

2.7 Support Systems

2.7.1 Component Cooling Water System

1.0 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 components connected to the CCWS. Heat transferred from these components 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 1b or 2b headers. The cross-connect is inside containment, downstream of the CIVs on each of the Common 1b and 2b 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 shown on Figure 2.7.1-1—Component Cooling Water System Functional Arrangement.

2.2 The location of CCWS equipment is as listed in Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design.

2.3 Physical separation exists between divisions of the CCWS.

3.0 Mechanical Design Features

- 3.1 Deleted.
- 3.2 Check valves will function as listed in Table 2.7.1-1.
- 3.3 Deleted.
- 3.4 Components 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 CCWS piping shown as ASME Code Section III on Figure 2.7.1-1 is designed in accordance with ASME Code Section III requirements.
- 3.10 CCWS piping shown as ASME Code Section III on Figure 2.7.1-1 is installed in accordance with an ASME Code Section III Design Report.
- 3.11 Pressure boundary welds in CCWS piping shown as ASME Code Section III on Figure 2.7.1-1 are in accordance with ASME Code Section III.
- 3.12 CCWS piping shown as ASME Code Section III on Figure 2.7.1-1 retains pressure boundary integrity at design pressure.
- 3.13 CCWS piping shown as ASME Code Section III on Figure 2.7.1-1 is installed and inspected in accordance with ASME Code Section III requirements.
- 3.14 Components listed in Table 2.7.1-1 as ASME Code Section III are designed in accordance with ASME Code Section III requirements.
- 3.15 Components listed in Table 2.7.1-1 as ASME Code Section III are fabricated in accordance with ASME Code Section III requirements.
- 3.16 Pressure boundary welds on components listed in Table 2.7.1-1 as ASME Code Section III are in accordance with ASME Code Section III requirements.
- 3.17 Components listed in Table 2.7.1-1 as ASME Code Section III retain pressure boundary integrity at design pressure.

4.0 I&C Design Features, Displays and Controls

- 4.1 Displays listed in Table 2.7.1-2—Component Cooling Water System Equipment I&C and Electrical Design are retrievable in the main control room (MCR) and the remote shutdown station (RSS) as listed in Table 2.7.1-2.

- 4.2 The CCWS equipment controls are provided in the MCR and the RSS as 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 by a test signal.
- 4.4 A CCWS low flow condition automatically opens the low head safety injection (LHSI)/residual heat removal (RHR) heat exchanger (HX) inlet valve.
- 4.5 A surge tank level of MIN3 automatically isolates the associated train common header switchover valves.
- 4.6 Deleted.
- 4.7 A flowrate difference between the supply and return from the Nuclear Auxiliary Building (NAB) and the Radioactive Waste Building (RWB) automatically isolates the non-safety-related branch.
- 4.8 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 CCWS train separation to RCP thermal barriers is maintained by interlocks provided on the supply and return thermal barrier containment isolation valves. The interlocks require that CIVs associated with one common header be closed before the other common header CIVs can be opened.
- 4.11 Manual or automatic actuation of a CCWS pump automatically actuates the corresponding ESWS pump.
- 5.0 Electrical Power Design Features**
- 5.1 The components 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 Valves listed in Table 2.7.1-2 fail as-is on loss of power.
- 6.0 Environmental Qualifications**
- 6.1 Components in Table 2.7.1-2, that are designated as harsh environment, will perform the function listed in Table 2.7.1-1 in the environments that exist during and following design basis events.
- 7.0 Equipment and System Performance**
- 7.1 The CCWS heat exchangers as listed in Table 2.7.1-1 have 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.

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- 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 seals.
 - 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 can perform the function listed in Table 2.7.1-1 under system operating conditions.
 - 7.8 The CCWS provides for flow testing of CCWS pumps during plant operation.
 - 7.9 Containment isolation valves listed in Table 2.7.1-1 close within the containment isolation response time following initiation of a containment isolation signal.
 - 7.10 The CCWS surge tanks provide adequate capacity for system operation.

