2.7 Support Systems

2.7.1 Component Cooling Water System

Design Description

1.0 System Description

The component cooling water system (CCWS) is a safety related closed loop cooling water system comprising four divisions that remove heat generated from safety related and non-safety related equipment connected to the CCWS. Heat transferred from this equipment to the CCWS is rejected to the essential service water system (ESWS) via the component cooling water heat exchangers.

The CCWS provides the following significant safety-related functions:

- The CCWS provides the transport of the heat from the safety injection system (SIS) and residual heat removal system (RHRS) to the ESWS.
- The CCWS provides the cooling of the thermal barrier of the reactor coolant pump (RCP) seals during all plant operating modes when the RCPs are running. There is a cross-connect in the header that supplies cooling to the RCP thermal barriers to allow thermal barrier cooling from either CCWS Common 1.b or 2.b headers. The cross-connect is inside containment, downstream of the CIVs on each of the Common 1.b and 2.b headers.
- The CCWS provides heat removal from the safety chilled water system (SCWS) divisions 2 and 3.
- The CCWS provides the removal of the decay heat from the fuel pool cooling water heat exchanger.
- The CCWS containment isolation valves close upon receipt of a containment isolation signal.

The CCWS provides the following significant non-safety-related functions:

- The non-safety-related dedicated CCWS train removes heat from the severe accident heat removal system (SAHRS).

2.0 Arrangement

2.1 The functional arrangement of the CCWS is as described in the Design Description of Section 2.7.1, Tables 2.7.1-1—Component Cooling Water System Equipment Mechanical Design and 2.7.1-2—Component Cooling Water System Equipment I&C and Electrical Design, and shown on Figure 2.7.1-1—Component Cooling Water System Functional Arrangement.

2.2 Deleted.

2.3 Physical separation exists between divisions of the CCWS as shown on Figure 2.7.1-1.

3.0 Mechanical Design Features

3.1 Pumps and valves listed in Table 2.7.1-1 will be functionally designed and qualified such that each valve is capable of performing its intended function for a full range of system differential pressure and flow, ambient temperatures, and available voltage (as applicable) under design basis accident conditions.

3.2 Check valves listed in Table 2.7.1-1 will function to change position as listed in Table 2.7.1-1 under normal operating conditions.

3.3 Deleted.

3.4 Equipment identified as Seismic Category I in Table 2.7.1-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.7.1-1.

3.5 Deleted.

3.6 Deleted.

3.7 Deleted.

3.8 Deleted.

3.9 Deleted.

3.10 Deleted.

3.11 Deleted.

3.12 Deleted.

3.13 Deleted.

3.14 ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.

3.15 As-built ASME Code Class 1, 2 and 3 components are reconciled with the design requirements.

3.16 Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.

3.17 ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.

3.18 ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

4.0 I&C Design Features, Displays, and Controls

4.1 Displays listed in Table 2.7.1-2 are indicated on the PICS operator workstations in the MCR and the RSS.

4.2 Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.7.1-2.

4.3 Equipment listed as being controlled by a priority and actuator control system (PACS) module in Table 2.7.1-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.

4.4 An interlock for the CCWS low flow condition automatically opens the low head safety injection (LHSI)/residual heat removal (RHR) heat exchanger (HX) inlet valve.

4.5 An interlock for the CCWS surge tank level of MIN3 automatically isolates the associated train common header switchover valves.

4.6 An interlock for the CCWS surge tank level of MIN4 automatically trips the associated CCWS pump and unlocks the common header switchover function to allow restoration of flow to the common users.

4.7 An interlock for the CCWS low surge tank level of MIN2 and when the supply flow rate to the Nuclear Auxiliary Building (NAB) and the Radioactive Waste Building (RWB) is greater than the flow rate from NAB and RWB automatically isolates the non-safety-related branch.

4.8 An interlock for the loss of one CCWS train initiates an automatic switchover to allow cooling of the common 'a' and/or 'b' headers.

4.9 Deleted.

4.10 An interlock for the CCWS train separation to RCP thermal barriers requires CIVs associated with one common header to be closed before the other common header CIVs can be opened.

4.11 An interlock for the manual or automatic actuation of a CCWS pump automatically actuates the corresponding ESWS pump.

4.12 Upon receipt of a SIS actuation signal, interlocks initiate the following:

- Start operable CCWS pumps, if not previously running.
- Open LHSI HX isolation valves.
- Open LHSI pump seal cooler isolation valves.
- Close isolation valves for non-safety-related users outside of the Reactor Building.

4.13 An interlock for the CCWS train to maintain cooling to the RCP thermal barriers requires opening the CIVs associated with the closed common header, when a CIV on the opened common header is closed.

5.0 Electrical Power Design Features

5.1 Equipment designated as Class 1E in Table 2.7.1-2 are powered from the Class 1E division as listed in Table 2.7.1-2 in a normal or alternate feed condition.

5.2 Hydraulic operated valves listed in Table 2.7.1 2 fail as is on loss of power.

6.0 Environmental Qualifications

6.1 Equipment designated as harsh environment in Table 2.7.1-2 will perform the function listed in Table 2.7.1-1 under normal environmental conditions, containment test conditions, anticipated operational occurrences, and accident and post-accident environmental conditions.

7.0 Equipment and System Performance

7.1 Each CCWS heat exchanger listed in Table 2.7.1-1 has the capacity to transfer the design heat load to the ESWS.

7.2 The pumps listed in Table 2.7.1-1 have net positive suction head available (NPSHA) that is greater than net positive suction head required (NPSHR) at system run-out flow at the minimum surge tank level.

