HITACHI

GE Hitachi Nuclear Energy

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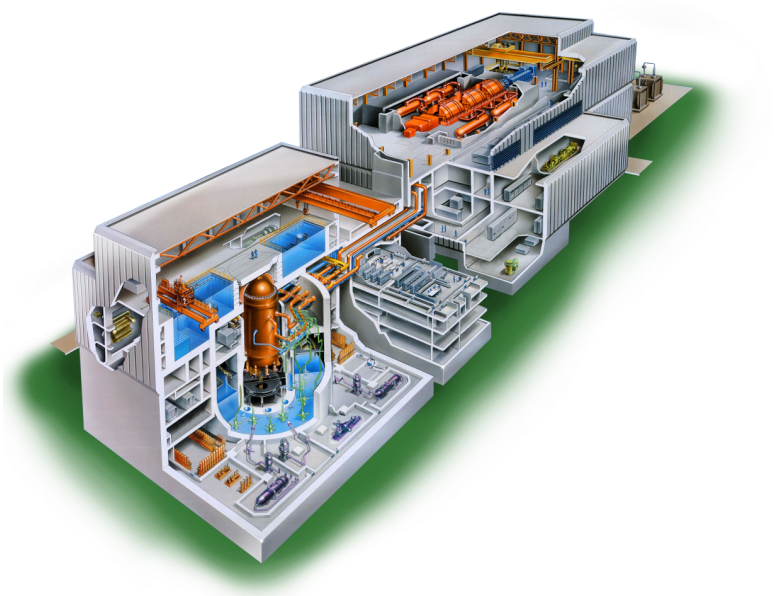
ABWR
Design Control Document
Tier 2



Chapter 21

Volume 7

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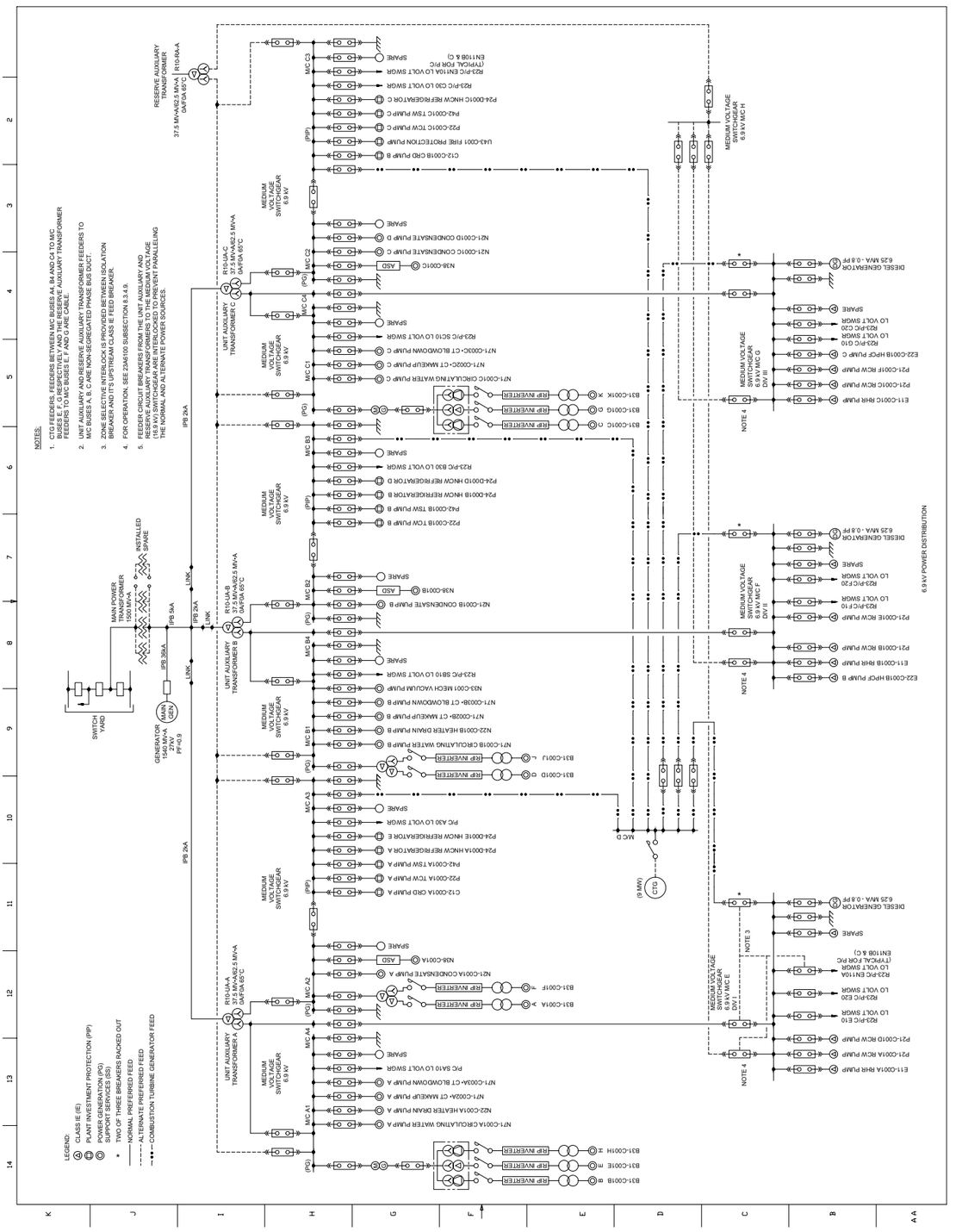


Figure 8.3-1 Electrical Power Distribution System SLD (Sheet 1 of 3)

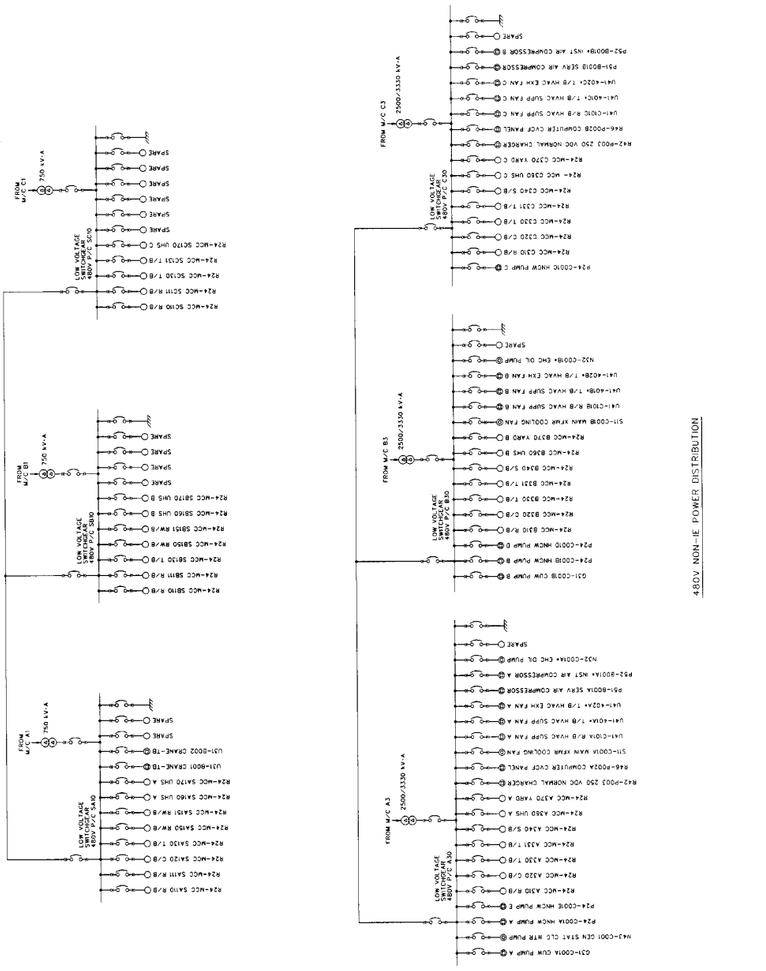


Figure 8.3-1 Electrical Power Distribution System SLD (Sheet 2 of 3)

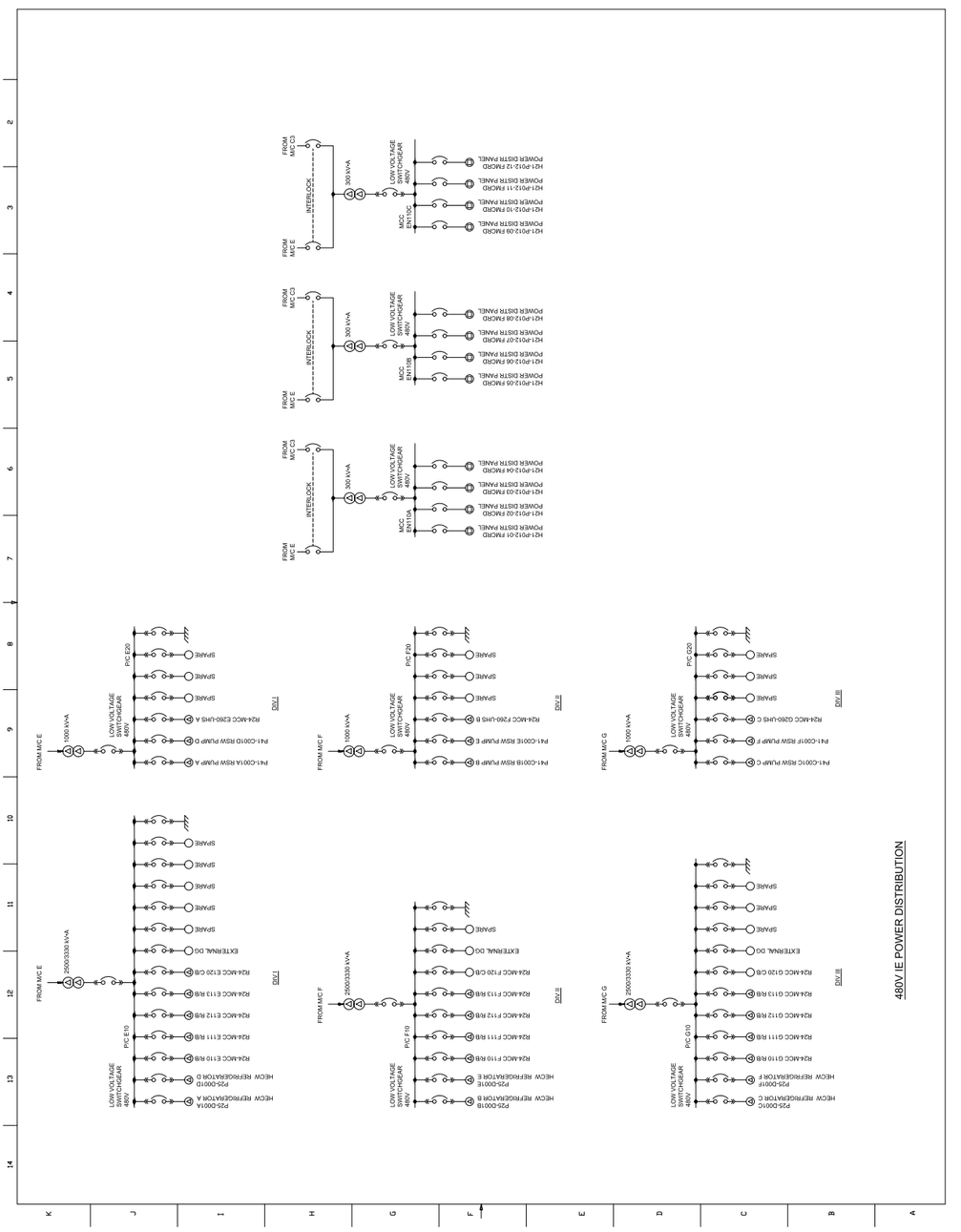


Figure 8.3-1 Electrical Power Distribution System SLD (Sheet 3 of 3)

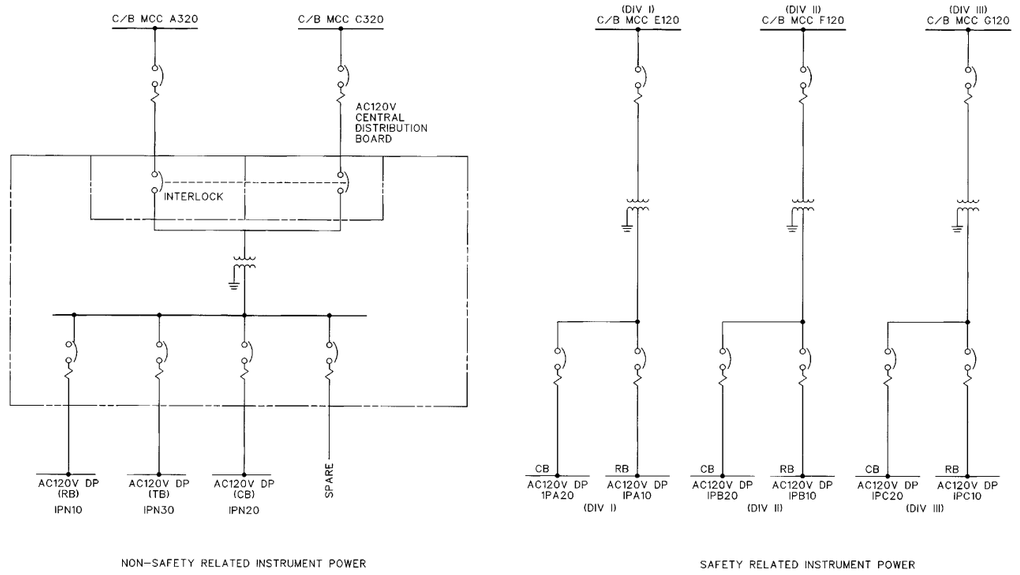


Figure 8.3-2 Instrument and Control Power Supply System SLD

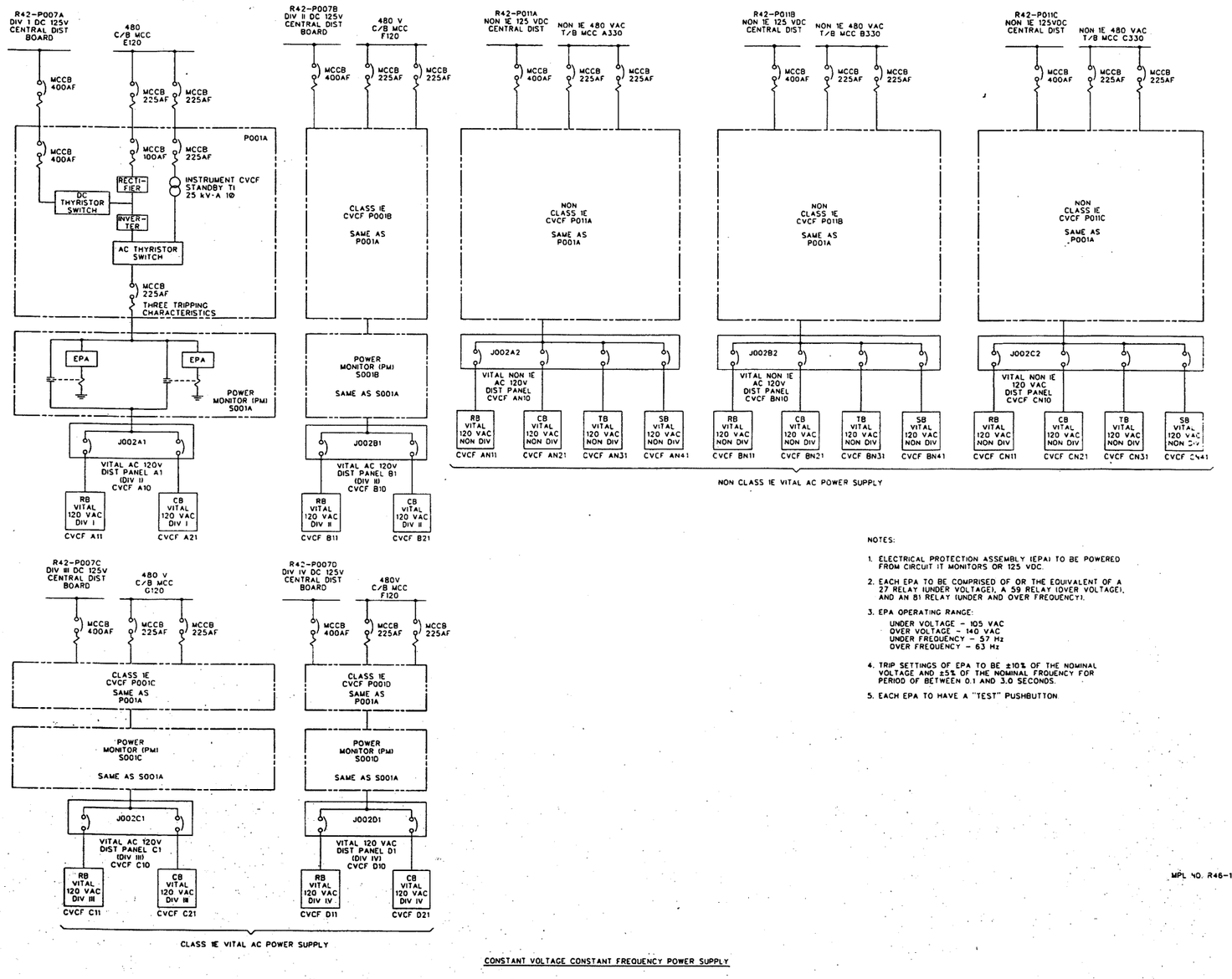
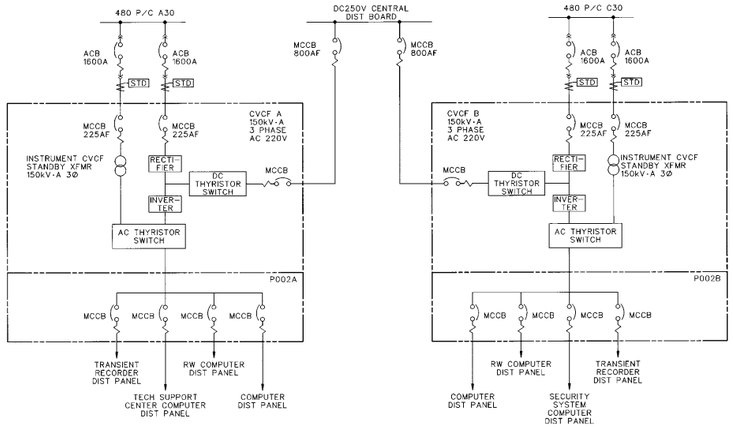
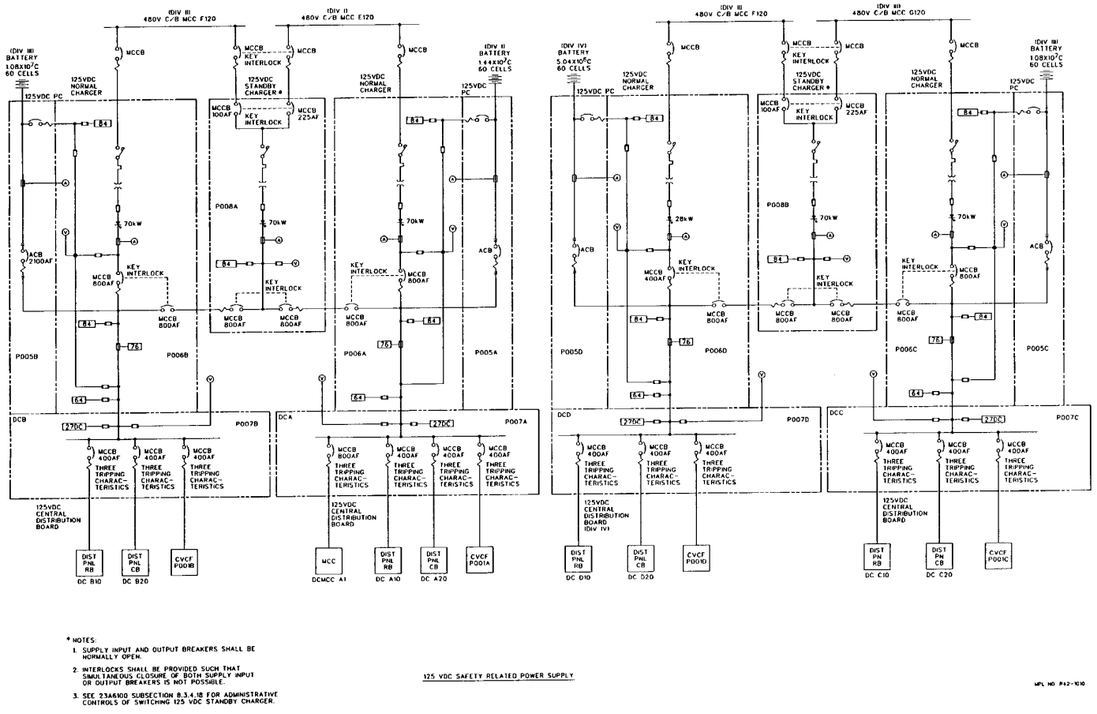


Figure 8.3-3 Plant Vital AC Power Supply System SLD (Sheet 1 of 2)



COMPUTER VITAL AC POWER SUPPLY

Figure 8.3-3 Plant Vital AC Power Supply System SLD (Sheet 2 of 2)



* NOTES:
1. SUPPLY INPUT AND OUTPUT BREAKERS SHALL BE NORMALLY OPEN.
2. INTERLOCKS SHALL BE PROVIDED SUCH THAT SIMULTANEOUS CLOSURE OF BOTH SUPPLY INPUT OR OUTPUT BREAKERS IS NOT POSSIBLE.
3. SEE 23A6100 SUBSECTION 8.3.4.1B FOR ADMINISTRATIVE CONTROLS OF SWITCHING 125 VDC STANDBY CHARGER.