8.0 System Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.1-3 lists the CCWS ITAAC.

Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design (7 Sheets)

Description	Tag Number ⁽¹⁾	Location	ASME Code Section III	Function	Seismic Category
Component Cooling Water Pumps	KAA10AP001 KAA20AP001 KAA30AP001 KAA40AP001	Safeguard Building 1 Safeguard Building 2 Safeguard Building 3 Safeguard Building 4	Yes	Run	I
Heat Exchangers	KAA10AC001 KAA20AC001 KAA30AC001 KAA40AC001	Safeguard Building 1 Safeguard Building 2 Safeguard Building 3 Safeguard Building 4	Yes	Heat Transfer Device	I
Surge Tanks	KAA10BB001 KAA20BB001 KAA30BB001 KAA40BB001	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	KAA10AA004 KAA20AA004 KAA30AA004 KAA40AA004	Safeguard Building 1 Safeguard Building 2 Safeguard Building 3 Safeguard Building 4	Yes	Prevent Backflow	I
Heat Exchanger Bypass Valves	KAA10AA112 KAA20AA112 KAA30AA112 KAA40AA112	Safeguard Building 1 Safeguard Building 2 Safeguard Building 3 Safeguard Building 4	Yes	Temperature control	I

Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design (7 Sheets)

Description	Tag Number ⁽¹⁾	Location	ASME Code Section III	Function	Seismic Category
Surge Tank Demin. Water Makeup Isolation Valves	KAA10AA027	Safeguard Building 1	Yes	Open/Close	I
	KAA20AA027	Safeguard Building 2			
	KAA30AA027	Safeguard Building 3			
	KAA40AA027	Safeguard Building 4			
Train Switchover Valves	KAA10AA033	Safeguard Building 1	Yes	Open/Close	I
	KAA10AA032	Safeguard Building 1			
	KAA20AA033	Safeguard Building 2			
	KAA20AA032	Safeguard Building 2			
Train Switchover Valves	KAA30AA033	Safeguard Building 3	Yes	Open/Close	I
	KAA30AA032	Safeguard Building 3			
	KAA40AA033	Safeguard Building 4			
	KAA40AA032	Safeguard Building 4			
Train Switchover Valves	KAA10AA006	Safeguard Building 1	Yes	Open/Close	I
	KAA10AA010	Safeguard Building 1			
	KAA20AA006	Safeguard Building 2			
	KAA20AA010	Safeguard Building 2			
Train Switchover Valves	KAA30AA006	Safeguard Building 3	Yes	Open/Close	I
	KAA30AA010	Safeguard Building 3			
	KAA40AA006	Safeguard Building 4			
	KAA40AA010	Safeguard Building 4			

Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design (7 Sheets)

Description	Tag Number ⁽¹⁾	Location	ASME Code Section III	Function	Seismic Category
LHSI HX Isolation Valves	KAA12AA005 KAA22AA005 KAA32AA005 KAA42AA005	Safeguard Building 1 Safeguard Building 2 Safeguard Building 3 Safeguard Building 4	Yes	Open	I
LHSI Pump Seal Cooler Isolation Valves	KAA22AA013 KAA32AA013	Safeguard Building 2 Safeguard Building 3	Yes	Open	I
CCWS to Low Head Safety Injection Heat Exchanger Downstream Check Valves	KAA12AA012 KAA22AA012 KAA32AA012 KAA42AA012	Safeguard Building 1 Safeguard Building 2 Safeguard Building 3 Safeguard Building 4	Yes	Prevent Backflow	I
CCWS to Low Head Safety Injection Pump Seal Fluid Cooler Downstream Check Valves	KAA22AA014 KAA32AA014	Safeguard Building 2 Safeguard Building 3	Yes	Prevent Backflow	I
Safety Chilled Water Chiller CCWS Flow Control Valves	KAA22AA101 KAA32AA101	Safeguard Building 2 Safeguard Building 3	Yes	Open/Close	I
Common Header 1a Fuel Pool Cooling Heat Exchanger 1 Downstream Control Valve	KAB10AA134	Fuel Building	Yes	Open/Close	I
Common Header 2a Fuel Pool Cooling Heat Exchanger 2 Downstream Control Valve	KAB20AA134	Fuel Building	Yes	Open/Close	I

Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design (7 Sheets)

