ABB
ASEA BROWN BOVERI

May 3, 1993
LD-93-073

Docket 52-002

Attention: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: Additional System 80+™ Submittal #1 Design Descriptions and ITAAC

REFERENCE: ABB-CE Letter LD-93-071, C. Brinkman (ABB-CE) to NRC, dated 4/30/93

Dear Sirs:

Submittal #1 of the System 80+ Design Descriptions and associated ITAAC (Inspections, Tests, Analyses and Acceptance Criteria) was transmitted by the Reference. Attached are additional Submittal #1 Design Descriptions and ITAAC which are submitted for review and approval.

ABB-CE has initiated an Integrated Review of the CESSAR-DC and Design Descriptions/ITAAC to ensure consistency among and within these documents. It is possible that changes to the attached material may be necessary should the review uncover any inconsistencies. It is our intention to incorporate such changes in our final amendment targeted for June 30, 1993.

Please feel free to query us as the staff evaluates this submittal. You may contact me or Mr. John Rec (203-285-2861) for assistance in this matter.

Very truly yours,

COMBUSTION ENGINEERING, INC.

G. D. Hess for

C. B. Brinkman
Acting Director
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D032 1/1

2.7.5 STATION SERVICE WATER SYSTEM

Design Description

The Station Service Water System (SSWS), in conjunction with the Ultimate Heat Sink (UHS), provides cooling water to remove heat from the Component Cooling Water System (CCWS).

The Basic Configuration of the SSWS is as shown on Figure 2.7.5-1. The SSWS is a safety-related system as noted on the figure.

The SSWS consists of two Divisions. Each SSWS Division receives heat from its corresponding CCWS Division through the component cooling water heat exchangers.

Each Division of the SSWS has two station service water pumps, two station service water strainers, piping, valves, controls, and instrumentation.

The SSWS pumps and strainers are located in the SSWS Pump Structure(s). Interconnecting piping runs between the SSWS Pump Structure(s) and the Component Cooling Water Heat Exchanger Structure.

The SSWS has the capacity to remove heat from the CCWS during operation, shutdown, refueling, and design basis accident conditions. Each Division has the heat dissipation capacity to achieve and maintain cold shutdown.

The ASME Code Section III Class for the SSWS pressure retaining components shown on Figure 2.7.5-1 is as depicted on the figure.

The safety related equipment shown on Figure 2.7.5-1 is qualified Seismic Category I.

The Class 1E loads shown on Figure 2.7.5-1 are powered from their respective Class 1E Division.

The two mechanical Divisions of the SSWS are physically separated.

Displays of the SSWS instrumentation shown on Figure 2.7.5-1 exist in the Main Control Room or can be retrieved there.

Controls exist in the Main Control Room to start and stop the station service water pumps, and to open and close those power operated valves shown on Figure 2.7.5-1.

Interface Requirements

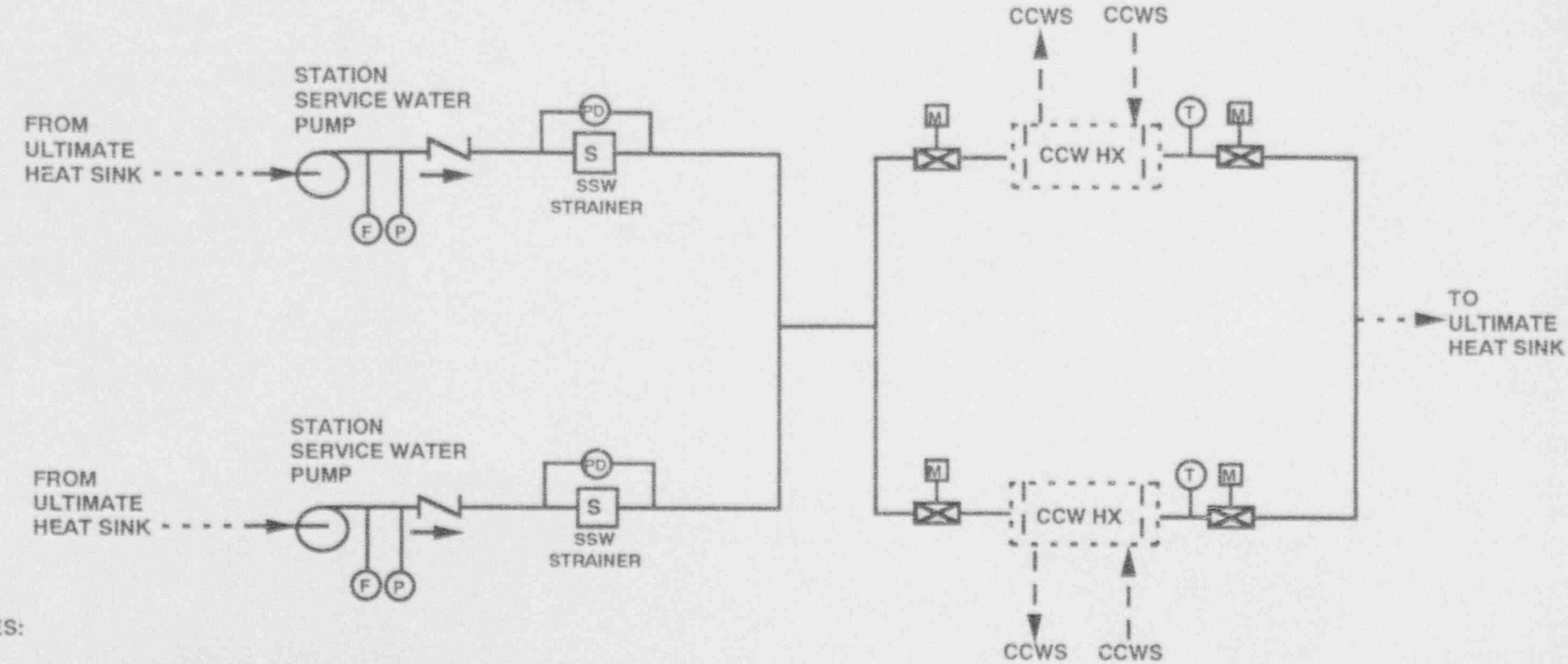
The Ultimate Heat Sink (UHS) transfers heat from the SSWS to the environment during operation, shutdown, refueling, and design basis accident conditions. The Ultimate Heat Sink is capable of dissipating a heat load of at least 143.0 million BTU/hr during the initial phase of a design basis accident. The UHS is sized so that makeup water is not required for at least 30 days following a design basis accident. During this period of 30 days, the design basis temperatures of safety-related equipment are not exceeded.

