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 when seal injection is not available.
- 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 and the spent fuel pool cooling system pump room ventilation coolers.
- 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 in 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 The equipment listed in Table 2.7.1-1 as ASME Code Section III is designed and tested to ASME Code Section III.

3.2 Check valves will function as listed in Table 2.7.1-1.

3.3 Piping indicated in Figure 2.7.1-1 as ASME Code Section III is designed and tested in accordance with ASME Code Section III.

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

3.5 Supports for piping shown as ASME Section III on Figure 2.7.1-1 will be designed per ASME Section III.

3.6 Specifications exist for components listed as ASME Section III in Table 2.7.1-1.

3.7 Specifications exist for piping shown as ASME Section III on Figure 2.7.1-1.

3.8 Specifications exist for supports for piping shown as ASME Section III on Figure 2.7.1-1.

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 2.7.1-1.

4.3 Actuators listed as being controlled by a priority actuation and control system (PACS) module in Table 2.7.1-2 are controlled by a PACS module.

4.4 A CCWS low flow condition auto opens the low head safety injection (LHSI)/residual head removal (RHR) heat exchanger (HX) outlet valve.

4.5 A surge tank level of MIN3 will auto isolate the associated train common header switchover valves.

4.6 A surge tank level of MIN4 will auto trip the associated CCWS pump.

4.7 A flowrate difference between the supply and return from the Nuclear Auxiliary Building (NAB) and the Radioactive Waste Building (RWB) auto isolates the non-safety-related branch.

4.8 Loss of one CCWS train initiates an auto switchover to allow cooling of the common ‘a’ and/or ‘b’ headers.

4.9 If the surge tank level falls to MIN4, the CCWS pump is tripped.

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 Electrical drivers for equipment listed in Table 2.7.1-2 for harsh environment can perform the safety function in Table 2.7.1-1 following exposure to the design basis environments for the time required.

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 sufficient net positive suction head absolute.

7.3 The CCWS delivers water to the LHSI/RHRS heat exchangers at the required flow and within the required time for core cooling due to design basis events.

7.4 The CCWS delivers water to the RCP thermal barrier seals at the required flow when seal injection is not available.

7.5 The CCWS delivers water to Divisions 2 and 3 of the SCWS chiller heat exchangers at the required flow to confirm availability of the SCWS system during design basis events.

7.6 The CCWS delivers water to the spent fuel pool cooling heat exchangers at the required flow to confirm cooling of the spent fuel pool during all plant conditions when spent fuel is in the pool.

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 design conditions.

7.8 The CCWS provides for flow testing of the 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.

8.0 System Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.1-3 specifies the inspections, tests, analyses, and acceptance criteria for the CCWS.

Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design (9 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	ASME Code Section III	Function	Seismic Category
Component Cooling Water Pump	KAA10 AP001	Safeguards Building Division 1	Yes	Run	I
Component Cooling Water Pump	KAA20 AP001	Safeguards Building Division 2	Yes	Run	I
Component Cooling Water Pump	KAA30 AP001	Safeguards Building Division 3	Yes	Run	I
Component Cooling Water Pump	KAA40 AP001	Safeguards Building Division 4	Yes	Run	I
Heat Exchanger	KAA10 AC001	Safeguards Building Division 1	Yes	Heat Transfer Device	I
Heat Exchanger	KAA20 AC001	Safeguards Building Division 2	Yes	Heat Transfer Device	I
Heat Exchanger	KAA30 AC001	Safeguards Building Division 3	Yes	Heat Transfer Device	I
Heat Exchanger	KAA40 AC001	Safeguards Building Division 4	Yes	Heat Transfer Device	I
Surge Tank	KAA10 BB001	Safeguards Building Division 1	Yes	Provide the following: 1. Pump NPSH 2. Adequate Surge Volume 3. Makeup Volume for normal leakage	I
Surge Tank	KAA20 BB001	Safeguards Building Division 2	Yes	Provide the following: 1. Pump NPSH 2. Adequate Surge Volume	I

Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design (9 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	ASME Code Section III	Function	Seismic Category
				3. Makeup Volume for normal leakage	
Surge Tank	KAA30 BB001	Safeguards Building Division 3	Yes	Provide the following: 1. Pump NPSH 2. Adequate Surge Volume 3. Makeup Volume for normal leakage	I
Surge Tank	KAA40 BB001	Safeguards Building Division 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 Valve	KAA10 AA004	Safeguards Building Division 1	Yes	Prevent Backflow	I
CCWS Pump/Heat Exchanger Downstream Check Valve	KAA20 AA004	Safeguards Building Division 2	Yes	Prevent Backflow	I
CCWS Pump/Heat Exchanger Downstream Check Valve	KAA30 AA004	Safeguards Building Division 3	Yes	Prevent Backflow	I
CCWS Pump/Heat Exchanger Downstream Check Valve	KAA40 AA004	Safeguards Building Division 4	Yes	Prevent Backflow	I
Heat Exchanger Bypass Temperature Control Valve	KAA10 AA112	Safeguards Building Division 1	Yes	Temperature control	I
Heat Exchanger Bypass Temperature Control Valve	KAA20 AA112	Safeguards Building Division 2	Yes	Temperature control	I

Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design (9 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	ASME Code Section III	Function	Seismic Category
Heat Exchanger Bypass Temperature Control Valve	KAA30 AA112	Safeguards Building Division 3	Yes	Temperature control	I
Heat Exchanger Bypass Temperature Control Valve	KAA40 AA112	Safeguards Building Division 4	Yes	Temperature control	I
Demineralized Water Makeup Supply To Surge Tank	KAA10 AA027	Safeguards Building Division 1	Yes	Open/Close	I
Demineralized Water Makeup Supply To Surge Tank	KAA20 AA027	Safeguards Building Division 2	Yes	Open/Close	I
Demineralized Water Makeup Supply To Surge Tank	KAA30 AA027	Safeguards Building Division 3	Yes	Open/Close	I
Demineralized Water Makeup Supply To Surge Tank	KAA40 AA027	Safeguards Building Division 4	Yes	Open/Close	I
CCWS Common Header 1a Switchover Valve	KAA10 AA033	Safeguards Building Division 1	Yes	Close	I
CCWS Common Header 1a Switchover Valve	KAA10 AA032	Safeguards Building Division 1	Yes	Close	I
CCWS Common Header 1a Switchover Valve	KAA20 AA033	Safeguards Building Division 2	Yes	Close	I
CCWS Common Header 1a Switchover Valve	KAA20 AA032	Safeguards Building Division 2	Yes	Close	I
CCWS Common Header 2a Switchover Valve	KAA30 AA033	Safeguards Building Division 3	Yes	Close	I
CCWS Common Header 2a Switchover Valve	KAA30 AA032	Safeguards Building Division 3	Yes	Close	I
CCWS Common Header 2a Switchover Valve	KAA40 AA033	Safeguards Building Division 4	Yes	Close	I

Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design (9 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	ASME Code Section III	Function	Seismic Category
CCWS Common Header 2a Switchover Valve	KAA40 AA032	Safeguards Building Division 4	Yes	Close	I
CCWS Common Header 1b Switchover Valve	KAA10 AA006	Safeguards Building Division 1	Yes	Close	I
CCWS Common Header 1b Switchover Valve	KAA10 AA010	Safeguards Building Division 1	Yes	Close	I
CCWS Common Header 1b Switchover Valve	KAA20 AA006	Safeguards Building Division 2	Yes	Close	I
CCWS Common Header 1b Switchover Valve	KAA20 AA010	Safeguards Building Division 2	Yes	Close	I
CCWS Common Header 2b Switchover Valve	KAA30 AA006	Safeguards Building Division 3	Yes	Close	I
CCWS Common Header 2b Switchover Valve	KAA30 AA010	Safeguards Building Division 3	Yes	Close	I
CCWS Common Header 2b Switchover Valve	KAA40 AA006	Safeguards Building Division 4	Yes	Close	I
CCWS Common Header 2b Switchover Valve	KAA40 AA010	Safeguards Building Division 4	Yes	Close	I
Low Head Safety Injection Heat Exchanger Isolation Valve	KAA12 AA005	Safeguards Building Division 1	Yes	Open	I
Low Head Safety Injection Heat Exchanger Isolation Valve	KAA22 AA005	Safeguards Building Division 2	Yes	Open	I
Low Head Safety Injection Heat Exchanger Isolation Valve	KAA32 AA005	Safeguards Building Division 3	Yes	Open	I
Low Head Safety Injection Heat Exchanger Isolation Valve	KAA42 AA005	Safeguards Building Division 4	Yes	Open	I

Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design (9 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	ASME Code Section III	Function	Seismic Category
Low Head Safety Injection Pump Seal Fluid Cooler Isolation Valve	KAA22 AA013	Safeguards Building Division 2	Yes	Open	I
Low Head Safety Injection Pump Seal Fluid Cooler Isolation Valve	KAA32 AA013	Safeguards Building Division 3	Yes	Open	I
CCWS to Low Head Safety Injection Heat Exchanger Downstream Check Valve	KAA12 AA012	Safeguards Building Division 1	Yes	Prevent Backflow	I
CCWS to Low Head Safety Injection Heat Exchanger Downstream Check Valve	KAA22 AA012	Safeguards Building Division 2	Yes	Prevent Backflow	I
CCWS to Low Head Safety Injection Heat Exchanger Downstream Check Valve	KAA32 AA012	Safeguards Building Division 3	Yes	Prevent Backflow	I
CCWS to Low Head Safety Injection Heat Exchanger Downstream Check Valve	KAA42 AA012	Safeguards Building Division 4	Yes	Prevent Backflow	I
CCWS to Low Head Safety Injection Pump Seal Fluid Cooler Downstream Check Valve	KAA22 AA014	Safeguards Building Division 2	Yes	Prevent Backflow	I
CCWS to Low Head Safety Injection Pump Seal Fluid Cooler Downstream Check Valve	KAA32 AA014	Safeguards Building Division 3	Yes	Prevent Backflow	I
CCWS to Safety Chilled Water Chiller Flow Control Valve	KAA22 AA101	Safeguards Building Division 2	Yes	Open/Close	I
CCWS to Safety Chilled Water Chiller Flow Control Valve	KAA32 AA101	Safeguards Building Division 3	Yes	Open/Close	I
Common Header 1a to Fuel Pool	KAB10 AA134	Fuel Building	Yes	Open/Close	I

Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design (9 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	ASME Code Section III	Function	Seismic Category
Cooling Heat Exchanger 1 Downstream Control Valve (motor operated valve (mov))					
Common Header 2a Fuel Pool Cooling Heat Exchanger 2 Downstream Control Valve (mov)	KAB20 AA134	Fuel Building	Yes	Open/Close	I
Common Header 1b Containment Supply Isolation Valve (mov)	KAB30 AA049	Safeguards Building Division 1	Yes	Close (Manually Initiated)	I
Common Header 1b Containment Return Isolation Valve (mov)	KAB30 AA051	Reactor Building	Yes	Close (Manually Initiated)	I
Common Header 1b Containment Return Isolation Valve (mov)	KAB30 AA052	Safeguards Building Division 1	Yes	Close (Manually Initiated)	I
Common Header 1b RCP Thermal Barriers 1/2 Upstream Containment Isolation Check Valve	KAB30 AA050	Reactor Building	Yes	Prevent Backflow	I
Common Header 2b Containment Supply Isolation Valves	KAB30 AA053	Safeguards Building Division 4	Yes	Close (Manually Initiated)	I
Common Header 2b Containment Return Isolation Valves	KAB30 AA055	Reactor Building	Yes	Close (Manually Initiated)	I
Common Header 2b Containment Return Isolation Valves	KAB30 AA056	Safeguards Building Division 4	Yes	Close (Manually Initiated)	I
Common Header 2b Containment Supply Isolation Check Valve	KAB30 AA054	Reactor Building	Yes	Close	I
Common Header 1b Containment Supply Isolation Valve (mov)	KAB40 AA001	Safeguards Building Division 1	Yes	Close	I

Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design (9 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	ASME Code Section III	Function	Seismic Category
Common Header 1b Containment Return Isolation Valve (mov)	KAB40 AA006	Reactor Building	Yes	Close	I
Common Header 1b Containment Return Isolation Valve (mov)	KAB40 AA012	Safeguard Building Division 1	Yes	Close	I
Common Header 1b Containment Supply Isolation Check Valve	KAB40 AA002	Reactor Building	Yes	Close	I
Common Header 2b Nuclear Auxiliary Building and Radwaste Building Isolation Supply Valve	KAB50 AA001	Safeguards Building Division 4	Yes	Close	I
Common Header 2b Nuclear Auxiliary and Radwaste Building Supply Isolation Valve	KAB50 AA006	Safeguards Building Division 4	Yes	Close	I
Common Header 2b Nuclear Auxiliary and Radwaste Building Return Isolation Valve	KAB50 AA004	Safeguards Building Division 4	Yes	Close	I
Common Header 2b Auxiliary and Waste Building Return Isolation Check Valve	KAB50 AA008	Safeguards Building Division 4	Yes	Close	I
Common Header 1b Containment Supply Isolation Valve (mov)	KAB60 AA013	Safeguards Building Division 1	Yes	Close	I
Common Header 1b Containment Return Isolation Valve (mov)	KAB60 AA018	Reactor Building	Yes	Close	I
Common Header 1b Containment Return Isolation Valve (mov)	KAB60 AA019	Safeguards Building Division 1	Yes	Close	I
Common Header 1b CVCS HP Cooler 1 and RCP Coolers 1/2 Containment Supply Isolation	KAB60 AA014	Reactor Building	Yes	Prevent Backflow	I

Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design (9 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	ASME Code Section III	Function	Seismic Category
Check Valve					
Common Header 1b CVCS HP Cooler 1 Downstream Control Valve (mov)	KAB60 AA116	Reactor Building	Yes	Open/Close	I
Common Header 2b Containment Supply Isolation Valves	KAB70 AA013	Safeguards Building Division 4	Yes	Close	I
Common Header 2b Containment Return Isolation Valves	KAB70 AA018	Reactor Building	Yes	Close	I
Common Header 2b Containment Return Isolation Valves	KAB70 AA019	Safeguards Building Division 4	Yes	Close	I
Common Header 2b Containment Supply Isolation Check Valve	KAB70 AA014	Reactor Building	Yes	Prevent Backflow	I
Common Header 2b CVCS HP Cooler 2 Downstream Control Valve (mov)	KAB70 AA116	Reactor Building	Yes	Close	I
CCWS Common Header 1b Nuclear Auxiliary Building Supply Isolation Valve (hydraulic)	KAB80 AA015	Safeguards Building Division 1	Yes	Close	I
CCWS Common Header 1b Nuclear Auxiliary Building Supply Isolation Valve (hydraulic)	KAB80 AA016	Safeguards Building Division 1	Yes	Close	I
CCWS Common Header 1b Nuclear Auxiliary Building Return Isolation Valve (hydraulic)	KAB80 AA019	Safeguards Building Division 1	Yes	Close	I
Common Header 1b Nuclear	KAB80 AA020	Safeguards Building	Yes	Close	I