7.3 The CCWS delivers water to the LHSI/RHRS heat exchangers to provide cooling.

7.4 The CCWS delivers water to the RCP thermal barrier coolers at the required flow from Common 1.b header and also from Common 2.b header.

7.5 The CCWS delivers water to Divisions 2 and 3 of the SCWS chiller heat exchangers.

7.6 The CCWS delivers water to the spent fuel pool cooling heat exchangers.

7.7 Class 1E valves listed in Table 2.7.1-2 will function to change position as listed in Table 2.7.1-1 under normal operating conditions.

7.8 The CCWS has provisions to allow flow testing of each CCWS pump during plant operation.

7.9 Deleted.

7.10 The CCWS surge tanks provide adequate capacity for normal system operation.

7.11 Each CCWS surge tank maintains a reserve volume to accommodate system leakage for seven days of continuous operation with no makeup source available.

Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.1-3 lists the CCWS ITAAC.

Table 2.7.1-1—CCWS Equipment Mechanical Design
Sheet 1 of 5

Description	Tag Number[1]	Location	ASME Code Section III	Function	Seismic Category
Component Cooling Water Pumps	30KAA10AP001 30KAA20AP001 30KAA30AP001 30KAA40AP001	Safeguard Building 1 Safeguard Building 2 Safeguard Building 3 Safeguard Building 4	Yes	Run	I
Heat Exchangers	30KAA10AC001 30KAA20AC001 30KAA30AC001 30KAA40AC001	Safeguard Building 1 Safeguard Building 2 Safeguard Building 3 Safeguard Building 4	Yes	Heat Transfer Device	I
Surge Tanks	30KAA10BB001 30KAA20BB001 30KAA30BB001 30KAA40BB001	Safeguard Building 1 Safeguard Building 2 Safeguard Building 3 Safeguard Building 4	Yes	Provide the following: 1. Pump NPSH 2. Adequate Surge Volume 3. Makeup Volume for normal leakage	I
CCWS Pump/Heat Exchanger Downstream Check Valves	30KAA10AA004 30KAA20AA004 30KAA30AA004 30KAA40AA004	Safeguard Building 1 Safeguard Building 2 Safeguard Building 3 Safeguard Building 4	Yes	Prevent Backflow	I
Heat Exchanger Bypass Valves	30KAA10AA112 30KAA20AA112 30KAA30AA112 30KAA40AA112	Safeguard Building 1 Safeguard Building 2 Safeguard Building 3 Safeguard Building 4	Yes	Temperature control	I
Surge Tank Demin. Water Makeup Isolation Valves	30KAA10AA027 30KAA20AA027 30KAA30AA027 30KAA40AA027	Safeguard Building 1 Safeguard Building 2 Safeguard Building 3 Safeguard Building 4	Yes	Open/Close	I

Table 2.7.1-1—CCWS Equipment Mechanical Design
Sheet 2 of 5

Description	Tag Number(1)	Location	ASME Code Section III	Function	Seismic Category
Train Switchover Valves	30KAA10AA033 30KAA10AA032 30KAA20AA033 30KAA20AA032	Safeguard Building 1 Safeguard Building 1 Safeguard Building 2 Safeguard Building 2	Yes	Open/Close	I
Train Switchover Valves	30KAA30AA033 30KAA30AA032 30KAA40AA033 30KAA40AA032	Safeguard Building 3 Safeguard Building 3 Safeguard Building 4 Safeguard Building 4	Yes	Open/Close	I
Train Switchover Valves	30KAA10AA006 30KAA10AA010 30KAA20AA006 30KAA20AA010	Safeguard Building 1 Safeguard Building 1 Safeguard Building 2 Safeguard Building 2	Yes	Open/Close	I
Train Switchover Valves	30KAA30AA006 30KAA30AA010 30KAA40AA006 30KAA40AA010	Safeguard Building 3 Safeguard Building 3 Safeguard Building 4 Safeguard Building 4	Yes	Open/Close	I
LHSI HX Isolation Valves	30KAA12AA005 30KAA22AA005 30KAA32AA005 30KAA42AA005	Safeguard Building 1 Safeguard Building 2 Safeguard Building 3 Safeguard Building 4	Yes	Open	I
LHSI Pump Seal Cooler Isolation Valves	30KAA22AA013 30KAA32AA013	Safeguard Building 2 Safeguard Building 3	Yes	Open	I
CCWS to Low Head Safety Injection Heat Exchanger Downstream Check Valves	30KAA12AA012 30KAA22AA012 30KAA32AA012 30KAA42AA012	Safeguard Building 1 Safeguard Building 2 Safeguard Building 3 Safeguard Building 4	Yes	Prevent Backflow	I

