ABB

December 8, 1994
LD-94-069

Docket No. 52-002

Attn: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: System 80+™ Design Control Document Design Change

Dear Sirs:

During the development of the Design Control Document, ABB-CE proposed a design change to remove the reactor coolant pump seal coolers. These coolers are shown as "Cooler No. 1" and "Cooler No. 2" on CESSAR-DC Figure 5.1.2-2. The high pressure cooler, also shown on that figure, remains as part of the design. Seal coolers No. 1 and 2 are being removed to simplify the design and it is noted that their removal decreases the probability of an intersystem LOCA.

Attached to this letter are the marked-up CESSAR-DC pages related to this design change. These markups have been discussed with NRC staff and it is our understanding that the staff concurs that the conclusions of the System 80+ Final Safety Evaluation Report remain valid.

If you have any questions, please call me or Mr. Stan Ritterbusch at (203) 285-5206.

Very truly yours,

COMBUSTION ENGINEERING, INC.

S. E. Ritterbusch for

C. B. Brinkman
Director
Nuclear Systems Licensing

CBB/ser
cc: S. Magruder (NRC)
P. Lang (DOE)

Combustion Engineering, Inc. P.O. Box 500 1000 Prospect Hill Rd. Windsor, CT 06095 Telephone (203) 688-1911 Fax (203) 285-5203

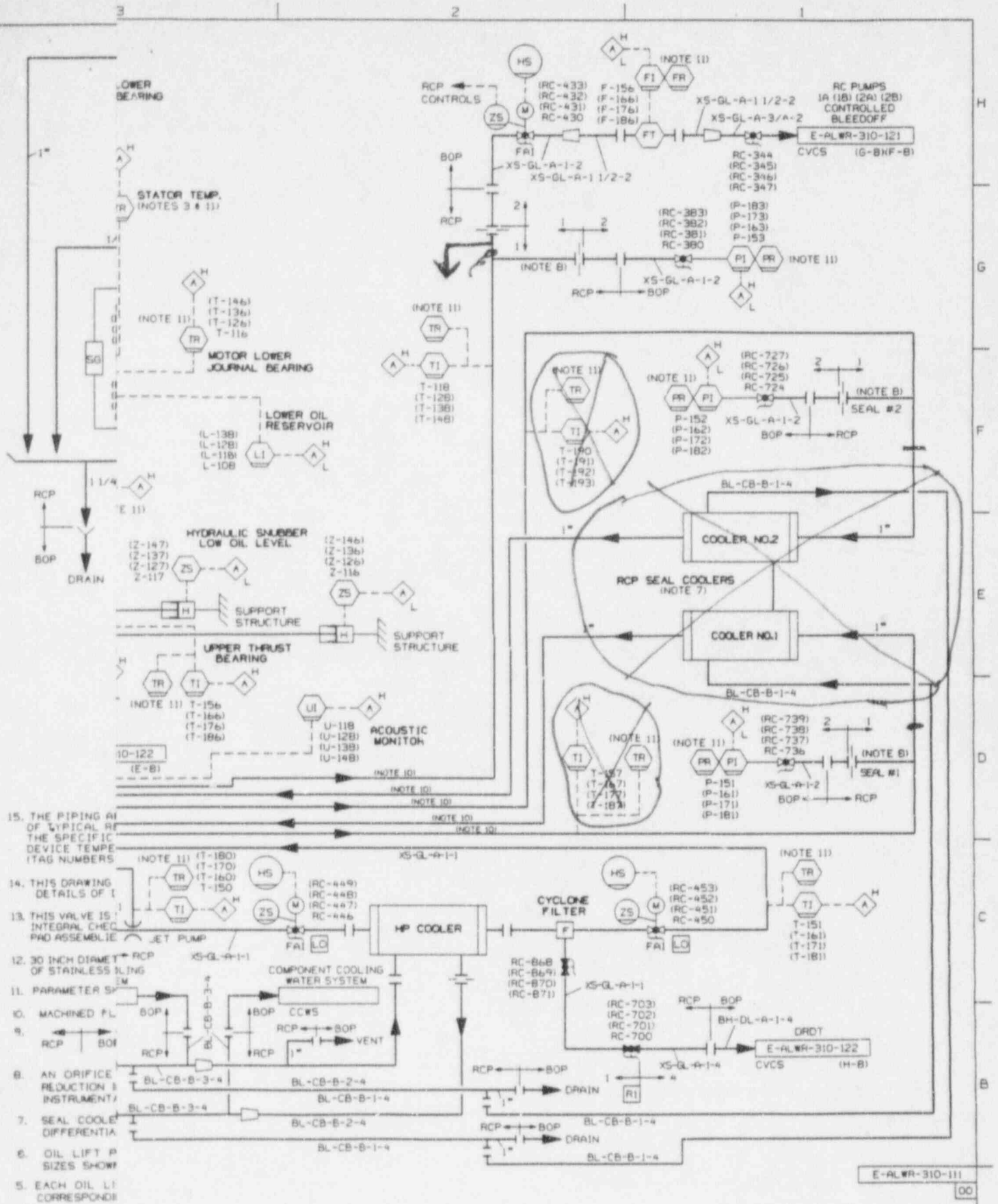
D032
1/1

TABLE 3.2-2

(Sheet 2 of 29)

SAFETY CLASS 1, 2 & 3 VALVES

Component Identification	Location/ Description	Safety Class	Seismic Category	Quality Class
RC-712, 713, 714, 715	RCP vent	2	I	1
RC-446, 447, 448, 449, 450, 451, 452, 453	RCP HP cooler	1	I	1
RC-868, 869, 870, 871, 700, 701, 702, 703	RCP filter drain	1	I	1
RC-724, 725, 726, 727, 736, 737, 738, 739	RCP seal cooler pressure	2	I	1
RC-430, 431, 432, 433, 344, 345, 346, 347	RCP controlled bleedoff	2	I	1
RC-380, 381, 382, 383	RCP vapor seal pressure indicator	2	I	1
Main Steam & Feedwater System (MS&FW) (1)				
SG-105, 106, 107, 108	ADV block valve	2	I	1
SG-130, 135, 172, 175	Downcomer isolation	2	I	1
SG-132, 137, 174, 177	Economizer isolation	2	I	1
SG-140, 141, 150, 151	Main steam isolation	2	I	1
SG-168, 182	Main steam isolation valve bypass valve	2	I	1
SG-169, 183	Main steam isolation valve bypass valve	2	I	1
SG-178, 179, 184, 185	Atmospheric dump valve	2	I	1
SG-552, 553	SG test connection	2	I	1
SG-554, 555, 556, 557, 558, 559, 560, 561, 572, 573, 574, 575, 576, 577, 578, 579, 691, 692, 694, 695	Main steam safety valve	2	I	1
SG-567, 598, 599, 612, 650, 651	Economizer check valve	2	I	1
SG-586, 587, 605, 609	Downcomer drain valve	2	I	1
SG-603, 611, 661, 665	SG purge connection	2	I	1
SG-608, 644	Economizer drain valve	2	I	1



Amendment I
December 21, 1990

80+™

REACTOR COOLANT PUMP
PIPING AND INSTRUMENTATION DIAGRAM

Figure
5.1.2-2

drains system collects miscellaneous leaks, spills, and equipment drainage, and routes them to a separate floor drain sump.