Table 2.7.1-1—Component Cooling Water System Equipment Mechanical Design (9 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	ASME Code Section III	Function	Seismic Category
Auxiliary Building Downstream Check Valve		Division 1			
Dedicated CCWS Surge Tank Isolation Valve	KAA80 AA020	Safeguards Building Division 4	No	Open	N/A
Dedicated CCWS Surge Tank Nitrogen Supply Valve	KAA80 AA021	Safeguards Building Division 4	No	Open	N/A
Dedicated CCWS Demin Water Makeup Water Supply Valve	KAA80 AA202	Safeguards Building Division 4	No	Open	N/A
Dedicated CCWS Pump	KAA80 AP001	Safeguards Building Division 4	No	Run	N/A
Dedicated CCWS Demin Water Makeup Pump	KAA80 AP201	Safeguards Building Division 4	No	Run	N/A
Dedicated CCWS Heat Exchanger	KAA80 AC001	Safeguards Building Division 4	No	Heat Transfer Device	N/A
Dedicated CCWS Surge Tank	KAA80 BB001	Safeguards Building Division 4	No	Provide the following: 1. Pump NPSH 2. Adequate surge volume 3. Makeup volume for normal leakage	N/A

(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 (9 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Component Cooling Water Pump	KAA10 AP001	Safeguards Building Division 1	1	Yes	Yes	On-Off	Start-Stop
Component Cooling Water Pump	KAA20 AP001	Safeguards Building Division 2	2	Yes	Yes	On-Off	Start-Stop
Component Cooling Water Pump	KAA30 AP001	Safeguards Building Division 3	3	Yes	Yes	On-Off	Start-Stop
Component Cooling Water Pump	KAA40 AP001	Safeguards Building Division 4	4	Yes	Yes	On-Off	Start-Stop
Train Switchover Valve	KAA10 AA006	Safeguards Building Division 1	1	TBD	Yes	Pos	Start-Stop
Train Switchover Valve	KAA10 AA010	Safeguards Building Division 1	1	TBD	Yes	Pos	Open-Close
Train Switchover Valve	KAA10 AA032	Safeguards Building Division 1	1	TBD	Yes	Pos	Open-Close
Train Switchover Valve	KAA10 AA033	Safeguards Building Division 1	1	TBD	Yes	Pos	Open-Close
Train Switchover Valve	KAA20 AA006	Safeguards Building Division 2	2	TBD	Yes	Pos	Open-Close
Train Switchover Valve	KAA20 AA010	Safeguards Building Division 2	2	TBD	Yes	Pos	Open-Close
Train Switchover Valve	KAA20 AA032	Safeguards Building Division 2	2	TBD	Yes	Pos	Open-Close
Train Switchover	KAA20 AA033	Safeguards Building	2	Yes	No	Pos	Open-Close

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

Equipment Description	Equipment Tag Number (1)	Equipment Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Valve		Division 2					
Train Switchover Valve	KAA30 AA006	Safeguards Building Division 3	3	Yes	No	Pos	Open-Close
Train Switchover Valve	KAA30 AA010	Safeguards Building Division 3	3	Yes	No	Pos	Open-Close
Train Switchover Valve	KAA30 AA032	Safeguards Building Division 3	3	Yes	No	Pos	Open-Close
Train Switchover Valve	KAA30 AA033	Safeguards Building Division 3	3	Yes	No	Pos	Open-Close
Train Switchover Valve	KAA40 AA006	Safeguards Building Division 4	4	Yes	No	Pos	Open-Close
Train Switchover Valve	KAA40 AA010	Safeguards Building Division 4	4	Yes	No	Pos	Open-Close
Train Switchover Valve	KAA40 AA032	Safeguards Building Division 4	4	Yes	No	Pos	Open-Close
Train Switchover Valve	KAA40 AA033	Safeguards Building Division 4	4	Yes	No	Pos	Open-Close
Heat Exchanger Bypass Valve	KAA10 AA112	Safeguards Building	1	Yes	No	Pos	Open-Close
Heat Exchanger Bypass Valve	KAA20 AA112	Safeguards Building	2	Yes	No	Pos	Open-Close
Heat Exchanger Bypass Valve	KAA30 AA112	Safeguards Building	3	Yes	No	Pos	Open-Close