Description	Tag Number ⁽¹⁾	Location	ASME Code Section III	Function	Seismic Category
Common Header 1b RCP Thermal Barriers Containment Isolation Valves	KAB30AA049	Safeguard Building 1	Yes	Close (Manually Initiated)	I
	KAB30AA051	Reactor Building			
	KAB30AA052	Safeguard Building 1			
Common Header 1b RCP Thermal Barriers 1/2 Upstream Containment Isolation Check Valve	KAB30AA050	Reactor Building	Yes	Prevent Backflow	I
Common Header 2b RCP Thermal Barriers Containment Isolation Valves	KAB30AA053	Safeguard Building 4	Yes	Close (Manually Initiated)	I
	KAB30AA055	Reactor Building			
	KAB30AA056	Safeguard Building 4			
Common Header 2b Containment Supply Isolation Check Valve	KAB30AA054	Reactor Building	Yes	Close	I
Common Header 1b Non-Safety Loads Containment Isolation Valves	KAB40AA001	Safeguard Building 1	Yes	Close	I
	KAB40AA006	Reactor Building			
	KAB40AA012	Safeguard Building 1			
Common Header 1b Containment Supply Isolation Check Valve	KAB40AA002	Reactor Building	Yes	Close	I
Common Header 2b Auxiliary Building and Waste Building Isolation Valves	KAB50AA001	Safeguard Building 4	Yes	Close	I
	KAB50AA006	Safeguard Building 4			
	KAB50AA004	Safeguard Building 4			
Common Header 2b Auxiliary and Waste Building Return Isolation Check Valve	KAB50AA008	Safeguard Building 4	Yes	Close	I

Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design (7 Sheets)

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

Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design (7 Sheets)

Description	Tag Number ⁽¹⁾	Location	ASME Code Section III	Function	Seismic Category
Dedicated CCWS Surge Tank Isolation Valve	KAA80AA020	Safeguard Building 4	No	Open	N/A
Dedicated CCWS Surge Tank Nitrogen Supply Valve	KAA80AA021	Safeguard Building 4	No	Open	N/A
Dedicated CCWS Demin Water Makeup Water Supply Valve	KAA80AA202	Safeguard Building 4	No	Open	N/A
Dedicated CCWS Pump	KAA80AP001	Safeguard Building 4	No	Run	N/A
Dedicated CCWS Demin Water Makeup Pump	KAA80AP201	Safeguard Building 4	No	Run	N/A
Dedicated CCWS Heat Exchanger	KAA80AC001	Safeguard Building 4	No	Heat Transfer Device	N/A
Dedicated CCWS Surge Tank	KAA80BB001	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	KAA10AA141 KAA10AA142	Safeguard Building 1 Safeguard Building 1	Yes	Open	I
Train 2 Surge Tank Makeup Isolation Valves	KAA20AA141 KAA20AA142	Safeguard Building 2 Safeguard Building 2	Yes	Open	I
Train 3 Surge Tank Makeup Isolation Valves	KAA30AA141 KAA30AA142	Safeguard Building 3 Safeguard Building 3	Yes	Open	I
Train 4 Surge Tank Makeup Isolation Valves	KAA40AA141 KAA40AA142	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—Component Cooling Water System Equipment I&C and Electrical Design
(7 Sheets)**