125 VDC SAFETY RELATED POWER SUPPLY

MPL NO. P42-X010

Figure 8.3-4 Plant DC Power Supply System SLD (Sheet 1 of 3)

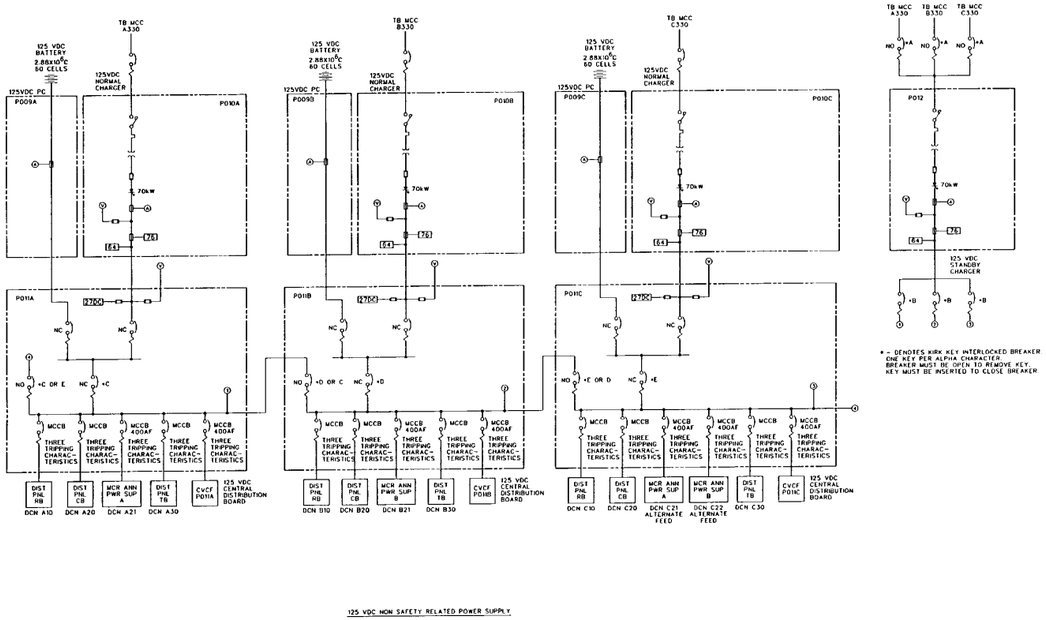


Figure 8.3-4 Plant DC Power Supply System SLD (Sheet 2 of 3)

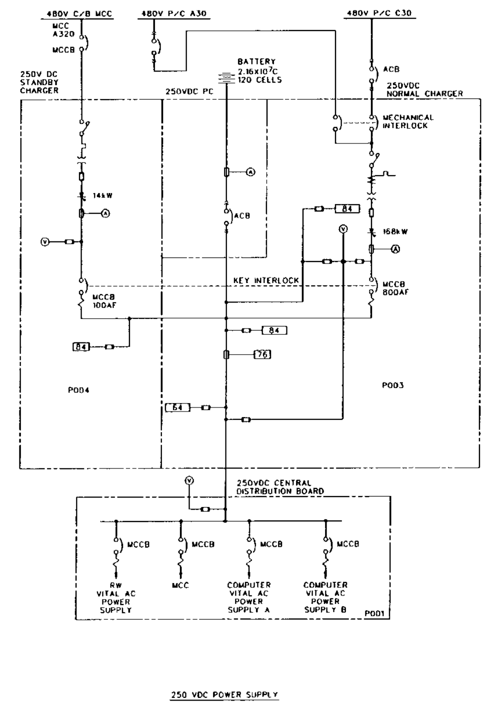


Figure 8.3-4 Plant DC Power Supply System SLD (Sheet 3 of 3)

NOTES:

1. ALL EQUIPMENT AND INSTRUMENTS ARE PREFIXED BY G41 UNLESS OTHERWISE NOTED.
2. VENT AND DRAIN VALVES ARE REQUIRED AT ALL HIGH OR LOW POINTS IN PIPING NOT SERVED BY EQUIPMENT HAVING VENTS AND DRAINS.
3. SYSTEM DESIGN SPECIFICATION; DESIGN CLASS 4D vs 4.

   (A) UNLESS OTHERWISE NOTED.

ITEM		APPLICATION
MAXIMUM OPERATING PRESS MPa G		1.57
MAXIMUM OPERATING TEMP °C		66
NORMAL OPERATING TEMP °C		52
SEISMIC CATAGORY		B(S1,S2)
PROCESS FLUID		W
PIPING MATERIAL		CS(SS)
PIPING THICKNESS	50A AND SMALLER	SCH 80
	80A AND LARGER	SCH 40
DESIGN CLASS	QUALITY CLASS	4D

   (B) APPLY STANDARD PIPING DIAGRAMS SHOWN IN STANDARD DESIGN SPECIFICATION FOR SMALL PIPING AND INSTRUMENTATION FOR VENTS, DRAINS AND INSTRUMENTS. ALSO, APPLY PIPE SCHEDULES AND INSULATION THICKNESS SPECIFIED.

4. VALVE INDICATION AND ALARMS SHALL BE INSTALLED IN THE MAIN CONTROL ROOM UNLESS OTHERWISE NOTED.
5. TWO SETS OF VALVES MARKED . . AND. . . ARE SHOWN, EACH VALVE SHOULD BE LOCATED CLOSE TO OTHER VALVES IN IT'S SET TO MORE EASILY PROVIDE COORDINATED MANUAL OPERATION.
6. PIPING MATERIAL, UNLESS OTHERWISE NOTED SHOULD BE CS, BUT PIPING BURIED IN CONCRETE SHOULD BE SS.
7. WATER LEVEL INDICATOR LI620 SHOULD BE INSTALLED NEAR THE OPERATING SWITCH OF VALVE F038.
8. TEMPERATURE ELEMENT TE002 INPUT TO RECORDER TRS605 IS THE ONLY ONE ALARMED.
9. AFTER SYSTEM CHECK, PX005A AND B SHOULD BE REMOVED.
10. PIPING BURIED IN CONCRETE IS SHOWN BY ////////// SYMBOL.
11. FC (OR FO) INDICATES VALVES FAIL CLOSED OR FAIL OPEN ON LOSS OF AIR PRESSURE TO VALVE OPERATOR OR LOSS OF ELECTRONIC POWER TO AIR CONTROLLING SOLENOID VALVES.
12. ALL AIR OPERATED VALVES TO HAVE OPEN-CLOSED INDICATING LIGHTS OPERATED FROM VALVE CONTROL SWITCH ON VALVE STEMS. ALL AIR OPERATED VALVES SHALL HAVE LIMIT SWITCHES.
13. NO VALVES OR INSTRUMENTS ARE TO BE LOCATED IN THE SHIELDED COMPARTMENT CONTAINING THE FILTER/DEMINERALIZER.
14. A COMMON TROUBLE ALARM FROM LOCAL ANNUNCIATORS SHALL ALARM IN THE MAIN CONTROL ROOM.
15. VALVE F028 IS LOCK CLOSED AND IS NOT OPENED UNLESS SPENT FUEL STORAGE POOL GATE IS IN CLOSED POSITION.
16. PIPE WITH A DESIGN PRESSURE OF 2.82 MPa G OR GREATER SHALL HAVE ITS MINIMUM WALL THICKNESS NO LESS THAN THAT OF A STANDARD WEIGHT PIPE, THICKER THAN STANDARD WEIGHT PIPE SHALL BE USED IF REQUIRED BY THE DESIGN PRESSURE OR OTHER REQUIREMENTS.
17. VALVES WITH A DESIGN PRESSURE OF 2.82 MPa G OR GREATER SHALL BE A MINIMUM OF CLASS 300 OR OF A HIGHER CLASS IF REQUIRED BY THE DESIGN PRESSURE.
18. SPENT FUEL POOL WATER LEVEL SIGNALS LEVEL 1 (LOWEST), LEVEL 2 (MIDDLE) AND LEVEL 3 (NEAR NORMAL) ALARMS IN MCR AND ALTERNATE LOCATION.

REFERENCE DOCUMENTS

		MPL NO.
1.	PIPING AND INSTRUMENT SYMBOLS DIAGRAM	A10-3030
2.	FUEL POOL COOLING & CLEANUP SYS PFD	G41-1020
3.	FUEL POOL COOLING & CLEANUP SYSTEM IBD	G41-1030
4.	RHR SYSTEM P&ID	E11-1010
5.	RADWASTE SYSTEM P&ID	K17-1010
6.	MAKEUP WATER SYSTEM (CONDENSATE)	P13-1010
7.	REAC BLDG COOLING WATER SYS P&ID	P21-1010
8.	SAMPLING SYSTEM P&ID	P91-1010
9.	HVAC SYSTEM P&ID	U41-1010
10.	SUPPRESSION POOL CLEANUP SYS P&ID	G51-1010
11.	NUCLEAR BOILER SYSTEM P&ID	B21-1010
12.	INSTRUMENT AIR SYSTEM P&ID	P52-1010
13.	REACTOR WATER CLEANUP SYS P&ID	G31-1010
14.	STANDBY GAS TREATMENT SYSTEM	T22-1010

LEGEND

SWH - STATIC WATER HEAD

ATM - ATMOSPHERIC PRESSURE

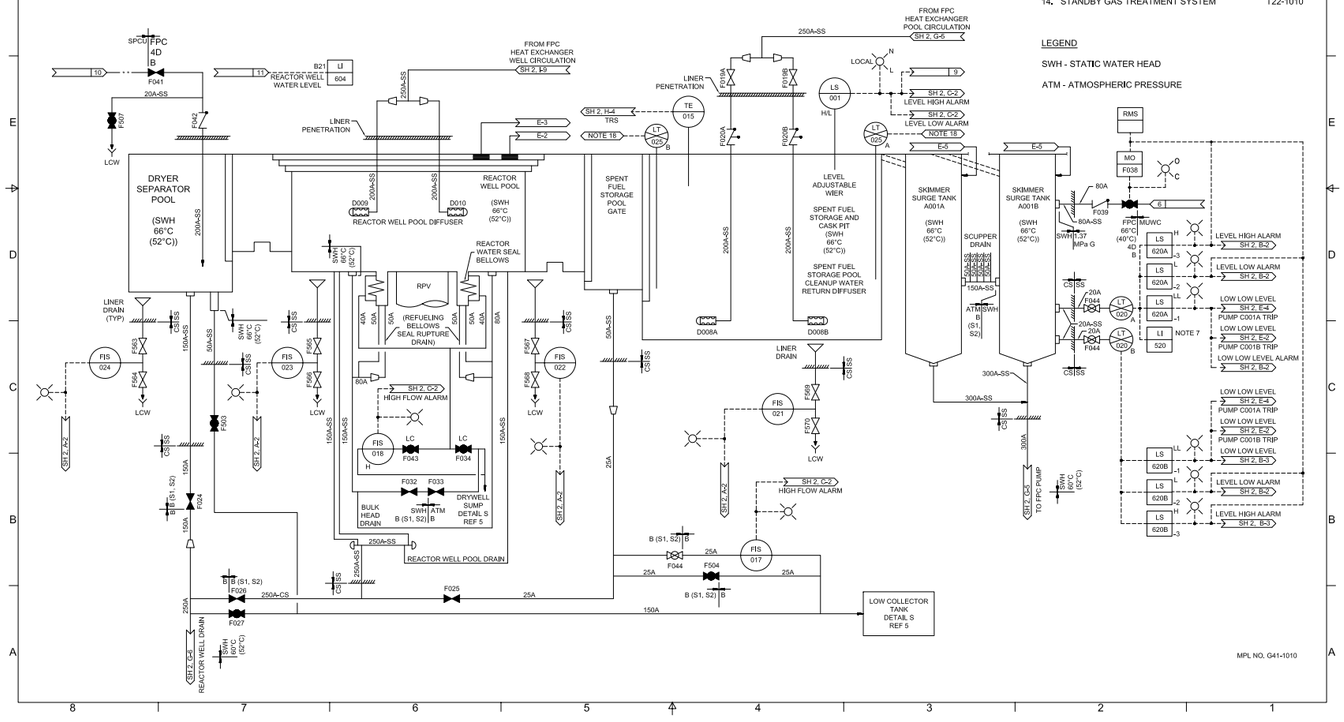


Figure 9.1-1 Fuel Pool Cooling and Cleanup System P&ID (Sheet 1 of 3)

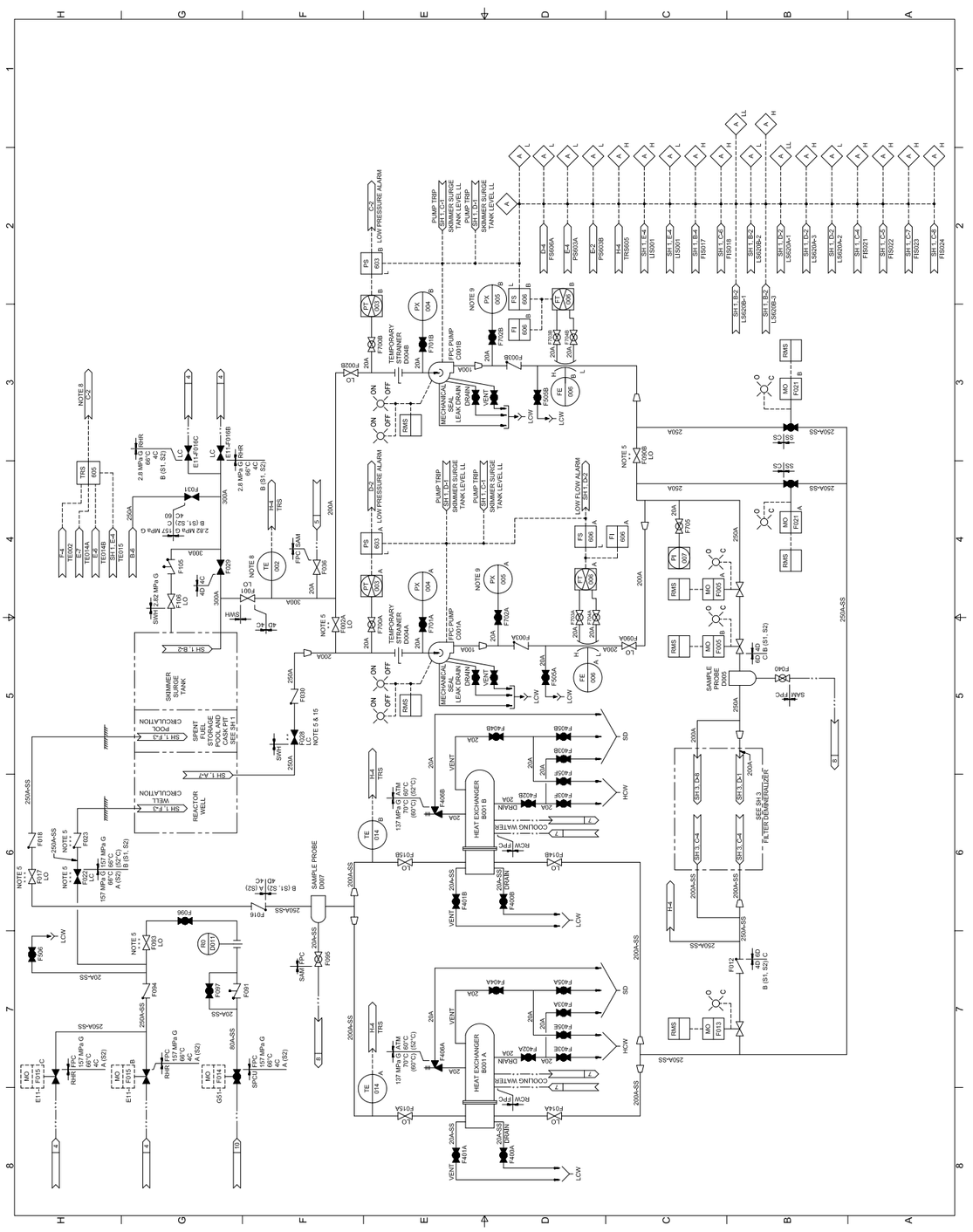


Figure 9.1-1 Fuel Pool Cooling and Cleanup System P&ID (Sheet 2 of 3)