Water is supplied to each SSWS pump at a net positive suction head (NPSH) greater than the pump's required NPSH.

The Station Service Water Pump Structure is qualified Seismic Category I and provides physical barriers to maintain separation of SSWS mechanical Divisions.

Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.5-1 specifies the inspections, tests, analyses and associated acceptance criteria for the SSWS.



NOTES:

A. SSWS COMPONENTS AND EQUIPMENT SHOWN ON THE FIGURE ARE ASME CODE SECTION III CLASS 3 AND ARE SAFETY-RELATED

B. SAFETY RELATED COMPONENTS AND EQUIPMENT SHOWN ON THE FIGURE ARE POWERED FROM THEIR RESPECTIVE CLASS 1E DIVISION.

FIGURE 2.7.5 - 1
STATION SERVICE WATER SYSTEM
(ONE OF TWO DIVISIONS)

TABLE 2.7.5-1

STATION SERVICE WATER SYSTEM
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The Basic Configuration of the SSWS is as shown on Figure 2.7.5-1.	1. Inspections of the as-built SSWS configuration will be conducted.	1. For the components and equipment shown on Figure 2.7.5-1, the as-built SSWS conforms with the Basic Configuration.
2. The SSWS has the capacity to remove heat from the CCWS during operation, shutdown, refueling, and design basis accident conditions.	2. Tests will be performed to measure SSWS flow rates, inspections will be conducted of the as-built SSWS, and analyses will be performed to determine the heat removal capacities of the as-built SSWS.	2. The SSWS has the capacity to remove heat from the CCWS during operation, shutdown, refueling, and design basis accident conditions.
3. The ASME Code Section III SSWS components shown on Figure 2.7.5-1 retain their pressure boundary integrity under internal pressures that will be experienced during service.	3. A pressure test will be conducted on those components of the SSWS required to be pressure tested by ASME Code Section III.	3. The results of the pressure test of ASME Code Section III components of the SSWS conform with the pressure testing criteria in ASME Code Section III.
4. The Class 1E loads shown on Figure 2.7.5-1 are powered from their respective Class 1E Division.	4. Tests will be performed on the SSWS by providing a test signal in only one Class 1E Division at a time.	4. Within the SSWS, a test signal exists only at the equipment powered from the Class 1E Division under test.
5. The two mechanical Divisions of the SSWS are physically separated.	5. Inspections of the as-built mechanical Divisions will be performed.	5. The two mechanical Divisions of the SSWS are separated by a Divisional wall or a fire barrier.

TABLE 2.7.5-1 (Continued)

STATION SERVICE WATER SYSTEM
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
6.a) Displays of the SSWS instrumentation shown on Figure 2.7.5-1 exist in the Main Control Room or can be retrieved there.	6.a) Inspection for the existence or retrieveability in the Main Control Room of instrumentation displays will be performed.	6.a) Display of the instrumentation shown on Figure 2.7.5-1 exist in the Main Control Room or can be retrieved there.
6.b) Controls exist in the Main Control Room to start and stop the station service water pumps, and to open and close those power operated valves shown on Figure 2.7.5-1.	6.b) Tests will be performed using the SSWS controls in the Main Control Room.	6.b) SSWS controls in the Main Control Room operate to start and stop station service water pumps, and to open and close those power operated valves shown on Figure 2.7.5-1.
7. Motor-Operated Valves (MOVs) having an active safety function will open and/or close under differential pressure or fluid flow conditions and under temperature conditions.	7. Tests will be conducted to open and/or close MOVs having an active safety function under pre-operational differential pressure or fluid flow conditions and under temperature conditions.	7. Each MOV having an active safety function opens and/or closes.
8. Check valves shown on Figure 2.7.5-1 will open and/or close under system pressure, fluid flow conditions, or temperature conditions.	8. Tests will be conducted to open and/or close the check valves shown on Figure 2.7.5-1 under system preoperational pressure, fluid flow conditions, or temperature conditions.	8. Each check valve shown on Figure 2.7.5-1 opens and/or closes.

2.7.6 COMPONENT COOLING WATER SYSTEM

Design Description

The Component Cooling Water System (CCWS) is a closed loop cooling water system that, in conjunction with the Station Service Water System (SSWS) and the Ultimate Heat Sink (UHS), removes heat generated from the plant's safety related and non-safety related components connected to the CCWS.

The Basic Configuration of the CCWS is as shown on Figure 2.7.6-1. Equipment listed in Table 2.7.6-1 can receive cooling water flow during the plant modes indicated. The ASME Code Section III Class 2 and 3 components and the instrumentation (except the radiation instrument) shown on Figure 2.7.6-1 are safety-related.

The CCWS consists of two Divisions. Each CCWS Division transfers heat to its corresponding SSWS Division through the component cooling water heat exchangers.

Each Division of the CCWS has two component cooling water heat exchangers, a component cooling water surge tank, two component cooling water pumps, piping, valves, controls, and instrumentation.

The CCWS heat exchangers are located in the CCWS Heat Exchanger Structure. The remainder of the CCWS components and equipment is located within the Nuclear Island structure except for piping that connects the CCWS heat exchangers to the components and equipment in the Nuclear Island structure.

The CCWS, in conjunction with the SSWS and UHS, has the capacity to dissipate the heat loads of connected components during operation, shutdown, refueling, and design basis accident conditions. Each Division has the heat dissipation capacity to achieve and maintain cold shutdown.

The ASME Code Section III Class for the CCWS pressure retaining components shown on Figure 2.7.6-1 is as depicted on the figure.

The safety related equipment shown on Figure 2.7.6-1 is qualified Seismic Category I.

The Class 1E loads shown on Figure 2.7.6-1 are powered from their respective Class 1E Division.

The two mechanical Divisions of the CCWS are physically separated.

Displays of the CCWS instrumentation shown on Figure 2.7.6-1 exist in the Main Control Room or can be retrieved there.

Controls exist in the Main Control Room to start and stop the component cooling water pumps, and to open and close those power operated valves shown on Figure 2.7.6-1.

Upon receipt of a Safety Injection Actuation Signal (SIAS), the system response is as follows:

1) The ASME Code Section III Class 3 valves that separate ASME Code Section III Class 3 component cooling water piping and non-ASME Code Section III component cooling water piping close automatically.