Table 2.7.1-1—CCWS Equipment Mechanical Design
Sheet 3 of 5

Description	Tag Number[1]	Location	ASME Code Section III	Function	Seismic Category
CCWS to Low Head Safety Injection Pump Seal Fluid Cooler Downstream Check Valves	30KAA22AA014 30KAA32AA014	Safeguard Building 2 Safeguard Building 3	Yes	Prevent Backflow	I
Safety Chilled Water Chiller CCWS Flow Control Valves	30KAA22AA101 30KAA32AA101	Safeguard Building 2 Safeguard Building 3	Yes	Open/Close	I
Common Header 1.a Fuel Pool Cooling Heat Exchanger 1 Downstream Control Valve	30KAB10AA134	Fuel Building	Yes	Open/Close	I
Common Header 2.a Fuel Pool Cooling Heat Exchanger 2 Downstream Control Valve	30KAB20AA134	Fuel Building	Yes	Open/Close	I
Common Header 1.b RCP Thermal Barriers Containment Isolation Valves	30KAB30AA049 30KAB30AA050 30KAB30AA051 30KAB30AA052	Safeguard Building 1 Reactor Building Reactor Building Safeguard Building 1	Yes	Close (Manually Initiated)	I
Common Header 2.b RCP Thermal Barriers Containment Isolation Valves	30KAB30AA053 30KAB30AA054 30KAB30AA055 30KAB30AA056	Safeguard Building 4 Reactor Building Reactor Building Safeguard Building 4	Yes	Close (Manually Initiated)	I
Common Header 1.b Non-Safety Loads Containment Isolation Valves	30KAB40AA001 30KAB40AA006 30KAB40AA012	Safeguard Building 1 Reactor Building Safeguard Building 1	Yes	Close	I
Common Header 1.b Containment Supply Isolation Check Valve	30KAB40AA002	Reactor Building	Yes	Close	I
Common Header 2.b Auxiliary Building and Waste Building Isolation Valves	30KAB50AA001 30KAB50AA006 30KAB50AA004	Safeguard Building 4 Safeguard Building 4 Safeguard Building 4	Yes	Close	I

Table 2.7.1-1—CCWS Equipment Mechanical Design
Sheet 4 of 5

Description	Tag Number(1)	Location	ASME Code Section III	Function	Seismic Category
Common Header 2.b Auxiliary and Waste Building Return Isolation Check Valve	30KAB50AA008	Safeguard Building 4	Yes	Close	I
Common Header 1.b Safety-Related Containment Isolation Valves	30KAB60AA013 30KAB60AA018 30KAB60AA019	Safeguard Building 1 Reactor Building Safeguard Building 1	Yes	Close	I
Common Header 1.b CVCS HP Cooler 1 and RCP Coolers 1/2 Containment Supply Isolation Check Valve	30KAB60AA014	Reactor Building	Yes	Prevent Backflow	I
Common Header 1.b CVCS HP Cooler 1 Downstream Control Valve	30KAB60AA116	Reactor Building	Yes	Close	I
Common Header 2.b Safety-Related Loads Containment Isolation Valves	30KAB70AA013 30KAB70AA018 30KAB70AA019	Safeguard Building 4 Reactor Building Safeguard Building 4	Yes	Close	I
Common Header 2.b Containment Supply Isolation Check Valve	30KAB70AA014	Reactor Building	Yes	Prevent Backflow	I
Common Header 2.b CVCS HP Cooler 2 Downstream Control Valve	30KAB70AA116	Reactor Building	Yes	Close	I
Common Header 1.b Auxiliary Building Isolation Valves	30KAB80AA015 30KAB80AA016	Safeguard Building 1 Safeguard Building 1	Yes	Close	I
Common Header 1.b Auxiliary Building Isolation Valve	30KAB80AA019	Safeguard Building 1	Yes	Close	I
Common Header 1.b Nuclear Auxiliary Building Downstream Check Valve	30KAB80AA020	Safeguard Building 1	Yes	Close	I

Table 2.7.1-1—CCWS Equipment Mechanical Design
Sheet 5 of 5

Description	Tag Number[1]	Location	ASME Code Section III	Function	Seismic Category
Dedicated CCWS Surge Tank Isolation Valve	30KAA80AA020	Safeguard Building 4	No	Open	N/A
Dedicated CCWS Surge Tank Nitrogen Supply Valve	30KAA80AA021	Safeguard Building 4	No	Open	N/A
Dedicated CCWS Demin Water Makeup Water Supply Valve	30KAA80AA202	Safeguard Building 4	No	Open	N/A
Dedicated CCWS Pump	30KAA80AP001	Safeguard Building 4	No	Run	N/A
Dedicated CCWS Demin Water Makeup Pump	30KAA80AP201	Safeguard Building 4	No	Run	N/A
Dedicated CCWS Heat Exchanger	30KAA80AC001	Safeguard Building 4	No	Heat Transfer Device	N/A
Dedicated CCWS Surge Tank	30KAA80BB001	Safeguard Building 4	No	Provide the following: 1. Pump NPSH 2. Adequate surge volume 3. Makeup volume for normal leakage	N/A
Train 1 Surge Tank Makeup Isolation Valves	30KAA10AA141 30KAA10AA142	Safeguard Building 1 Safeguard Building 1	Yes	Open	I
Train 2 Surge Tank Makeup Isolation Valves	30KAA20AA141 30KAA20AA142	Safeguard Building 2 Safeguard Building 2	Yes	Open	I
Train 3 Surge Tank Makeup Isolation Valves	30KAA30AA141 30KAA30AA142	Safeguard Building 3 Safeguard Building 3	Yes	Open	I
Train 4 Surge Tank Makeup Isolation Valves	30KAA40AA141 30KAA40AA142	Safeguard Building 4 Safeguard Building 4	Yes	Open	I