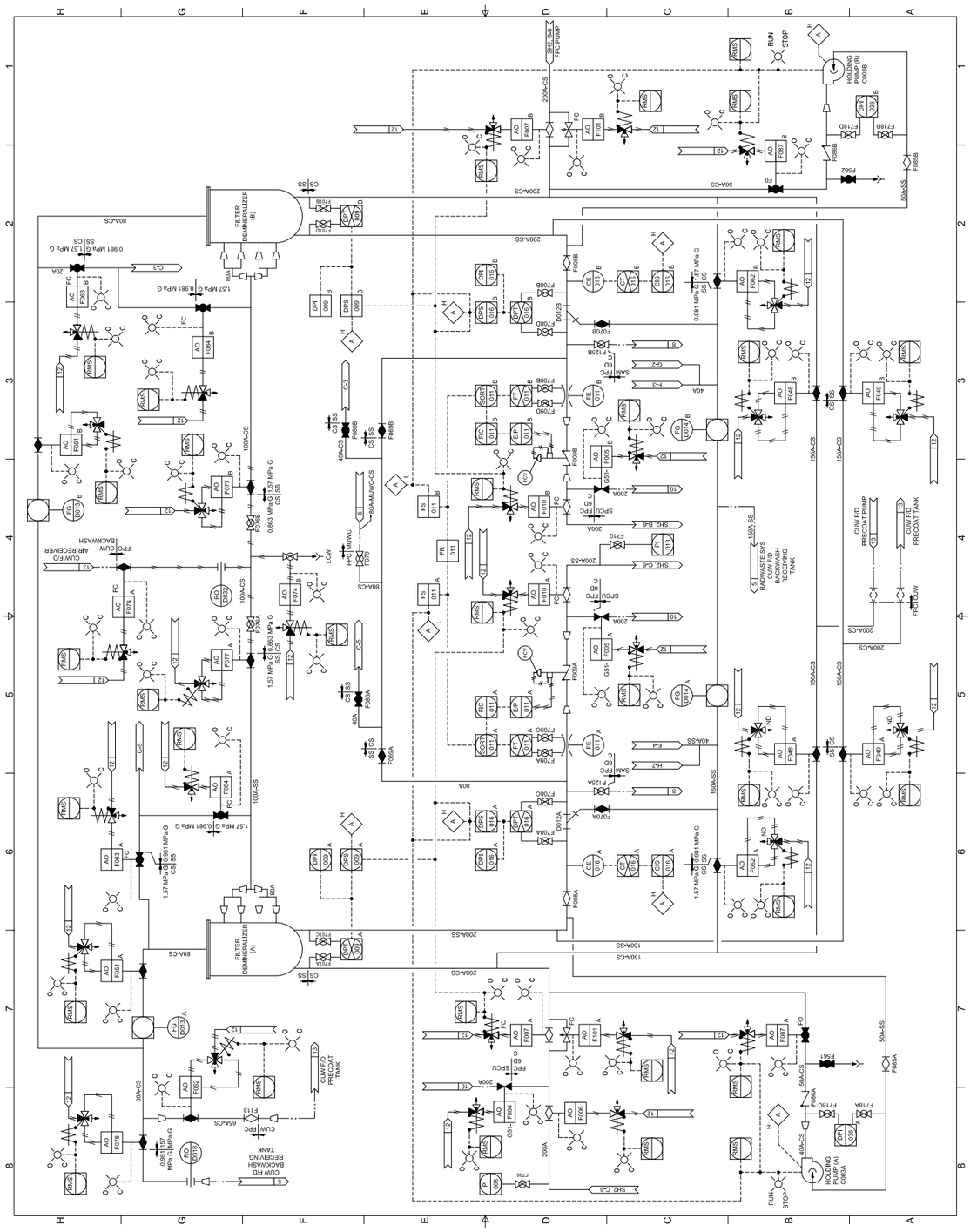
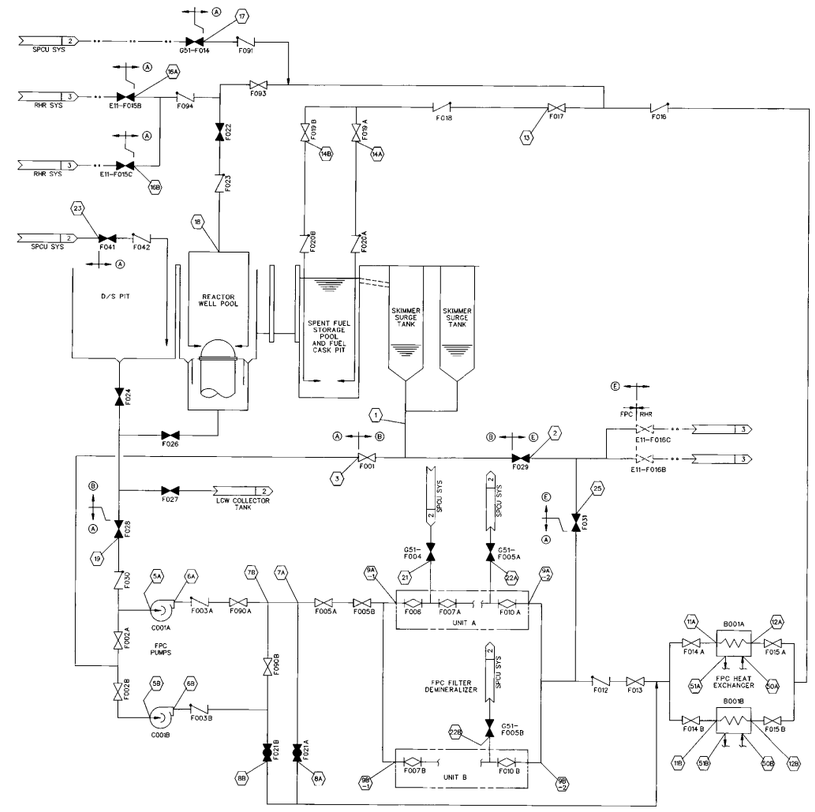


Figure 9.1-1 Fuel Pool Cooling and Cleanup System P&ID (Sheet 3 of 3)



MODE A FPC SYSTEM FLOW DIAGRAM

BOUNDARY CONDITION		(A)	(B)	(C)	(D)	(E)
DESIGN PRESSURE	(MPa G)	1.57	STATIC WATER HEAD	3.43	2.82	2.82
DESIGN TEMPERATURE	(°C)	66	66	66	66	66

NOTES:

1. [a] TABLE VALUES NOT AVAILABLE UNTIL DETAILED DESIGN IS COMPLETE.
2. EXCHANGED HEAT LOADS FOR MODES A AND B APPLY TO SYSTEM HEAT EXCHANGERS AFTER REACTOR WELL/FUEL STORAGE POOL GATE IS IN CLOSED POSITION.
3. IN MODE B, RHR OPERATES IN PARALLEL WITH FPC SYSTEM.
4. MODE D, REFUELING OPERATION WATER TO FILL REACTOR WELL DISCHARGES THROUGH DIFFUSERS AND WALL SPARGER OR EXPOSED WALL WETTING METHOD.
5. DURING MODES E-1, E-2, E-3 AND G, SPENT FUEL STORAGE POOL TEMPERATURE MAY EXCEED 52°C FOR SHORT PERIOD.
6. 5 $\frac{A}{B}$ MEANS 5A AND 5B, EACH AT VALUE SHOWN.

   5A(B) MEANS 5A OR 5B AT VALUE SHOWN BUT NOT CONCURRENTLY.
7. MODE C, FAILURE OF A OR B TRAIN IS POSTULATED.
8. DRAIN OPERATING MODES:

   MODE E-1, TWO FPC PUMPS ARE OPERATING TO DRAIN D/S PIT AND REACTOR WELL DISCHARGING THE WATER FOR TREATMENT BY F/D A AND F/D B BEFORE RELEASE INTO THE SUPPRESSION POOL THROUGH THE SPCU SYSTEM PIPING.

   MODE E-2, ONE FPC PUMP IS OPERATING TO DRAIN REACTOR WELL AND DISCHARGE THE WATER FOR TREATMENT IN ONE F/D BEFORE RELEASE INTO THE SUPPRESSION POOL THROUGH THE SPCU SYSTEM PIPING. THE SECOND FPC PUMP IS OPERATING TO REMOVE WATER FROM THE SPENT FUEL STORAGE POOL SKIMMER TANKS AND DISCHARGING THE WATER THROUGH THE FPC BYPASS PIPE INTO THE FPC HEAT EXCHANGERS TO COOL IT BEFORE RETURN TO THE SPENT FUEL STORAGE POOL DIFFUSERS.

   MODE E-3, TWO FPC PUMPS ARE OPERATING TO DRAIN THE D/S PIT AND REACTOR WELL AND DISCHARGE THE WATER FOR TREATMENT IN TWO F/D'S BEFORE RELEASE TO THE LOW COLLECTOR TANK OF RADWASTE SYSTEM THROUGH THE RHR SYSTEM.
9. IN MODE B, ONE RHR PUMP AND HEAT EXCHANGER IS OPERATED FOR BACKUP COOLING BECAUSE FPC SYSTEM ALONE CAN NOT COOL POOL SUFFICIENTLY.
10. IN MODE D, RHR SHUTDOWN COOLING RETURN WATER IS INJECTED THROUGH REACTOR WELL DIFFUSERS.
11. IN MODE F, 1 FPC PUMP (A) OR (B) IS OPERATED FOR FUEL POOL COOLING AND SPCU IS OPERATED FOR S/P CLEANUP THROUGH F/D (A).
12. IN MODE G, 1 FPC PUMP (A) OR (B) IS OPERATED FOR FUEL POOL COOLING AND S/P WATER IS SUPPLIED TO D/S PIT THROUGH F/D BY SPCU PUMP OPERATION.
13. VALVES F014A, F014B, F027 AND G41-F014 ARE NOT SHOWN IN THE MODE TABLES BECAUSE THEY DO NOT OPEN/CLOSE FOR ANY OPERATING MODE.
14. FLOWS SHOWN FOR MODE E-3 ARE TO BE FINALIZED AFTER DETAIL DESIGN IS COMPLETE.

REFERENCE DOCUMENTS	MPL NO.
1. FUEL POOL COOLING CLEANUP SYS P&ID	G41-1010
2. SUPPRESSION POOL CLEANUP SYSTEM P&ID	G51-1010
3. RESIDUAL HEAT REMOVAL SYSTEM P&ID	E11-1010
2. RADWASTE SYSTEM P&ID	K17-1010

MPL NO. G41-1020

Figure 9.1-2 Fuel Pool Cooling and Cleanup System PFD (Sheet 1 of 2)

MODE A: NORMAL HEAT LOAD OPERATING MODE

POSITION	1	3	5^{A}_{B}	6^{A}_{B}	7A	7B	9^{A-1}_{B-1}	9^{A-2}_{B-2}	11^{A}_{B}	12^{A}_{B}	13	14^{A}_{B}	50^{A}_{B}	51^{A}_{B}
FLOW (m^3/h)	500	500	250	250	500	500	250	250	250	250	500	250		
PRESS (MPa G)	*	*	*	*	*	*	*	*	*	*	*	*		
TEMP (°C)	52	←					→		52	45.4	45.4	45.4		
Max ALLOWABLE PRESS LOSS (m)			TDH = 80				ΔP = 41		ΔP = 7					

EXCHANGED HEAT/UNIT 6.9 X 10^{6} kJ/h (21 DAYS AFTER SHUTDOWN) NOTE 2

MODE B: MAXIMUM HEAT LOAD OPERATING MODE NOTE 9

POSITION	1	2	3	5^{A}_{B}	6^{A}_{B}	7A	7B	9^{A-1}_{B-1}	9^{A-2}_{B-2}	11^{A}_{B}	12^{A}_{B}	13	16	14^{A}_{B}	50^{A}_{B}	51^{A}_{B}
FLOW (m^3/h)	850	350	500	250	250	500	500	250	250	250	250	850	350	425		
PRESS (MPa G)	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
TEMP (°C)	60	←					→		60	53.4	51.5	48.9	51.5			

EXCHANGED HEAT/UNIT 30.14 X 10^{6} kJ/h (21 DAYS AFTER SHUTDOWN) NOTE 2
FPC Hx/UNIT 6.9 X 10^{6} kJ/h AND RHR Hx 16.32 X 10^{6} kJ/h

MODE C: COOLING MODE AFTER EARTHQUAKE (POSTULATED SINGLE FAILURE) NOTE 7

POSITION	1	3	5A	6A	7A	8A	11A	12A	13	14^{A}_{B}	50A	51A
FLOW (m^3/h)	250	250	250	250	250	250	250	250	250	125		
PRESS (MPa G)	*	*	*	*	*	*	*	*	*	*		
TEMP (°C)	62.7	←					→	62.7	51.9	51.9	51.9			

EXCHANGED HEAT 11.22 X 10^{6} kJ/h (45 DAYS AFTER SHUTDOWN)

MODE D: REFUELING OPERATING MODE NOTE 10

POSITION	1	3	5^{A}_{B}	6^{A}_{B}	7A	7B	9^{A-1}_{B-1}	9^{A-2}_{B-2}	11^{A}_{B}	12^{A}_{B}	13	50^{A}_{B}	51^{A}_{B}	16A(B)	18
FLOW (m^3/h)	500	500	250	250	500	500	250	250	250	250	500			954	954
PRESS (MPa G)	*	*	*	*	*	*	*	*	*	*	*			*	*
TEMP (°C)	Max 52	←						→	Max 52	Max 45.4	Max 45.4			Max 52	Max 52

MODE E1: DRAIN OPERATING MODE NOTES 5 & 8

POSITION	19	5^{A}_{B}	6^{A}_{B}	7A	7B	9^{A-1}_{B-1}	22 $^{A}_{B}$
FLOW (m^3/h)	500	250	250	500	500	250	250
PRESS (MPa G)	*	*	*	*	*	*	*
TEMP (°C)	Max 52	←				→	Max 52

MODE E2: DRAIN OPERATING MODE NOTES 5 & 8

POSITION	19	5A	6A	7A	7B	9A-1 (B-1)	22A(B)	1	3	4	5B	6B	8A	11^{A}_{B}	12^{A}_{B}	13	14^{A}_{B}	50^{A}_{B}	51^{A}_{B}
FLOW (m^3/h)	250	250	250	250	250	250	250	250	250	250	250	250	250	125	125	250	125		
PRESS (MPa G)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
TEMP (°C)	Max 52	←											→	Max 52	Max 42.2	Max 42.2	Max 42.2		

MODE E3: DRAIN OPERATING MODE NOTES 5, 8 & 14

POSITION	19	5^{A}_{B}	6^{A}_{B}	7A	7B	9^{A-1}_{B-1}	9^{A-2}_{B-2}	25
FLOW (m^3/h)	500	250	250	500	500	250	250	500
PRESS (MPa G)	*	*	*	*	*	*	*	*
TEMP (°C)	Max 52	←					→	Max 52

MODE F: SUPPRESSION POOL CLEANUP OPERATING MODE NOTE 11

POSITION	1	3	5A(B)	6A(B)	7A	7B	9B-1	9B-2	11^{A}_{B}	12^{A}_{B}	13	14^{A}_{B}	50^{A}_{B}	51^{A}_{B}	21	22A
FLOW (m^3/h)	250	250	250	250	250	250	250	250	125	125	250	125			250	250
PRESS (MPa G)	*	*	*	*	*	*	*	*	*	*	*	*			*	*
TEMP (°C)	53.7	←						→	53.7	42.9	42.9	42.9			Max 35	Max 35

EXCHANGED HEAT 11.22 X 10^{6} kJ/h (45 DAYS AFTER SHUTDOWN)

MODE G: D/S PIT AND REACTOR WELL FILL OPERATING MODE NOTES 5 & 12

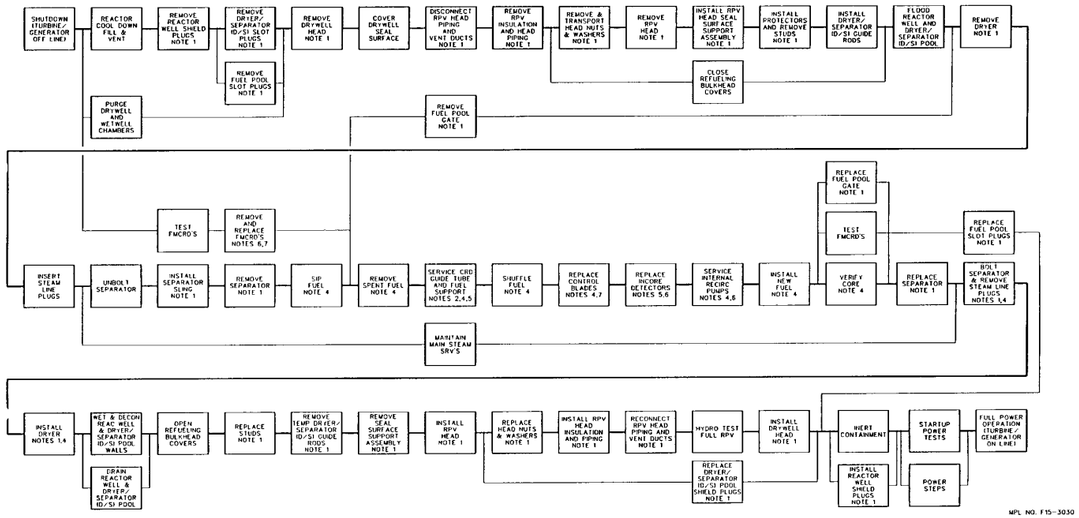
POSITION	1	3	5A(B)	6A(B)	7A	7B	9B-1	9B-2	11^{A}_{B}	12^{A}_{B}	13	14^{A}_{B}	50^{A}_{B}	51^{A}_{B}	21	22A	23
FLOW (m^3/h)	250	250	250	250	250	250	250	250	125	125	250	125			250	250	250
PRESS (MPa G)	*	*	*	*	*	*	*	*	*	*	*	*			*	*	*
TEMP (°C)	Max 52	←						→				Max 52			Max 35	Max 35	Max 35

VALVE OPENING/CLOSING CONDITION NOTE 13

	F001	F002A	F002B	F090A	F090B	F021A	F021B	F005 A,B	F013	F014A	F014B	F015A	F015B	F017	F022	F024	F026	F028	F029	F041	F093	F006	F010A	G51-F004	G51-F005A	F007B	F010B	G51-F005B	E11-F015B	E11-F015C	E11-F016B	E11-F016C	F031
MODE A	O	O	O	O	O	X	X	O	O	O	O	O	O	O	X	X	X	X	X	X	O	O	O	X	X	O	O	X	X	X	X	X	X
MODE B	O	O	O	O	O	X	X	O	O	O	O	O	O	O	X	X	X	X	O	X	O	O	O	X	X	O	O	X	O/X	X/O	O/X	X/O	X
MODE C	O	O/X	X/O	O	O	P/X	X/P	X	X	O/X	X/O	O/X	X/O	O	X	X	X	X	X	X	O	O	O	X	X	O	O	X	X	X	X	X	X
MODE D	O	O	O	O	O	X	X	O	O	O	O	O	O	O	X	X	X	X	X	X	O	O	O	X	X	O	O	X	O/X	X/O	X	X	X
MODE E1	X	O	O	O	O	X	X	O	O	O	O	O	O	O	X	O	O	O	X	X	O	O	X	X	O	O	X	O	X	X	X	X	X
MODE E2	O	X	O	O	X	X	P	O	O	O	O	O	O	O	X	X	O	O	X	X	O	O/X	X	X	O/X	X/O	X	X/O	X	X	X	X	X
MODE E3	X	O	O	O	O	X	X	O	X	O	O	O	O	O	X	O	O	O	X	X	O	O	O	X	X	O	O	X	X	X	O/X	X/O	O
MODE F	O	O/X	X/O	O	O	X	X	O	O	O	O	O	O	O	X	X	X	X	X	X	O	X	X	O	O	O	O	X	X	X	X	X	X
MODE G	O	O/X	X/O	O	O	X	X	O	O	O	O	O	O	O	X	X	X	X	X	O	O	X	X	O	O	O	O	X	X	X	X	X	X