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

**Table 2.7.1-2—Component Cooling Water System Equipment I&C and Electrical Design
(7 Sheets)**

Description	Tag Number ⁽¹⁾	Location	IEEE Class 1E ⁽²⁾	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Heat Exchanger Bypass Valve	KAA20AA112	Safeguard Building 2	2 ^N 1 ^A	Yes	Yes	Pos	Open-Close
Heat Exchanger Bypass Valve	KAA30AA112	Safeguard Building 3	3 ^N 4 ^A	Yes	Yes	Pos	Open-Close
Heat Exchanger Bypass Valve	KAA40AA112	Safeguard Building 4	4 ^N 3 ^A	Yes	Yes	Pos	Open-Close
Surge Tank Level	KAA10CL094	Safeguard Building 1	1	N/A	No	Level	NA / NA
Surge Tank Level	KAA10CL099	Safeguard Building 1	1	N/A	No	Level	NA / NA
Surge Tank Level	KAA20CL094	Safeguard Building 2	2	N/A	No	Level	NA / NA
Surge Tank Level	KAA20CL099	Safeguard Building 2	2	N/A	No	Level	NA / NA
Surge Tank Level	KAA30CL094	Safeguard Building 3	3	N/A	No	Level	NA / NA
Surge Tank Level	KAA30CL099	Safeguard Building 3	3	N/A	No	Level	NA / NA
Surge Tank Level	KAA40CL094	Safeguard Building 4	4	N/A	No	Level	NA / NA
Surge Tank Level	KAA40CL099	Safeguard Building 4	4	N/A	No	Level	NA / NA
LHSI HX Isolation Valve	KAA12AA005	Safeguard Building 1	1 ^N 2 ^A	Yes	Yes	Pos	Open-Close
LHSI HX Isolation Valve	KAA22AA005	Safeguard Building 2	2 ^N 1 ^A	Yes	Yes	Pos	Open-Close
LHSI HX Isolation Valve	KAA32AA005	Safeguard Building 3	3 ^N 4 ^A	Yes	Yes	Pos	Open-Close
LHSI HX Isolation Valve	KAA42AA005	Safeguard Building 4	4 ^N 3 ^A	Yes	Yes	Pos	Open-Close

**Table 2.7.1-2—Component Cooling Water System Equipment I&C and Electrical Design
(7 Sheets)**

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	KAA22AA013	Safeguard Building 2	2 ^N 1 ^A	Yes	Yes	Pos	Open-Close
LHSI Pump Seal Cooler Isolation Valve	KAA32AA013	Safeguard Building 3	3 ^N 4 ^A	Yes	Yes	Pos	Open-Close
Common Header 2b Auxiliary Building and Waste Building Isolation Valves	KAB50AA001 KAB50AA004 KAB50AA006	Safeguard Building 4	NA ⁽³⁾	N/A	Yes	Pos	Open-Close
Common Header 1b Auxiliary Building Isolation Valves	KAB80AA015 KAB80AA016 KAB80AA019	Safeguard Building 1	NA ⁽³⁾	N/A	Yes	Pos	Open-Close
Common Header 1b Non-Safety Loads Containment Isolation Valves	KAB40AA001 KAB40AA006 KAB40AA012	Safeguard Building 1 Safeguard Building 1 Reactor Building	1 ^N 2 ^A 1 ^N 2 ^A 4 ^N 3 ^A	Yes	Yes	Pos	Open-Close

**Table 2.7.1-2—Component Cooling Water System Equipment I&C and Electrical Design
(7 Sheets)**

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

**Table 2.7.1-2—Component Cooling Water System Equipment I&C and Electrical Design
(7 Sheets)**

Description	Tag Number ⁽¹⁾	Location	IEEE Class 1E ⁽²⁾	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Common Header 2b RCP Thermal Barriers Containment Isolation Valves	KAB30AA053	Safeguard Building 4	4 ^N 3 ^A	Yes	Yes	Pos	Open-Close
	KAB30AA055	Reactor Building	1 ^N 2 ^A				
	KAB30AA056	Safeguard Building 4	4 ^N 3 ^A				
Surge Tank Demin. Water Makeup Isolation Valves	KAA10AA027	Safeguard Building 1	1 ^N 2 ^A	N/A	Yes	Pos	Open-Close
	KAA20AA027	Safeguard Building 2	2 ^N 1 ^A				
	KAA30AA027	Safeguard Building 3	3 ^N 4 ^A				
	KAA40AA027	Safeguard Building 4	4 ^N 3 ^A				
Common Header 1a Fuel Pool Cooling Heat Exchanger 1 Downstream Control Valve	KAB10AA134	Fuel Building	1 ^N 2 ^A	N/A	Yes	NA / NA	NA / NA
Common Header 2a Fuel Pool Cooling Heat Exchanger 2 Downstream Control Valve	KAB20AA134	Fuel Building	4 ^N 3 ^A	N/A	Yes	NA / NA	NA / NA

