Table 3.9-16: Active Valve List

Valve No.	Description	ASME Class	Function[1]
ASME Class 1, 2, and 3			
Chemical and Volume Control System			
CVC-AOV-0336	CVCS Discharge Isolation Valve	3	5
CVC-SV-0404	RPV High Point Degasification Isolation Valve	3	5
CVC-AOV-0089	Demineralized Water Supply to CVC Makeup Upstream Isolation Valve	3	3
CVC-AOV-0090	Demineralized Water Supply to CVC Makeup Downstream Isolation Valve	3	3
Containment System			
CVC-CKV-0323	Pressurizer Spray Check Valve	3	~~6~~5
CVC-CKV-0329	CVCS Injection Check Valve	3	~~6~~5
CVC-HOV-0324	Pressurizer Spray Outboard Containment Isolation Valve	1	1, 2, 3, 4
CVC-HOV-0325	Pressurizer Spray Inboard Containment Isolation Valve	1	1, 2, 3, 4
CVC-HOV-0330	CVCS Injection Outboard Containment Isolation Valve	1	1, 2, 3, 4
CVC-HOV-0331	CVCS Injection Inboard Containment Isolation Valve	1	1, 2, 3, 4
CVC-HOV-0334	CVCS Discharge Inboard Containment Isolation Valve	1	1, 2, 3, 4
CVC-HOV-0335	CVCS Discharge Outboard Containment Isolation Valve	1	1, 2, 3, 4
CVC-HOV-0401	RPV High Point Degasification Inboard Containment Isolation Valve	1	1, 2, 3, 4
CVC-HOV-0402	RPV High Point Degasification Outboard Containment Isolation Valve	1	1, 2, 3, 4
CE-HOV-0001	Containment Evacuation Inboard Containment Isolation Valve	2	2, 3, 4
CE-HOV-0002	Containment Evacuation Outboard Containment Isolation Valve	2	2, 3, 4
CFD-HOV-0021	Containment Flooding & Drain Outboard Containment Isolation Valve	2	2, 3, 4
CFD-HOV-0022	Containment Flooding & Drain Inboard Containment Isolation Valve	2	2, 3, 4
RCCW-HOV-0184	Reactor Component Cooling Water Inlet Outboard Containment Isolation Valve	2	2, 3, 4
RCCW-HOV-0185	Reactor Component Cooling Water Inlet Inboard Containment Isolation Valve	2	2, 3, 4
RCCW-HOV-0190	Reactor Component Cooling Water Outlet Inboard Containment Isolation Valve	2	2, 3, 4
RCCW-HOV-0191	Reactor Component Cooling Water Outlet Outboard Containment Isolation Valve	2	2, 3, 4
FW-HOV-0137	Feedwater Isolation Valve	2	2, 3, 4
FW-HOV-0237	Feedwater Isolation Valve	2	2, 3, 4
FW-CKV-0136	Feedwater Isolation Check Valve	2	3
FW-CKV-0236	Feedwater Isolation Check Valve	2	3
MS-HOV-0101	Main Steam Isolation Valve	2	2, 3, 4
MS-HOV-0201	Main Steam Isolation Valve	2	2, 3, 4
MS-HOV-0103	Main Steam Isolation Bypass Valve	2	2, 3, 4
MS-HOV-0203	Main Steam Isolation Bypass Valve	2	2, 3, 4
Decay Heat Removal System			
DHR-HOV-0111	Decay Heat Removal System Actuation Valve	2	3, 4
DHR-HOV-0121	Decay Heat Removal System Actuation Valve	2	3, 4
DHR-HOV-0211	Decay Heat Removal System Actuation Valve	2	3, 4
DHR-HOV-0221	Decay Heat Removal System Actuation Valve	2	3, 4

Table 3.9-16: Active Valve List (Continued)