O : OPEN P : PARTIALLY OPEN X : CLOSE

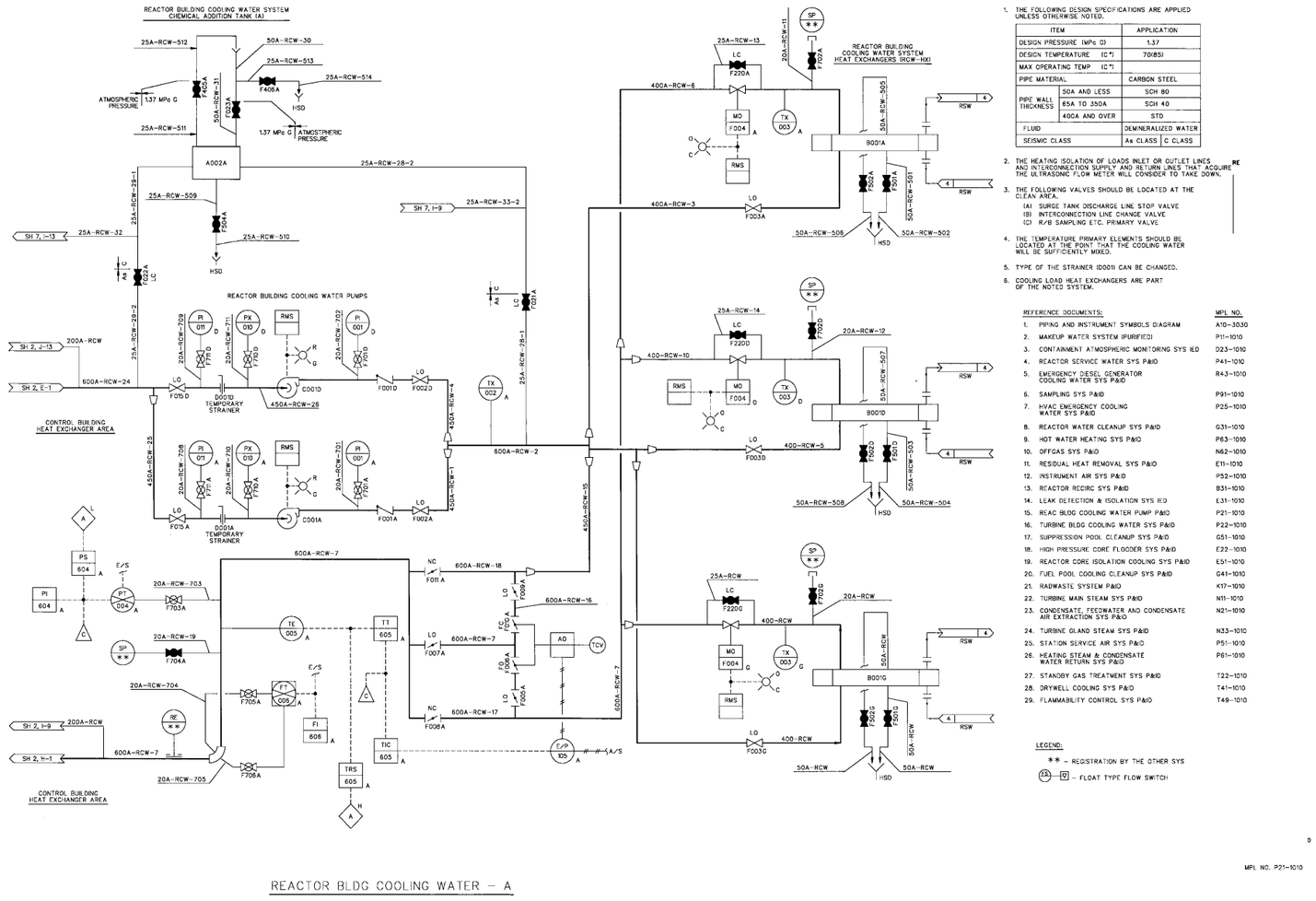
Figure 9.1-2 Fuel Pool Cooling and Cleanup System PFD (Sheet 2 of 2)



NOTES

1. REACTOR BUILDING CRANE REQUIRED.
2. ADDITIONAL NON-ROUTINE OPERATION TO BE PERFORMED AS REQUIRED.
3. HEAVY LINE BETWEEN OPERATIONS INDICATES ANTICIPATED CRITICAL PATH DURING A NORMAL OUTAGE.
4. PLATFORM REQUIRED OVER REACTOR.
5. NON-ROUTINE WORK.
6. WORK MAY BE PERFORMED INTERMITTENTLY WITH MOVING FUEL BUT NOT SIMULTANEOUSLY.
7. TECHNICAL SPEC RESTRICTIONS APPLY.

Figure 9.1-12 Plant Refueling and Servicing Sequence



NOTES:

1. THE FOLLOWING DESIGN SPECIFICATIONS ARE APPLIED UNLESS OTHERWISE NOTED.

ITEM		APPLICATION
DESIGN PRESSURE (MPa G)		1.37
DESIGN TEMPERATURE (C°)		70(85)
MAX OPERATING TEMP (C°)		
PIPE MATERIAL		CARBON STEEL
PIPE WALL THICKNESS	50A AND LESS	SCH 80
	65A TO 350A	SCH 40
	400A AND OVER	STD
FLUID		DEMINERALIZED WATER
SEISMIC CLASS		As CLASS C CLASS

2. THE HEATING ISOLATION OF LOADS INLET OR OUTLET LINES AND INTERCONNECTION SUPPLY AND RETURN LINES THAT ACQUIRE THE ULTRASONIC FLOW METER WILL CONSIDER TO TAKE DOWN. RE
3. THE FOLLOWING VALVES SHOULD BE LOCATED AT THE CLEAN AREA.
   (A) SURGE TANK DISCHARGE LINE STOP VALVE
   (B) INTERCONNECTION LINE CHANGE VALVE
   (C) R/B SAMPLING ETC. PRIMARY VALVE
4. THE TEMPERATURE PRIMARY ELEMENTS SHOULD BE LOCATED AT THE POINT THAT THE COOLING WATER WILL BE SUFFICIENTLY MIXED.
5. TYPE OF THE STRAINER (D001) CAN BE CHANGED.
6. COOLING LOAD HEAT EXCHANGERS ARE PART OF THE NOTED SYSTEM.

REFERENCE DOCUMENTS:

		MPL NO.
1.	PIPING AND INSTRUMENT SYMBOLS DIAGRAM	A10–3030
2.	MAKEUP WATER SYSTEM (PURIFIED)	P11–1010
3.	CONTAINMENT ATMOSPHERIC MONITORING SYS (ED)	D23–1010
4.	REACTOR SERVICE WATER SYS P&ID	P41–1010
5.	EMERGENCY DIESEL GENERATOR COOLING WATER SYS P&ID	R43–1010
6.	SAMPLING SYS P&ID	P91–1010
7.	HVAC EMERGENCY COOLING WATER SYS P&ID	P25–1010
8.	REACTOR WATER CLEANUP SYS P&ID	G31–1010
9.	HOT WATER HEATING SYS P&ID	P63–1010
10.	OFFGAS SYS P&ID	N62–1010
11.	RESIDUAL HEAT REMOVAL SYS P&ID	E11–1010
12.	INSTRUMENT AIR SYS P&ID	P52–1010
13.	REACTOR RECIRC SYS P&ID	B31–1010
14.	LEAK DETECTION & ISOLATION SYS (ED)	E31–1010
15.	REAC BLDG COOLING WATER PUMP P&ID	P21–1010
16.	TURBINE BLDG COOLING WATER SYS P&ID	P22–1010
17.	SUPPRESSION POOL CLEANUP SYS P&ID	G51–1010
18.	HIGH PRESSURE CORE FLOODER SYS P&ID	E22–1010
19.	REACTOR CORE ISOLATION COOLING SYS P&ID	E51–1010
20.	FUEL POOL COOLING CLEANUP SYS P&ID	G41–1010
21.	RADWASTE SYSTEM P&ID	K17–1010
22.	TURBINE MAIN STEAM SYS P&ID	N11–1010
23.	CONDENSATE, FEEDWATER AND CONDENSATE AIR EXTRACTION SYS P&ID	N21–1010
24.	TURBINE GLAND STEAM SYS P&ID	N33–1010
25.	STATION SERVICE AIR SYS P&ID	P51–1010
26.	HEATING STEAM & CONDENSATE WATER RETURN SYS P&ID	P61–1010
27.	STANDBY GAS TREATMENT SYS P&ID	T22–1010
28.	DRYWELL COOLING SYS P&ID	T41–1010
29.	FLAMMABILITY CONTROL SYS P&ID	T49–1010

LEGEND:

** – REGISTRATION BY THE OTHER SYS

(13)–[D] – FLOAT TYPE FLOW SWITCH

D

MPL NO. P21–1010

Figure 9.2-1 Reactor Building Cooling Water System P&ID (Sheet 1 of 9)

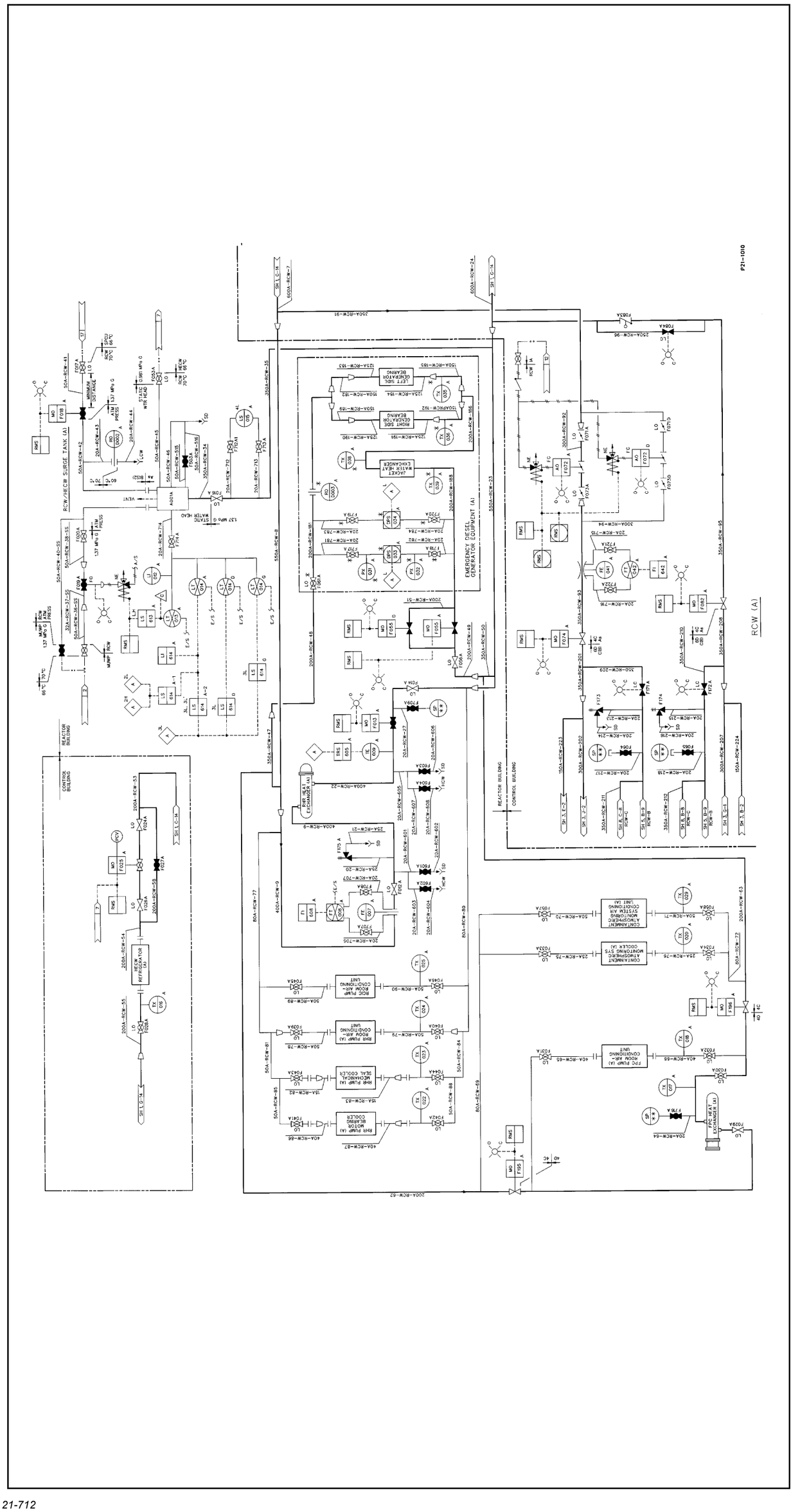


Figure 9.2-1 Reactor Building Cooling Water System P&ID (Sheet 2 of 9)

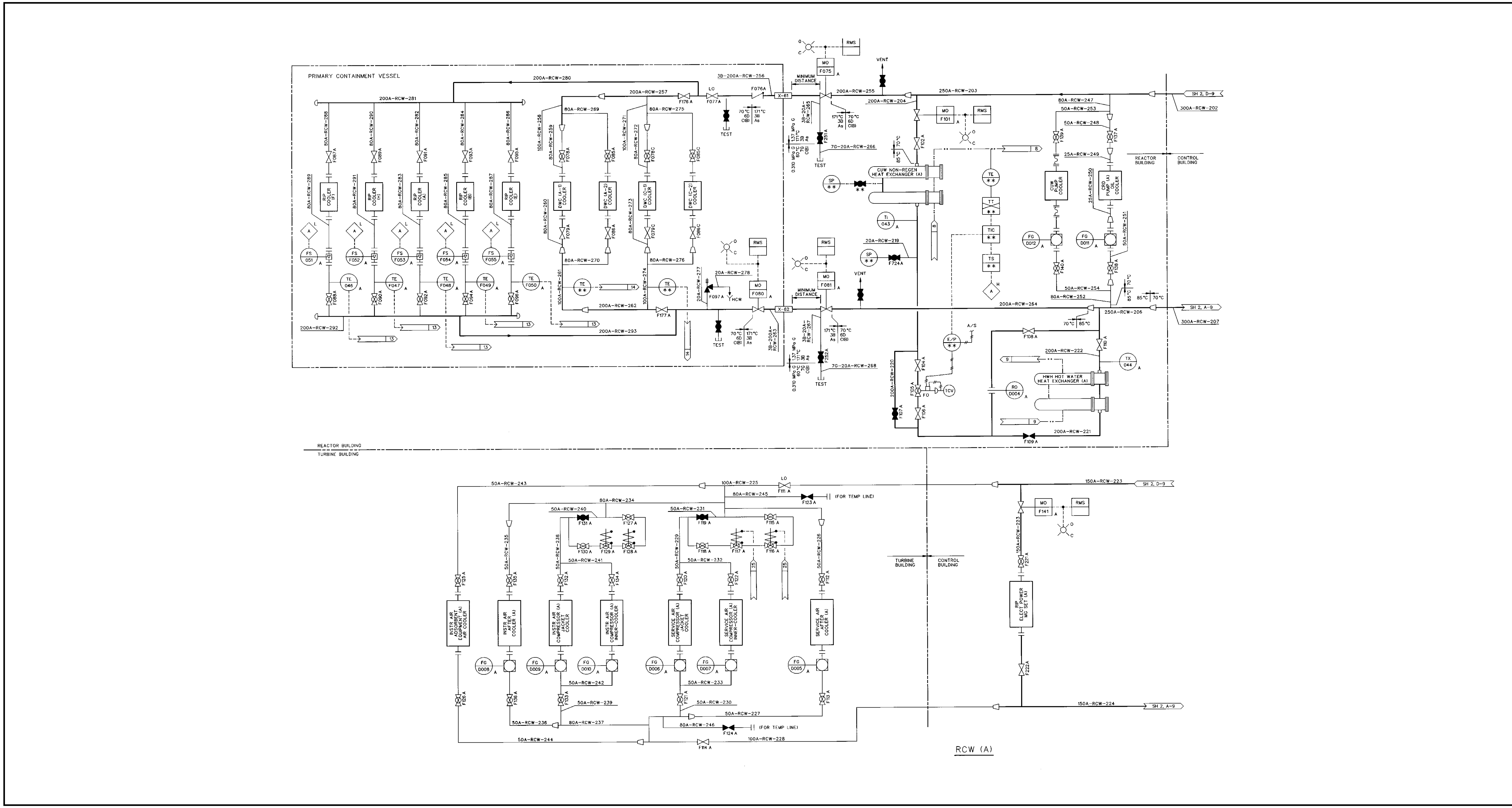


Figure 9.2-1 Reactor Building Cooling Water System P&ID (Sheet 3 of 9)

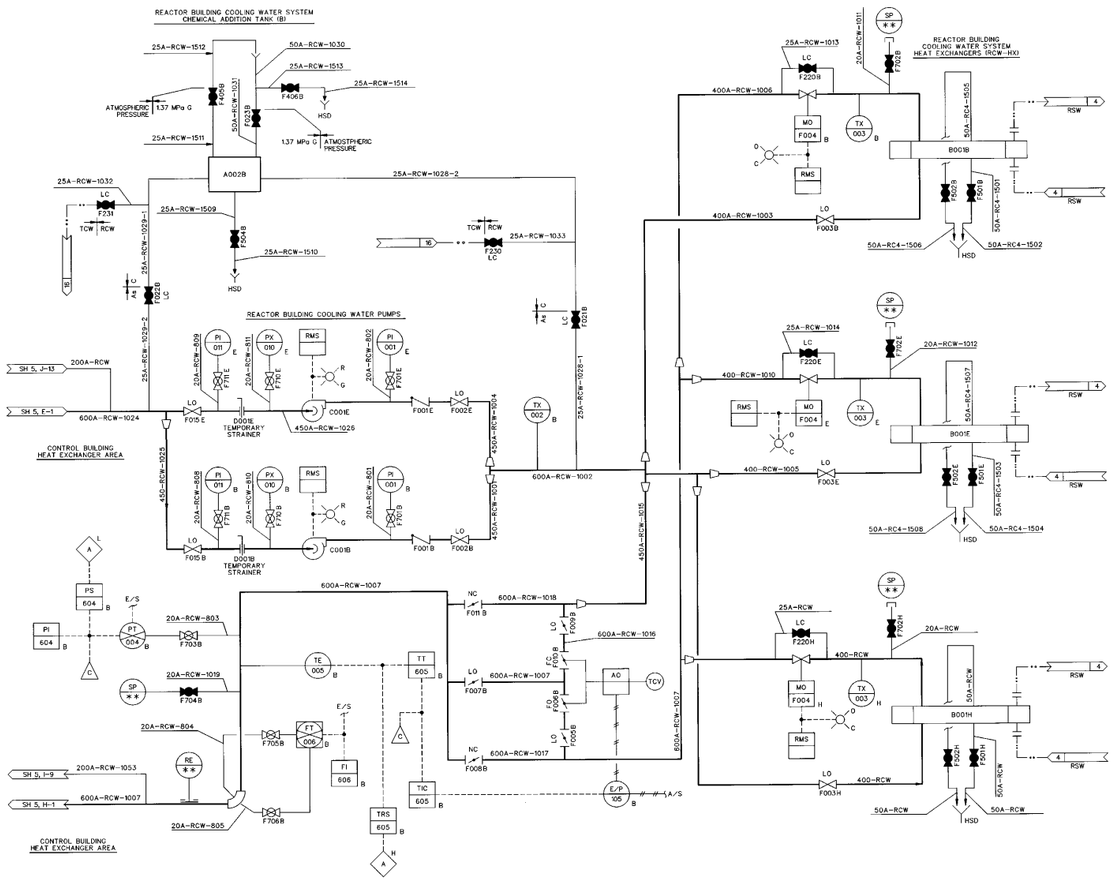


Figure 9.2-1 Reactor Building Cooling Water System P&ID (Sheet 4 of 9)