**Table 2.7.1-2—Component Cooling Water System Equipment I&C and Electrical Design
(7 Sheets)**

Description	Tag Number ⁽¹⁾	Location	IEEE Class 1E ⁽²⁾	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Common Header 1b Safety Related Loads CVCS HP Cooler 1 Downstream Control Valve	KAB60AA116	Reactor Building	NA	N/A	Yes	Pos	Open-Close
Common Header 2b Safety Related Loads CVCS HP Cooler 2 Downstream Control Valve	KAB70AA116	Reactor Building	NA	N/A	Yes	Pos	Open-Close
Dedicated CCWS Surge Tank Isolation Valve	KAA80AA020	Safeguard Building 4	4	N/A	Yes	Pos	Open-Close
Dedicated CCWS Surge Tank Nitrogen Supply Valve	KAA80AA021	Safeguard Building 4	4	N/A	Yes	Pos	Open-Close
Dedicated CCWS Demin Water Makeup Water Supply Valve	KAA80AA202	Safeguard Building 4	4	N/A	Yes	Pos	Open-Close
Dedicated CCWS Pump	KAA80AP001	Safeguard Building 4	4	N/A	Yes	On-Off / NA	Start-Stop / NA
Dedicated CCWS Demin Water Makeup Pump	KAA80AP201	Safeguard Building 4	4	N/A	Yes	On-Off / NA	Start-Stop / NA

**Table 2.7.1-2—Component Cooling Water System Equipment I&C and Electrical Design
(7 Sheets)**

Description	Tag Number ⁽¹⁾	Location	IEEE Class 1E ⁽²⁾	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Safety Chilled Water Chiller CCWS Flow Control Valve	KAA22AA101	Safeguard Building 2	2 ^N 1 ^A	N/A	Yes	NA / NA	NA / NA
Safety Chilled Water Chiller CCWS Flow Control Valve	KAA32AA101	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 component is normally powered from; ^A denotes the division the component is powered from when alternate feed is implemented.
- 3) Each hydraulically operated valve has multiple solenoid-operated pilot valves. Each pilot valve is powered from a different Class 1E uninterruptible power supply division to provide redundancy.

**Table 2.7.1-3—Component Cooling Water System ITAAC
(8 Sheets)**

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
2.1	The functional arrangement of the CCWS is as shown on Figure 2.7.1-1.	Inspections of the as-built system will be conducted.	The as-built CCWS conforms to the functional arrangement as shown on Figure 2.7.1-1.
2.2	The location of CCWS equipment is as listed in Table 2.7.1-1.	An inspection will be performed of the location of the equipment listed in Table 2.7.1-1.	The equipment listed in Table 2.7.1-1 is located as listed in Table 2.7.1-1.
2.3	Physical separation exists between redundant divisions of the CCWS.	An inspection will be performed to verify that redundant divisions of the CCWS are located in separate Safeguard Buildings.	The equipment listed in Table 2.7.1-1 is located as listed in Table 2.7.1-1.
3.1	Deleted.	Deleted.	Deleted.
3.2	Check valves listed in Table 2.7.1-1 will function as listed in Table 2.7.1-1.	Tests will be performed for the operation of the check valves listed in Table 2.7.1-1.	The check valves listed in Table 2.7.1-1 perform the functions listed in Table 2.7.1-1.
3.3	Deleted.	Deleted.	Deleted.
3.4	Components 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 components 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.	a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the Seismic Category I components identified 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.