Valve No.	Description	ASME Class	Function[1]
Emergency Core Cooling System[2]			
ECC-POV-0001A	Reactor Vent Valve A	1	1, 3, 4
ECC-POV-0001B	Reactor Vent Valve B	1	1, 3, 4
ECC-POV-0002A	Reactor Recirculation Valve A	1	1, 3, 4
ECC-POV-0002B	Reactor Recirculation Valve B	1	1, 3, 4
Safety and Relief Valves			
RCS-PSV-0003A	Reactor Safety Valve A	1	1, 3
RCS-PSV-0003B	Reactor Safety Valve B	1	1, 3
SGS-RV-0102	Steam Generator System Thermal Relief Valve	2	2
SGS-RV-0202	Steam Generator System Thermal Relief Valve	2	2
Non-Code Class Valves			
Condensate and Feedwater System			
FW-AOV-0134	Feedwater Regulating Valve	NC	6~~7~~
FW-AOV-0234	Feedwater Regulating Valve	NC	6~~7~~
FW-CKV-0135	Backup Feedwater Check Valve	NC	6~~7~~
FW-CKV-0235	Backup Feedwater Check Valve	NC	6~~7~~
Main Steam System			
MS-AOV-0102	Backup Main Steam Isolation Valve	NC	6~~7~~
MS-AOV-0202	Backup Main Steam Isolation Valve	NC	6~~7~~
MS-AOV-0104	Backup Main Steam Isolation Bypass Valve	NC	6~~7~~
MS-AOV-0204	Backup Main Steam Isolation Bypass Valve	NC	6~~7~~

1 - Function 1 - Reactor coolant pressure boundary
2 - Containment isolation
3 - Accident mitigation
4 - Safe shutdown
5 - Nonsafety-related, but provide an augmented quality function (NRC Quality Group C/D boundary)
~~6 - Nonsafety-related, but provide an augmented quality function (NRC Quality Group C/D boundary, backup containment isolation)~~
6~~7~~ - Nonsafety backup to a safety-related function (Section 15.0.0.6.6)

2 - Trip and reset valves are included with each RVV and RRV.

Table 3.9-18: Valve Augmented Requirements

Valve No.	Description	Valve / Actuator[1]	Function Position	Augmented Function(s)[2]	ASME Class / IST Category	IST Type[3]	Notes
Chemical Volume and Control System							
CVC-AOV-0336	CVCS Discharge Isolation Valve	BALL Remote AO	Closed	Active BDBE Containment Isolation	Class 3 Category A	Position Verification Test Exercise Full Stroke/Quarterly~~Cold Shutdown~~ Failsafe Test/Quarterly~~Cold Shutdown~~ Leak Test Performance Assessment Test	N/A~~5~~
CVC-SV-0404	~~NDS Supply to Reactor Module Isolation~~RPV High Point Degasification Solenoid Valve	GLOBE Remote SO	Closed	Active BDBE Containment Isolation	Class 3 Category A	Position Verification Test Exercise Full Stroke/Quarterly~~Cold Shutdown~~ Failsafe Test/Quarterly~~Cold Shutdown~~ Leak Test	N/A~~5~~
CVC-CKV-0329	CVCS Injection Check Valve	Nozzle Check	Closed	Active BDBE Containment Isolation	Class 3 Category A/C	Check Exercise/Cold Shutdown Leak Test	4~~4, 5~~
CVC-CKV-0323	Pressurizer Spray Check Valves	Nozzle Check	Closed	Active BDBE Containment Isolation	Class 3 Category A/C	Check Exercise/Cold Shutdown Leak Test	4~~4, 5~~

Notes:

1. AO air operated; CVCS chemical volume and control; NPM NuScale Power Module; RPV reactor pressure vessel
2. Valves with augmented test requirements have a beyond-design-basis event function and a Regulatory Guide 1.26, footnote 5, class break function (valves of high leaktight integrity).~~are relied on in the safety analyses, and these components either provide a nonsafety backup to a safety-related function or are nonsafety-related that provide an augmented quality function. The design does not use safety-related electric power to mitigate accidents or for the safe shutdown of the NPM; therefore, all valves listed have an active-to-failed function to transfer to its backup position on loss of motive power.~~ Valves with an active function are tested by observing the operation of the actuator upon loss of valve actuating power.
3. Cold Shutdown Outage as defined in ASME OM Code, Paragraph ISTA-2000 is Mode 3, safe shutdown, with all reactor coolant temperatures < 200 degrees F. The term “cold shutdown” is used throughout Section 3.9.6 for clarity with the OM Code requirements (Section 3.9.6.4.1).
4. Backup CVCS Check Valves: The backup CVCS check valves are normally closed, nozzle check valves. These valves cannot be full- stroke or part-stroke exercised closed during plant operation because system flow must be reversed to demonstrate valve closure. The nozzle check design is a spring-to-close design. Nonintrusive testing can be used to verify valve closure (safety-function position) at cold shutdown. Normal CVCS operation satisfies the open (nonsafety-function position) exercise for these valves pursuant to ISTC-3550, Valves in Regular Use, at a frequency that satisfies the requirements for augmented testing by periodically measuring line flow and pressure to confirm the valves are fully open.