2) The spent fuel pool cooling heat exchanger isolation valve closes automatically.

3) The component cooling water heat exchanger bypass valves close automatically.

Upon receipt of a Containment Spray Actuation Signal (CSAS), the containment spray heat exchanger isolation valve opens automatically.

Upon receipt of a component cooling water low-low surge tank level signal, isolation valves for cooling loops composed of non-ASME Code Section III piping close automatically.

Valves with response positions indicated on Figure 2.7.6-1 change position to that indicated on the figure upon loss of motive power.

Makeup water to the CCWS is supplied by the Demineralized Water Makeup System (DWMS). A safety related Seismic Category I makeup line is provided to each Division from the SSWS via a spool piece which can be connected.

Pressure relief and flow isolation valves are provided for each reactor coolant pump as shown on Figure 2.7.6-1. Pressure relief capacity is sized to accept the maximum expected in-leakage from a reactor coolant pump seal cooler tube rupture.

Interface Requirements

The CCWS pipe channels from the Nuclear Island structure to the component cooling water heat exchanger structure are qualified Seismic Category I and provide physical barriers between CCWS mechanical Divisions.

Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.6-2 specifies the inspections, tests, analyses and associated acceptance criteria for the CCWS.

TABLE 2.7.6-1

Plant Mode/ Components	Normal Operation	Shutdown Cooling	Refueling	Design Basis Accident
SAFETY RELATED		(Note a)		
Shutdown cooling heat exchanger	-	X	X	-
Containment spray heat exchanger	-	-	-	X
Spent fuel pool cooling heat exchanger	X	X	X	X (Note b)
Diesel Generator	X	X	X	X
Pump Motor Coolers, Miniflow Heat Exchangers, and Essential Chilled Water Condensers	X	X	X	X

TABLE 2.7.6-1 (Continued)

Plant Mode/ Components	Normal Operation	Shutdown Cooling	Refueling	Design Basis Accident
NON-SAFETY RELATED		(Note a)		
Reactor coolant pumps and pump motors	X	X	X	X
Charging pump motor coolers	X	X	X	X
Charging pump miniflow heat exchanger	X	X	X	X
Normal Chilled Water Condensers, Instrument Air Compressors (Note C)	X	X	X	-
Letdown Heat Exchanger, Sample Heat Exchangers, Gas Stripper, and Boric Acid Concentrator (Note c)	X	X	X	-

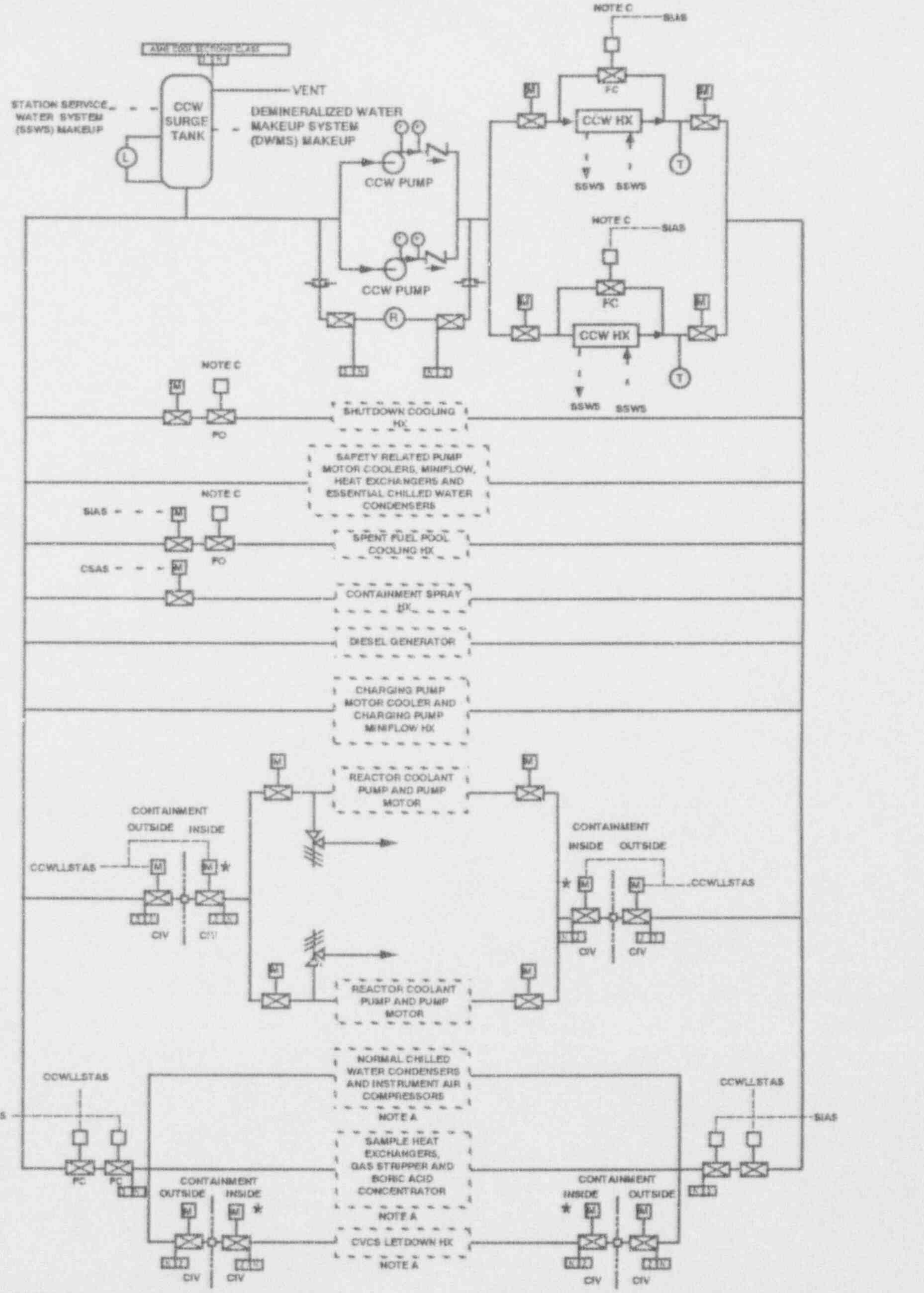
NOTES FOR TABLES 2.7.6-1

a. (X) = Equipment can receive component cooling water flow in this mode.

(-) = Equipment does not receive component cooling water flow in this mode.

b. Will require operator action to restore.

c. Assignment of the non-safety related CCWS heat removal loads to the respective CCWS Division is dependent upon the location of the components associated with those loads.