Relief valves are provided on the component cooling water lines of each heat exchanger that is cooled by component cooling water. These relief valves are sized to provide protection against increased pressure due to thermal effects while portions of the system are isolated or to relieve the maximum credible leakage from higher pressure sources. The discharge of these relief devices is routed to a suitable location so that personnel and other nuclear safety related equipment are adequately protected. ASME III Class 3 requires a minimum size of 3/4 inch for these thermal relief valves.

Pressure relief is provided for each reactor coolant pump to protect against the potential overpressurization of the CCWS due to a reactor coolant pump high pressure seal cooler ~~or throttle seal cooler~~ tube rupture. The pressure relief is sized to accept the maximum expected in-leakage from a reactor coolant pump high pressure seal cooler ~~or throttle seal cooler~~ tube rupture. The pressure relief discharge is directed to the containment floor drain sump which is within the holdup volume.

Electric motor operated valves are located on the component cooling water supply and return lines to each reactor coolant pump. These valves can be used to isolate the in-leakage due to a reactor coolant pump high pressure seal cooler ~~or throttle seal cooler~~ tube rupture.

In case of a major leak in one of the CCWS divisions, the affected division is removed from service and the other division is utilized.

Water quality design parameters applicable to the CCWS are given in Table 9.2.2-1.

9.2.2.2.1 Component Descriptions

Table 9.2.2-4 contains the component design parameters for the major components. Each component is described in the following subsections. The active valves are described in Section 9.2.2.2.1.9 and listed in Table 9.2.2-5.

9.2.2.2.1.1 Component Cooling Water Heat Exchangers

The CCW heat exchangers are designed to meet specific site conditions. A horizontal shell and tube heat exchanger is discussed in the following sections, however a plate type heat exchanger may be substituted. Sites selecting the plate type heat exchanger shall provide strainer protection against debris or arrangements which allow backflushing on the service water side.

B. Shutdown cooling mini-flow heat exchangers (2 total, 1 per division).

C. Safety injection pump motor coolers (4 total, 2 per division).

D. Containment spray heat exchangers (2 total, 1 per division).

E. Shutdown cooling pump motor coolers (2 total, 1 per division).

F. Containment spray pump motor coolers (2 total, 1 per division).

G. Containment spray mini-flow heat exchangers (2 total, 1 per division).

H. Component cooling water pump motor coolers (4 total, 2 per division).

I. Spent fuel pool cooling pump motor coolers (2 total, 1 per division).

J. Motor driven emergency feedwater pump motor coolers (2 total, 1 per division).

K. Diesel generator engine jacket water cooler (2 total, 1 per division).

L. Essential chilled water condensers (2 total, 1 per division).

M. Spent fuel pool cooling heat exchangers (2 total, 1 per division).

The non-essential components are divided between the two divisions of the CCWS. The split was based upon (1) creating similar flow and heat load requirements between the two divisions and (2) component locations. These components are listed below:

A. Reactor coolant pump (RCP) motor air coolers (4 total, 2 per division).

B. RCP motor oil coolers (4 total, 2 per division). (Note: Each set of RCP motor oil coolers contains one upper and one lower bearing oil cooler).

C. RCP oil coolers (4 total, 2 per division)

D. RCP seal coolers (8 total, 4 per division).

E. RCP high pressure coolers (4 total, 2 per division).

14. Gas stripper outlet header temperature.

15. Diesel generator engine jacket water cooler 1 and 2 outlet temperatures.

16. Diesel generator engine starting aftercoolers 1A, 1B, 2A, and 2B outlet temperatures.

17. Component cooling water pump motor coolers 1A, 1B, 2A and 2B outlet temperatures.

18. Essential chilled water condensers 1 and 2 outlet temperatures.

B. Control Room Indication

Control room indication is provided for component cooling water heat exchangers 1A, 1B, 2A, and 2B inlet and outlet temperatures.

C. Test Points

Temperature test points are provided for the following process temperature parameters:

1. CCW heat exchangers 1A, 1B, 2A, and 2B inlet and outlet temperatures.

2. Sample heat exchanger outlet header temperatures.

3. Reactor coolant pump coolers inlet header temperature.

4. Reactor coolant pumps 1A, 1B, 2A, and 2B high pressure cooler outlet temperatures.

5. Reactor coolant pumps 1A, 1B, 2A, and 2B seal cooler outlet header temperatures.

6. Reactor coolant pumps 1A, 1B, 2A, and 2B oil cooler outlet temperatures.

7. Reactor coolant pumps 1A, 1B, 2A, and 2B motor lower bearing oil cooler outlet temperatures.

8. Reactor coolant pumps 1A, 1B, 2A, and 2B motor air cooler outlet temperatures.

9. Reactor coolant pumps 1A, 1B, 2A, and 2B motor upper bearing oil cooler outlet temperatures.

10. Charging pump mini-flow heat exchangers 1 and 2 outlet temperatures.

4. Safety injection pump motor coolers 1, 2, 3, and 4 outlet flows.

5. Containment spray pump motor coolers 1 and 2 outlet flows.

6. Letdown heat exchanger outlet flow.

7. Gas stripper outlet flow.

8. Boric acid concentrator outlet flow.

9. Reactor coolant pumps 1A, 1B, 2A, and 2B high pressure coolers outlet flows.

10. Reactor coolant pumps 1A, 1B, 2A, and 2B seal coolers outlet header flows.

11. Reactor coolant pumps 1A, 1B, 2A, and 2B oil coolers outlet flows.

12. Reactor coolant pumps 1A, 1B, 2A, and 2B motor lower bearing oil coolers outlet flows.

13. Reactor coolant pumps 1A, 1B, 2A, and 2B motor air coolers outlet flows.

14. Reactor coolant pumps 1A, 1B, 2A, and 2B motor upper bearing oil coolers outlet flows.

15. Emergency feedwater pump motor coolers 1 and 2 outlet flows.

16. Containment spray heat exchangers 1 and 2 outlet flows.

17. Spent fuel pool cooling pump motor coolers 1 and 2 outlet flows.

18. Containment spray mini-flow heat exchangers 1 and 2 outlet flows.

19. Shutdown cooling mini-flow heat exchangers 1 and 2 outlet flows.

20. Component cooling water radiation monitors 1 and 2 inlet flows.

21. Sample heat exchangers (each) outlet flows.

22. Diesel generator engine jacket water cooler 1 and 2 outlet flows.

2. Shutdown cooling heat exchangers 1 and 2 low and high outlet flows.

3. Shutdown cooling pump motor coolers 1 and 2 low outlet flows.

4. Safety injection pump motor coolers 1, 2, 3, and 4 low outlet flows.

5. Containment spray pump motor coolers 1 and 2 low outlet flows.

6. Reactor coolant pumps 1A, 1B, 2A, and 2B high pressure coolers low outlet flows.

7. Reactor coolant pumps 1A, 1B, 2A, and 2B seal coolers low outlet header flows.

8. Reactor coolant pumps 1A, 1B, 2A, and 2B oil coolers low outlet flows.

9. Reactor coolant pumps 1A, 1B, 2A, and 2B motor lower bearing oil coolers low outlet flows.

10. Reactor coolant pumps 1A, 1B, 2A, and 2B motor air coolers low outlet flows.

11. Reactor coolant pumps 1A, 1B, 2A, and 2B motor upper bearing oil coolers low outlet flows.

12. Emergency feedwater pump motor coolers 1 and 2 low outlet flows.

13. Containment spray heat exchangers 1 and 2 low outlet flows.

14. Spent fuel pool cooling pump motor coolers 1 and 2 low outlet flows.

15. Diesel generator engine jacket water cooler 1 and 2 low outlet flows.

16. Diesel generator engine starting air aftercoolers 1A, 1B, 2A, and 2B low outlet flows.

17. Component cooling water pump motor coolers 1A, 1B, 2A, and 2B low outlet flows.

18. Essential chilled water condensers 1 and 2 low outlet flows.

19. Charging pump motor coolers 1 and 2 low outlet flows.

TABLE 9.2.2-3 (Cont'd)

(Sheet 2 of 16)

TYPICAL COMPONENT COOLING WATER SYTEM HEAT LOADS AND FLOW REQUIREMENTS

NORMAL OPERATION

Component	Number With Heat Load		Total Heat Load	Number Receiving Flow		Total Flow
	Div. 1	Div. 2	(E+06 Btu/hr)	Div. 1	Div. 2	(gpm)
Essential Chilled Water Condensers	0	0	0	1	1	1620
RCP Motor Air Coolers	2	2	6.44	2	2	1200
RCP Motor Oil Coolers**	2	2	0.612	2	2	192
RCP Oil Coolers	2	2	1.8	2	2	281.6
RCP Seal Coolers*	2	2	0.128	2	2	70.4
RCP High Pressure Coolers	2	2	0.748	2	2	300
Letdown Heat Exchanger	0	1	22.7	0	1	1500
Charging Pump Motor Coolers	1	0	0.577	1	1	140
Charging Pump Mini-Flow Heat Exchangers	1	0	1.98	1	1	800
Primary Sample Heat Exchangers	0	8	4.08	0	8	240
Steam Generator Primary Sample Heat Exchangers	0	6	3.24	0	6	120
Gas Stripper	0	1	17.6	0	1	700

TABLE 9.2.2-3 (Cont'd)

(Sheet 3 of 16)

TYPICAL COMPONENT COOLING WATER SYTEM HEAT LOADS AND FLOW REQUIREMENTS

NORMAL OPERATION

Component	Number With Heat Load		Total Heat Load	Number Receiving Flow		Total Flow
	Div. 1	Div. 2	(E + 06 Btu/hr)	Div. 1	Div. 2	(gpm)
Boric Acid Concentrator	0	1	14	0	1	700
Normal Chilled Water Condensers	1	1	24	2	2	12000
Instrument Air Compressor Oil Coolers, Intercoolers, Jacket Coolers, and Aftercoolers	1	1	0.585	2	2	200

30.0745
78.9175

TOTAL HEAT LOAD PER DIVISION 1 = 30.1385 E + 06 Btu/hr
TOTAL HEAT LOAD PER DIVISION 2 = 78.9815 E + 06 Btu/hr

TOTAL FLOW PER DIVISION 1 = 15159 gpm
TOTAL FLOW PER DIVISION 2 = 13419 gpm

15123.8
13383.8

TABLE 9.2.2-3 (Cont'd)

(Sheet 5 of 16)

TYPICAL COMPONENT COOLING WATER SYTEM HEAT LOADS AND FLOW REQUIREMENTS

SHUTDOWN COOLING (INITIAL)

Component	Number With Heat Load		Total Heat Load	Number Receiving Flow		Total Flow
	Div. 1	Div. 2	(E+06 Btu/hr)	Div. 1	Div. 2	(gpm)
Essential Chilled Water Condensers	0	0	0	1	1	1620
RCP Motor Air Coolers	1	1	3.22	2	2	1200
RCP Motor Oil Coolers**	1	1	0.306	2	2	192
RCP Oil Coolers	1	1	0.9	2	2	281.6
RCP Seal Coolers*	1	1	0.064	2	2	70.4
RCP High Pressure Coolers	1	1	0.374	2	2	300
Letdown Heat Exch. ger	0	1	12	0	1	990
Charging Pump Motor Coolers	1	0	0.577	1	1	140
Charging Pump Mini-Flow Heat Exchangers	1	0	1.98	1	1	800
Primary Sample Heat Exchangers	0	8	4.08	0	8	240
Steam Generator Primary Sample Heat Exchangers	0	6	3.24	0	6	120
Gas Stripper	0	1	17.6	0	1	700

TABLE 9.2.2-3 (Cont'd)

(Sheet 6 of 16)

TYPICAL COMPONENT COOLING WATER SYTEM HEAT LOADS AND FLOW REQUIREMENTS

SHUTDOWN COOLING (INITIAL)

Component	Number With Heat Load		Total Heat Load	Number Receiving Flow		Total Flow
	Div. 1	Div. 2	(E+06 Btu/hr)	Div. 1	Div. 2	(gpm)
Boric Acid Concentrator	0	1	14	0	1	700
Normal Chilled Water Condensers	1	1	24	2	2	12000
Instrument Air Compressor Oil Coolers, Intercoolers, Jacket Coolers, and Aftercoolers	1	1	0.585	2	2	200