~~5. Backup Containment Isolation Valves: Third isolation valves that provide a nonsafety backup function as defined by Regulatory Guide 1.26, C.2(c) footnote 6 as having "high leaktight integrity." These valves define the NRC Quality Group C/D and Seismic I/III classification break. The power operated valves receive a nonsafety containment isolation signal.~~

Table 3.11-1: List of Environmentally Qualified Equipment Located in Harsh Environments (Continued)

Description[4][5]	Environmental Qualification Zone[1]	Environmental Qualification Environment	Qualification Program	Environmental Qualification Category[3]	PAM Type[2]	Operating Time (Hrs)
I&C Separation Group A Electrical Penetration Assembly (EPA)	CNV-5, RXBP-1	Harsh	Electrical Mechanical	A	B,C,D	720
I&C Separation Group B Electrical Penetration Assembly (EPA)	CNV-5, RXBP-1	Harsh	Electrical Mechanical	A	B,C,D	720
I&C Separation Group C Electrical Penetration Assembly (EPA)	CNV-5, RXBP-1	Harsh	Electrical Mechanical	A	B,C,D	720
I&C Separation Group D Electrical Penetration Assembly (EPA)	CNV-5, RXBP-1	Harsh	Electrical Mechanical	A	B,C,D	720
CRDM Power 2 Nozzle Electrical Penetration Assembly (EPA)	CNV-5, RXBP-1	Harsh	Electrical Mechanical	A	N/A	720
Main Steam Isolation Valve (MSIV) #1 and #2	RXBP-1	Harsh	Electrical Mechanical	A B	N/A	1 720
MS Isolation Bypass Valve (MSIBV) #1 and #2	RXBP-1	Harsh	Electrical Mechanical	A B	N/A	1 720
Feedwater Isolation Valve (FWIV) #1 and #2	RXBP-1	Harsh	Electrical Mechanical	A B	N/A	1 720
Feedwater Isolation Check Valve #1 and #2	RXBP-1	Harsh	Mechanical	A B	N/A	1 720
RCCW Supply CIV, Inboard and Outboard	RXBP-1	Harsh	Electrical Mechanical	A B	N/A	1 720
RCCW Return CIV, Inboard and Outboard	RXBP-1	Harsh	Electrical Mechanical	A B	N/A	1 720
RPV High Point Degas CIV, Inboard and Outboard	RXBP-1	Harsh	Electrical Mechanical	A B	N/A	1 720
~~RPV High Point Degas Solenoid Valve~~	~~RXBP-1~~	~~Harsh~~	~~Electrical Mechanical~~	~~A B~~	~~N/A~~	~~1 720~~
~~PZR Spray Flow Check Valve~~	~~RXBP-1~~	~~Harsh~~	~~Mechanical~~	~~A B~~	~~N/A~~	~~1 720~~

Table 3.11-1: List of Environmentally Qualified Equipment Located in Harsh Environments (Continued)

Description[4][5]	Environmental Qualification Zone[1]	Environmental Qualification Environment	Qualification Program	Environmental Qualification Category[3]	PAM Type[2]	Operating Time (Hrs)
PZR Spray CIV, Inboard and Outboard	RXBP-1	Harsh	Electrical Mechanical	A B	N/A	1 720
~~CVC Injection Flow Check Valve~~	~~RXBP-~~	~~Harsh~~	~~Mechanical~~	~~A~~ ~~B~~	~~N/A~~	~~1~~ ~~720~~
CVC Injection CIV, Inboard and Outboard	RXBP-1	Harsh	Electrical Mechanical	A B	N/A	1 720
CVC Discharge CIV, Inboard and Outboard	RXBP-1	Harsh	Electrical Mechanical	A B	N/A	1 720
~~CVC Discharge Air Operated Valve~~	~~RXBP-1~~	~~Harsh~~	~~Electrical~~ ~~Mechanical~~	~~A~~ ~~B~~	~~N/A~~	~~1~~ ~~720~~
Containment Flood and Drain CIV, Inboard and Outboard	RXBP-1	Harsh	Electrical Mechanical	A B	N/A	1 720
Containment Evacuation CIV, Inboard and Outboard	RXBP-1	Harsh	Electrical Mechanical	A B	N/A	1 720
Central Hydraulic Power Unit Skid A and Skid B	RXBG-8	Harsh	Electrical Mechanical	A B	N/A	1 720
Passive Autocatalytic Recombiner (PAR)	CNV-4 or CNV-5	Harsh	Mechanical	B	N/A	720
Containment Narrow Range Pressure Element A/B/C/D	CNV-6	Harsh	Electrical	A	N/A	720
Containment Wide Range Pressure Element A/B	CNV-	Harsh	Electrical	A	B,C,D	720
Containment Level Indication A/B/C/D	RXBP-1, CNV-1 - CNV-6	Harsh	Electrical	A	N/A	720
SG #1 and SG #2 Main Steam Temperature Indication A/B/C/D	RXBP-1	Harsh	Electrical	A	N/A	720
FWIV #1 Position Indication A / B	RXBP-1	Harsh	Electrical	A	B,C,D	720
FWIV #2 Position Indication A / B	RXBP-1	Harsh	Electrical	A	B,C,D	720