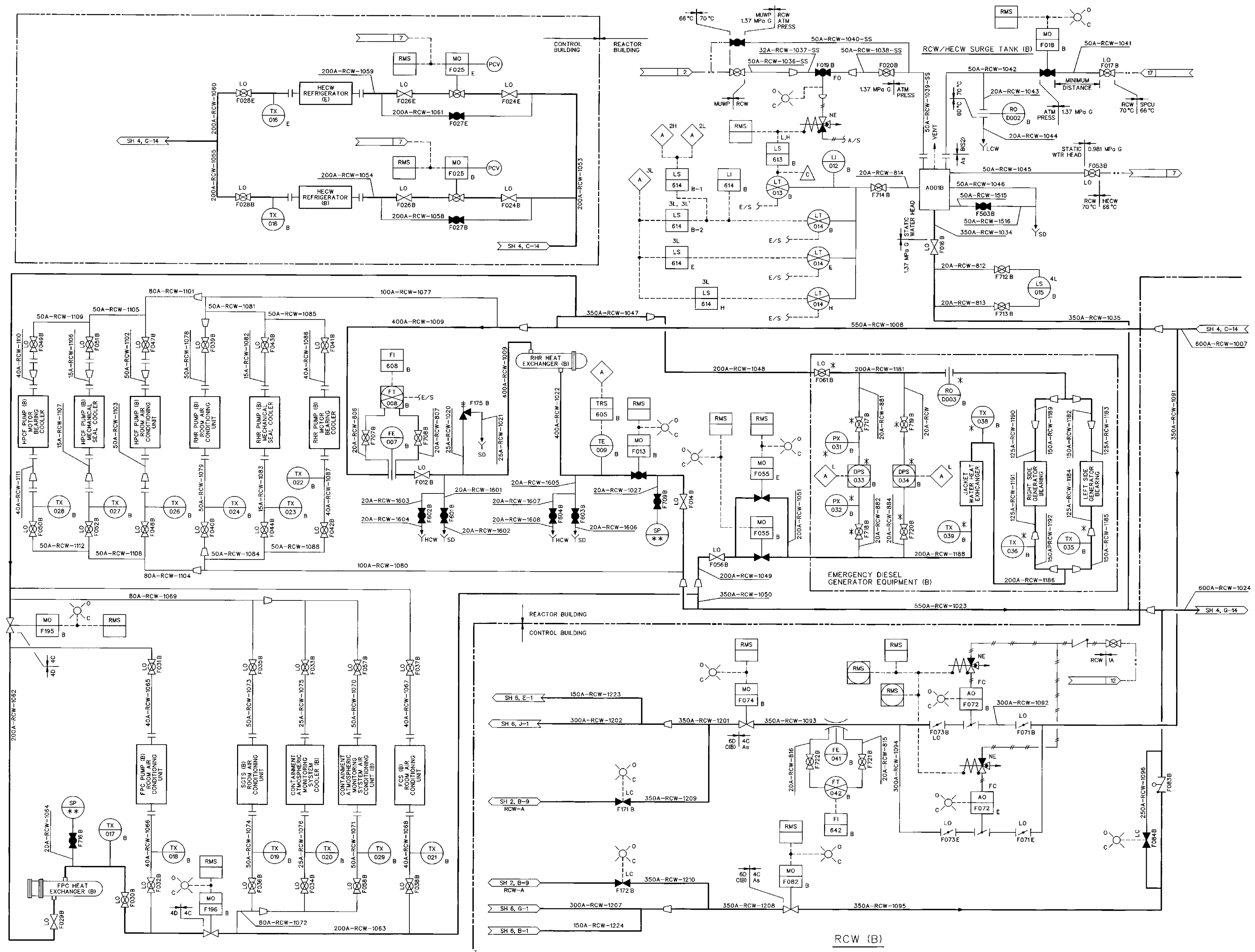


Figure 9.2-1 Reactor Building Cooling Water System P&ID (Sheet 5 of 9)

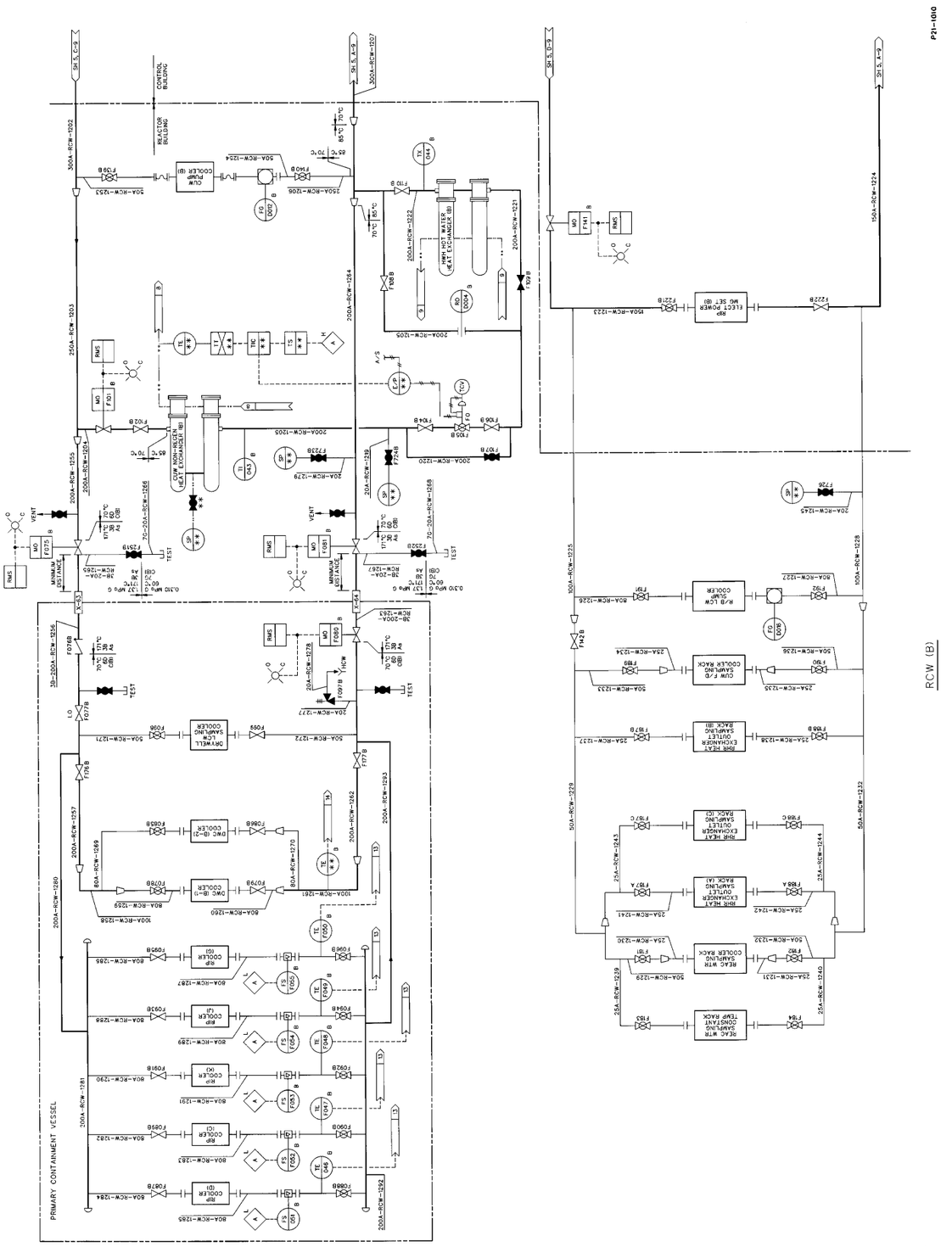
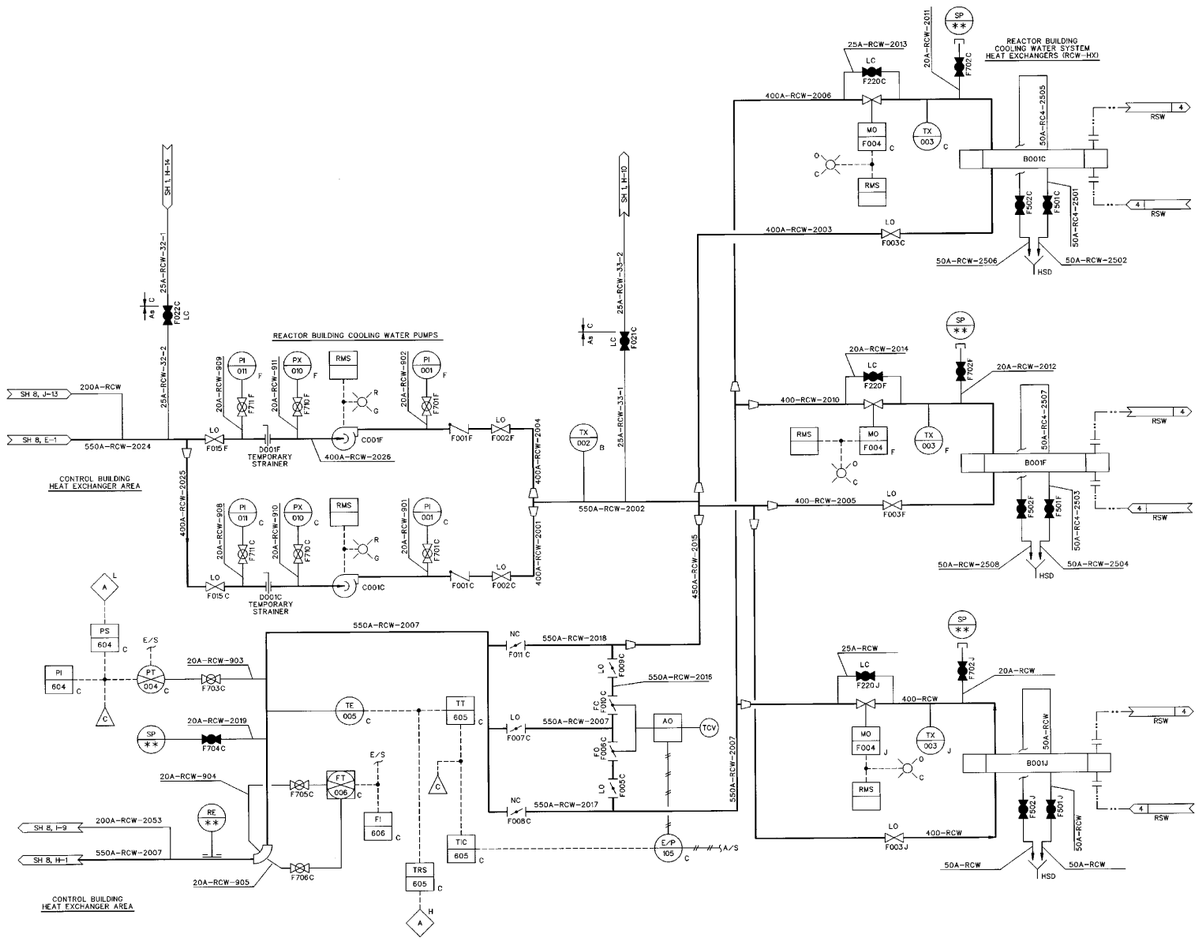


Figure 9.2-1 Reactor Building Cooling Water System P&ID (Sheet 6 of 9)



REACTOR BLDG COOLING WATER – C

Figure 9.2-1 Reactor Building Cooling Water System P&ID (Sheet 7 of 9)

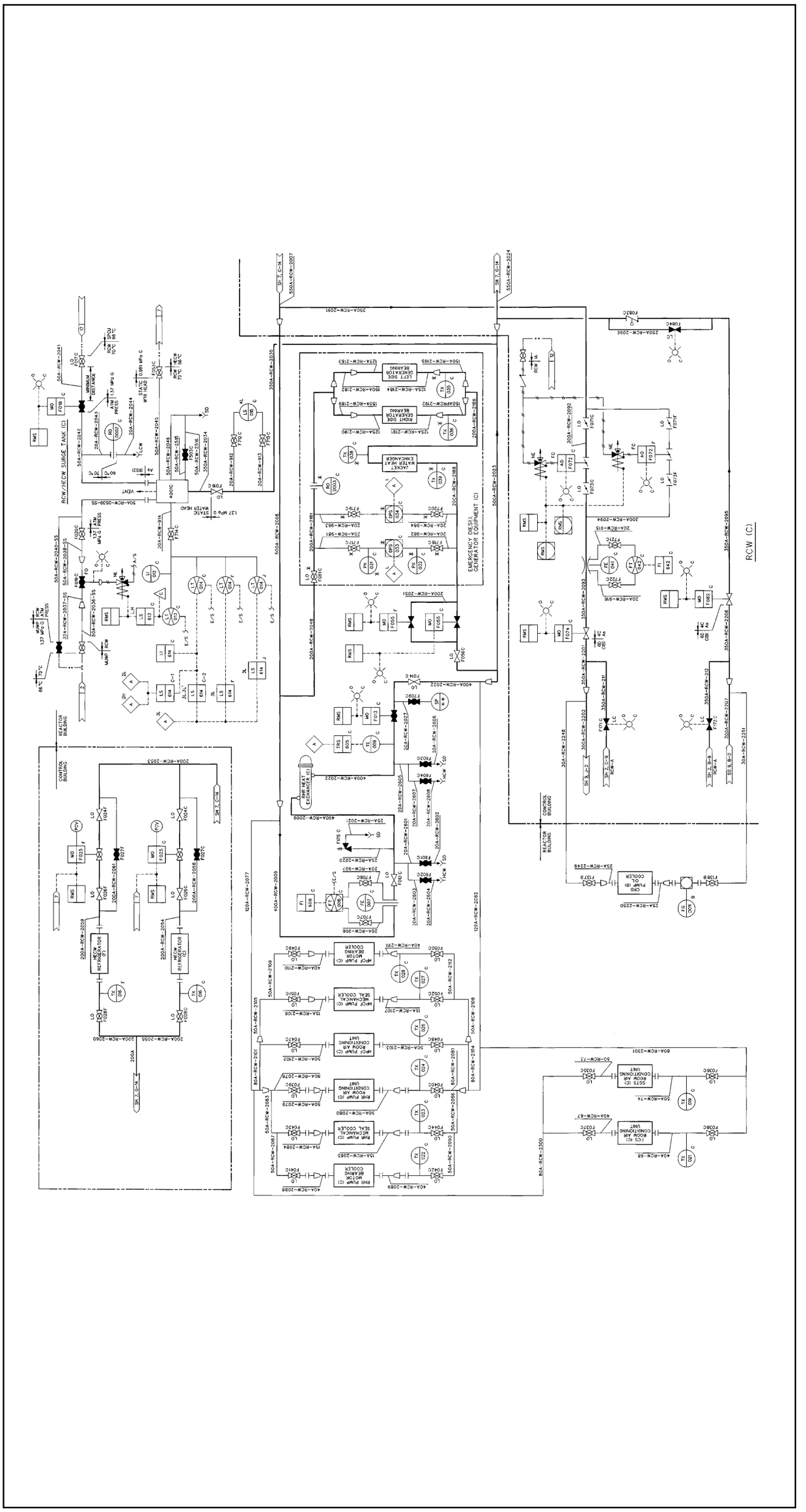


Figure 9.2-1 Reactor Building Cooling Water System P&ID (Sheet 8 of 9)

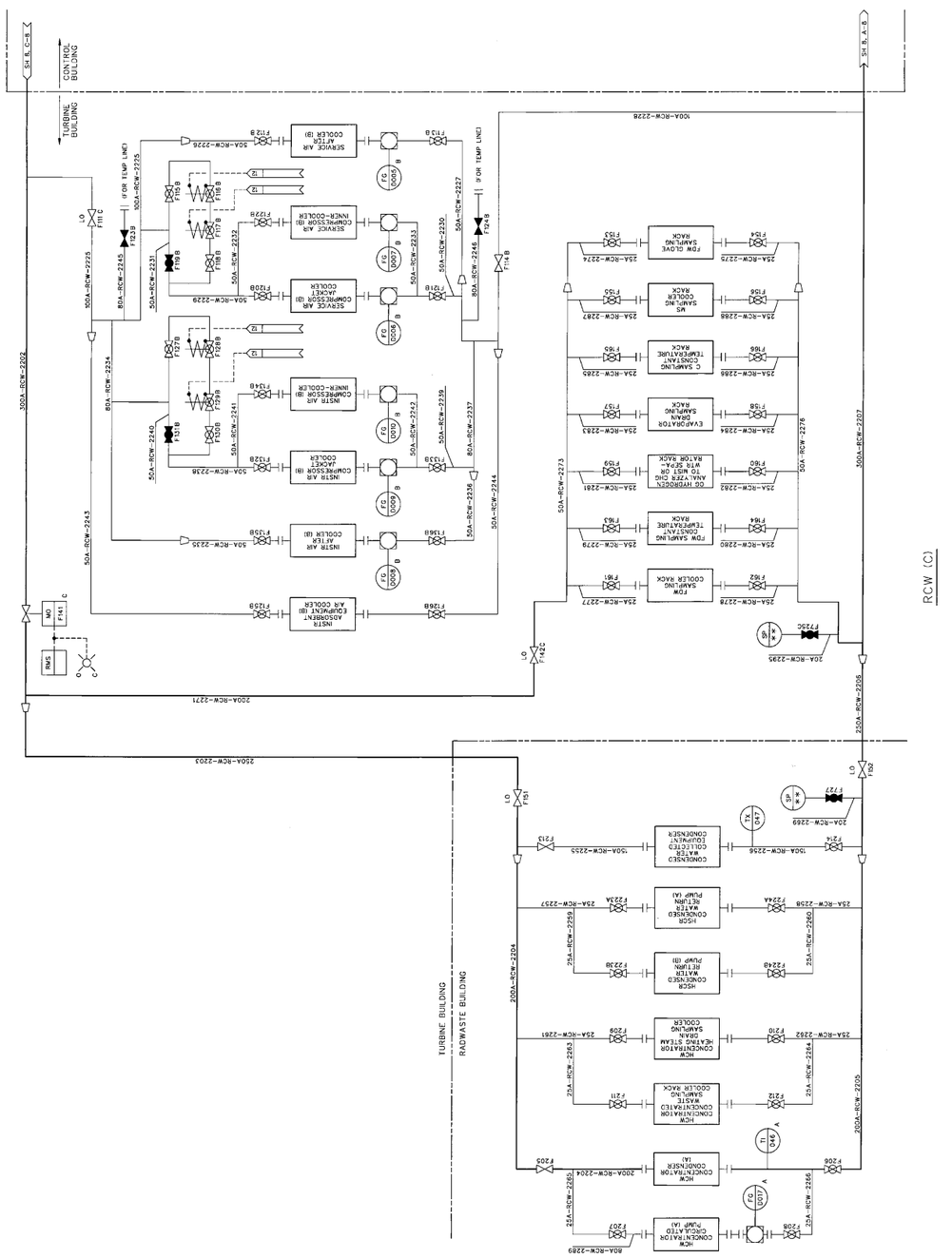


Figure 9.2-1 Reactor Building Cooling Water System P&ID (Sheet 9 of 9)