**Table 2.7.1-3—Component Cooling Water System ITAAC
(8 Sheets)**

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
		b. Inspections will be performed of the Seismic Category I components identified in Table 2.7.1-1 to verify that the components, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	b. Inspection reports exist and conclude that the Seismic Category I components identified in Table 2.7.1-1, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).
3.5	Deleted.	Deleted.	Deleted.
3.6	Deleted.	Deleted.	Deleted.
3.7	Deleted.	Deleted.	Deleted.
3.8	Deleted.	Deleted.	Deleted.
3.9	CCWS piping shown as ASME Code Section III on Figure 2.7.1-1 is designed in accordance with ASME Code Section III requirements.	Inspections of the ASME Code Section III Design Reports (NCA-3550) and associated reference documents will be performed. {{DAC}}	ASME Code Section III Design Reports (NCA-3550) exist and conclude that CCWS piping shown as ASME Code Section III on Figure 2.7.1-1 complies with ASME Code Section III requirements. {{DAC}}
3.10	CCWS piping shown as ASME Code Section III on Figure 2.7.1-1 is installed in accordance with an ASME Code Section III Design Report.	Analyses to reconcile as-built deviations to the ASME Code Design Reports (NCA-3550) will be performed. Piping analyzed using time-history methods will be reconciled to the as-built information.	For CCWS piping shown as ASME Code Section III on Figure 2.7.1-1, ASME Code Data Reports (N-5) exist and conclude that design reconciliation (NCA-3554) has been completed in accordance with the ASME Code Section III for the as-built system. The report(s) document the as-built condition.

**Table 2.7.1-3—Component Cooling Water System ITAAC
(8 Sheets)**

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
3.11	Pressure boundary welds in CCWS piping shown as ASME Code Section III on Figure 2.7.1-1 are in accordance with ASME Code Section III.	Inspections of pressure boundary welds verify that welding is performed in accordance with ASME Code Section III requirements.	ASME Code Section III Data Reports exist and conclude that pressure boundary welding for CCWS piping shown as ASME Code Section III on Figure 2.7.1-1 has been performed in accordance with ASME Code Section III.
3.12	CCWS piping shown as ASME Code Section III on Figure 2.7.1-1 retains pressure boundary integrity at design pressure.	Hydrostatic tests will be performed on the system.	For CCWS piping shown as ASME Code Section III on Figure 2.7.1-1, ASME Code Section III Data Reports exist and conclude that hydrostatic test results comply with ASME Code Section III requirements.
3.13	CCWS piping shown as ASME Code Section III on Figure 2.7.1-1 is installed and inspected in accordance with ASME Code Section III requirements.	An inspection of the as-built piping will be performed.	For as-built CCWS piping shown as ASME Code Section III on Figure 2.7.1-1, N-5 Data Reports exist and conclude that installation and inspection are in accordance with ASME Code Section III requirements.
3.14	Components listed in Table 2.7.1-1 as ASME Code Section III are designed in accordance with ASME Code Section III requirements.	Inspections will be performed for the existence of ASME Code Section III Design Reports.	ASME Code Section III Design Reports (NCA-3550) exist for components listed as ASME Code Section III in Table 2.7.1-1.
3.15	Components listed in Table 2.7.1-1 as ASME Code Section III are fabricated in accordance with ASME Code Section III requirements.	Inspections will be performed to verify that the design report has been revised to reflect as-built deviations from the design if applicable.	For components listed as ASME Code Section III in Table 2.7.1-1, the as-built component satisfies design requirements of ASME Code Section III as demonstrated in the Design Report (NCA-3550).

**Table 2.7.1-3—Component Cooling Water System ITAAC
(8 Sheets)**

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
3.16	Pressure boundary welds on components listed in Table 2.7.1-1 as ASME Code Section III are in accordance with ASME Code Section III requirements.	Inspections of pressure boundary welds will be performed to verify that welding is performed in accordance with ASME Code Section III requirements.	For components listed as ASME Code Section III in Table 2.7.1-1, ASME Code Section III Data Reports (NCA-8000) exist and conclude that pressure boundary welding has been performed in accordance with ASME Code Section III.
3.17	Components listed in Table 2.7.1-1 as ASME Code Section III retain pressure boundary integrity at design pressure.	Hydrostatic tests will be performed on the components.	For components listed as ASME Code Section III in Table 2.7.1-1, ASME Code Section III Data Reports exist and conclude that hydrostatic test results comply with ASME Code Section III requirements.
4.1	Displays exist or can be retrieved in the MCR and the RSS as identified in Table 2.7.1-2.	Tests will be performed for the retrievability of the displays in the MCR or the RSS as listed in Table 2.7.1-2.	<ul style="list-style-type: none"> a. The displays listed in Table 2.7.1-2 as being retrieved in the MCR can be retrieved in the MCR. b. The displays listed in Table 2.7.1-2 as being retrieved in the RSS can be retrieved in the RSS.
4.2	Controls exist in the MCR and the RSS as identified in Table 2.7.1-2.	Tests will be performed for the existence of control signals from the MCR and the RSS to the equipment listed in Table 2.7.1-2.	<ul style="list-style-type: none"> a. The controls listed in Table 2.7.1-2 as being in the MCR exist in the MCR. b. The controls listed in Table 2.7.1-2 as being in the RSS exist in the RSS.
4.3	Equipment listed as being controlled by a PACS module in Table 2.7.1-2 responds to the state requested by a test signal.	A test will be performed using test signals.	Equipment listed as being controlled by a PACS module in Table 2.7.1-2 responds to the state requested by the test signal.
4.4	A CCWS low flow condition automatically opens the LHSI/RHR HX inlet valve.	Tests will be performed using test signals to verify the interlock.	The following interlock responds as specified below when activated by a test signal: CCWS low flow condition automatically opens the LHSI/RHR HX inlet valve.