Table 2.7.1-2—Component Cooling Water System Equipment I&C and Electrical Design (9 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Heat Exchanger Bypass Valve	KAA40 AA112	Safeguards Building	4	Yes	No	Pos	Open-Close
Surge Tank Level	KAA10 CL094	Safeguards Building	1	No	No	Level	NA / NA
Surge Tank Level	KAA10 CL099	Safeguards Building	1	No	No	Level	NA / NA
Surge Tank Level	KAA20 CL094	Safeguards Building	2	No	No	Level	NA / NA
Surge Tank Level	KAA20 CL099	Safeguards Building	2	No	No	Level	NA / NA
Surge Tank Level	KAA30 CL094	Safeguards Building	3	No	No	Level	NA / NA
Surge Tank Level	KAA30 CL099	Safeguards Building	3	No	No	Level	NA / NA
Surge Tank Level	KAA40 CL094	Safeguards Building	4	No	No	Level	NA / NA
Surge Tank Level	KAA40 CL099	Safeguards Building	4	No	No	Level	NA / NA
LHSI HX Isolation Valve	KAA12 AA005	Safeguards Building	1	Yes	Yes	Pos	Open-Close
LHSI HX Isolation Valve	KAA22 AA005	Safeguards Building	2	Yes	Yes	Pos	Open-Close
LHSI HX Isolation Valve	KAA32 AA005	Safeguards Building	3	Yes	Yes	Pos	Open-Close
LHSI HX Isolation Valve	KAA42 AA005	Safeguards Building	4	Yes	Yes	Pos	Open-Close
LHSI Pump Seal Cooler Isolation Valve	KAA22 AA013	Safeguards Building	2	Yes	Yes	Pos	Open-Close
LHSI Pump Seal Cooler Isolation Valve	KAA32 AA013	Safeguards Building	3	Yes	Yes	Pos	Open-Close
Common Header 2b	KAB50 AA001	Safeguards Building	4	No	No	Pos	Open-Close /

Table 2.7.1-2—Component Cooling Water System Equipment I&C and Electrical Design (9 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Auxiliary Building and Waste Building Isolation Valve							TBD
Common Header 2b Auxiliary Building and Waste Building Isolation Valve	KAB50 AA004	Safeguards Building	4	No	No	Pos	Open-Close
Common Header 2b Auxiliary Building and Waste Building Isolation Valve	KAB50 AA006	Safeguards Building	4	No	No	Pos	Open-Close
Common Header 1b Auxiliary Building Isolation Valve	KAB80 AA015	Safeguards Building	1	No	No	Pos	Open-Close
Common Header 1b Auxiliary Building Isolation Valve	KAB80 AA016	Safeguards Building	1	No	No	Pos	Open-Close
Common Header 1b Auxiliary Building Isolation Valve	KAB80 AA019	Safeguards Building	1	No	No	Pos	Open-Close
Common Header 1b Non-Safety Loads Containment Isolation Valve	KAB40 AA001	Safeguards Building	1	Yes	Yes	Pos	Open-Close
Common Header 1b Non-Safety Loads	KAB40 AA006	Safeguards Building	1	Yes	Yes	Pos	Open-Close

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

Equipment Description	Equipment Tag Number (1)	Equipment Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Containment Isolation Valve							
Common Header 1b Non-Safety Loads Containment Isolation Valve	KAB40 AA012	Reactor Building	1	Yes	Yes	Pos	Open-Close
Common Header 1b Safety Related Loads Containment Isolation Valves	KAB60 AA013	Safeguards Building	1	Yes	Yes	Pos	Open-Close
Common Header 1b Safety Related Loads Containment Isolation Valves	KAB60 AA018	Reactor Building	1	Yes	Yes	Pos	Open-Close
Common Header 1b Safety Related Loads Containment Isolation Valves	KAB60 AA019	Safeguards Building	1	Yes	Yes	Pos	Open-Close
Common Header 2b Safety Related Loads Containment Isolation Valves	KAB70 AA013	Safeguards Building	4	Yes	Yes	Pos	Open-Close
Common Header 2b Safety Related Loads Containment Isolation Valves	KAB70 AA018	Reactor Building	4	Yes	Yes	Pos	Open-Close