1. Equipment tag numbers are provided for information only and are not part of the certified design.

Table 2.7.1-2—CCWS Equipment I&C and Electrical Design
Sheet 1 of 7

Description	Tag Number(1)	Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Component Cooling Water Pumps	30KAA10AP001 30KAA20AP001 30KAA30AP001 30KAA40AP001	Safeguard Building 1 Safeguard Building 2 Safeguard Building 3 Safeguard Building 4	1 2 3 4	Yes	Yes	On-Off / On-Off	Start-Stop / Start-Stop
Train Switchover Valves	30KAA10AA006 30KAA10AA010 30KAA10AA032 30KAA10AA033	Safeguard Building 1	NA (3)	Yes	Yes	Position / Position	Open-Close / Open-Close
Train Switchover Valves	30KAA20AA006 30KAA20AA010 30KAA20AA032 30KAA20AA033	Safeguard Building 2	NA (3)	Yes	Yes	Position / Position	Open-Close / Open-Close
Train Switchover Valves	30KAA30AA006 30KAA30AA010 30KAA30AA032 30KAA30AA033	Safeguard Building 3	NA (3)	Yes	Yes	Position / Position	Open-Close / Open-Close
Train Switchover Valves	30KAA40AA006 30KAA40AA010 30KAA40AA032 30KAA40AA033	Safeguard Building 4	NA (3)	Yes	Yes	Position / Position	Open-Close / Open-Close
Heat Exchanger Bypass Valve	30KAA10AA112	Safeguard Building 1	1^N 2^A	Yes	Yes	Position / Position	Open-Close / Open-Close
Heat Exchanger Bypass Valve	30KAA20AA112	Safeguard Building 2	2^N 1^A	Yes	Yes	Position / Position	Open-Close / Open-Close

Table 2.7.1-2—CCWS Equipment I&C and Electrical Design
Sheet 2 of 7

Description	Tag Number(1)	Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Heat Exchanger Bypass Valve	30KAA30AA112	Safeguard Building 3	3^N 4^A	Yes	Yes	Position / Position	Open-Close / Open-Close
Heat Exchanger Bypass Valve	30KAA40AA112	Safeguard Building 4	4^N 3^A	Yes	Yes	Position / Position	Open-Close / Open-Close
Surge Tank Level	30KAA10CL094	Safeguard Building 1	1	N/A	No	Level / Level	NA / NA
Surge Tank Level	30KAA10CL099	Safeguard Building 1	1	N/A	No	Level / Level	NA / NA
Surge Tank Level	30KAA20CL094	Safeguard Building 2	2	N/A	No	Level / Level	NA / NA
Surge Tank Level	30KAA20CL099	Safeguard Building 2	2	N/A	No	Level / Level	NA / NA
Surge Tank Level	30KAA30CL094	Safeguard Building 3	3	N/A	No	Level / Level	NA / NA
Surge Tank Level	30KAA30CL099	Safeguard Building 3	3	N/A	No	Level / Level	NA / NA
Surge Tank Level	30KAA40CL094	Safeguard Building 4	4	N/A	No	Level / Level	NA / NA
Surge Tank Level	30KAA40CL099	Safeguard Building 4	4	N/A	No	Level / Level	NA / NA
LHSI HX Isolation Valve	30KAA12AA005	Safeguard Building 1	1^N 2^A	Yes	Yes	Position / Position	Open-Close / Open-Close
LHSI HX Isolation Valve	30KAA22AA005	Safeguard Building 2	2^N 1^A	Yes	Yes	Position / Position	Open-Close / Open-Close
LHSI HX Isolation Valve	30KAA32AA005	Safeguard Building 3	3^N 4^A	Yes	Yes	Position / Position	Open-Close / Open-Close
LHSI HX Isolation Valve	30KAA42AA005	Safeguard Building 4	4^N 3^A	Yes	Yes	Position / Position	Open-Close / Open-Close

Table 2.7.1-2—CCWS Equipment I&C and Electrical Design
Sheet 3 of 7

Description	Tag Number(1)	Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
LHSI Pump Seal Cooler Isolation Valve	30KAA22AA013	Safeguard Building 2	2^N 1^A	Yes	Yes	Position / Position	Open-Close / Open-Close
LHSI Pump Seal Cooler Isolation Valve	30KAA32AA013	Safeguard Building 3	3^N 4^A	Yes	Yes	Position / Position	Open-Close / Open-Close
Common Header 2.b Auxiliary Building and Waste Building Isolation Valves	30KAB50AA001 30KAB50AA004 30KAB50AA006	Safeguard Building 4	NA(3)	N/A	Yes	Position / Position	Open-Close / Open-Close
Common Header 1.b Auxiliary Building Isolation Valves	30KAB80AA015 30KAB80AA016 30KAB80AA019	Safeguard Building 1	NA(3)	N/A	Yes	Position / Position	Open-Close / Open-Close
Common Header 1.b Non-Safety Loads Containment Isolation Valves	30KAB40AA001 30KAB40AA006 30KAB40AA012	Safeguard Building 1 Safeguard Building 1 Reactor Building	1^N 2^A 1^N 2^A 4^N 3^A	Yes	Yes	Position / Position	Open-Close / Open-Close

Table 2.7.1-2—CCWS Equipment I&C and Electrical Design
Sheet 4 of 7

Description	Tag Number(1)	Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Common Header 1.b Safety Related Loads Containment Isolation Valves	30KAB60AA013	Safeguard Building 1	1N 2A	Yes	Yes	Position / Position	Open-Close / Open-Close
	30KAB60AA018	Reactor Building	4N 3A				
	30KAB60AA019	Safeguard Building 1	1N 2A				
Common Header 2.b Safety Related Loads Containment Isolation Valves	30KAB70AA013	Safeguard Building 4	4N 3A	Yes	Yes	Position / Position	Open-Close / Open-Close
	30KAB70AA018	Reactor Building	1N 2A				
	30KAB70AA019	Safeguard Building 4	4N 3A				
Common Header 1.b RCP Thermal Barriers Containment Isolation Valves	30KAB30AA049	Safeguard Building 1	1N 2A	Yes	Yes	Position / Position	Open-Close / Open-Close
	30KAB30AA050	Reactor Building	4N 3A				
	30KAB30AA051	Reactor Building	4N 3A				
	30KAB30AA052	Safeguard Building 1	1N 2A				