**Table 2.7.1-3—Component Cooling Water System ITAAC
(8 Sheets)**

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
4.5	A surge tank level of MIN3 automatically isolates the associated train common header switchover valves.	Tests will be performed using test signals to verify the interlock.	The following interlock responds as specified below when activated by a test signal: Surge tank level of MIN3 automatically isolates the associated train common header switchover valves.
4.6	Deleted.	Deleted.	• Deleted.
4.7	A flow rate difference between the supply and return from NAB and RWB automatically isolates the non-safety related branch.	Tests will be performed using test signals to verify the interlock.	The following interlock responds as specified below when activated by a test signal: Flow rate difference between the supply and return from NAB and RWB automatically isolates the non-safety related branch.
4.8	Loss of one CCWS train initiates an automatic switchover to allow cooling of the common “a” and/or “b” headers.	Tests will be performed using test signals to verify the interlock.	The following interlock responds as specified below when activated by a test 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	CCWS train separation to RCP thermal barriers is maintained by interlocks provided on the supply and return thermal barrier containment isolation valves. The interlocks require that CIVs associated with one common header be closed before the other common header CIVs can be opened.	Tests will be performed using test signals to verify the interlocks.	The following interlock responds as specified below when activated by a test signal: Thermal barrier CIVs associated with common header 1 fail to open while CIVs associated with common header 2 are opened and vice versa. Thermal barrier CIVs associated with common header 1 open when CIVs associated with common header 2 are closed and vice versa.

**Table 2.7.1-3—Component Cooling Water System ITAAC
(8 Sheets)**

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
4.11	Manual or automatic actuation of a CCWS pump automatically actuates the corresponding ESWS pump.	Tests will be performed using test signals to verify the interlocks.	The following interlock responds as specified below when activated by a test signal: Actuation of a CCWS pump automatically actuates the corresponding ESWS pump.
5.1	The components 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.	<ul style="list-style-type: none"> a. Testing will be performed for components designated as Class 1E in Table 2.7.1-2 by providing a test signal in each normally aligned division. b. Testing will be performed for components designated as Class 1E in Table 2.7.1-2 by providing a test signal in each division with the alternate feed aligned to the divisional pair. 	<ul style="list-style-type: none"> a. The test signal provided in the normally aligned division is present at the respective Class 1E component identified in Table 2.7.1-2. b. The test signal provided in each division with the alternate feed aligned to the divisional pair is present at the respective Class 1E component identified in Table 2.7.1-2.
5.2	Valves listed in Table 2.7.1-2 fail as-is on loss of power.	Testing will be performed for the valves listed in Table 2.7.1-2 to fail as-is on loss of power.	Following loss of power, the valves listed in Table 2.7.1-2 fail as-is.
6.1	Components in Table 2.7.1-2, that are designated as harsh environment, will perform the function listed in Table 2.7.1-1 in the environments that exist during and following design basis events.	<ul style="list-style-type: none"> a. Type tests or type tests and analysis will be performed to demonstrate the ability of the components listed as harsh environment in Table 2.7.1-2 to perform the function listed in Table 2.7.1-1 for the environmental conditions that could occur during and following design basis events. 	<ul style="list-style-type: none"> a. Environmental Qualification Data Packages (EQDP) exist and conclude that the components listed as harsh environment in Table 2.7.1-2 can perform the function listed in Table 2.7.1-1 during and following design basis events including the time required to perform the listed function.