Table 2.7.1-2—Component Cooling Water System Equipment I&C and Electrical Design (9 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Common Header 2b Safety Related Loads Containment Isolation Valve	KAB70 AA019	Safeguards Building	4	Yes	Yes	Pos	Open-Close
Common Header 1b RCP Thermal Barriers Containment Isolation Valve	KAB30 AA049	Safeguards Building	1	Yes	No	Pos	Open-Close
Common Header 1b RCP Thermal Barriers Containment Isolation Valve	KAB30 AA051	Reactor Building	1	Yes	No	Pos	Open-Close
Common Header 1b RCP Thermal Barriers Containment Isolation Valve	KAB30 AA052	Safeguards Building	1	Yes	No	Pos	Open-Close
Common Header 2b RCP Thermal Barriers Containment Isolation Valve	KAB30 AA053	Safeguards Building	4	Yes	No	Pos	Open-Close
Common Header 2b RCP Thermal Barriers Containment Isolation Valve	KAB30 AA055	Reactor Building	4	Yes	No	Pos	Open-Close
Common Header 2b RCP Thermal Barriers Containment Isolation	KAB30 AA056	Safeguards Building	4	Yes	No	Pos	Open-Close

Table 2.7.1-2—Component Cooling Water System Equipment I&C and Electrical Design (9 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Valve							
Surge Tank Demin. Water Makeup Supply Isolation Valve	KAA10 AA027	Safeguards Building	NA	No	No	NA / NA	NA / NA
Surge Tank Demin. Water Makeup Supply Isolation Valve	KAA20 AA027	Safeguards Building	NA	No	No	NA / NA	NA / NA
Surge Tank Demin. Water Makeup Supply Isolation Valve	KAA30 AA027	Safeguards Building	NA	No	No	NA / NA	NA / NA
Surge Tank Demin. Water Makeup Supply Isolation Valve	KAA40 AA027	Safeguards Building	NA	No	No	NA / NA	NA / NA
Common Header 1a Fuel Pool Cooling Heat Exchanger 1 Downstream Control Valve	KAA10 AA134	Safeguards Building	1	No	No	NA / NA	NA / NA
Common Header 1a Fuel Pool Cooling Heat Exchanger 2 Downstream Control Valve	KAA20 AA134	Safeguards Building	2	No	No	NA / NA	NA / NA
Common Header 1b Safety Related Loads CVCS HP Cooler 1	KAB60 AA116	Reactor Building	1	No	No	Pos	Open-Close

Table 2.7.1-2—Component Cooling Water System Equipment I&C and Electrical Design (9 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Downstream Control Valve							
Common Header 2b Safety Related Loads CVCS HP Cooler 2 Downstream Control Valve	KAB70 AA116	Reactor Building	4	No	No	Pos	Open-Close
Dedicated CCWS Surge Tank Isolation Valve	KAA80 AA020	Safeguards Building	NA	No	No	Pos	Open-Close
Dedicated CCWS Surge Tank Nitrogen Supply Valve	KAA80 AA021	Safeguards Building	NA	No	No	Pos	Open-Close
Dedicated CCWS Demin Water Makeup Water Supply Valve	KAA80 AA202	Safeguards Building	NA	No	No	Pos	Open-Close
Dedicated CCWS Pump	KAA80 AP001	Safeguards Building	NA	No	No	On-Off / NA	Start-Stop / NA
Dedicated CCWS Demin Water Makeup Pump	KAA80 AP201	Safeguards Building	NA	No	No	On-Off / NA	Start-Stop / NA
Safety Chilled Water Chiller CCWS Flow Control Valve	KAA22 AA101	Safeguards Building	2	No	No	NA / NA	NA / NA
Safety Chilled Water Chiller CCWS Flow	KAA32 AA101	Safeguards Building	3	No	No	NA / NA	NA / NA

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

Equipment Description	Equipment Tag Number (1)	Equipment Location	IEEE Class 1E (2)	EQ – Harsh Env.	PACS	MCR/RSS Displays	MCR/RSS Controls
Control Valve							
Operational Chilled Water Temp Control	KAB50 AA111	Safeguards Building	NA	No	No	NA / NA	NA / NA
Operational Chilled Water Temp Control	KAB50 AA112	Safeguards Building	NA	No	No	NA / NA	NA / NA
Operational Chilled Water Temp Control	KAB50 AA113	Safeguards Building	NA	No	No	NA / NA	NA / NA
Coolant Degasification Condenser CCWS Isolation Valve	KAB50 AA122	Safeguards Building	NA	No	No	NA / NA	NA / NA
Operational Chilled Water Temp Control	KAB80 AA101	Safeguards Building	NA	No	No	NA / NA	NA / NA
Operational Chilled Water Temp Control	KAB80 AA102	Safeguards Building	NA	No	No	NA / NA	NA / NA
Operational Chilled Water Temp Control	KAB80 AA103	Safeguards Building	NA	No	No	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.