149.5305
197.9135

TOTAL HEAT LOAD PER DIVISION 1 = 149.5825 E+06 Btu/hr
TOTAL HEAT LOAD PER DIVISION 2 = 197.9455 E+06 Btu/hr

TOTAL FLOW PER DIVISION 1 = 23159 gpm
TOTAL FLOW PER DIVISION 2 = 25909 gpm

23128.8
25878.8

Amendment R
July 30, 1

TABLE 9.2.2-3 (Cont'd)

(Sheet 8 of 16)

TYPICAL COMPONENT COOLING WATER SYTEM HEAT LOADS AND FLOW REQUIREMENTS

SHUTDOWN COOLING (FINAL)

Component	Number With Heat Load		Total Heat Load	Number Receiving Flow		Total Flow
	Div. 1	Div. 2	(E+06 Btu/hr)	Div. 1	Div. 2	(gpm)
Essential Chilled Water Condensers	0	0	0	1	1	1620
RCP Motor Air Coolers	0	0	0	2	2	1200
RCP Motor Oil Coolers**	0	0	0	2	2	192
RCP Oil Coolers	0	0	0	2	2	281.6
RCP Seal Coolers*	0	0	0	2	2	70.4
RCP High Pressure Coolers	0	0	0	2	2	300
Letdown Heat Exchanger	0	1	0.51	0	1	35
Charging Pump Motor Coolers	1	0	0.577	1	1	140
Charging Pump Mini-Flow Heat Exchangers	1	0	1.98	1	1	800
Primary Sample Heat Exchangers	0	8	4.08	0	8	240
Steam Generator Primary Sample Heat Exchangers	0	6	3.24	0	6	120
Gas Stripper	0	0	0	0	1	700

TABLE 9.2.2-3 (Cont'd)

(Sheet 9 of 16)

TYPICAL COMPONENT COOLING WATER SYTEM HEAT LOADS AND FLOW REQUIREMENTS

SHUTDOWN COOLING (FINAL)

Component	Number With Heat Load		Total Heat Load	Number Receiving Flow		Total Flow
	Div. 1	Div. 2	(E + 06 Btu/hr)	Div. 1	Div. 2	(gpm)
Boric Acid Concentrator	0	1	14	0	1	700
Normal Chilled Water Condensers	1	1	24	2	2	12000
Instrument Air Compressor Oil Coolers, Intercoolers, Jacket Coolers, and Aftercoolers	1	1	0.585	2	2	200

TOTAL HEAT LOAD PER DIVISION 1 = 56.2705 E+06 Btu/hr
TOTAL HEAT LOAD PER DIVISION 2 = 65.3235 E+06 Btu/hr

TOTAL FLOW PER DIVISION 1 = 28159 gpm
TOTAL FLOW PER DIVISION 2 = 24954 gpm

28123.8
24918.8

TABLE 9.2.2-3 (Cont'd)

(Sheet 11 of 16)

TYPICAL COMPONENT COOLING WATER SYTEM HEAT LOADS AND FLOW REQUIREMENTS

REFUELING OPERATIONS

Component	Number With Heat Load		Total Heat Load	Number Receiving Flow		Total Flow
	Div. 1	Div. 2	(E+06 Btu/hr)	Div. 1	Div. 2	(gpm)
Essential Chilled Water Condensers	0	0	0	1	1	1620
RCP Motor Air Coolers*	0	0	0	2	2	1200
RCP Motor Oil Coolers**	0	0	0	2	2	192
RCP Oil Coolers	0	0	0	2	2	281.6
RCP Seal Coolers*	0	0	0	2	2	70.4
RC High Pressure Coolers	0	0	0	2	2	300
Letdown Heat Exchanger	0	0	0	0	0	0
Charging Pump Motor Coolers	0	0	0	1	1	140
Charging Pump Mini-Flow Heat Exchangers	0	0	0	1	1	800
Primary Sample Heat Exchangers	0	0	0	0	8	240
Steam Generator Primary Sample Heat Exchangers	0	0	0	0	6	120
Gas Stripper	0	1	17.6	0	1	700

Amendment J
April 30, 1992

TABLE 9.2.2-3 (Cont'd)

(Sheet 12 of 16)

TYPICAL COMPONENT COOLING WATER SYTEM HEAT LOADS AND FLOW REQUIREMENTS

REFUELING OPERATIONS

Component	Number With Heat Load		Total Heat Load	Number Receiving Flow		Total Flow
	Div. 1	Div. 2	(E+06 Btu/hr)	Div. 1	Div. 2	(gpm)
Boric Acid Concentrator	0	1	14	0	1	700
Normal Chilled Water Condensers	1	1	24	2	2	12000
Instrument Air Compressor Oil Coolers, Intercoolers, Jacket Coolers, and Aftercoolers	1	1	0.585	2	2	200

TOTAL HEAT LOAD PER DIVISION 1 = 53.7085 E+06 Btu/hr
TOTAL HEAT LOAD PER DIVISION 2 = 85.3085 E+06 Btu/hr

28123.8

TOTAL FLOW PER DIVISION 1 = (28159) gpm
TOTAL FLOW PER DIVISION 2 = (29919) gpm

24883.8

TABLE 9.2.2-3 (Cont'd)

(Sheet 14 of 16)

TYPICAL COMPONENT COOLING WATER SYTEM HEAT LOADS AND FLOW REQUIREMENTS

DESIGN BASIS ACCIDENT

Component	Number With Heat Load		Total Heat Load	Number Receiving Flow		Total Flow
	Div. 1	Div. 2	(E+06 Btu/hr)	Div. 1	Div. 2	(gpm)
Essential Chilled Water Condensers	1	1	6.48	1	1	1620
RCP Motor Air Coolers	0	0	0	2	2	1200
RCP Motor Oil Coolers	0	0	0	2	2	192
RCP Oil Coolers	0	0	0	2	2	281.6
RCP Seal Coolers*	0	0	0	2	2	70.4
RCP High Pressure Coolers	0	0	0	2	2	300
Letdown Heat Exchanger	0	0	0	0	0	0
Charging Pump Motor Coolers	1	0	0.577	1	1	140
Charging Pump Mini-Flow Heat Exchangers	1	0	1.98	1	1	800
Primary Sample Heat Exchangers	0	0	0	0	0	0
Steam Generator Primary Sample Heat Exchangers	0	0	0	0	0	0
Gas Stripper	0	0	0	0	0	0

TABLE 9.2.2-3 (Cont'd)

(Sheet 15 of 16)