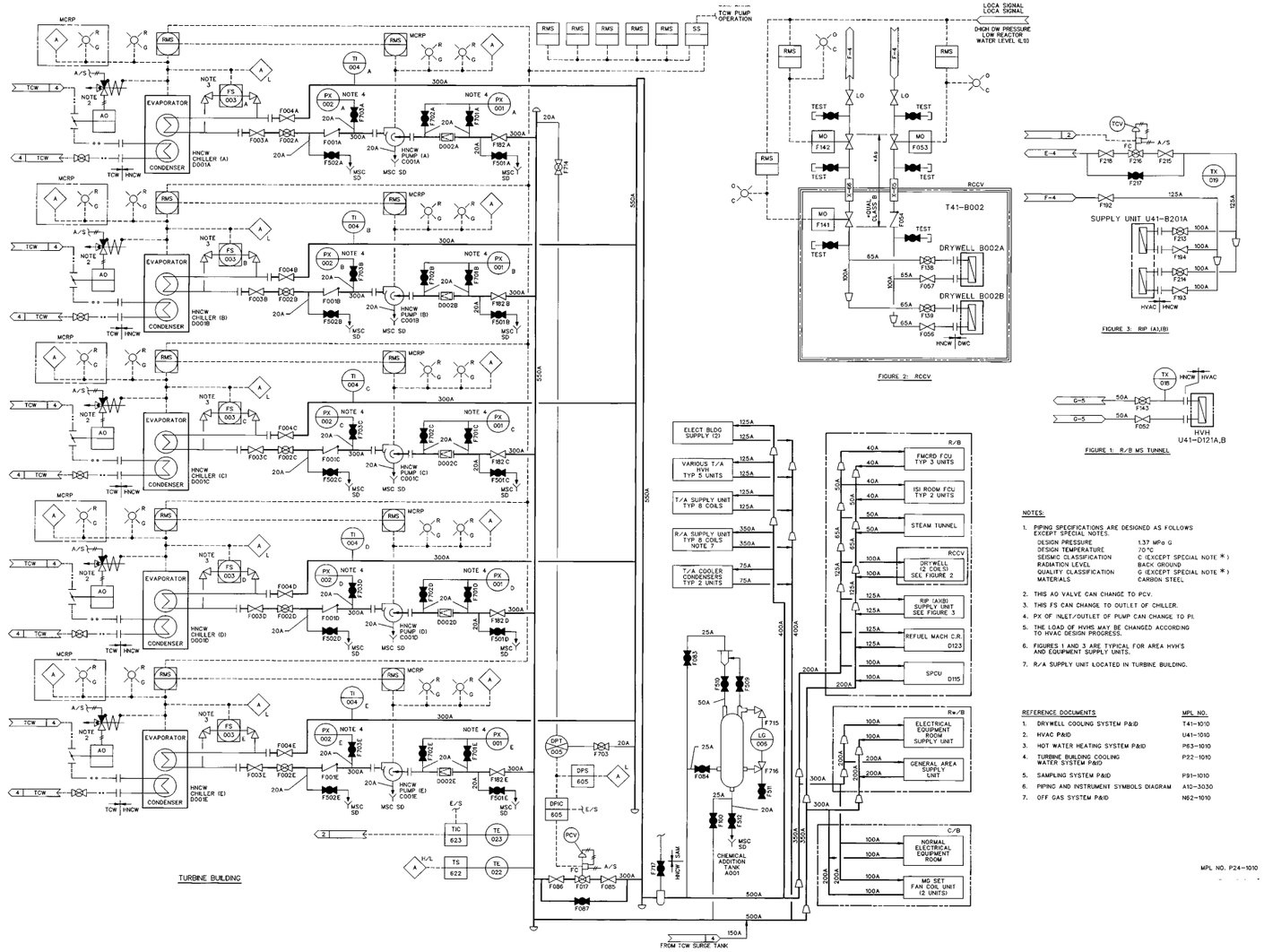


Figure 9.2-2 HVAC Normal Cooling Water System P&ID

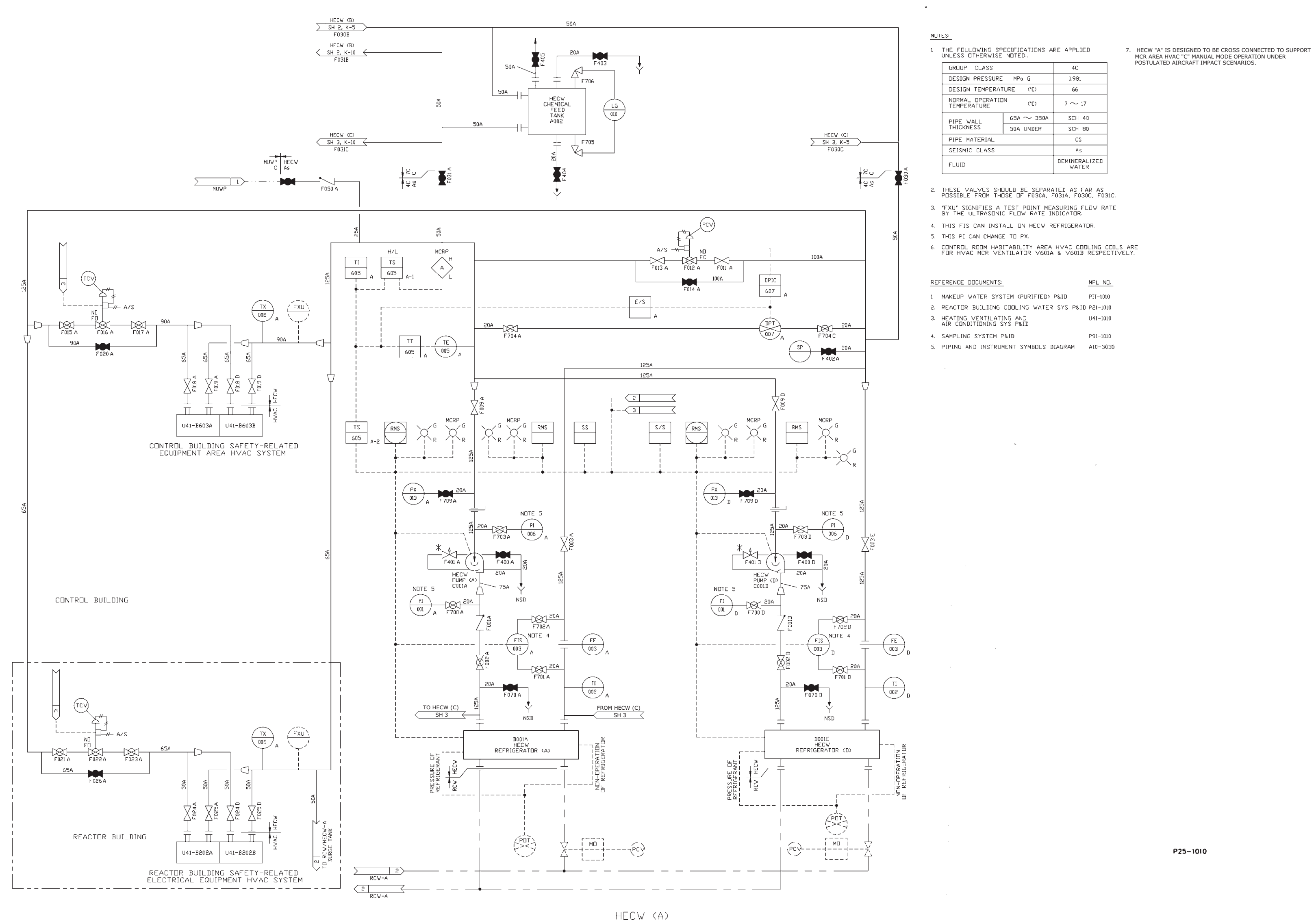


Figure 9.2-3 HVAC Emergency Cooling Water System P&ID (Sheet 1 of 3)

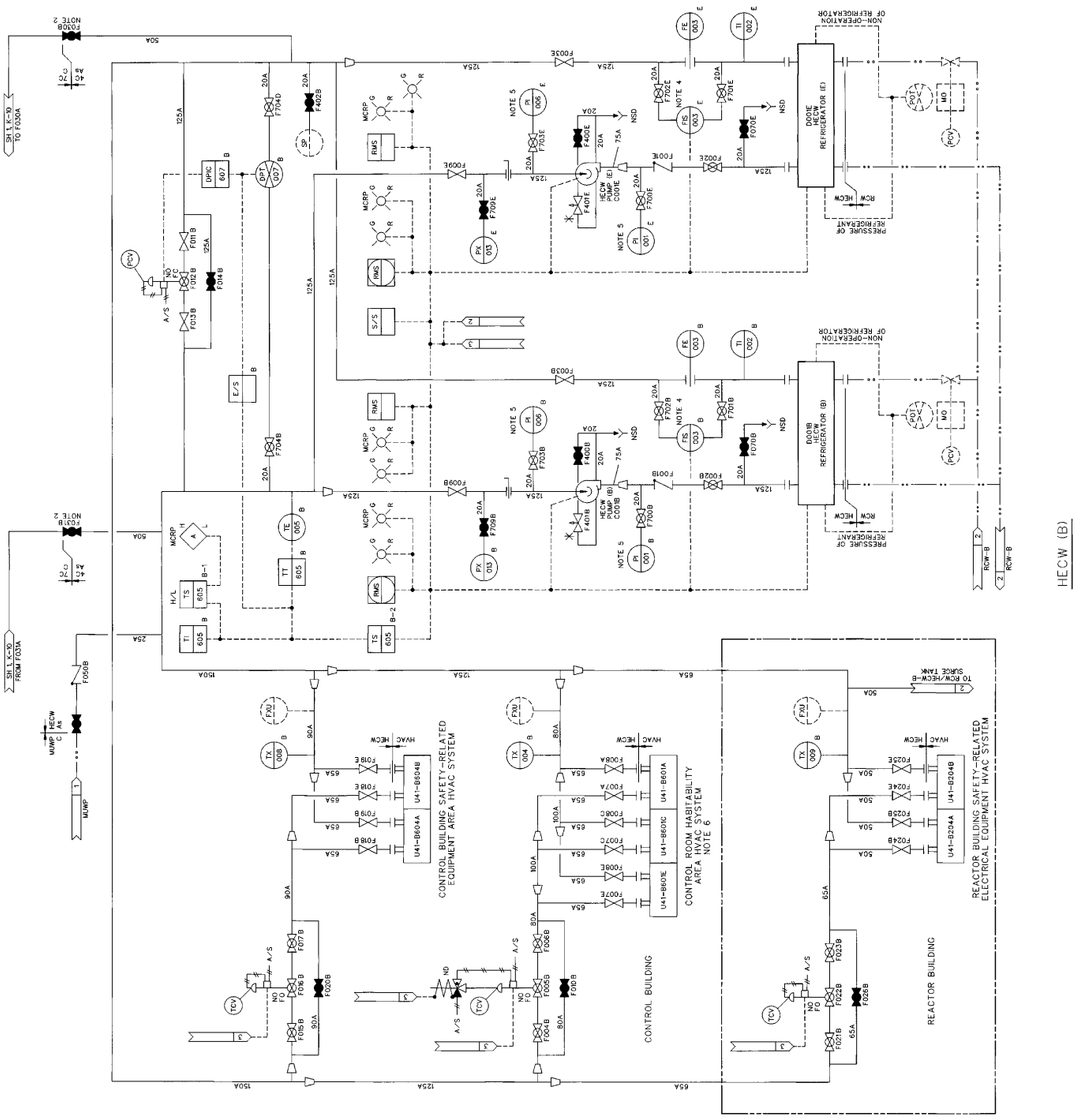


Figure 9.2-3 HVAC Emergency Cooling Water System P&ID (Sheet 2 of 3)

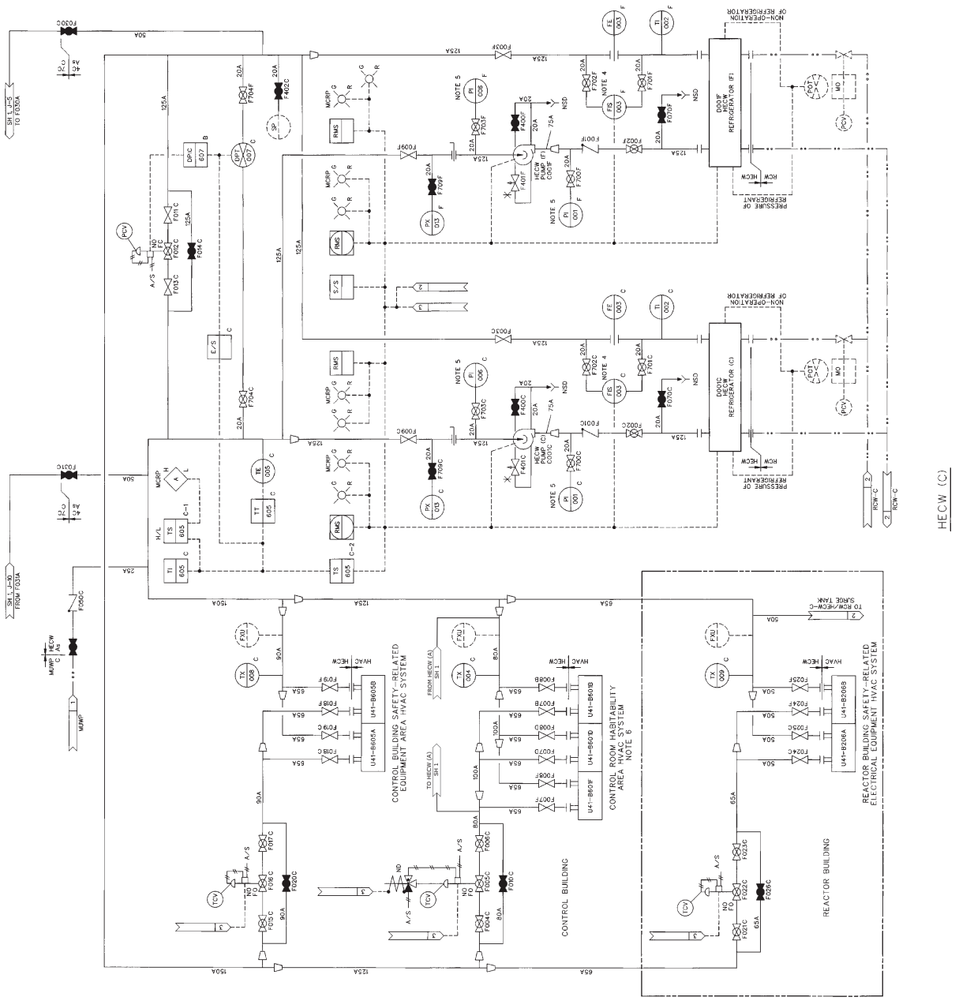
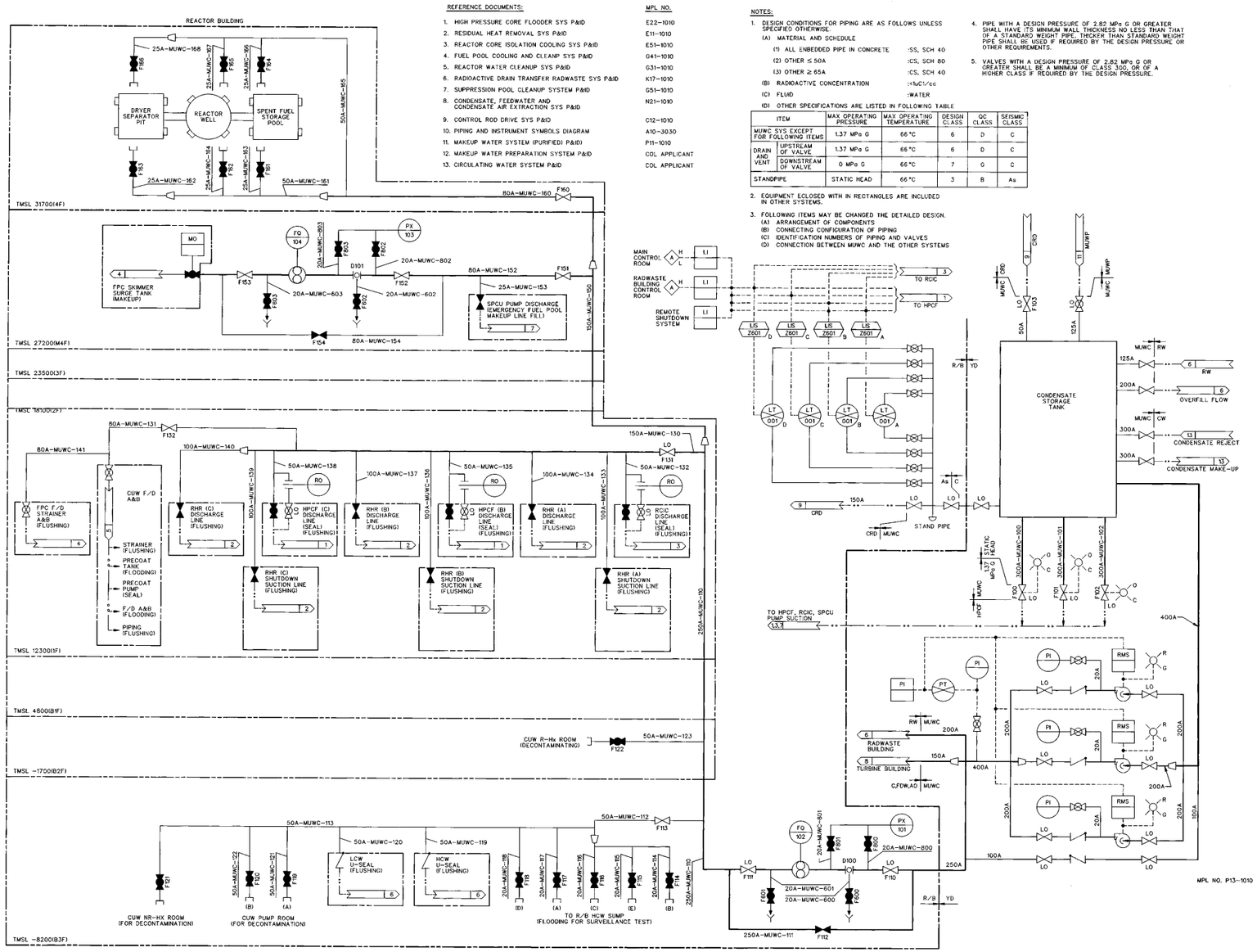