Table 6.2-7: Classification of Structures, Systems, and Components

SSC (Note 1)	Location	SSC Classification (A1, A2, B1, B2)	Augmented Design Requirements (Note 2)	Quality Group/Safety Classification (Ref RG 1.26 or RG 1.143) (Note 3)	Seismic Classification (Ref. RG 1.29 or RG 1.143) (Note 4)
CNTS, Containment System					
All components (except as listed below)-	RXB	A1	None	B	I
• CIVs (CVC PZR spray, RPV high point degasification, CVC injection & discharge) • CITFs (CVC PZR spray, RVP high point degasification, CVC injection & discharge)	RXB	A1	None	A	I
• CIV stored energy device pressure transmitters (MSIV, FWIV, RCCW CIVs, CVC high point degasification CIVs, PZR spray CIVs, CVC injection & discharge CIVs, CFD CIVs, CE CIVS) • Containment pressure instrumentation (narrow range) • Containment level instrumentation • MS temperature sensors • Closed and open position indicators for FWIVs • CHPU skid A & B • Supply/vent hydraulic lines from CHPU to CIVs • Hydraulic manifolds between CHPU and CIVs	RXB	A1	None	N/A	I
Feedwater isolation check valves	RXB	A2	None	B	I
• CNV-RPV support ledge • CNV CRDM support frame • Supply/vent hydraulic lines from CHPU to DHRS actuation valves	RXB	A2	None	N/A	I
• RPV high point degas solenoid valve • CVC discharge air operated valve • CVC injection and PZR spray flow check valves • ~~Piping from PZR spray CIVs to class 3 CVC PRZ spray check valve (outside CNV)~~ • ~~Piping from CVC injection CIVs to class 3 CVC injection check valve (outside CNV)~~ • ~~Piping from CVC discharge CIVs to class 3 CVC discharge isolation valve (outside CNV)~~ • ~~Piping from CVC RPV high point degasification CIVs to class 3 RPV high point degasification isolation valve (outside CNV)~~	RXB	B2~~B1~~	• Subject to in-service testing ~~(Note 2)~~	C	II~~I~~

Table 6.2-7: Classification of Structures, Systems, and Components (Continued)

SSC (Note 1)	Location	SSC Classification (A1, A2, B1, B2)	Augmented Design Requirements (Note 2)	Quality Group/Safety Classification (Ref RG 1.26 or RG 1.143) (Note 3)	Seismic Classification (Ref. RG 1.29 or RG 1.143) (Note 4)
• Piping from PZR spray CIVs to class 3 CVC PZR spray check valve (outside CNV) • Piping from CVC injection CIVs to class 3 CVC injection check valve (outside CNV) • Piping from CVC discharge CIVs to class 3 CVC discharge isolation valve (outside CNV) • Piping from CVC RPV high point degasification CIVs to class 3 RPV high point degasification isolation valve (outside CNV)	RXB	B2	None	C	II
• Piping from CE CIVs to disconnect flange (outside CNV) • Piping from MSIV and FWIV to disconnect flange (outside CNV)	RXB	B2	None	D	I
• Piping from (CFDS and RCCWS) CIVs to disconnect flange (outside CNV) • Piping from class 3 CVC valves to disconnect flange (outside CNV) • CFD piping (inside CNV) • CNV test line A and B	RXB	B2	None	D	II
• Containment top support structure • Feedwater temperature sensors	RXB	B2	None	N/A	I
• Containment pressure instrumentation (wide range) • Closed and open position indicators (MSIV, MSIBV, RCCWS CIVs, RPV high point degasification CIVs, PZR spray CIVs, CVC injection & discharge CIVs, CFD CIVs, CE CIVs)	RXB	B2	IEEE 497-2016 (Note 5)	N/A	I
PAR	RXB	B2	RG 1.7	N/A	II
• Closed and open position indicators (RPV high point degasification solenoid valve, CVC discharge AOV) • Flushing hydraulic line from CHPU to inboard & outboard CIVs and DHR actuation valves	RXB	B2	None	N/A	II