TYPICAL COMPONENT COOLING WATER SYTEM HEAT LOADS AND FLOW REQUIREMENTS

DESIGN BASIS ACCIDENT

Component	Number With Heat Load		Total Heat Load	Number Receiving Flow		Total Flow
	Div. 1	Div. 2	(E+06 Btu/hr)	Div. 1	Div. 2	(gpm)
Boric Acid Concentrator	0	0	0	0	0	0
Normal Chilled Water Condensers	0	0	0	0	0	0
Instrument Air Compressor Oil Coolers, Intercoolers, Jacket Coolers, and Aftercoolers	1	1	0.585	2	2	200

TOTAL HEAT LOAD PER DIVISION 1 = 134.2427 E+06 Btu/hr
TOTAL HEAT LOAD PER DIVISION 2 = 131.6857 E+06 Btu/hr

TOTAL FLOW PER DIVISION 1 = 12159 gpm
TOTAL FLOW PER DIVISION 2 = 12159 gpm

12123.8
12123.8

Amendment

TABLE 9.2.2-3 (Cont'd)

(Sheet 16 of 16)

TYPICAL COMPONENT COOLING WATER SYSTEM HEAT LOADS AND FLOW REQUIREMENTS

NOTES:

* Four sets of two coolers per pump (two sets per division). Data list applies to the two cooler combination

** Each set contains one upper and one lower bearing oil cooler. Data applies to the two cooler combination

*** The listed heat load for the spent fuel pool cooling heat exchangers does not give consideration to a single active failure. Under this condition, the heat load on a single spent fuel pool cooling heat exchanger would be 19.19×10^6 Btu/hr. Likewise, a single active failure coincident with a full core offload would result in a heat load of 67.25×10^6 Btu/hr on a single spent fuel pool cooling heat exchanger.

– This heat load must be carried by each division

Fig 9.2.2-1
Sheet 5

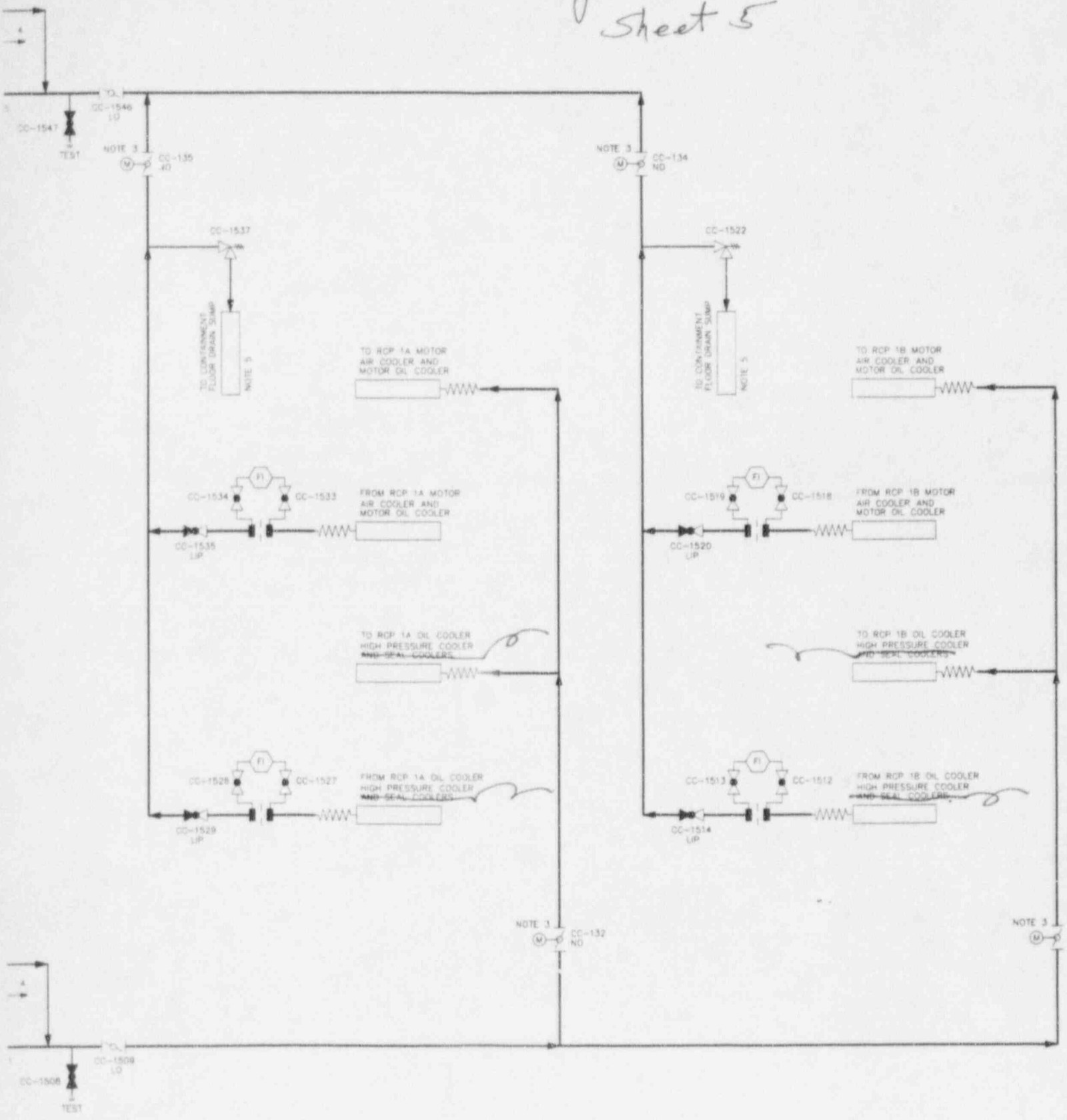
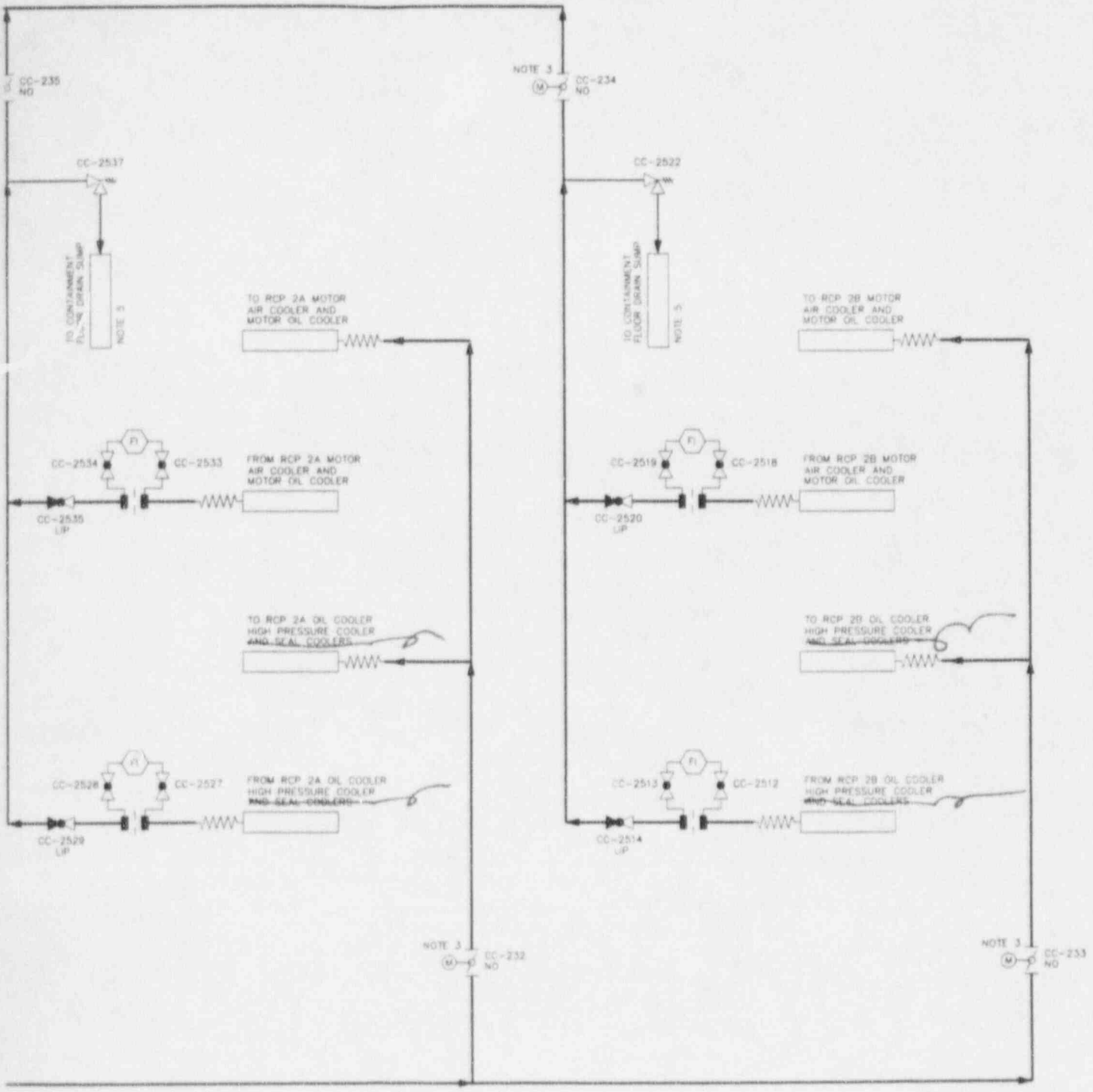