Table 2.7.1-3—Component Cooling Water System Inspections, Tests, Analyses, and Acceptance Criteria (7 Sheets)

Commitment Wording	Inspection, Analysis or Test	Acceptance Criteria
2.1 The functional arrangement of the CCWS is as shown in Figure 2.7.1-1.	Inspections of the as-built system will be conducted.	An inspection report exists and concludes that the as-built CCWS conforms to the functional arrangement as shown in Figure 2.7.1-1.
2.2 Equipment shown in Figure 2.7.1-1 is located 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.	A report exists and concludes that 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 safeguards buildings.	A report exists and concludes that redundant divisions of the CCWS are located in separate safeguards buildings.
3.1 The components designated as ASME Code Section III in Table 2.7.1-1 are designed to ASME Code Section III requirements.	Inspections will be conducted of ASME design, NDE and hydrostatic test reports for the components listed as ASME Code Section III in Table 2.7.1-1.	A report exists and concludes that the components listed as ASME Code Section III in Table 2.7.1-1 have been designed and hydrostatically tested in accordance ASME Code Section III requirements.
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.
3.3a The piping identified as being within the ASME Code Section III boundary as indicated in Figure 2.7.1-1 has been designed in accordance with ASME Code Section III requirements including seismic loads.	Analysis of the as-designed piping will be performed in accordance with ASME Code Section III requirements for the piping indicated in Figure 2.7.1-1.	ASME Code Section III stress reports exist and conclude that the as-designed piping identified as ASME Code Section III in Figure 2.7.1-1 meets ASME Code Section III design requirements.

Table 2.7.1-3—Component Cooling Water System Inspections, Tests, Analyses, and Acceptance Criteria (7 Sheets)

	Commitment Wording	Inspection, Analysis or Test	Acceptance Criteria
3.3b	The piping identified as being within the ASME Code Section III boundary as indicated in Figure 2.7.1-1 has been inspected and hydrostatically tested in accordance with ASME Code Section III.	Inspections will be conducted of the as-built piping as indicated in Figure 2.7.1-1 for the following: Welding has been performed per ASME Code Section III. Hydrostatic testing per ASME Code Section III was performed.	A report exists and concludes that the piping as indicated in Figure 2.7.1-1 as ASME Code Section III has been welded in accordance with ASME Code Section III welding requirements. A report exists and concludes that the piping as indicated in Figure 2.7.1-1 as ASME Code Section III has been hydrostatically tested in accordance with ASME Code Section III requirements.
3.4	Equipment identified as Seismic Category I in Table 2.7.1-1 can withstand a design basis seismic load without loss of safety function as listed in Table 2.7.1-1.	Inspection will be performed of the equipment identified as Seismic Category I in Table 2.7.1-1. Type tests, tests, analyses or a combination of tests and analyses will be performed on the equipment designated as Seismic Category I in Table 2.7.1-1.	A report exists and concludes that the equipment designated as Seismic Category I in Table 2.7.1-1 is installed as designed. A report exists and concludes that the equipment designated as Seismic Category I in Table 2.7.1-1 can with stand a design basis seismic load without loss of safety function.

Table 2.7.1-3—Component Cooling Water System Inspections, Tests, Analyses, and Acceptance Criteria (7 Sheets)

Commitment Wording	Inspection, Analysis or Test	Acceptance Criteria
3.5 Supports for piping shown as ASME Section III in Figure 2.7.1-1 will be designed per ASME Section III.	An analysis will be performed.	a. Supports for piping shown as ASME Section III in Figure 2.7.1-1 are designed to ASME Section III. b. Snubbers have been identified, including those analyzed for fatigue for piping shown as ASME Section III in Figure 2.7.1-1. Support mass is less than ten percent of the adjacent pipe span for piping shown as ASME Section III in Figure 2.7.1-1 .
3.6 Specifications exist for components listed as ASME Section III in Table 2.7.1-1.	An inspection will be performed.	Specifications exist for components listed as ASME Section III in Table 2.7.1-1.
3.7 Specifications exist for piping shown as ASME Section III in Figure 2.7.1-1.	An inspection will be performed.	Specifications exist for piping identified as ASME Section III in Figure 2.7.1-1.
3.8 Specifications exist for supports for piping shown as ASME Section III in Figure 2.7.1-1.	An inspection will be performed.	Specifications exist for supports for piping shown as ASME Section III in Figure 2.7.1-1.
4.1 Displays exist or can be retrieved in the MCR and the RSS as identified in Table 2.7.1-2.	Inspections will be performed for the existence or retrieveability of the displays in the MCR or the RSS as listed in Table 2.7.1-2.	The displays listed in Table 2.7.1-2 as being retrieved in the MCR can be retrieved in the MCR. The displays listed in Table 2.7.1-2 as being retrieved in the RSS can be retrieved in the RSS.