NOTES:

A. ASSIGNMENT OF THE NON-SAFETY RELATED CCWS HEAT REMOVAL LOADS TO THEIR RESPECTIVE CCWS DIVISION IS DEPENDENT UPON THE LOCATION OF COMPONENTS ASSOCIATED WITH THOSE LOADS.

B. SAFETY RELATED COMPONENTS AND EQUIPMENT SHOWN ON THE FIGURE ARE POWERED FROM THEIR RESPECTIVE CLASS 1E DIVISION.

C. THIS VALVE IS FOR FLOW CONTROL. OPEN/CLOSE OPERATION FROM THE MAIN CONTROL ROOM IS NOT REQUIRED.

* EQUIPMENT FOR WHICH PARAGRAPH NUMBER (3) OF THE "VERIFICATIONS FOR BASIC CONFIGURATION FOR SYSTEMS" OF THE GENERAL PROVISIONS (SECTION 1.2) APPLIES.

FIGURE 2.7.6-1
COMPONENT COOLING WATER SYSTEM
(ONE OF TWO DIVISIONS)

TABLE 2.7.6-2

COMPONENT COOLING WATER SYSTEM
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The Basic Configuration of the CCWS is as shown on Figure 2.7.6-1.	1. Inspections of the as-built CCWS configuration will be conducted.	1. For the components and equipment shown on Figure 2.7.6-1, the as-built CCWS conforms with the Basic Configuration.
2. The CCWS, in conjunction with the SSWS and USH, has the capacity to dissipate the heat loads of connected components during operation, shutdown, refueling and design basis accident conditions.	2. Tests will be performed to measure CCWS flow rates, inspections will be conducted of the as-built CCWS, and analyses will be performed to determine the heat removal capacities of the as-built component cooling water heat exchangers.	2. The CCWS, in conjunction with the SSWS and USH, has the capacity to dissipate the heat loads of connected components during operation, shutdown, refueling and design basis accident conditions.
3. The ASME Code Section III CCWS components shown on Figure 2.7.6-1 retain their pressure boundary integrity under internal pressures that will be experienced during service.	3. A pressure test will be conducted on those components of the CCWS required to be pressure tested by ASME Code Section III.	3. The results of the pressure test of ASME Code Section III components of the CCWS conform with the pressure testing criteria in ASME Code Section III.
4. The Class 1E loads shown on Figure 2.7.6-1 are powered from their respective Class 1E Division.	4. Tests will be performed on the CCWS by providing a test signal in only one Class 1E Division at a time.	4. Within the CCWS, a test signal exists only at the equipment powered from the Class 1E Division under test.
5. The two mechanical Divisions of the CCWS are physically separated.	5. Inspections of the as-built mechanical Divisions will be performed.	5. The two mechanical Divisions of the CCWS are separated by a Divisional wall or a fire barrier except for components of the CCWS within Containment which are separated by spatial arrangement or physical barriers.

TABLE 2.7.6-2 (Continued)

COMPONENT COOLING WATER SYSTEM
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
6.a) Displays of the CCWS instrumentation shown on Figure 2.7.6-1 exist in the Main Control Room or can be retrieved there.	6.a) Inspection for the existence or retrieveability in the Main Control Room of instrumentation displays will be performed.	6.a) Displays of the instrumentation shown on Figure 2.7.6-1 exist in the Main Control Room or can be retrieved there.
6.b) Controls exist in the Main Control Room to start and stop the component cooling water pumps, and to open and close those power operated valves shown on Figure 2.7.6-1.	6.b) Tests will be performed using the CCWS controls in the Main Control Room.	6.b) CCWS controls in the Main Control Room operate to start and stop component cooling water pumps, and to open and close those power operated valves shown on Figure 2.7.6-1.
7. Upon receipt of a Safety Injection Actuation Signal (SIAS), the response system is as follows:	7. Tests will be performed using a simulated SIAS.	
7.a) The ASME Code Section III Class 3 valves that separate the ASME Code Section III Class 3 component cooling water piping and non-ASME Code Section III component cooling water piping close automatically.		7.a) Upon receipt of a SIAS, the valves close.
7.b) The spent fuel pool cooling heat exchanger isolation valve closes automatically.		7.b) Upon receipt of a SIAS, the valve closes.
7.c) The component cooling water heat exchanger bypass valves close automatically.		7.c) Upon receipt of a SIAS, the valves close.

TABLE 2.7.6-2 (Continued)

COMPONENT COOLING WATER SYSTEM
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
8. Upon the receipt of a component cooling water surge tank low-low level signal, isolation valves for cooling loops composed of non-ASME Code Section III piping close automatically.	8. A test will be performed using a simulated component cooling water surge tank low-low level signal.	8. Upon the receipt of a component cooling water surge tank low-low level signal, the valves close.
9. Upon receipt of a Containment Spray Actuation Signal (CSAS), the containment spray heat exchanger isolation valve opens automatically.	9. A test will be performed using a simulated CSAS signal.	9. Upon receipt of a CSAS, the valve opens.
10. Motor-Operated Valves (MOVs) having an active safety function will open and/or close under differential pressure or fluid flow conditions and under temperature conditions.	10. Tests to open and/or close MOVs having an active safety function will be conducted under preoperational differential pressure or fluid flow conditions and under temperature conditions.	10. Each MOV having an active safety function opens and/or closes.
11. Check valves shown on Figure 2.7.6-2 will open and/or close under system pressure, fluid flow conditions, or temperature conditions.	11. Tests to open and/or close check valves shown on Figure 2.7.6-2 will be conducted under system preoperational pressure, fluid flow conditions, or temperature conditions.	11. Each check valve shown on Figure 2.7.6-2 opens and/or closes.
12. Valves with response positions indicated on Figure 2.7.6-1 change position to that indicated on the figure upon loss of motive power.	12. A test of loss of motive power to these valves will be performed.	12. These valves change position to the position indicated on Figure 2.7.6-1 on loss of motive power.

TABLE 2.7.6-2 (Continued)

COMPONENT COOLING WATER SYSTEM
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
13. The spool piece on the SSWS makeup line to each Division of the CCWS can be connected.	13. Installation of the spool piece will be performed.	13. The spool piece on the SSWS makeup line to each Division of the CCWS can be connected.
14. Pressure relief capacity provided for each reactor coolant pump is sized to accept the maximum expected in-leakage from a reactor coolant pump seal cooler tube rupture.	14. An analysis will be performed to confirm the pressure relief capacity provided for each reactor coolant pump.	14. Pressure relief capacity provided for each reactor coolant pump is sized to accept the maximum in-leakage from a reactor coolant pump seal cooler tube rupture.