Figure 9.2-3 HVAC Emergency Cooling Water System P&ID (Sheet 3 of 3)



REFERENCE DOCUMENTS:

		MPL NO.
1.	HIGH PRESSURE CORE FLOODER SYS P&ID	E22-1010
2.	RESIDUAL HEAT REMOVAL SYS P&ID	E11-1010
3.	REACTOR CORE ISOLATION COOLING SYS P&ID	E51-1010
4.	FUEL POOL COOLING AND CLEANP SYS P&ID	G41-1010
5.	REACTOR WATER CLEANUP SYS P&ID	G31-1010
6.	RADIOACTIVE DRAIN TRANSFER RADWASTE SYS P&ID	K17-1010
7.	SUPPRESSION POOL CLEANUP SYSTEM P&ID	G51-1010
8.	CONDENSATE, FEEDWATER AND CONDENSATE AIR EXTRACTION SYS P&ID	N21-1010
9.	CONTROL ROD DRIVE SYS P&ID	C12-1010
10.	PIPING AND INSTRUMENT SYMBOLS DIAGRAM	A10-3030
11.	MAKEUP WATER SYSTEM (PURIFIED) P&ID	F11-1010
12.	MAKEUP WATER PREPARATION SYSTEM P&ID	COL APPLICANT
13.	CIRCULATING WATER SYSTEM P&ID	COL APPLICANT

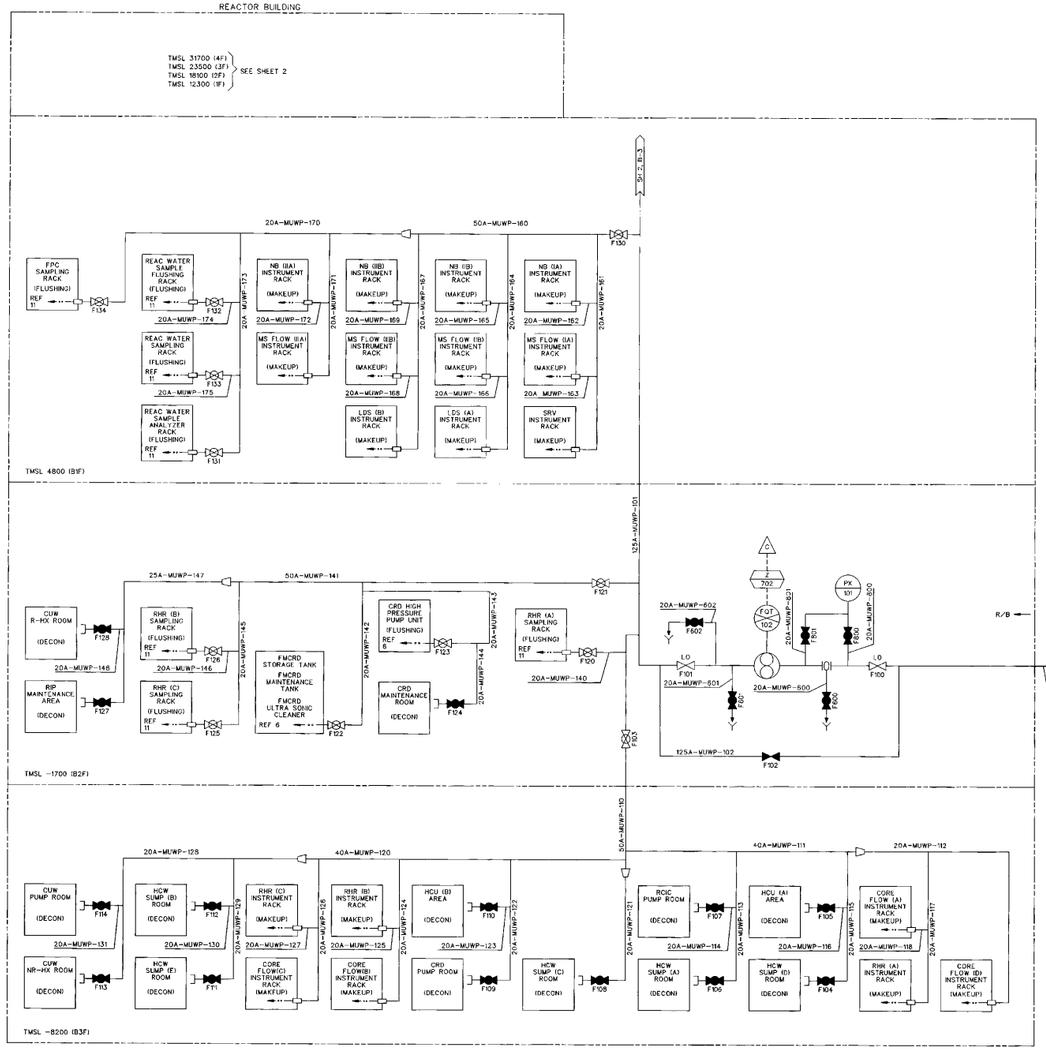
NOTES:

1. DESIGN CONDITIONS FOR PIPING ARE AS FOLLOWS UNLESS SPECIFIED OTHERWISE.
   (A) MATERIAL AND SCHEDULE
   (1) ALL ENBEDDED PIPE IN CONCRETE :SS, SCH 40
   (2) OTHER ≤ 50A :CS, SCH 80
   (3) OTHER ≥ 65A :CS, SCH 40
   (B) RADIOACTIVE CONCENTRATION :<4μCi/cc
   (C) FLUID :WATER
   (D) OTHER SPECIFICATIONS ARE LISTED IN FOLLOWING TABLE

ITEM		MAX OPERATING PRESSURE	MAX OPERATING TEMPERATURE	DESIGN CLASS	QC CLASS	SEISMIC CLASS
MUWC SYS EXCEPT FOR FOLLOWING ITEMS		1.37 MPa G	66 °C	6	D	C
DRAIN AND VENT	UPSTREAM OF VALVE	1.37 MPa G	66 °C	6	D	C
	DOWNSTREAM OF VALVE	0 MPa G	66 °C	7	G	C
STANDPIPE		STATIC HEAD	66 °C	3	B	As

2. EQUIPMENT ECLOSED WITH IN RECTANGLES ARE INCLUDED IN OTHER SYSTEMS.
3. FOLLOWING ITEMS MAY BE CHANGED THE DETAILED DESIGN.
   (A) ARRANGEMENT OF COMPONENTS
   (B) CONNECTING CONFIGURATION OF PIPING
   (C) IDENTIFICATION NUMBERS OF PIPING AND VALVES
   (D) CONNECTION BETWEEN MUWC AND THE OTHER SYSTEMS
4. PIPE WITH A DESIGN PRESSURE OF 2.82 MPa G OR GREATER SHALL HAVE ITS MINIMUM WALL THICKNESS NO LESS THAN THAT OF A STANDARD WEIGHT PIPE. THICKER THAN STANDARD WEIGHT PIPE SHALL BE USED IF REQUIRED BY THE DESIGN PRESSURE OR OTHER REQUIREMENTS.
5. VALVES WITH A DESIGN PRESSURE OF 2.82 MPa G OR GREATER SHALL BE A MINIMUM OF CLASS 300, OR OF A HIGHER CLASS IF REQUIRED BY THE DESIGN PRESSURE.

Figure 9.2-4 Makeup Water System (Condensate) P&ID



NOTES:

1. DESIGN CONDITIONS OF PIPING ARE FOLLOWING UNLESS OTHERWISE SPECIFIED.
   (A). MATERIAL & SCHEDULE : SS SCH 40
   (B). RADIOACTIVE CONCENTRATION : R.G.
   (C). FLUID : WATER
   (D). OTHER SPECIFICATIONS ARE LISTED IN FOLLOWING TABLE.

ITEM		MAX OPERATING PRESSURE	MAX OPERATING TEMP	DESIGN CLASS	QC CLASS	SEISMIC CLASS
MUWP SYSTEM EXCEPT FOR FOLLOWING ITEMS		1.37 MPa G	66 °c	6	D	C
DRAIN & VENT	UPSTREAM OF VALVE	1.37 MPa G	66 °c	6	D	C
	DOWNSTREAM OF VALVE	0 MPa G	66 °c	7	Q	C
PCV BOUNDARY		1.37 MPa G	171 °c	3	B	As

2. EQUIPMENT ENCLOSED IN RECTANGLE ARE INCLUDED IN OTHER SYSTEMS.
3. FOLLOWING ITEMS MAY BE CHANGED DURING DETAILED DESIGN.
   (A). ARRANGEMENT OF COMPONENTS
   (B). CONNECTING CONFIGURATION OF PIPING
   (C). IDENTIFICATION NUMBERS OF PIPING & VALVES
   (D). CONNECTION BETWEEN MUWP AND THE OTHER SYSTEMS
4. MAKEUP WATER TO THIS EQUIPMENT SHALL BE SUPPLIED FROM THE CONNECTION IN SERVICE BOX.
5. PIPE WITH A DESIGN PRESSURE OF 2.82 MPa G OR GREATER SHALL HAVE ITS MINIMUM WALL THICKNESS NO LESS THAN THAT OF A STANDARD WEIGHT PIPE. THICKER THAN STANDARD WEIGHT PIPE SHALL BE USED IF REQUIRED BY THE DESIGN PRESSURE OR OTHER REQUIREMENTS.
6. VALVES WITH A DESIGN PRESSURE OF 2.82 MPa G OR GREATER SHALL BE A MINIMUM OF CLASS 300, OR OF A HIGHER CLASS IF REQUIRED BY THE DESIGN PRESSURE.

REFERENCE DOCUMENTS:

	MPL NO.
1. REAC RECIRC SYS P&ID	B31-1010
2. SLC SYS P&ID	C41-1010
3. POST ACCIDENT SAMPLING SYS P&ID	P91-1010
4. STANDBY GAS TREATMENT SYS P&ID	T22-1010
5. FLAMMABILITY CONTROL SYS P&ID	T49-1010
6. DECONTAMINATION SYSTEM P&ID	U48-1010
7. REAC BLDG COOLING WATER SYS P&ID	P21-1010
8. EMERGENCY D/G COOLING WATER SYS P&ID	R43-1010
9. STACK SYSTEM P&ID	Y31-1010
10. MAKEUP WATER SYSTEM (CONDENSATE) P&ID	P13-1010
11. SAMPLING SYS P&ID	P91-1010
12. MAKEUP WATER PREPARATION SYS P&ID	INTERFACE
13. RADWASTE SYSTEM P&ID	K17-1010
14. CONDENSATE DEMINERALIZER SYS P&ID	N27-1010
15. TURBINE BUILDING COOLING WATER SYS P&ID	P22-1010
16. HOUSE BOILER P&ID	P62-1010
17. HVAC SYSTEM P&ID	U41-1010
18. SUPPRESSION POOL CLEANUP SYSTEM P&ID	D51-1010
19. PIPING AND INSTRUMENT SYMBOLS DIAGRAM	A10-3030

Figure 9.2-5 Makeup Water System (Purified) P&ID (Sheet 1 of 3)

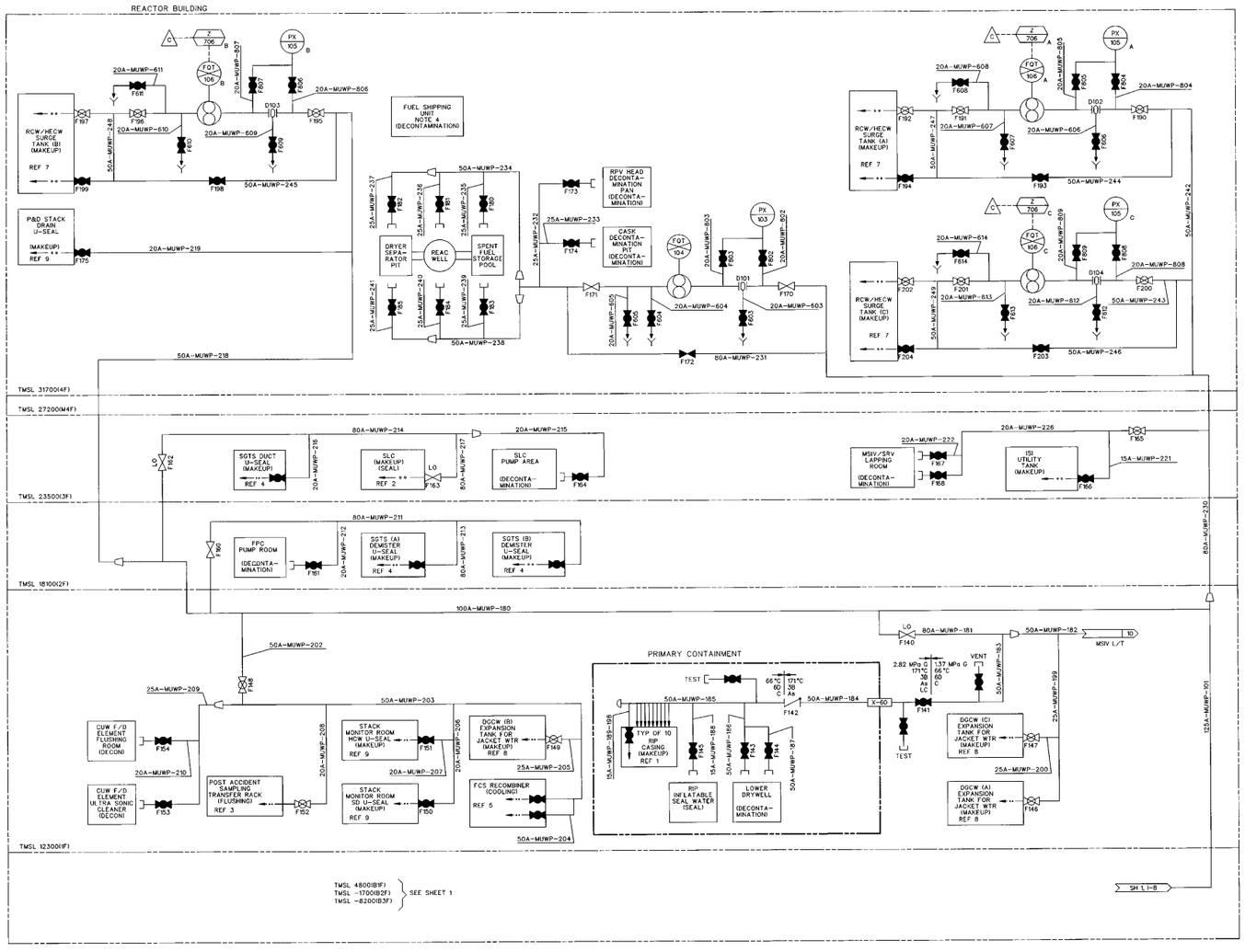


Figure 9.2-5 Makeup Water System (Purified) P&ID (Sheet 2 of 3)

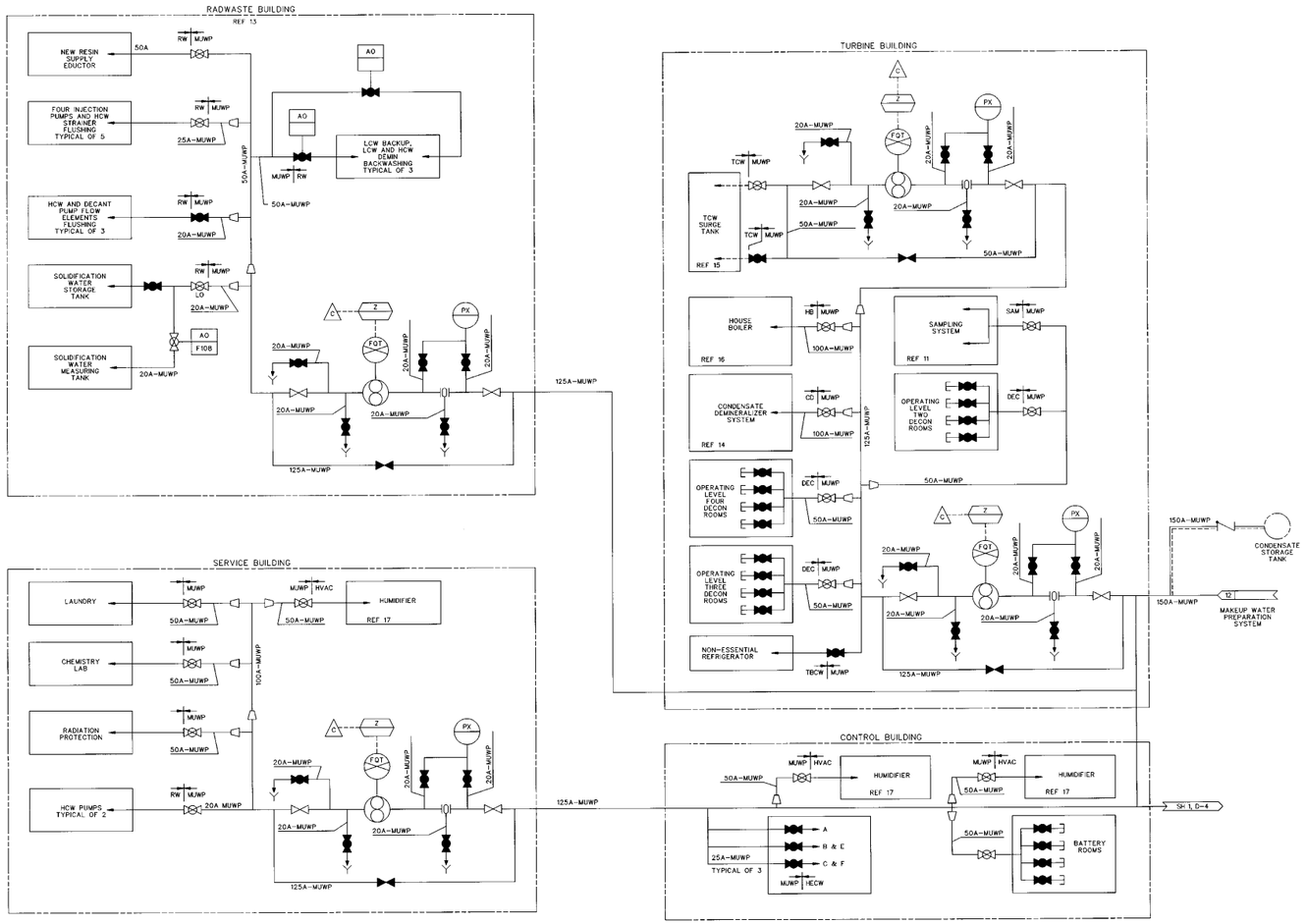


Figure 9.2-5 Makeup Water System (Purified) P&ID (Sheet 3 of 3)

