool</u>	<u>Harsh</u>	<u>Electrical</u>	<u>Yes</u>	<u>No</u>	<u>A</u>
ECC-SV-0103A ECC-SV-0103B ECC-SV-0103C ECC-SV-0106A ECC-SV-0106B	Reset Valve <u>RVV Reset Valve</u>	RXB - Pool	Harsh	Electrical Mechanical	Yes	Yes	A
<u>ECC-SV-0106A</u> <u>ECC-SV-0106B</u>	<u>RRV Reset Valve</u>	<u>RXB - Pool</u>	<u>Harsh</u>	<u>Electrical</u> <u>Mechanical</u>	<u>Yes</u>	<u>Yes</u>	<u>A</u>

Table 2.8-1: Module Specific Mechanical and Electrical/I&C Equipment (Continued)

Equipment Identifier	Description	Location	EQ Environment	Qualification Program	Seismic Category I	Class 1E	EQ Category ⁽¹⁾
ECC-ZSC-0103A ECC-ZSO-0103A ECC-ZSC-0103B ECC-ZSO-0103B ECC-ZSC-0103C ECC-ZSO-0103C ECC-ZSC-0106A ECC-ZSO-0106A ECC-ZSC-0106B ECC-ZSO-0106B	Reset Valve Position Indication	RXB—Pool	Harsh	Electrical	Yes	No	A
Decay Heat Removal System							
DHR-AOV-1001A DHR-AOV-1001B DHR-AOV-2001A DHR-AOV-2001B <u>DHR-HOV-1002A</u> <u>DHR-HOV-1002B</u> <u>DHR-HOV-2002A</u> <u>DHR-HOV-2002B</u>	DHRS Actuation Valve (2 per side)	RXB - Top of Module	Harsh	Electrical Mechanical	Yes	Yes	A
DHR-TT-1006A DHR-TT-1006B DHR-TT-2006A DHR-TT-2006B	DHRS Condenser Outlet Temperature <u>Transmitters</u> (2 per side)	RXB - Pool	Harsh	Electrical	Yes	Yes <u>No</u>	A
DHR-PT-1007A DHR-PT-1007B DHR-PT-1007C DHR-PT-2007A DHR-PT-2007B DHR-PT-2007C	DHRS Condenser Outlet Pressure <u>Transmitters</u> (3 per side)	RXB - Pool	Harsh	Electrical	Yes	Yes <u>No</u>	A

Table 2.8-1: Module Specific Mechanical and Electrical/I&C Equipment (Continued)

Equipment Identifier	Description	Location	EQ Environment	Qualification Program	Seismic Category I	Class 1E	EQ Category ⁽¹⁾
DHR-ZSO-1002A DHR-ZSC-1002A DHR-ZSO-1002B DHR-ZSC-1002B DHR-ZSO-2002A DHR-ZSC-2002A DHR-ZSO-2002B DHR-ZSC-2002B	DHRS Valve Position Indicator (2 for open, 2 for close per side)	RXB - Top of Module	Harsh	Electrical	Yes	No	A
<u>DHR-HX-1001</u> <u>DHR-HX-2001</u>	<u>Condenser</u>	<u>RXB - Side of Module</u>	<u>N/A</u>	<u>N/A</u>	<u>Yes</u>	<u>N/A</u>	<u>N/A</u>
DHR-PT-1001A DHR-PT-1001B DHR-PT-1001C DHR-PT-1001D DHR-PT-2001A DHR-PT-2001B DHR-PT-2001C DHR-PT-2001D	SG Steam Pressure <u>Transmitters</u> (4 per side)	RXB - Top of Module	Harsh	Electrical	Yes	Yes	A
Main Steam System							
<u>MS-AOV-1003</u> <u>MS-AOV-2003</u>	<u>Secondary Main Steam Isolation Valves</u>	<u>RXB - 100'</u>	<u>Harsh</u>	<u>Electrical</u> <u>Mechanical</u>	<u>Yes</u>	<u>No</u>	<u>A B</u>
<u>MS-AOV-1004</u> <u>MS-AOV-2004</u>	<u>Secondary Main Steam Isolation Bypass Valves</u>	<u>RXB - 100'</u>	<u>Harsh</u>	<u>Electrical</u> <u>Mechanical</u>	<u>Yes</u>	<u>No</u>	<u>A B</u>
Condensate and Feedwater System							
FW-FCV-0067 A/B <u>FW-FCV-1006</u> <u>FW-FCV-2006</u>	Feedwater Regulating Valve A/B	RXB - 100'	Harsh	Electrical Mechanical	Yes	No	A
FW-ZT-0067 A/B	Feedwater Regulating Valve A/B Position-Indicating Transmitter	RXB - 100'	Harsh	Electrical	Yes	No	A

Table 2.8-1: Module Specific Mechanical and Electrical/I&C Equipment (Continued)