Table 2.7.1-2—CCWS Equipment I&C and Electrical Design
Sheet 5 of 7

Description	Tag Number(1)	Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Common Header 2.b RCP Thermal Barriers Containment Isolation Valves	30KAB30AA053	Safeguard Building 4	4^N 3^A	Yes	Yes	Position / Position	Open-Close / Open-Close
	30KAB30AA054	Reactor Building	1^N 2^A				
	30KAB30AA055	Reactor Building	1^N 2^A				
	30KAB30AA056	Safeguard Building 4	4^N 3^A				
Surge Tank Demin. Water Makeup Isolation Valves	30KAA10AA027	Safeguard Building 1	1^N 2^A	N/A	Yes	Position / Position	Open-Close / Open-Close
	30KAA20AA027	Safeguard Building 2	2^N 1^A				
	30KAA30AA027	Safeguard Building 3	3^N 4^A				
	30KAA40AA027	Safeguard Building 4	4^N 3^A				
Common Header 1.a Fuel Pool Cooling Heat Exchanger 1 Downstream Control Valve	30KAB10AA134	Fuel Building	1^N 2^A	N/A	Yes	NA / NA	NA / NA

Table 2.7.1-2—CCWS Equipment I&C and Electrical Design
Sheet 6 of 7

Description	Tag Number(1)	Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Common Header 2.a Fuel Pool Cooling Heat Exchanger 2 Downstream Control Valve	30KAB20AA134	Fuel Building	4^N 3^A	N/A	Yes	NA / NA	NA / NA
Common Header 1.b Safety Related Loads CVCS HP Cooler 1 Downstream Control Valve	30KAB60AA116	Reactor Building	N/A	N/A	Yes	Position / N/A	Open-Close / Open-Close
Common Header 2.b Safety Related Loads CVCS HP Cooler 2 Downstream Control Valve	30KAB70AA116	Reactor Building	NA	N/A	Yes	Position / N/A	Open-Close / Open-Close
Dedicated CCWS Surge Tank Isolation Valve	30KAA80AA020	Safeguard Building 4	4 (4)	N/A	Yes	Position / N/A	Open-Close / Open-Close
Dedicated CCWS Surge Tank Nitrogen Supply Valve	30KAA80AA021	Safeguard Building 4	4 (4)	N/A	Yes	Position / N/A	Open-Close / Open-Close
Dedicated CCWS Demin Water Makeup Water Supply Valve	30KAA80AA202	Safeguard Building 4	4 (4)	N/A	Yes	Position / N/A	Open-Close / Open-Close
Dedicated CCWS Pump	30KAA80AP001	Safeguard Building 4	4 (4)	N/A	Yes	On-Off / NA	Start-Stop / NA

Table 2.7.1-2—CCWS Equipment I&C and Electrical Design
Sheet 7 of 7

Description	Tag Number(1)	Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Dedicated CCWS Demin Water Makeup Pump	30KAA80AP201	Safeguard Building 4	4 (4)	N/A	Yes	On-Off / NA	Start-Stop / NA
Safety Chilled Water Chiller CCWS Flow Control Valve	30KAA22AA101	Safeguard Building 2	2^N 1^A	N/A	Yes	NA / NA	NA / NA
Safety Chilled Water Chiller CCWS Flow Control Valve	30KAA32AA101	Safeguard Building 3	3^N 4^A	N/A	Yes	NA / NA	NA / NA

1. Equipment tag numbers are provided for information only and are not part of the certified design.

2. ^{N} denotes the division the equipment is normally powered from; ^{A} denotes the division the equipment is powered from when alternate feed is implemented.

3. Each hydraulically operated valve has multiple solenoid-operated pilot valves and hydraulic fluid pumps. Pilot valves and hydraulic fluid pumps are powered from different Class 1E divisions to provide redundancy.

4. Dedicated equipment are non-Class 1E equipment but are powered from the Class 1E division as shown.

Table 2.7.1-3—Component Cooling Water System ITAAC
Sheet 1 of 11

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.1	The functional arrangement of the CCWS is as described in the Design Description of Section 2.7.1, Tables 2.7.1-1 and 2.7.1-2, and as shown on Figure 2.7.1-1.	An inspection of the as-built CCWS functional arrangement will be performed.	The CCWS conforms to the functional arrangement as described in the Design Description of Section 2.7.1, Tables 2.7.1-1 and 2.7.1-2, and as shown on Figure 2.7.1-1.
2.2	Deleted.	Deleted.	Deleted.
2.3	Physical separation exists between divisions of the CCWS as shown on Figure 2.7.1-1.	An inspection will be performed to verify that as-built divisions of the CCWS are located in separate Safeguard Buildings.	The divisions of the CCWS are located in separate Safeguard Buildings as shown on Figure 2.7.1-1.
3.1	Pumps and valves listed in Table 2.7.1-1 will be functionally designed and qualified such that each valve is capable of performing its intended function for a full range of system differential pressure and flow, ambient temperatures, and available voltage (as applicable) under design basis accident conditions.	Tests or type tests of pumps and valves will be performed to demonstrate that the pumps and valves function under design basis accident conditions.	A report concludes that the pumps and valves listed in Table 2.7.1-1 are capable of performing their intended function for a full range of system differential pressure and flow, ambient temperatures, and available voltage (as applicable) under design basis accident conditions.
3.2	Check valves listed in Table 2.7.1-1 will function to change position as listed in Table 2.7.1-1 under normal operating conditions.	Tests will be performed to verify the ability of check valves to change position under normal operating conditions.	The check valves change position as listed in Table 2.7.1-1 under normal operating conditions.
3.3	Deleted.	Deleted.	Deleted.