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TITLE OF ATTACHED DOCUMENT: Additional System 80+ Submittal #1 Design Descriptions and ITAAC

QUALITY RECORD: YES (NOTE A) / NO (circled: NO)

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May 3, 1993
LD-93-073

Docket 52-002

Attention: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: Additional System 80+™ Submittal #1 Design Descriptions and ITAAC

REFERENCE: ABB-CE Letter LD-93-071, C. Brinkman (ABB-CE) to NRC, dated 4/30/93

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Please feel free to query us as the staff evaluates this submittal. You may contact me or Mr. John Rec (203-285-2861) for assistance in this matter.

Very truly yours,

COMBUSTION ENGINEERING, INC.

G. D. Hess for

C. B. Brinkman
Acting Director
Nuclear Systems Licensing

9305110197

cc: T. Boyce (NRC)
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2.7.5 STATION SERVICE WATER SYSTEM

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The Basic Configuration of the SSWS is as shown on Figure 2.7.5-1. The SSWS is a safety-related system as noted on the figure.

The SSWS consists of two Divisions. Each SSWS Division receives heat from its corresponding CCWS Division through the component cooling water heat exchangers.

Each Division of the SSWS has two station service water pumps, two station service water strainers, piping, valves, controls, and instrumentation.

The SSWS pumps and strainers are located in the SSWS Pump Structure(s). Interconnecting piping runs between the SSWS Pump Structure(s) and the Component Cooling Water Heat Exchanger Structure.

The SSWS has the capacity to remove heat from the CCWS during operation, shutdown, refueling, and design basis accident conditions. Each Division has the heat dissipation capacity to achieve and maintain cold shutdown.

The ASME Code Section III Class for the SSWS pressure retaining components shown on Figure 2.7.5-1 is as depicted on the figure.

The safety related equipment shown on Figure 2.7.5-1 is qualified Seismic Category I.

The Class 1E loads shown on Figure 2.7.5-1 are powered from their respective Class 1E Division.

The two mechanical Divisions of the SSWS are physically separated.

Displays of the SSWS instrumentation shown on Figure 2.7.5-1 exist in the Main Control Room or can be retrieved there.

Controls exist in the Main Control Room to start and stop the station service water pumps, and to open and close those power operated valves shown on Figure 2.7.5-1.

Interface Requirements

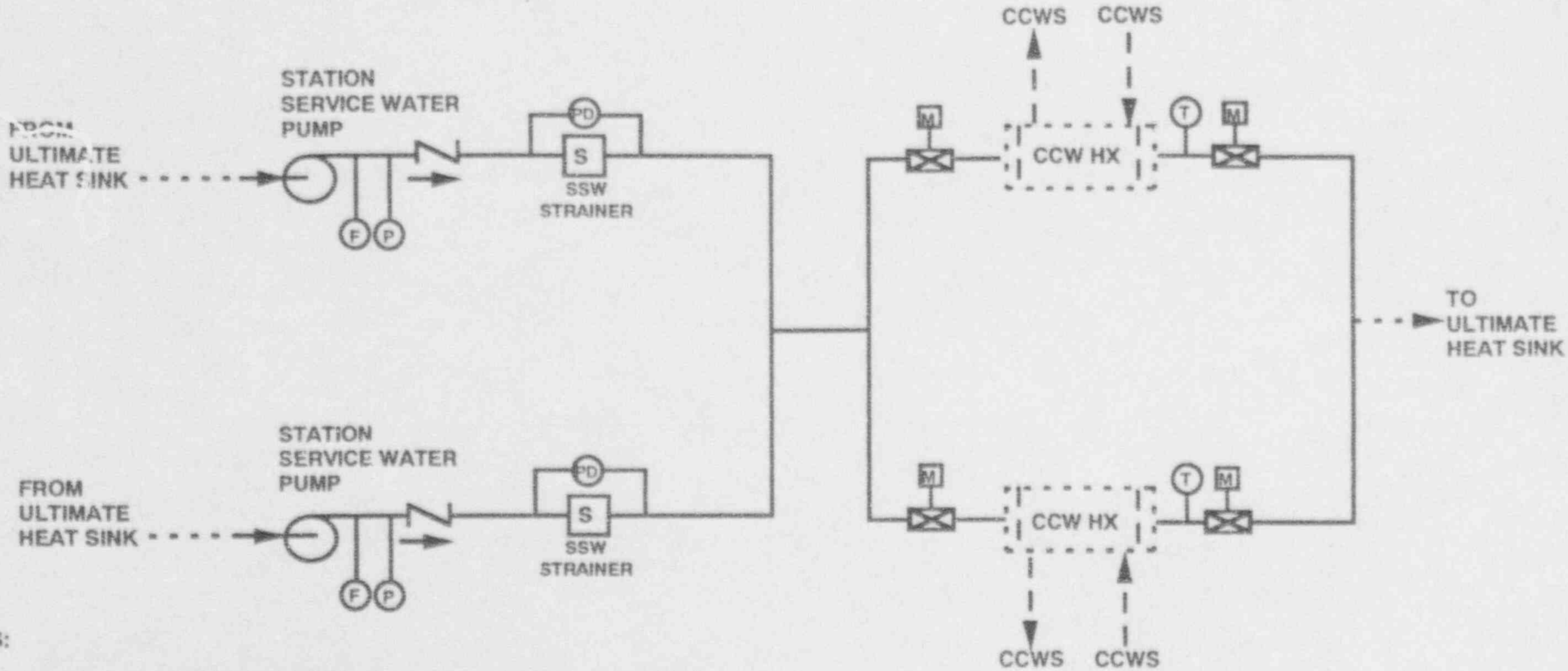
The Ultimate Heat Sink (UHS) transfers heat from the SSWS to the environment during operation, shutdown, refueling, and design basis accident conditions. The Ultimate Heat Sink is capable of dissipating a heat load of at least 143.0 million BTU/hr during the initial phase of a design basis accident. The UHS is sized so that makeup water is not required for at least 30 days following a design basis accident. During this period of 30 days, the design basis temperatures of safety-related equipment are not exceeded.

Water is supplied to each SSWS pump at a net positive suction head (NPSH) greater than the pump's required NPSH.