Equipment Identifier	Description	Location	EQ Environment	Qualification Program	Seismic Category I	Class 1E	EQ Category ⁽¹⁾
CKV-10070148A CKV-20070148B	Feedwater Supply Check Valve	RXB - 100'	Harsh	Mechanical	Yes	N/A	A
Module Protection System							
None	Division I – Power Isolation, Conversion and Monitoring Devices	RXB - 75'	Harsh	Electrical	Yes	Yes	B
None	<ul style="list-style-type: none"> • <u>Safety-Related MPS Modules</u> – <u>Safety Function Modules</u> – <u>Hard-wired Modules</u> – <u>Scheduling and Bypass Modules</u> – <u>Equipment Interface Modules</u> – <u>Scheduling and Voting Modules</u> 	RXB - 75' RXB - 86'	Mild	Electrical	Yes	Yes	E
None	<u>Power Isolation, Conversion and Monitoring Devices</u>	RXB - 75' RXB - 86'	Mild	Electrical	Yes	Yes	E
None	<u>ELVS Voltage Sensors</u>	RXB - 75' RXB - 86'	Mild	Electrical	Yes	Yes	E
None	<u>Under-the-Bioshield Temperature Sensors</u>	RXB - Top of the Module	Harsh	Electrical	Yes	Yes	A
<u>MPS-BKR-1S-0002A</u> <u>MPS-BKR-1S-0002B</u> <u>MPS-BKR-2S-0002A</u> <u>MPS-BKR-2S-0002B</u>	<u>PZR Heater Trip Breakers</u>	RXB - 75' RXB - 86'	Mild	Electrical	Yes	Yes	E
<u>MPS-BKR-1S-0001A</u> <u>MPS-BKR-1S-0001B</u> <u>MPS-BKR-2S-0001A</u> <u>MPS-BKR-2S-0001B</u>	<u>Reactor Trip Breakers</u>	RXB - 75' RXB - 86'	Mild	Electrical	Yes	Yes	E
<u>MPS-HS-AS-TB01 through TB15</u> <u>MPS-HS-BS-TB01 through TB15</u> <u>MPS-HS-CS-TB01 through TB15</u> <u>MPS-HS-DS-TB01 through TB15</u>	<u>Safety Function Module Trip/Bypass Switches</u>	RXB - 75' RXB - 86'	Mild	Electrical	Yes	Yes	E

Table 2.8-1: Module Specific Mechanical and Electrical/I&C Equipment (Continued)

Equipment Identifier	Description	Location	EQ Environment	Qualification Program	Seismic Category I	Class 1E	EQ Category ⁽¹⁾
MPS-HS-1S-0001 MPS-HS-2S-0001	Enable Nonsafety Control Switches	CRB - 76.5'	Mild	Electrical	Yes	Yes	E
MPS-HS-1S-0002 MPS-HS-2S-0002	MCR Isolation Switches	RXB - 75'	Harsh	Electrical	Yes	Yes	B
MPS-HS-1S-MA08 MPS-HS-2S-MA08	Manual PZR Heater Breaker Trip Switches	CRB - 76.5'	Mild	Electrical	Yes	Yes	E
MPS-HS-1S-MA07 MPS-HS-2S-MA07	Manual LTOP Actuation Switches	CRB - 76.5'	Mild	Electrical	Yes	Yes	E
MPS-HS-1S-MA06 MPS-HS-2S-MA06	Manual ECCS Actuation Switches	CRB - 76.5'	Mild	Electrical	Yes	Yes	E
MPS-HS-1S-MA05 MPS-HS-2S-MA05	Manual DWSI Actuation Switches	CRB - 76.5'	Mild	Electrical	Yes	Yes	E
MPS-HS-1S-MA04 MPS-HS-2S-MA04	Manual DHRS Actuation Switches	CRB - 76.5'	Mild	Electrical	Yes	Yes	E
MPS-HS-1S-MA03 MPS-HS-2S-MA03	Manual CVCSI Actuation Switches	CRB - 76.5'	Mild	Electrical	Yes	Yes	E
MPS-HS-1S-MA02 MPS-HS-2S-MA02	Manual CSI Actuation Switches	CRB - 76.5'	Mild	Electrical	Yes	Yes	E
MPS-HS-1S-MA01 MPS-HS-2S-MA01	Manual Reactor Trip Switches	CRB - 76.5'	Mild	Electrical	Yes	Yes	E
MPS-HS-1S-0004 MPS-HS-2S-0004	Override Switches	CRB - 76.5'	Mild	Electrical	Yes	Yes	E
MPS-HS-1S-0003 MPS-HS-2S-0003	Operating Bypass Switches	CRB - 76.5'	Mild	Electrical	Yes	Yes	E
Neutron Monitoring System							
None	Neutron Detectors Excore Neutron Detectors	RXB - Pool	Harsh	Electrical	Yes	Yes	A
None	Excore Signal Conditioning and Processing Equipment	RXB - 75' RXB - 86'	Mild	Electrical	Yes	Yes	E
None	Excore Power Isolation, Conversion and Monitoring Devices	RXB - 75' RXB - 86'	Mild	Electrical	Yes	Yes	E

Table 2.8-1: Module Specific Mechanical and Electrical/I&C Equipment (Continued)