Table 2.7.1-3—Component Cooling Water System ITAAC
Sheet 2 of 11

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.4	Equipment identified as Seismic Category I in Table 2.7.1-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.7.1-1.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the equipment identified as Seismic Category I in Table 2.7.1-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements. b. An inspection will be performed of the as-built equipment identified as Seismic Category I in Table 2.7.1-1 to verify that the equipment, including anchorage, are installed per the approved design requirements.	a. Test/analysis reports conclude that the equipment identified as Seismic Category I in Table 2.7.1-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.7.1-1 including the time required to perform the listed function. b. Inspection reports conclude that the equipment identified as Seismic Category I in Table 2.7.1-1, including anchorage, are installed per the approved design requirements.
3.5	Deleted.	Deleted.	Deleted.
3.6	Deleted.	Deleted.	Deleted.
3.7	Deleted.	Deleted.	Deleted.
3.8	Deleted.	Deleted.	Deleted.
3.9	Deleted.	Deleted.	Deleted.
3.10	Deleted.	Deleted.	Deleted.
3.11	Deleted.	Deleted.	Deleted.
3.12	Deleted.	Deleted.	Deleted.
3.13	Deleted.	Deleted.	Deleted.
3.14	ASME Code Class 1, 2 and 3 piping systems are designed in accordance with ASME Code Section III requirements.	An inspection of piping design and analysis documentation required by the ASME Code Section III will be performed. {{DAC}}	ASME Code Section III Design Report(s) exist that meet the requirements of NCA-3550 and conclude that the design of the ASME Code Class 1, 2 and 3 piping system complies with the requirements of the ASME Code Section III. {{DAC}}

Table 2.7.1-3—Component Cooling Water System ITAAC
Sheet 3 of 11

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.15	As-built ASME Code Class 1, 2 and 3 are reconciled with the design requirements.	A reconciliation analysis of ASME Code Class 1, 2 and 3 components will be performed.	ASME Code Design Report(s) exist that meet the requirements of NCA-3550, conclude that the design reconciliation has been completed for as-built ASME Code Class 1, 2 and 3 components, and document the results of the reconciliation analysis.
3.16	Pressure-boundary welds in ASME Code Class 1, 2 and 3 components meet ASME Code Section III non-destructive examination requirements.	An inspection of the as-built pressure-boundary welds in ASME Code Class 1, 2 and 3 components will be performed.	ASME Code reports(s) exist that conclude that ASME Code Section III requirements are met for non-destructive examination of pressure-boundary welds in ASME Code Class 1, 2 and 3 components.
3.17	ASME Code Class 1, 2 and 3 components retain their pressure-boundary integrity at their design pressure.	A hydrostatic test will be conducted on ASME Code Class 1, 2 and 3 components that are required to be hydrostatically tested by the ASME Code Section III.	ASME Code Data Report(s) exist and conclude that the results of the hydrostatic test of ASME Code Class 1, 2 and 3 components comply with the requirements of ASME Code Section III.
3.18	ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.	An inspection of the as-built construction activities and documentation for ASME Code Class 1, 2 and 3 components will be conducted.	ASME Code Data Report(s) exist that conclude that ASME Code Class 1, 2 and 3 components are fabricated, installed, and inspected in accordance with ASME Code Section III requirements.

Table 2.7.1-3—Component Cooling Water System ITAAC
Sheet 4 of 11

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
4.1	Displays listed in Table 2.7.1-2 are indicated on the PICS operator workstations in the MCR and the RSS.	a. Tests will be performed to verify that the displays listed in Table 2.7.1-2 are indicated on the PICS operator workstations in the MCR by using test input signals to PICS. b. Tests will be performed to verify that the displays listed in Table 2.7.1-2 are indicated on the PICS operator workstations in the RSS by using test input signals inputs to PICS.	a. Displays listed in Table 2.7.1-2 are indicated on the PICS operator workstations in the MCR. b. Displays listed in Table 2.7.1-2 are indicated on the PICS operator workstations in the RSS.
4.2	Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.7.1-2.	a. Tests will be performed using controls on the PICS operator workstations in the MCR. b. Tests will be performed using controls on the PICS operator workstations in the RSS.	a. Controls on the PICS operator workstations in the MCR perform the function listed in Table 2.7.1-2. b. Controls on the PICS operator workstations in the RSS perform the function listed in Table 2.7.1-2.
4.3	Equipment listed as being controlled by a PACS module in Table 2.7.1-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.	A test will be performed using test input signals to verify equipment controlled by a PACS module responds to the state requested and provides drive monitoring signals back to the PACS module.	Equipment listed as being controlled by a PACS module in Table 2.7.1-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.
4.4	An interlock for the CCWS low flow condition automatically opens the LHSI/ RHR HX inlet valve.	Tests will be performed using test input signals to verify the interlock automatically opens the LHSI/RHR HX inlet valve on a CCWS low flow condition.	The following interlock responds as specified below when activated by a test input signal: ● CCWS low flow condition automatically opens the LHSI/RHR HX inlet valve.