The Station Service Water Pump Structure is qualified Seismic Category I and provides physical barriers to maintain separation of SSWS mechanical Divisions.

Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.5-1 specifies the inspections, tests, analyses and associated acceptance criteria for the SSWS.



NOTES:

A. SSWS COMPONENTS AND EQUIPMENT SHOWN ON THE FIGURE ARE ASME CODE SECTION III CLASS 3 AND ARE SAFETY-RELATED

B. SAFETY RELATED COMPONENTS AND EQUIPMENT SHOWN ON THE FIGURE ARE POWERED FROM THEIR RESPECTIVE CLASS 1E DIVISION.

FIGURE 2.7.5 - 1
STATION SERVICE WATER SYSTEM
(ONE OF TWO DIVISIONS)

TABLE 2.7.5-1

STATION SERVICE WATER SYSTEM
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The Basic Configuration of the SSWS is as shown on Figure 2.7.5-1.	1. Inspections of the as-built SSWS configuration will be conducted.	1. For the components and equipment shown on Figure 2.7.5-1, the as-built SSWS conforms with the Basic Configuration.
2. The SSWS has the capacity to remove heat from the CCWS during operation, shutdown, refueling, and design basis accident conditions.	2. Tests will be performed to measure SSWS flow rates, inspections will be conducted of the as-built SSWS, and analyses will be performed to determine the heat removal capacities of the as-built SSWS.	2. The SSWS has the capacity to remove heat from the CCWS during operation, shutdown, refueling, and design basis accident conditions.
3. The ASME Code Section III SSWS components shown on Figure 2.7.5-1 retain their pressure boundary integrity under internal pressures that will be experienced during service.	3. A pressure test will be conducted on those components of the SSWS required to be pressure tested by ASME Code Section III.	3. The results of the pressure test of ASME Code Section III components of the SSWS conform with the pressure testing criteria in ASME Code Section III.
4. The Class 1E loads shown on Figure 2.7.5-1 are powered from their respective Class 1E Division.	4. Tests will be performed on the SSWS by providing a test signal in only one Class 1E Division at a time.	4. Within the SSWS, a test signal exists only at the equipment powered from the Class 1E Division under test.
5. The two mechanical Divisions of the SSWS are physically separated.	5. Inspections of the as-built mechanical Divisions will be performed.	5. The two mechanical Divisions of the SSWS are separated by a Divisional wall or a fire barrier.

TABLE 2.7.5-1 (Continued)

STATION SERVICE WATER SYSTEM
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
6.a) Displays of the SSWS instrumentation shown on Figure 2.7.5-1 exist in the Main Control Room or can be retrieved there.	6.a) Inspection for the existence or retrieveability in the Main Control Room of instrumentation displays will be performed.	6.a) Display of the instrumentation shown on Figure 2.7.5-1 exist in the Main Control Room or can be retrieved there.
6.b) Controls exist in the Main Control Room to start and stop the station service water pumps, and to open and close those power operated valves shown on Figure 2.7.5-1.	6.b) Tests will be performed using the SSWS controls in the Main Control Room.	6.b) SSWS controls in the Main Control Room operate to start and stop station service water pumps, and to open and close those power operated valves shown on Figure 2.7.5-1.
7. Motor-Operated Valves (MOVs) having an active safety function will open and/or close under differential pressure or fluid flow conditions and under temperature conditions.	7. Tests will be conducted to open and/or close MOVs having an active safety function under pre-operational differential pressure or fluid flow conditions and under temperature conditions.	7. Each MOV having an active safety function opens and/or closes.
8. Check valves shown on Figure 2.7.5-1 will open and/or close under system pressure, fluid flow conditions, or temperature conditions.	8. Tests will be conducted to open and/or close the check valves shown on Figure 2.7.5-1 under system preoperational pressure, fluid flow conditions, or temperature conditions.	8. Each check valve shown on Figure 2.7.5-1 opens and/or closes.

2.7.6 COMPONENT COOLING WATER SYSTEM

Design Description

The Component Cooling Water System (CCWS) is a closed loop cooling water system that, in conjunction with the Station Service Water System (SSWS) and the Ultimate Heat Sink (UHS), removes heat generated from the plant's safety related and non-safety related components connected to the CCWS.

The Basic Configuration of the CCWS is as shown on Figure 2.7.6-1. Equipment listed in Table 2.7.6-1 can receive cooling water flow during the plant modes indicated. The ASME Code Section III Class 2 and 3 components and the instrumentation (except the radiation instrument) shown on Figure 2.7.6-1 are safety-related.

The CCWS consists of two Divisions. Each CCWS Division transfers heat to its corresponding SSWS Division through the component cooling water heat exchangers.

Each Division of the CCWS has two component cooling water heat exchangers, a component cooling water surge tank, two component cooling water pumps, piping, valves, controls, and instrumentation.

The CCWS heat exchangers are located in the CCWS Heat Exchanger Structure. The remainder of the CCWS components and equipment is located within the Nuclear Island structure except for piping that connects the CCWS heat exchangers to the components and equipment in the Nuclear Island structure.

The CCWS, in conjunction with the SSWS and UHS, has the capacity to dissipate the heat loads of connected components during operation, shutdown, refueling, and design basis accident conditions. Each Division has the heat dissipation capacity to achieve and maintain cold shutdown.

The ASME Code Section III Class for the CCWS pressure retaining components shown on Figure 2.7.6-1 is as depicted on the figure.

The safety related equipment shown on Figure 2.7.6-1 is qualified Seismic Category I.

The Class 1E loads shown on Figure 2.7.6-1 are powered from their respective Class 1E Division.

The two mechanical Divisions of the CCWS are physically separated.

Displays of the CCWS instrumentation shown on Figure 2.7.6-1 exist in the Main Control Room or can be retrieved there.

Controls exist in the Main Control Room to start and stop the component cooling water pumps, and to open and close those power operated valves shown on Figure 2.7.6-1.

Upon receipt of a Safety Injection Actuation Signal (SIAS), the system response is as follows:

1) The ASME Code Section III Class 3 valves that separate ASME Code Section III Class 3 component cooling water piping and non-ASME Code Section III component cooling water piping close automatically.

2) The spent fuel pool cooling heat exchanger isolation valve closes automatically.

3) The component cooling water heat exchanger bypass valves close automatically.

Upon receipt of a Containment Spray Actuation Signal (CSAS), the containment spray heat exchanger isolation valve opens automatically.