Equipment Identifier	Description	Location	EQ Environment	Qualification Program	Seismic Category I	Class 1E	EQ Category ⁽¹⁾
In-Core Instrumentation System							
None	In-core instrument string/temperature sensors <u>In-core instrument string / temperature and flux sensors</u>	RXB - CNV-5 CNV-6 <u>RXB - Inside Containment</u>	Harsh	Electrical	Yes	Yes <u>No</u>	A
None	In-core instrument string sheath	RXB - CNV-5 <u>RXB - Inside Containment</u>	Harsh	Mechanical	Yes	N/A	B

Notes:

1. EQ Categories:

- A Equipment that will experience the environmental conditions of design basis accidents for which it must function to mitigate said accidents, and that will be qualified to demonstrate operability in the accident environment for the time required for accident mitigation with safety margin to failure.
- B Equipment that will experience the environmental conditions of design basis accidents through which it need not function for mitigation of said accidents, but through which it must not fail in a manner detrimental to plant safety or accident mitigation, and that will be qualified to demonstrate the capability to withstand the accident environment for the time during which it must not fail with safety margin to failure.
- E Equipment that will not experience environmental conditions of design basis accidents and that will be qualified to demonstrate operability under the expected extremes of its nonaccident service environment.

Table 3.14-1: Mechanical and Electrical/Instrumentation and Controls Common Equipment

Plant ID Equipment Identifier	Description	Location	EQ Environment	EQ Program	Seismic Category	Class 1E	EQ Category ⁽¹⁾
Module Assembly Equipment - Bolting							
None	RPV Support Stand	RXB - UHS	N/A	N/A	I	N/A	N/A
Fuel Handling Equipment							
CRN-0001B140-CRN-001	Fuel handling machine (FHM)	Reactor Building (RXB)-24'-0"RXB 100'-0" Elevation	Harsh	Electrical Mechanical	I	N/A No	B
None	FHM load path components.	RXB 24'-0" Elevation	Harsh	Mechanical	I	N/A	B
None	FHM critical control systems	RXB 100'-0" Elevation	Harsh	Electrical	I	N/A	B
None	FHM load cell	RXB 100'-0" Elevation	Harsh	Electrical	I	N/A	B
Spent Fuel Storage System							
00-SFS-SRK-0001	Fuel Storage Racks	RXB - Spent Fuel Pool	N/A	N/A	I	N/A	N/A
Reactor Pool Cooling System							
TE-1010A	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1010B	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1011A	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1011B	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1012A	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1012B	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1013A	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1013B	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1014A	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1014B	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1015A	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1015B	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1016A	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1016B	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1017A	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1017B	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1018A	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1018B	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1019A	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1019B	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A

Table 3.14-1: Mechanical and Electrical/Instrumentation and Controls Common Equipment (Continued)

Plant ID/Equipment Identifier	Description	Location	EQ Environment	EQ Program	Seismic Category	Class 1E	EQ Category⁽¹⁾
TE-1020A	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1020B	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1021A	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
TE-1021B	Instrumentation - temperature	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
Ultimate Heat Sink							
LI/LIT-101A LI/LIT-101B LI/LIT-102A LI/LIT-102B	Pool level instruments	RXB 24'-0" Elevation	Harsh	Electrical	I	N/A No	A
None	<u>Water Makeup Line</u>	<u>RXB - UHS</u>	<u>N/A</u>	<u>N/A</u>	<u>I</u>	<u>N/A</u>	<u>N/A</u>
Radiation Monitoring System							
None	Radiation monitoring that monitor post-accident monitoring B & C variables	Containment vessel, module-pool bay vapor space - outside containment and under the bioshield, RXB 24'-0" thru 145'-6" Elevation	Harsh	Electrical	I	1E	A
Reactor Building Cranes							
CRN-0001 <u>00-RBC-CRN-001</u>	Reactor Building crane	RXB 100'-0" thru 145'-6" Elevation	Harsh	Electrical Mechanical	I	N/A No	B
<u>00-RBC-MHE-0001</u>	<u>Module Lifting Adapter</u>	<u>RXB - Various</u>	<u>N/A</u>	<u>N/A</u>	<u>I</u>	<u>N/A</u>	<u>N/A</u>
Reactor Building Components							
None	<u>UHS Pool Liner and Dry Dock Liner</u>	<u>RXB - UHS</u>	<u>N/A</u>	<u>N/A</u>	<u>I</u>	<u>N/A</u>	<u>N/A</u>

Notes:

1. EQ Categories:

- ~~a~~A - Equipment that will experience the environmental conditions of design basis accidents for which it must function to mitigate said accidents, and that will be qualified to demonstrate operability in the accident environment for the time required for accident mitigation with safety margin to failure.
- ~~b~~B - Equipment that will experience the environmental conditions of design basis accidents through which it need not function for mitigation of said accidents, but through which it must not fail in a manner detrimental to plant safety or accident mitigation, and that will be qualified to demonstrate the capability to withstand the accident environment for the time during which it must not fail with safety margin to failure.