Table 2.7.1-3—Component Cooling Water System ITAAC
Sheet 5 of 11

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
4.5	An interlock for the CCWS surge tank level of MIN3 automatically isolates the associated train common header switchover valves.	Tests will be performed using test input signals to verify the interlock automatically isolates the associated train common header switchover valves on a CCWS surge tank level of MIN3.	The following interlock responds as specified below when activated by a test input signal: ● CCWS surge tank level of MIN3 automatically isolates the associated train common header switchover valves.
4.6	An interlock for the CCWS surge tank level of MIN4 automatically trips the associated CCWS pump and unlocks the common header switchover function to allow restoration of flow to the common users.	Tests will be performed using test input signals to verify the interlock automatically trips the associated CCWS pump and unlocks the common header switchover function to allow restoration of flow to the common users on a CCWS surge tank level of MIN4.	The following interlocks respond as specified below when activated by a test input signal: ● CCWS surge tank level MIN4 automatically trips the associated CCWS pump. ● CCWS surge tank level MIN4 automatically unlocks the common header switchover sequence. This interlock to be verified by performing a switchover function to allow restoration of flow to the common users.
4.7	An interlock for the CCWS low surge tank level of MIN2 and when the supply flow rate to the NAB and the RWB is greater than the flow rate from NAB and RWB automatically isolates the non-safety-related branch.	Tests will be performed using test input signals to verify the interlock automatically isolates the non-safety-related branch on a CCWS low surge tank level of MIN2 and when the supply flow rate to the NAB and the RWB is greater than the flow rate from NAB and RWB.	The following interlock responds as specified below when activated by a test input signal: ● A CCWS low surge tank level of MIN2 and the supply flow rate to NAB and RWB is greater than the flow rate from NAB and RWB automatically isolates the non-safety-related branch.

Table 2.7.1-3—Component Cooling Water System ITAAC
Sheet 6 of 11

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
4.8	An interlock for the loss of one CCWS train automatically initiates a switchover to allow cooling of the common “a” and/or “b” headers.	Tests will be performed using test input signals to verify the interlock automatically initiates a switchover to allow cooling of the common “a” and/or “b” headers on loss of one CCWS train.	The following interlock responds as specified below when activated by a test input signal: ● Loss of one CCWS train automatically initiates a switchover to allow cooling of the common “a” and/or “b” headers.
4.9	Deleted.	Deleted.	Deleted.
4.10	An interlock for the CCWS train separation to RCP thermal barriers requires CIVs associated with one common header to be closed before the other common header CIVs can be opened.	Tests will be performed using test input signals to verify the operation of the following interlocks: ● Thermal barrier CIVs associated with common header 1 will not open while CIVs associated with common header 2 are opened and vice versa. ● Thermal barrier CIVs associated with common header 1 will open when CIVs associated with common header 2 are closed and vice versa.	The following interlocks respond as specified below when activated by a test input signal: ● Thermal barrier CIVs associated with common header 1 will not open while CIVs associated with common header 2 are opened and vice versa. ● Thermal barrier CIVs associated with common header 1 will open when CIVs associated with common header 2 are closed and vice versa.
4.11	An interlock for the manual or automatic actuation of a CCWS pump automatically actuates the corresponding ESWS pump.	Tests will be performed using test input signals to verify the interlock automatically actuates the corresponding ESWS pump on manual or automatic actuation of a CCWS pump.	The following interlock responds as specified below when activated by a test input signal: ● Manual or automatic actuation of a CCWS pump automatically actuates the corresponding ESWS pump.

Table 2.7.1-3—Component Cooling Water System ITAAC
Sheet 7 of 11

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
4.12	Upon receipt of an SIS actuation signal, interlocks initiate the following: ● Start operable CCWS pumps, if not previously running. ● Open LHSI HX isolation valves. ● Open LHSI pump seal cooler isolation valves. ● Close isolation valves for non-safety-related users outside of the Reactor Building.	Tests will be performed using test input signals to verify that upon receipt of an SIS actuation signal, interlocks initiate the following: ● Start operable CCWS pumps, if not previously running. ● Open LHSI HX isolation valves. ● Open LHSI pump seal cooler isolation valves. ● Close isolation valves for non-safety-related users outside of the Reactor Building.	The following interlocks respond as specified below when activated by an SIS actuation signal test input signal: ● CCWS operable pumps start (if not previously running). ● LHSI HX isolation valves open. ● LHSI pump seal cooler isolation valves open. ● Isolation valves for non-safety-related users outside of Reactor Building close.
4.13	An interlock for the CCWS train to maintain cooling to the RCP thermal barriers requires opening the CIVs associated with the closed common header, when a CIV on the opened common header is closed.	Tests will be performed using test input signals to verify the interlock automatically the operation of the following interlocks: ● Thermal barrier CIVs associated with the closed common header 1 will open when a CIV on the opened common header 2 closes. ● Thermal barrier CIVs associated with the closed common header 2 will open when a CIV on the opened common header 1 closes.	The following interlock responds as specified below when activated by a test input signal: ● Thermal barrier CIVs associated with the closed common header 1 will open when a CIV on the opened common header 2 closes. ● Thermal barrier CIVs associated with the closed common header 2 will open when a CIV on the opened common header 1 closes.

Table 2.7.1-3—Component Cooling Water System ITAAC
Sheet 8 of 11

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
5.1	Equipment designated as Class 1E in Table 2.7.1-2 are powered from the Class 1E division as listed in Table 2.7.1-2 in a normal or alternate feed condition.	a. Testing will be performed by providing a test input signal in each normally aligned division.	a. The test input signal provided in the normally aligned division is present at the respective Class 1E equipment identified in Table 2.7.1-2.
		b. Testing will be performed by providing a test input signal in each division with the alternate feed aligned to the divisional pair.	b. The test input signal provided in each division with the alternate feed aligned to the divisional pair is present at the respective Class 1E equipment identified in Table 2.7.1-2.
5.2	Hydraulic operated valves listed in Table 2.7.1-2 fail as is on loss of power.	Tests will be performed to verify that hydraulic operated valves listed in Table 2.7.1-2 fail as is on loss of power.	Following loss of power, hydraulic operated valves listed in Table 2.7.1-2 fail as is.