Upon receipt of a component cooling water low-low surge tank level signal, isolation valves for cooling loops composed of non-ASME Code Section III piping close automatically.

Valves with response positions indicated on Figure 2.7.6-1 change position to that indicated on the figure upon loss of motive power.

Makeup water to the CCWS is supplied by the Demineralized Water Makeup System (DWMS). A safety related Seismic Category I makeup line is provided to each Division from the SSWS via a spool piece which can be connected.

Pressure relief and flow isolation valves are provided for each reactor coolant pump as shown on Figure 2.7.6-1. Pressure relief capacity is sized to accept the maximum expected in-leakage from a reactor coolant pump seal cooler tube rupture.

Interface Requirements

The CCWS pipe channels from the Nuclear Island structure to the component cooling water heat exchanger structure are qualified Seismic Category I and provide physical barriers between CCWS mechanical Divisions.

Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.7.6-2 specifies the inspections, tests, analyses and associated acceptance criteria for the CCWS.

TABLE 2.7.6-1

Plant Mode/ Components	Normal Operation	Shutdown Cooling	Refueling	Design Basis Accident
SAFETY RELATED		(Note a)		
Shutdown cooling heat exchanger	-	X	X	-
Containment spray heat exchanger	-	-	-	X
Spent fuel pool cooling heat exchanger	X	X	X	X (Note b)
Diesel Generator	X	X	X	X
Pump Motor Coolers, Miniflow Heat Exchangers, and Essential Chilled Water Condensers	X	X	X	X

TABLE 2.7.6-1 (Continued)

Plant Mode/ Components	Normal Operation	Shutdown Cooling	Refueling	Design Basis Accident
NON-SAFETY RELATED		(Note a)		
Reactor coolant pumps and pump motors	X	X	X	X
Charging pump motor coolers	X	X	X	X
Charging pump miniflow heat exchanger	X	X	X	X
Normal Chilled Water Condensers, Instrument Air Compressors (Note C)	X	X	X	-
Letdown Heat Exchanger, Sample Heat Exchangers, Gas Stripper, and Boric Acid Concentrator (Note c)	X	X	X	-

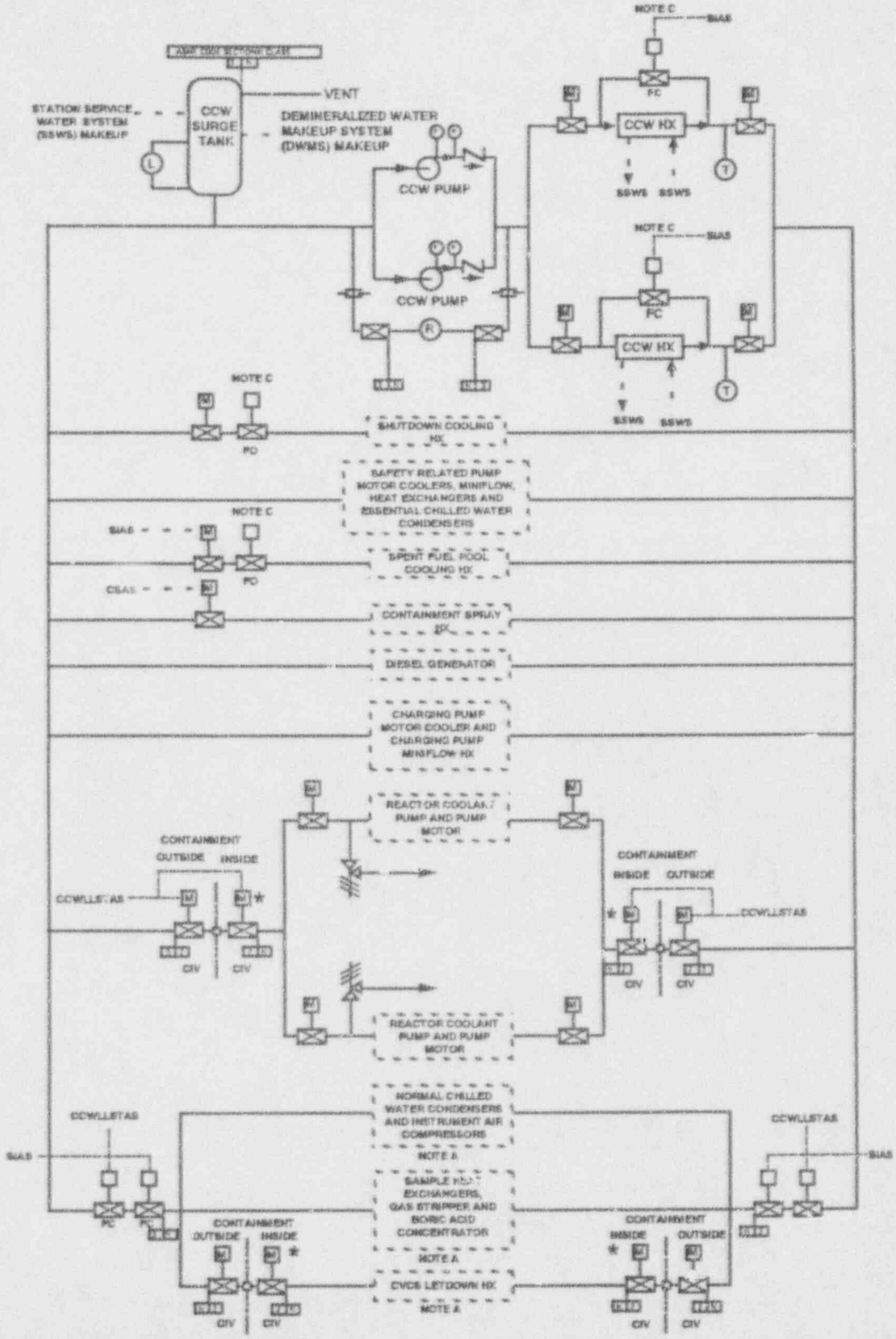
NOTES FOR TABLES 2.7.6-1

a. (X) = Equipment can receive component cooling water flow in this mode.

(-) = Equipment does not receive component cooling water flow in this mode.

b. Will require operator action to restore.

c. Assignment of the non-safety related CCWS heat removal loads to the respective CCWS Division is dependent upon the location of the components associated with those loads.



NOTES:

A. ASSIGNMENT OF THE NON-SAFETY RELATED CCWS HEAT REMOVAL LOADS TO THEIR RESPECTIVE CCWS DIVISION IS DEPENDENT UPON THE LOCATION OF COMPONENTS ASSOCIATED WITH THOSE LOADS.