Table 2.7.1-3—Component Cooling Water System Inspections, Tests, Analyses, and Acceptance Criteria (7 Sheets)

Commitment Wording	Inspection, Analysis or Test	Acceptance Criteria
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.	The controls listed in Table 2.7.1-2 as being in the MCR exist in the MCR. The controls listed in Table 2.7.1-2 as being in the RSS exist in the RSS.
4.3 Actuators listed as being controlled by a PACS module in Table 2.7.1-2 are controlled by a PACS module.	An operational test will be performed using test signals for the actuators being controlled by a PACS module as listed in Table 2.7.1-2. An inspection will be performed on the actuation of the actuator.	The actuators listed as being controlled by a PACS module in Table 2.7.1-2 actuate to the state requested by the signal.
4.4 A CCWS low flow condition auto opens the LHSI/RHR HX outlet valve.	Tests will be performed using simulated signals to verify the interlock.	The interlock functions in response to a simulated signal.
4.5 A surge tank level of MIN3 will auto isolate the associated train common header switchover valves.	Tests will be performed using simulated signals to verify the interlock.	The interlock functions in response to a simulated signal.
4.6 A surge tank level of MIN4 will auto trip the associated CCWS pump.	Tests will be performed using simulated signals to verify the interlock.	The interlock functions in response to a simulated signal.
4.7 A flow rate difference between the supply and return from NAB and RWB auto isolates the non-safety related branch.	Tests will be performed using simulated signals to verify the interlock.	The interlock functions in response to a simulated signal.
4.8 Loss of one CCWS train initiates an auto switchover to allow cooling of the common “a” and/or “b” headers.	Tests will be performed using simulated signals to verify the interlock.	The interlock functions in response to a simulated signal.
4.9 If the surge tank level falls to MIN4, the CCWS pump is tripped.	Tests will be performed using simulated signals to verify the interlock.	The interlock functions in response to a simulated signal.

Table 2.7.1-3—Component Cooling Water System Inspections, Tests, Analyses, and Acceptance Criteria (7 Sheets)

Commitment Wording	Inspection, Analysis or Test	Acceptance Criteria
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.	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. 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.	The test signal provided in the normally aligned division is present at the respective Class 1E component identified in Table 2.7.1-2. 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 listed as Class 1E 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 before and during the time required to perform their safety function.	Type tests, tests, analyses or a combination of tests and analyses will be performed to demonstrate the ability of the equipment listed for 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 before and during a design basis accident. For equipment listed for harsh environment in Table 2.7.1-2, an inspection will be performed of the as-installed Class 1E equipment and the associated wiring, cables and terminations.	A report exists and concludes that the Class 1E equipment listed for harsh environment in Table 2.7.1-2 can perform the function listed in Table 2.7.1-1 before and during design basis accidents for the time required to perform the listed function. Inspection concludes the as-installed Class 1E equipment and associated wiring, cables, and terminations as listed in Table 2.7.1-2 for harsh environment conform to the design.

Table 2.7.1-3—Component Cooling Water System Inspections, Tests, Analyses, and Acceptance Criteria (7 Sheets)

Commitment Wording	Inspection, Analysis or Test	Acceptance Criteria
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.	A report exists and concludes that the ESWS has the capacity to remove the design heat load via the heat exchanger listed in Table 2.7.1-1.
7.2 The pumps listed in Table 2.7.1-1 have sufficient NPSHA.	Testing and analyses will be performed to verify adequate NPSHA for pumps listed in Table 2.7.1-1.	A report exists and concludes that the pumps listed in Table 2.7.1-1 have sufficient NPSHA.
7.3 The CCWS delivers water to the LHSI/RHRS at the required flow and within the required time to provide core cooling due to design basis events.	Tests and analyses will be performed to determine the CCWS delivery rate under design conditions. An integrated system test will be performed using a simulated safety injection actuation signal to verify the startup time of the CCWS pump.	A report exists and concludes that the CCWS delivers the following design flowrate to the LHSI HX [2.19 x 10^6 lb/hr]. A report exists and concludes that the CCWS starts within the following required time in response to a simulated SIS actuation signal.
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 design conditions.	A report exists and concludes that the CCWS delivers the following design flowrate to the thermal barrier coolers [0.0198 x 10^6 lb/hr].
7.5 The CCWS delivers water to divisions 2 and 3 Safety Chilled Water Chillers.	Tests and analyses will be performed to determine the CCWS delivery rate under design conditions.	A report exists and concludes that the CCWS delivers the following design flowrate to the safety chilled water chillers [0.373 x 10^6 lb/hr].
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 design conditions.	A report exists and concludes that the CCWS delivers the following design flowrate to the spent fuel pool cooling heat exchangers [0.8818 x 10^6 lb/hr].

Table 2.7.1-3—Component Cooling Water System Inspections, Tests, Analyses, and Acceptance Criteria (7 Sheets)

Commitment Wording	Inspection, Analysis or Test	Acceptance Criteria
7.7 Class 1E valves listed in Table 2.7.1-2 perform the function listed in Table 2.7.1-1 under system 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 design conditions.	The as-installed valve changes position as listed Table 2.7.1-1 under system design conditions.
7.8 The CCWS has provisions to allow flow testing of the CCWS pumps during plant operation.	Testing for flow of the CCWS pumps back to the surge tank will be performed.	The flow test line allows CCWS pump flow back to the surge tank.
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.	A report exists and concludes that the containment isolation valves listed in Table 2.7.1-1 close within the required times following initiation of a containment isolation signal.