Table 17.4-1: Design Reliability Assurance Program Structures, Systems, and Components Functions, Categorization, and Categorization Basis (Continued)

System Function	Function Category (A1 & B1)	SSC Required to Perform System Function	Basis for Function Categorization
CNTS (Continued)			
		• CVCS piping (outside containment): - RPV high point degasification solenoid valve to disconnect flange - PZR spray flow check valve to disconnect flange - Injection flow check valve to disconnect flange - Discharge air operated valve to disconnect flange • Containment pressure transducers (wide range) • Feedwater isolation check valves • Feedwater resistance temperature detectors • CNTS top support structure • Containment vessel, control rod drive mechanism support frame • RPV support ledge • Passive autocatalytic recombiner	
• ~~Provides backup isolation capability for containment isolation lines that may result in a loss-of-coolant event.~~	~~B1~~	• ~~RPV high point degasification solenoid valve~~ • ~~PZR spray flow check valve~~ • ~~CVCS injection flow check valve~~ • ~~CVCS discharge air operated valve~~ • ~~CVCS piping: (outside containment)~~ - ~~RPV high point degasification CIV to reducer~~ - ~~Reducer to RPV high point degasification solenoid valve~~ - ~~PZR spray CIV to PZR spray flow check valve~~ - ~~Injection CIV to injection flow check valve~~ - ~~Discharge CIV to discharge air operated valve~~	~~Determination by expert panel and informed with input from PRA, deterministic, and other methods of analysis~~
Reactor Core System (RXC)			
• Contains fission products and transuranics within the fuel rods to minimize contamination of the reactor coolant • Maintains a coolable geometry under normal operating and design-basis event conditions	A1	• Fuel assembly	Determination by expert panel and informed with input from PRA, deterministic, and other methods of analysis

Table 2.4-3: Module-Specific Mechanical and Electrical/Instrumentation and Controls Equipment (Continued)

Equipment Identifier	Description	EQ Environment	Qualification Program	Seismic Category I	Class 1E	EQ Category(1)
RCCW-HOV-0190	RCCWS return inboard CIV	Harsh	Electrical Mechanical	Yes	Yes	A B
RCCW-HOV-0191	RCCWS return outboard CIV	Harsh	Electrical Mechanical	Yes	Yes	A B
CE-HOV-0001	CES inboard CIV	Harsh	Electrical Mechanical	Yes	Yes	A B
CE-HOV-0002	CES outboard CIV	Harsh	Electrical Mechanical	Yes	Yes	A B
CFD-HOV-0022	CFDS inboard CIV	Harsh	Electrical Mechanical	Yes	Yes	A B
CFD-HOV-0021	CFDS outboard CIV	Harsh	Electrical Mechanical	Yes	Yes	A B
~~CVC-CKV-0323~~	~~PZR spray flow check valve~~	~~Harsh~~	~~Mechanical~~	~~Yes~~	~~N/A~~	~~A B~~
~~CVC-CKV-0329~~	~~CVCS injection flow check valve~~	~~Harsh~~	~~Mechanical~~	~~Yes~~	~~N/A~~	~~A B~~
~~CVC-AOV-0336~~	~~CVC discharge air operated valve~~	~~Harsh~~	~~Mechanical~~	~~Yes~~	~~No~~	~~A B~~
~~CVC-SV-0404~~	~~RPV high point degas solenoid valve~~	~~Harsh~~	~~Electrical~~	~~Yes~~	~~No~~	~~A B~~
CNT-SKD-0500 CNT-SKD-0600	Central hydraulic power unit skids	Harsh	Electrical Mechanical	Yes	Yes	B
CNT-PE-1001A CNT-PE-1001B CNT-PE-1001C CNT-PE-1001D	Containment narrow range pressure elements	Harsh	Electrical	Yes	Yes	A
CNT-PE-1002A CNT-PE-1002B	Containment wide range pressure elements	Harsh	Electrical	Yes	No	A
CNT-LE-1003A CNT-LE-1003B CNT-LE-1003C CNT-LE-1003D	Containment level indication	Harsh	Electrical	Yes	Yes	A
MS-TE-1001A MS-TE-1001B MS-TE-1001C MS-TE-1001D	SG #1 main steam temperature indication	Harsh	Electrical	Yes	Yes	A
MS-TE-2001A MS-TE-2001B MS-TE-2001C MS-TE-2001D	SG #2 main steam temperature indication	Harsh	Electrical	Yes	Yes	A