Fig. 9.2.2-1
Sheet 11



NOTES

1. FOR GE DRAW F400-
2. THE BY ABOVE WITH T THE H BYPAS
3. OPEN/ FROM
4. AUTOM LOW-L LEVEL CLOSE
5. LINE SI ROUTE PROTE

TABLE 13B-2

(Sheet 2 of 5)

SYSTEM 80+™ VITAL EQUIPMENT LIST - REACTOR COOLANT PUMP

EQUIPMENT NUMBER / IDENTIFIER	SAFETY CLASS / CLASS 1E	SEISMIC CATEGORY	STRUCTURE / SEIS. CAT. / EL.	ELECTRICAL [4] POWER SOURCE	NOTES
RCP 1A Seal Injection Cyclone Filter Manual Drain Valves, RC-700/868	1	I	RB / I / -	N/A	Inside Containment
RCP 1B Seal Injection Cyclone Filter Manual Drain Valves, RC-701/869	1	I	RB / I / -	N/A	Inside Containment
RCP 2B Seal Injection Cyclone Filter Manual Drain Valves, RC-702/870	1	I	RB / I / -	N/A	Inside Containment
RCP 2A Seal Injection Cyclone Filter Manual Drain Valves, RC-703/871	1	I	RB / I / -	N/A	Inside Containment
RCP 1A Seal Injection HP Cooler Outlet MOV, RC-450	1	I	RB / I / -	N/A	Inside Containment, Locked Open [3]
RCP 1B Seal Injection HP Cooler Outlet MOV, RC-451	1	I	RB / I / -	N/A	Inside Containment, Locked Open [3]
RCP 2A Seal Injection HP Cooler Outlet MOV, RC-452	1	I	RB / I / -	N/A	Inside Containment, Locked Open [3]
RCP 2B Seal Injection HP Cooler Outlet MOV, RC-453	1	I	RB / I / -	N/A	Inside Containment, Locked Open [3]
RCP 1A Seal #1 Outlet Pressure Instrument, P-151	2	I	RB / I / -	N/A	Inside Containment
RCP 1B Seal #1 Outlet Pressure Instrument, P-161	2	I	RB / I / -	N/A	Inside Containment
RCP 2A Seal #1 Outlet Pressure Instrument, P-171	2	I	RB / I / -	N/A	Inside Containment
RCP 2B Seal #1 Outlet Pressure Instrument, P-181	2	I	RB / I / -	N/A	Inside Containment
RCP 1A Seal Cooler #1	1	I	RB / I / -	N/A	Inside Containment
RCP 1B Seal Cooler #1	1	I	RB / I / -	N/A	Inside Containment
RCP 2A Seal Cooler #1	1	I	RB / I / -	N/A	Inside Containment
RCP 2B Seal Cooler #1	1	I	RB / I / -	N/A	Inside Containment

TABLE 13B-2

(Sheet 3 of 5)