Table 2.7.1-3—Component Cooling Water System ITAAC
Sheet 9 of 11

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
6.1	Equipment designated as harsh environment in Table 2.7.1-2 will perform the function listed in Table 2.7.1-1 under normal environmental conditions, containment test conditions, anticipated operational occurrences, and accident and post-accident environmental conditions.	a. Type tests or type tests and analysis will be performed to demonstrate the ability of the equipment designated as harsh environment in Table 2.7.1-2 to perform the function listed in Table 2.7.1-1 under normal environmental conditions, containment test conditions, anticipated operational occurrences, and accident and post-accident environmental conditions. b. An inspection will be performed of the as-built equipment designated as harsh environment in Table 2.7.1-2 to verify that the equipment, including anchorage, are installed per the approved design requirements.	a. EQDPs conclude that the equipment designated as harsh environment in Table 2.7.1-2 can perform the function listed in Table 2.7.1-1 under normal environmental conditions, containment test conditions, anticipated operational occurrences, and accident and post-accident environmental conditions, including the time required to perform the listed function. b. Inspection reports conclude that the equipment designated as harsh environment in Table 2.7.1-2, including anchorage, are installed per the approved design requirements.
7.1	Each CCWS heat exchanger listed in Table 2.7.1-1 has the capacity to transfer the design heat load to the ESWS.	Tests and analyses will be performed to verify the capability of the CCWS heat exchangers to transfer the design heat load to the ESWS.	Each CCWS heat exchanger listed in Table 2.7.1-1 has the capacity to transfer the heat load of greater than or equal to 293.35 E+06 BTU/hr with a minimum additional margin of 10% above the specified 10% tube plugging allowance to the ESWS.
7.2	The pumps listed in Table 2.7.1-1 have NPSHA that is greater than NPSHR at system run-out flow at the minimum surge tank level.	Tests and analyses will be performed to verify pump NPSHA that is greater than NPSHR at system run-out flow at the minimum surge tank level.	The pumps listed in Table 2.7.1-1 have NPSHA that is greater than NPSHR at system run-out flow at the minimum surge tank level.

Table 2.7.1-3—Component Cooling Water System ITAAC
Sheet 10 of 11

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
7.3	The CCWS delivers water to the LHSI/RHRS heat exchangers to provide cooling.	Tests will be performed to verify the CCWS flowrate to the LHSI/RHRS heat exchangers under normal operating conditions.	The CCWS delivers a minimum flow of 2.19×10^6 lb/hr to each LHSI/RHR heat exchanger under normal operating conditions.
7.4	The CCWS delivers water to the RCP thermal barrier coolers at the required flow from Common 1.b header and also from Common 2.b header.	Tests will be performed to verify the CCWS flowrate to the thermal barrier coolers from Common 1.b header and also from Common 2.b header under normal operating conditions.	The CCWS delivers a minimum flow of 0.0792×10^6 lb/hr to the thermal barrier coolers from Common 1.b header and also from Common 2.b header under normal operating conditions.
7.5	The CCWS delivers water to Divisions 2 and 3 SCWS chiller heat exchangers.	Tests will be performed to verify the CCWS flowrate to the Divisions 2 and 3 SCWS chiller heat exchangers under normal operating conditions.	The CCWS delivers a minimum flow of 0.514×10^6 lb/hr to the Divisions 2 and 3 SCWS chiller heat exchangers under normal operating conditions.
7.6	The CCWS delivers water to the spent fuel pool heat exchangers.	Tests will be performed to verify the CCWS flowrate to the spent fuel pool cooling heat exchangers under normal operating conditions.	The CCWS delivers a minimum flow of 0.8818×10^6 lb/hr to the spent fuel pool cooling heat exchangers under normal operating conditions.
7.7	Class 1E valves listed in Table 2.7.1-2 will function to change position as listed in Table 2.7.1-1 under normal operating conditions.	Tests will be performed to verify the ability of Class 1E valves to change position under normal operating conditions.	Class 1E valves listed in Table 2.7.1-2 change position as listed in Table 2.7.1-1 under normal operating conditions.
7.8	The CCWS has provisions to allow flow testing of each CCWS pump during plant operation.	Tests will be performed to verify the CCWS has provisions to allow flow testing of each CCWS pump during plant operation.	Normal system alignment allows flow testing of each CCWS pump during plant operation.
7.9	Deleted.	Deleted.	Deleted.
7.10	The CCWS surge tanks provide adequate capacity for normal system operation.	An inspection and analysis will be performed to verify the as-built CCWS surge tank capacity.	The CCWS surge tank capacity is equal to or greater than 950 ft^3.

Table 2.7.1-3—Component Cooling Water System ITAAC
Sheet 11 of 11

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
7.11	Each CCWS surge tank maintains a reserve volume to accommodate system leakage for seven days of continuous operation with no makeup source available.	An inspection and analysis will be performed to verify that each as-built CCWS surge tank maintains a reserve volume to accommodate system leakage for seven days with no makeup source available.	CCWS surge tank reserve volume of 750 gallons accommodates worst case total train leakage of less than or equal to 4 gph for seven days with no makeup source available.