B. SAFETY RELATED COMPONENTS AND EQUIPMENT SHOWN ON THE FIGURE ARE POWERED FROM THEIR RESPECTIVE CLASS 1E DIVISION.

C. THIS VALVE IS FOR FLOW CONTROL. OPEN/CLOSE OPERATION FROM THE MAIN CONTROL ROOM IS NOT REQUIRED.

* EQUIPMENT FOR WHICH PARAGRAPH NUMBER (3) OF THE "VERIFICATIONS FOR BASIC CONFIGURATION FOR SYSTEMS" OF THE GENERAL PROVISIONS (SECTION 1.2) APPLIES.

FIGURE 2.7.6-1
COMPONENT COOLING WATER SYSTEM
(ONE OF TWO DIVISIONS)

TABLE 2.7.6-2

COMPONENT COOLING WATER SYSTEM
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The Basic Configuration of the CCWS is as shown on Figure 2.7.6-1.	1. Inspections of the as-built CCWS configuration will be conducted.	1. For the components and equipment shown on Figure 2.7.6-1, the as-built CCWS conforms with the Basic Configuration.
2. The CCWS, in conjunction with the SSWS and USH, has the capacity to dissipate the heat loads of connected components during operation, shutdown, refueling and design basis accident conditions.	2. Tests will be performed to measure CCWS flow rates, inspections will be conducted of the as-built CCWS, and analyses will be performed to determine the heat removal capacities of the as-built component cooling water heat exchangers.	2. The CCWS, in conjunction with the SSWS and USH, has the capacity to dissipate the heat loads of connected components during operation, shutdown, refueling and design basis accident conditions.
3. The ASME Code Section III CCWS components shown on Figure 2.7.6-1 retain their pressure boundary integrity under internal pressures that will be experienced during service.	3. A pressure test will be conducted on those components of the CCWS required to be pressure tested by ASME Code Section III.	3. The results of the pressure test of ASME Code Section III components of the CCWS conform with the pressure testing criteria in ASME Code Section III.
4. The Class 1E loads shown on Figure 2.7.6-1 are powered from their respective Class 1E Division.	4. Tests will be performed on the CCWS by providing a test signal in only one Class 1E Division at a time.	4. Within the CCWS, a test signal exists only at the equipment powered from the Class 1E Division under test.
5. The two mechanical Divisions of the CCWS are physically separated.	5. Inspections of the as-built mechanical Divisions will be performed.	5. The two mechanical Divisions of the CCWS are separated by a Divisional wall or a fire barrier except for components of the CCWS within Containment which are separated by spatial arrangement or physical barriers.

TABLE 2.7.6-2 (Continued)

COMPONENT COOLING WATER SYSTEM
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
6.a) Displays of the CCWS instrumentation shown on Figure 2.7.6-1 exist in the Main Control Room or can be retrieved there.	6.a) Inspection for the existence or retrieveability in the Main Control Room of instrumentation displays will be performed.	6.a) Displays of the instrumentation shown on Figure 2.7.6-1 exist in the Main Control Room or can be retrieved there.
6.b) Controls exist in the Main Control Room to start and stop the component cooling water pumps, and to open and close those power operated valves shown on Figure 2.7.6-1.	6.b) Tests will be performed using the CCWS controls in the Main Control Room.	6.b) CCWS controls in the Main Control Room operate to start and stop component cooling water pumps, and to open and close those power operated valves shown on Figure 2.7.6-1.
7. Upon receipt of a Safety Injection Actuation Signal (SIAS), the response system is as follows:	7. Tests will be performed using a simulated SIAS.	7.a) Upon receipt of a SIAS, the valves close.
7.a) The ASME Code Section III Class 3 valves that separate the ASME Code Section III Class 3 component cooling water piping and non-ASME Code Section III component cooling water piping close automatically.		
7.b) The spent fuel pool cooling heat exchanger isolation valve closes automatically.		7.b) Upon receipt of a SIAS, the valve closes.
7.c) The component cooling water heat exchanger bypass valves close automatically.		7.c) Upon receipt of a SIAS, the valves close.

TABLE 2.7.6-2 (Continued)

COMPONENT COOLING WATER SYSTEM
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
8. Upon the receipt of a component cooling water surge tank low-low level signal, isolation valves for cooling loops composed of non-ASME Code Section III piping close automatically.	8. A test will be performed using a simulated component cooling water surge tank low-low level signal.	8. Upon the receipt of a component cooling water surge tank low-low level signal, the valves close.
9. Upon receipt of a Containment Spray Actuation Signal (CSAS), the containment spray heat exchanger isolation valve opens automatically.	9. A test will be performed using a simulated CSAS signal.	9. Upon receipt of a CSAS, the valve opens.
10. Motor-Operated Valves (MOVs) having an active safety function will open and/or close under differential pressure or fluid flow conditions and under temperature conditions.	10. Tests to open and/or close MOVs having an active safety function will be conducted under preoperational differential pressure or fluid flow conditions and under temperature conditions.	10. Each MOV having an active safety function opens and/or closes.
11. Check valves shown on Figure 2.7.6-2 will open and/or close under system pressure, fluid flow conditions, or temperature conditions.	11. Tests to open and/or close check valves shown on Figure 2.7.6-2 will be conducted under system preoperational pressure, fluid flow conditions, or temperature conditions.	11. Each check valve shown on Figure 2.7.6-2 opens and/or closes.
12. Valves with response positions indicated on Figure 2.7.6-1 change position to that indicated on the figure upon loss of motive power.	12. A test of loss of motive power to these valves will be performed.	12. These valves change position to the position indicated on Figure 2.7.6-1 on loss of motive power.

TABLE 2.7.6-2 (Continued)

COMPONENT COOLING WATER SYSTEM
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
13. The spool piece on the SSWS makeup line to each Division of the CCWS can be connected.	13. Installation of the spool piece will be performed.	13. The spool piece on the SSWS makeup line to each Division of the CCWS can be connected.
14. Pressure relief capacity provided for each reactor coolant pump is sized to accept the maximum expected in-leakage from a reactor coolant pump seal cooler tube rupture.	14. An analysis will be performed to confirm the pressure relief capacity provided for each reactor coolant pump.	14. Pressure relief capacity provided for each reactor coolant pump is sized to accept the maximum in-leakage from a reactor coolant pump seal cooler tube rupture.