SYSTEM 80+™ VITAL EQUIPMENT LIST - REACTOR COOLANT PUMP

EQUIPMENT NUMBER / IDENTIFIER	SAFETY CLASS / CLASS 1E	SEISMIC CATEGORY	STRUCTURE / SEIS. CAT. / EL.	ELECTRICAL [4] POWER SOURCE	NOTES
RCP 1A Seal #2 Outlet Pressure Instrument, P-724	2	I	RB / I / -	N/A	Inside Containment
RCP 1B Seal #2 Outlet Pressure Instrument, P-725	2	I	RB / I / -	N/A	Inside Containment
RCP 2A Seal #2 Outlet Pressure Instrument, P-726	2	I	RB / I / -	N/A	Inside Containment
RCP 2B Seal #2 Outlet Pressure Instrument, P-727	2	I	RB / I / -	N/A	Inside Containment
RCP 1A Seal Cooler #2	1	I	RB / I / -	N/A	Inside Containment
RCP 1B Seal Cooler #2	1	I	RB / I / -	N/A	Inside Containment
RCP 2A Seal Cooler #2	1	I	RB / I / -	N/A	Inside Containment
RCP 2B Seal Cooler #2	1	I	RB / I / -	N/A	Inside Containment
RCP 1A Seal #3 Outlet Pressure Instrument, P-153	2	I	RB / I / -	N/A	Inside Containment
RCP 1B Seal #3 Outlet Pressure Instrument, P-163	2	I	RB / I / -	N/A	Inside Containment
RCP 2A Seal #3 Outlet Pressure Instrument, P-173	2	I	RB / I / -	N/A	Inside Containment
RCP 2B Seal #3 Outlet Pressure Instrument, P-183	2	I	RB / I / -	N/A	Inside Containment
RCP 1A Seal Injection Return MOV, RC-430	2	I	RB / I / -	N/A	Inside Containment
RCP 1B Seal Injection Return MOV, RC-431	2	I	RB / I / -	N/A	Inside Containment
RCP 2A Seal Injection Return MOV, RC-432	2	I	RB / I / -	N/A	Inside Containment
RCP 2B Seal Injection Return MOV, RC-433	2	I	RB / I / -	N/A	Inside Containment

h. Letdown Backup Isolation Valve (CH-516) (Open, Closed Position)

8. Historical and trend data on RCS functional group parameters.

18.7.3.2.1.4 Reactor Coolant Pump (RCP) Functional Group Indication

The indication for the RCPs is divided into two groups:

A. DIAS Displays

Four discrete indicators are provided, one for each RCP. Figure 18.7.3-20 illustrates discrete indicators for RCP 1A and RCP 1B, with typical analog page displayed. Each indicator has twenty four parameters related to its associated RCP. Since none of these are considered to be key plant process parameters, continuous display is not required. Due to the large number of sensors on this single indicator, the parameters are divided into four functional groups: seal, cooling system, pump/motor and oil system. These functional groups allow better operator access via a menu system.

The four groups and the parameters indicated in each group are defined below. The four instrument tag numbers following each parameter description are associated with RCP 1A, 1B, 2A and 2B, respectively.

1. Seal

Figure 18.7.3-21 illustrates the seal menu page for RCP 1A (other RCP seal menus are similar).

a. Seal #1 Outlet Pressure (P-151, 161, 171, 181)

b. Seal #2 Outlet Pressure (P-152, 162, 172, 182)

c. Seal #3 Outlet Pressure (P-153, 163, 173, 183)

d. Seal #1 Outlet Temperature (T-157, 167, 177, 187)

e. Seal #2 Outlet Temperature (T-190, 191, 192, 193)

f. Seal #3 Outlet Temperature (T-118, 128, 138, 148)

Delete

d. "Pzr Water Temp Validation Fault", Priority 2

e. "Pzr Pressure Validation Fault", Priority 2

f. "RCP D/P Validation Fault", Priority 2

10. "RCS Loop Temperature Deviation"

Alarm messages under this alarm tile include:

a. "T_c Cold Leg 1A/1B Temp Deviation", Priority 2

b. "T_c Cold Leg 2A/2B Temp Deviation", Priority 2

c. "T_c Loop 1/2 Temp Deviation", Priority 2

d. "T_h Loop 1/2 Temp Deviation", Priority 2

18.7.3.2.3.2 RCP Functional Group Alarms

Alarms were selected for the RCP functional group by the process indicated earlier in Section 18.7.3.2. The alarms are organized into functional subgroups consistent with the menus on RCP discrete indicators (Section 18.7.3.2.1.4). They are provided in the following lists for Priority 1 and Priority 2 alarms, respectively:

Four Alarm Tiles exist for each RCP (16 alarm windows):

1. "RCP (1A, 1B, 2A and 2B) Seal"

Alarm messages under this Alarm Tile include:

a. RCP_Seals #2 and #3 Outlet Press Hi, Priority 1

b. RCP_Seal #2 Outlet Press High, Priority 2

c. RCP_Seal #3 Outlet Press High, Priority 2

d. RCP_Seal #1 Outlet Press Low, Priority 2

e. RCP_Controlled Bleedoff Flow High, Priority 1

f. RCP_Seal #1 Outlet Temp High, Priority 1

g. RCP_Seal #2 Outlet Temp High, Priority 1

h. RCP_Seal #3 Outlet Temp High, Priority 1

RCP 1A SEAL/COOLING

PERFORMANCE

CURRENT	400
PUMP D/P VALID	65
110	65
111	65
ROTATION	NORMAL

SEAL SYSTEM

SEAL NO.	INLET PRESS	OUTLET TEMP
3	505	142
2	1305	142
1	2235	142

RC-380 FLOW 2.0

CH-241 FLOW 7.0 TEMP 125

ESSENTIAL COOLING WATER

FLOW	501
OUTLET TEMP	130

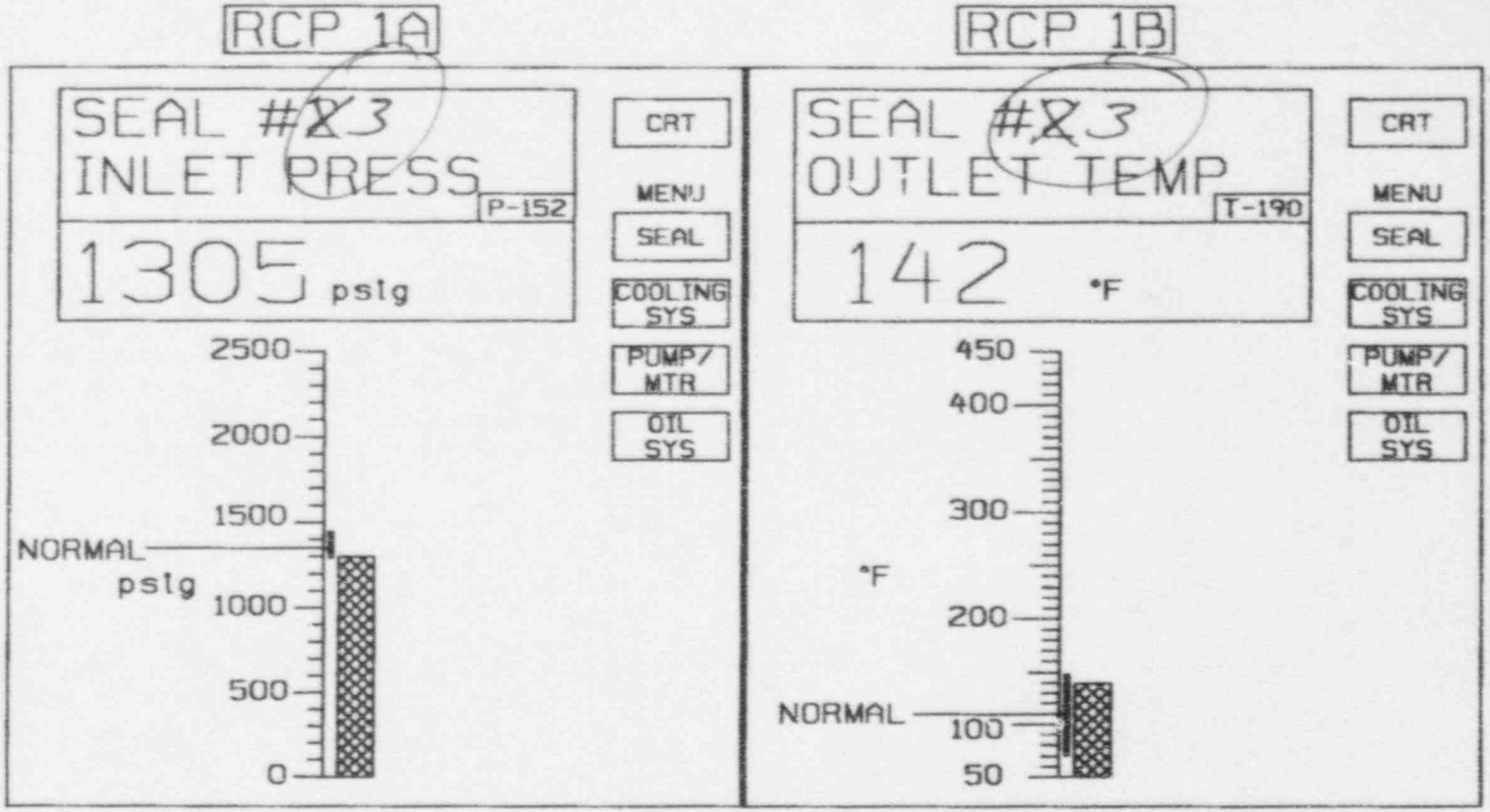
HP COOLER

RCP 1A — T 130 — RC-446 — RC-450 — T 100 — RCP 1A

ECW

OPER SEL | CLR

LAST PAGE | CFM | PRI | SEC | PWR | ELE | AUX | OTHR

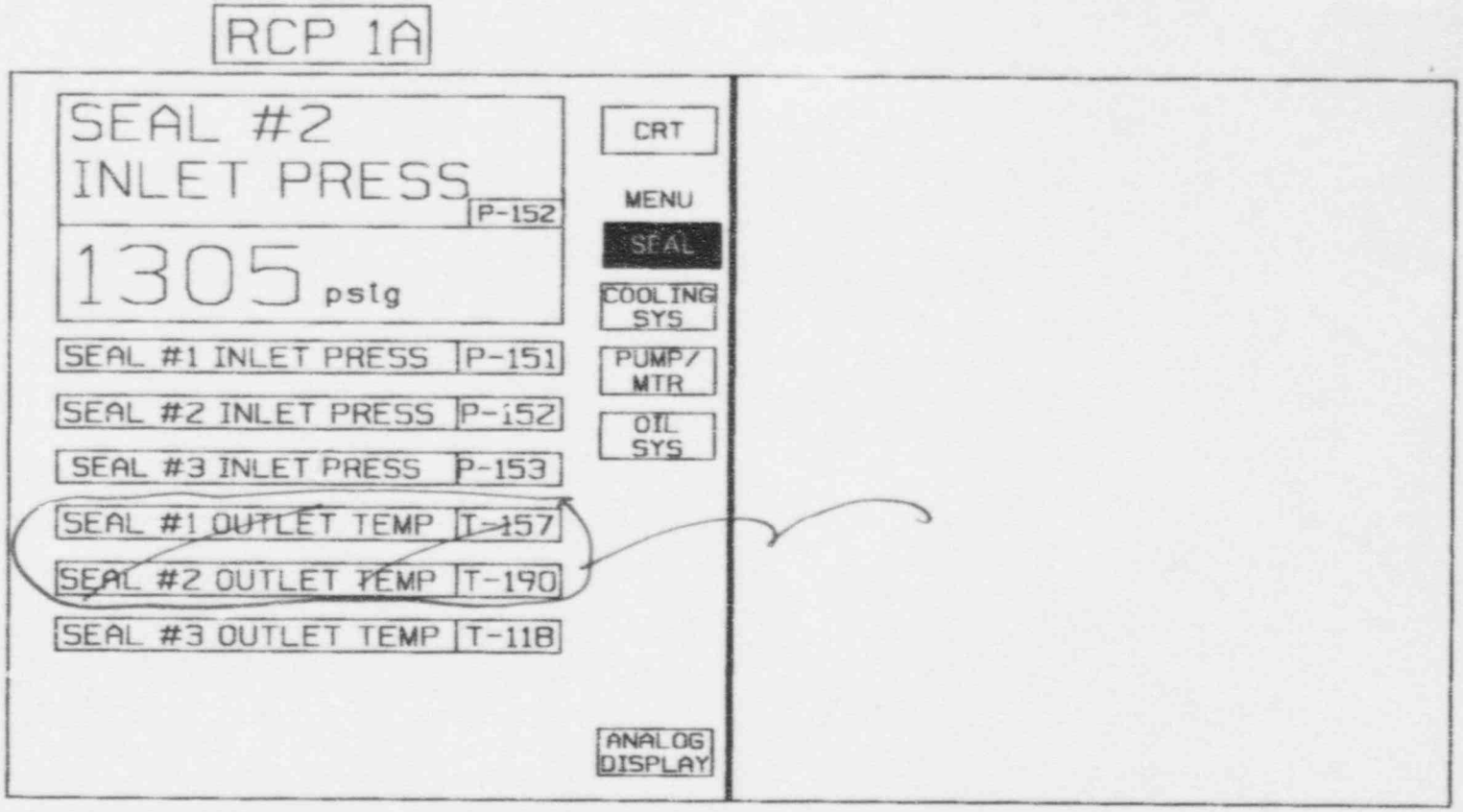


NPS-PANELFRONTS (SHT4)

RCPS 1A AND 1B TYPICAL ANALOG DISPLAY

Figure 18.7.3-20

Amendment E
December 30, 1988



NPS-PANELFRONTS (SHT7)

System 80+™

RCP 1A SEAL SYSTEM MENU PAGE

Figure 18.7.3-21

Amendment E
December 30, 1988