**Table 2.7.1-3—Component Cooling Water System ITAAC
(8 Sheets)**

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
		b. Components listed as harsh environment in Table 2.7.1-2 will be inspected to verify installation in accordance with the construction drawings including the associated wiring, cables and terminations. Deviations to the construction drawings will be reconciled to the EQDP.	b. Inspection reports exists and conclude that the components listed in Table 2.7.1-2 as harsh environment has been installed per the construction drawings and any deviations have been reconciled to the EQDP.
7.1	The CCWS heat exchanger as listed in Table 2.7.1-1 has the capacity to transfer the design heat load to the ESWS system.	Tests and analyses will be performed to demonstrate the capability of the CCWS heat exchanger as listed in Table 2.7.1-1 to transfer the heat load to the ESWS.	The CCW heat exchanger satisfies the required heat transfer of an equivalent combined product of the heat exchanger area of 39963 ft ² and the overall heat transfer coefficient of 360 BTU/hr*ft ² *°F.
7.2	The pumps listed in Table 2.7.1-1 have NPSHA that is greater than NPSHR at system run-out flow.	Testing will be performed to verify NPSHA for pumps listed in Table 2.7.1-1.	The pumps listed in Table 2.7.1-1 have NPSHA that is greater than NPSHR at system run-out flow with consideration for minimum allowable surge tank water level (as corrected to account for actual temperature and atmospheric conditions).
7.3	The CCWS delivers water to the LHSI/RHRS heat exchangers to provide cooling.	Tests and analyses will be performed to determine the CCWS delivery rate under operating conditions.	The CCWS delivers at least a flowrate to each LHSI/RHR heat exchanger of 2.19 x 10 ⁶ lb/hr.
7.4	The CCWS delivers water to the RCP thermal barrier coolers.	Tests and analyses will be performed to determine the CCWS delivery rate under operating conditions.	The CCWS delivers at least a flowrate to the thermal barrier coolers of 0.0198 x 10 ⁶ lb/hr.
7.5	The CCWS delivers water to Divisions 2 and 3 SCWS chiller heat exchangers.	Tests and analyses will be performed to determine the CCWS delivery rate under operating conditions.	The CCWS delivers at least a flowrate to the safety chilled water chillers of 0.373 x 10 ⁶ lb/hr.

**Table 2.7.1-3—Component Cooling Water System ITAAC
(8 Sheets)**

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
7.6	The CCWS delivers water to the spent fuel pool heat exchangers.	Tests and analyses will be performed to determine the CCWS delivery rate under operating conditions.	The CCWS delivers at least a flowrate to the spent fuel pool cooling heat exchangers of 0.8818×10^6 lb/hr.
7.7	Class 1E valves listed in Table 2.7.1-2 perform the function listed in Table 2.7.1-1 under system operating conditions.	Tests and analyses or a combination of tests and analyses will be performed to demonstrate the ability of the valves listed in Table 2.7.1-2 to change position as listed in Table 2.7.1-1 under system operating conditions.	The valves change position as listed in Table 2.7.1-1 under system operating conditions.
7.8	The CCWS provides for flow testing of CCWS pumps during plant operation.	A test will be performed.	Normal system alignment allows testing of each CCWS pump during plant operation.
7.9	Containment isolation valves listed in Table 2.7.1-1 close within the containment isolation response time following initiation of a containment isolation signal.	Tests will be performed to demonstrate the ability of the containment isolation valves listed in Table 2.7.1-1 to close within the containment isolation response time following initiation of a containment isolation signal.	Containment isolation valves listed in Table 2.7.1-1 close within 60 seconds following initiation of a containment isolation signal.
7.10	The CCWS surge tanks provide adequate capacity for system operation.	Tests and analysis will be performed to determine the CCWS surge tank capacity.	The CCWS surge tank capacity is equal to or greater than 950 ft^3 .

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