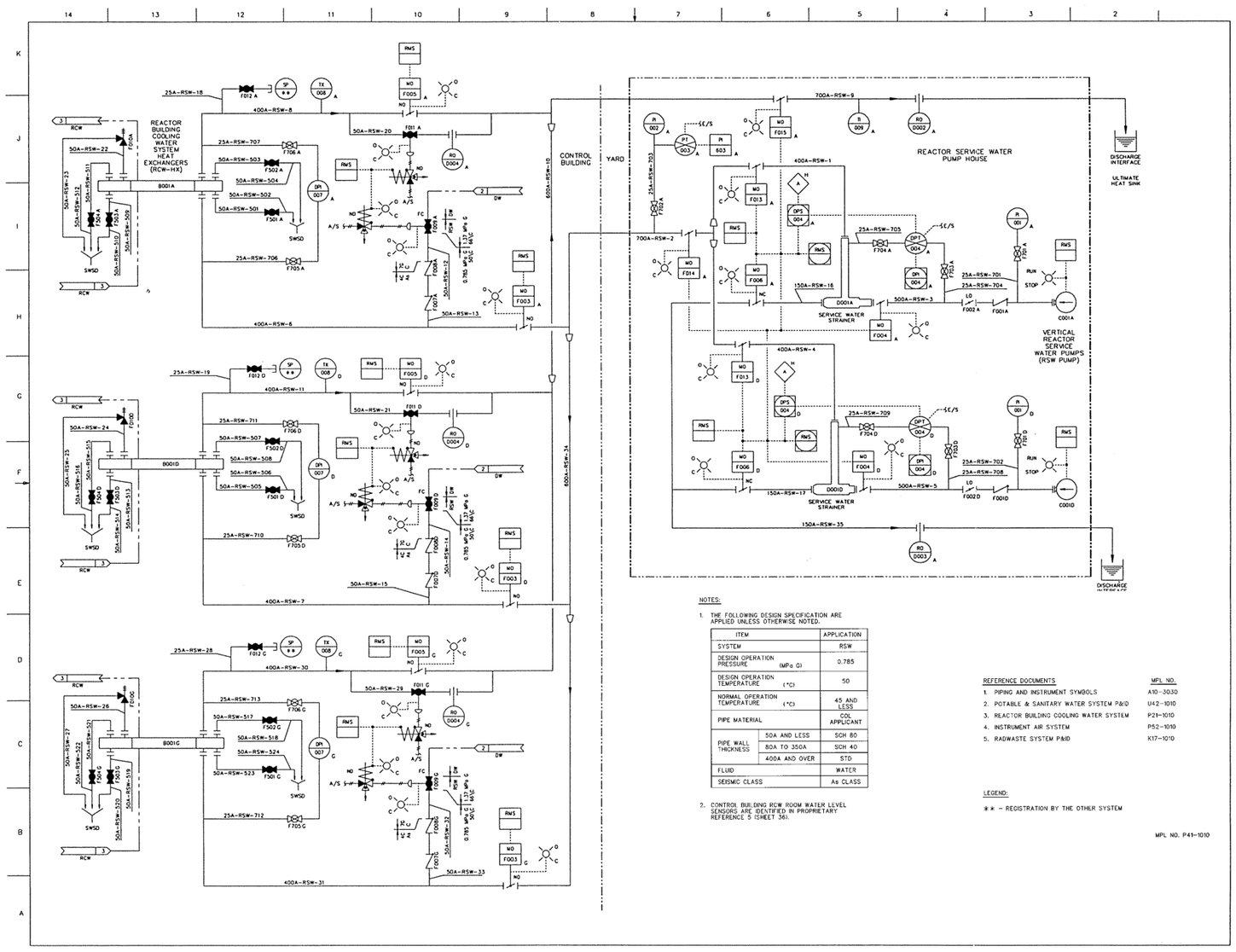


Figure 9.2-7 Reactor Service Water System P&ID (Sheet 1 of 3)

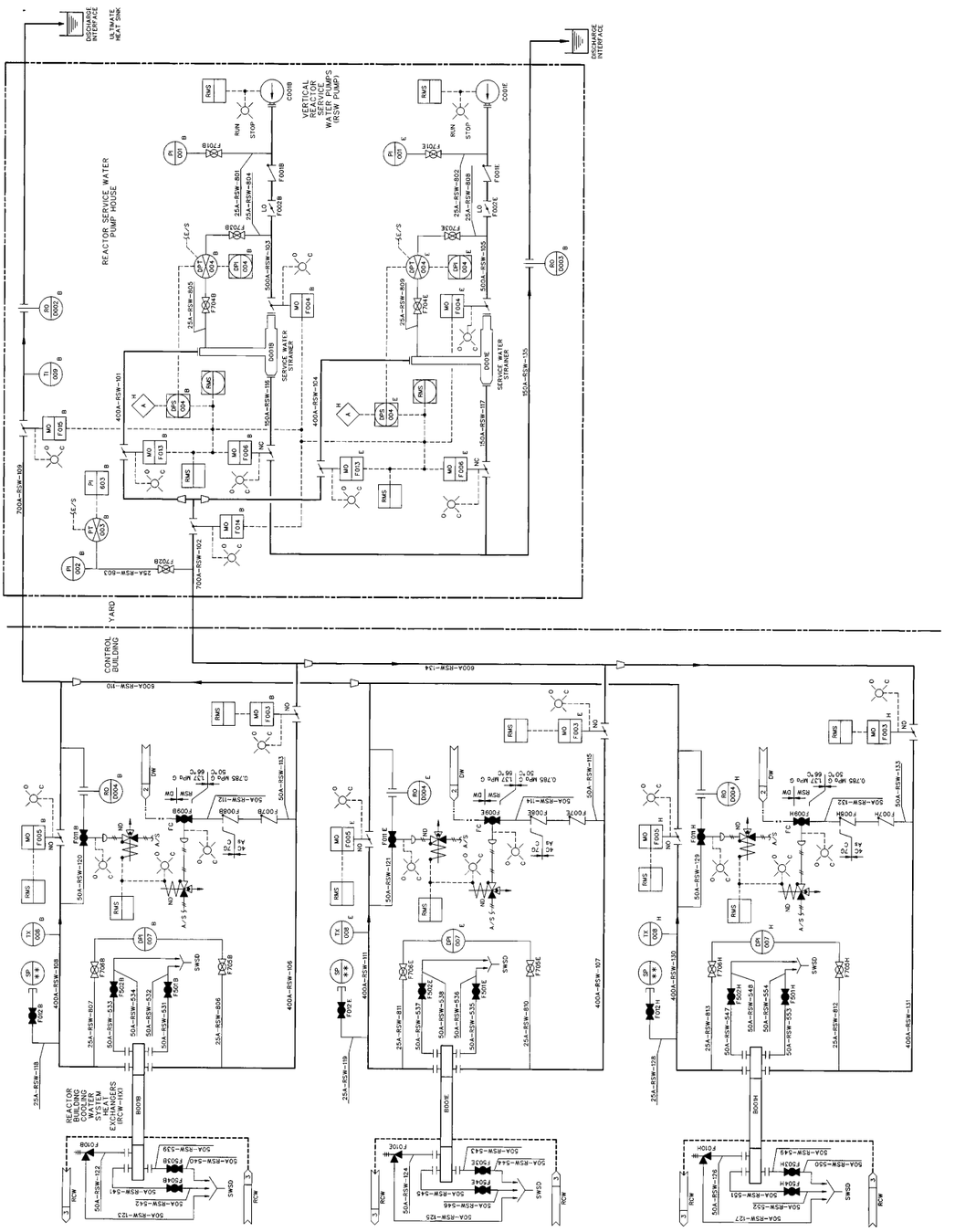


Figure 9.2-7 Reactor Service Water System P&ID (Sheet 2 of 3)

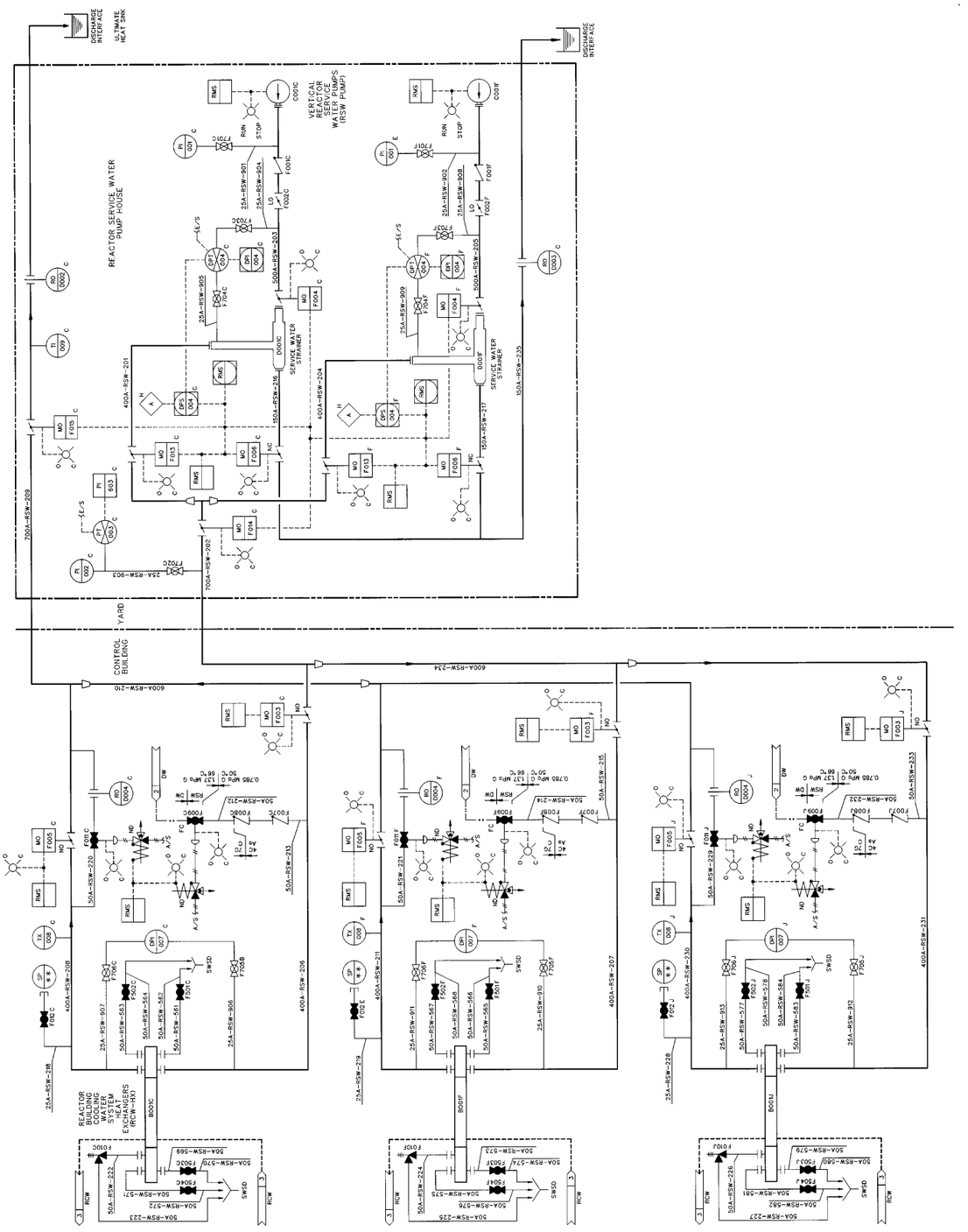
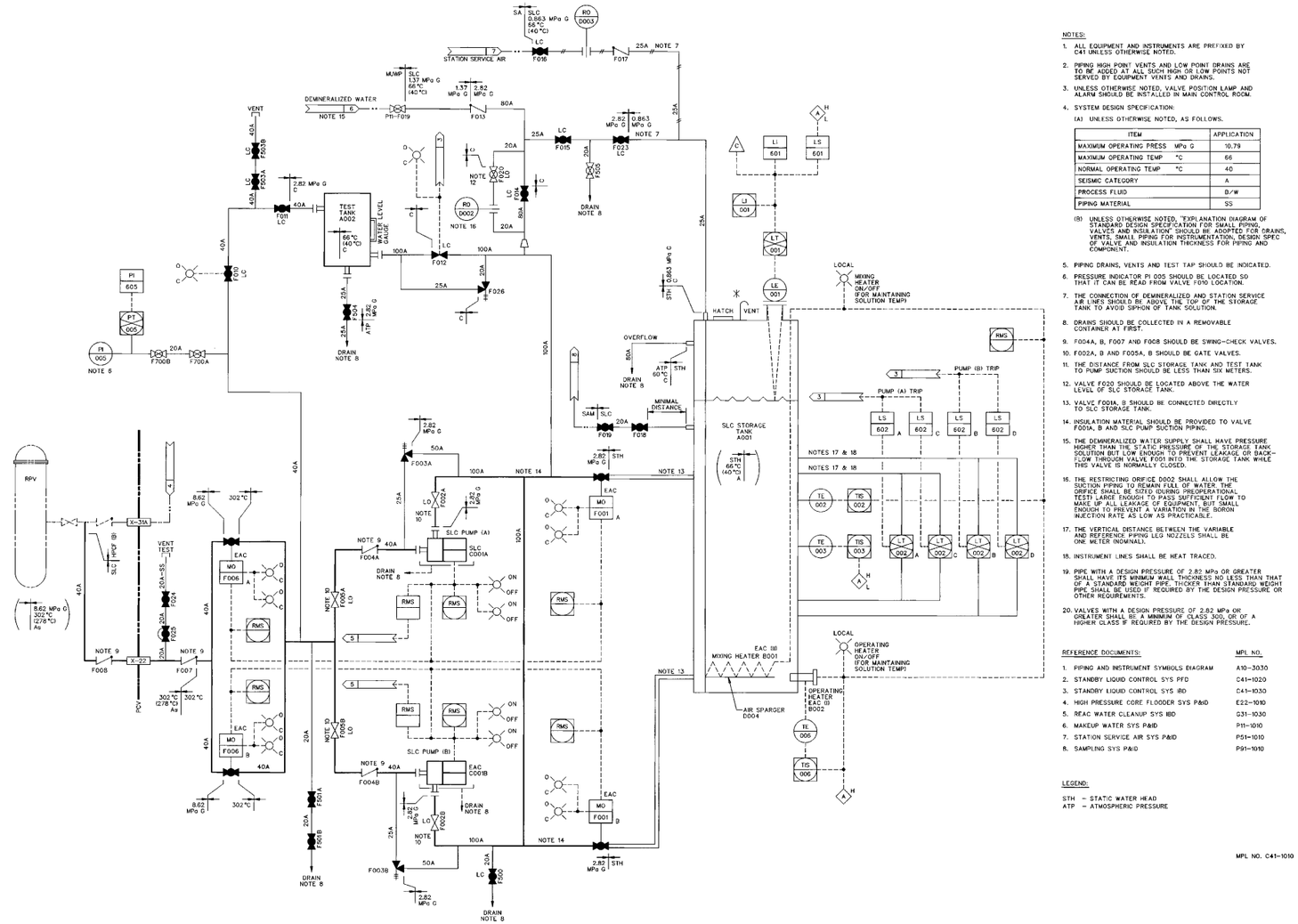


Figure 9.2-7 Reactor Service Water System P&ID (Sheet 3 of 3)



NOTES:

1. ALL EQUIPMENT AND INSTRUMENTS ARE PREFIXED BY C41 UNLESS OTHERWISE NOTED.
2. PIPING HIGH POINT VENTS AND LOW POINT DRAINS ARE TO BE ADDED AT ALL SUCH HIGH OR LOW POINTS NOT SERVED BY EQUIPMENT VENTS AND DRAINS.
3. UNLESS OTHERWISE NOTED, VALVE POSITION LAMP AND ALARM SHOULD BE INSTALLED IN MAIN CONTROL ROOM.
4. SYSTEM DESIGN SPECIFICATION:

   (A) UNLESS OTHERWISE NOTED, AS FOLLOWS.

ITEM		APPLICATION
MAXIMUM OPERATING PRESS	MPa G	10.79
MAXIMUM OPERATING TEMP	°C	66
NORMAL OPERATING TEMP	°C	40
SEISMIC CATEGORY		A
PROCESS FLUID		B/W
PIPING MATERIAL		SS

   (B) UNLESS OTHERWISE NOTED, "EXPLANATION DIAGRAM OF STANDARD DESIGN SPECIFICATION FOR SMALL PIPING, VALVES AND INSULATION" SHOULD BE ADOPTED FOR DRAINS, VENTS, SMALL PIPING FOR INSTRUMENTATION, DESIGN SPEC OF VALVE AND INSULATION THICKNESS FOR PIPING AND COMPONENT.

5. PIPING DRAINS, VENTS AND TEST TAP SHOULD BE INDICATED.
6. PRESSURE INDICATOR PI 005 SHOULD BE LOCATED SO THAT IT CAN BE READ FROM VALVE F010 LOCATION.
7. THE CONNECTION OF DEMINERALIZED AND STATION SERVICE AIR LINES SHOULD BE ABOVE THE TOP OF THE STORAGE TANK TO AVOID SIPHON OF TANK SOLUTION.
8. DRAINS SHOULD BE COLLECTED IN A REMOVABLE CONTAINER AT FIRST.
9. F004A, B, F007 AND F008 SHOULD BE SWING-CHECK VALVES.
10. F002A, B AND F005A, B SHOULD BE GATE VALVES.
11. THE DISTANCE FROM SLC STORAGE TANK AND TEST TANK TO PUMP SUCTION SHOULD BE LESS THAN SIX METERS.
12. VALVE F020 SHOULD BE LOCATED ABOVE THE WATER LEVEL OF SLC STORAGE TANK.
13. VALVE F001A, B SHOULD BE CONNECTED DIRECTLY TO SLC STORAGE TANK.
14. INSULATION MATERIAL SHOULD BE PROVIDED TO VALVE F001A, B AND SLC PUMP SUCTION PIPING.
15. THE DEMINERALIZED WATER SUPPLY SHALL HAVE PRESSURE HIGHER THAN THE STATIC PRESSURE OF THE STORAGE TANK SOLUTION BUT LOW ENOUGH TO PREVENT LEAKAGE, OR BACK-FLOW THROUGH VALVE F001 INTO THE STORAGE TANK WHILE THIS VALVE IS NORMALLY CLOSED.
16. THE RESTRICTING ORIFICE D002 SHALL ALLOW THE SUCTION PIPING TO REMAIN FULL OF WATER. THE ORIFICE SHALL BE SIZED (DURING PREOPERATIONAL TEST) LARGE ENOUGH TO PASS SUFFICIENT FLOW TO MAKE UP ALL LEAKAGE OF EQUIPMENT, BUT SMALL ENOUGH TO PREVENT A VARIATION IN THE BORON INJECTION RATE AS LOW AS PRACTICABLE.
17. THE VERTICAL DISTANCE BETWEEN THE VARIABLE AND REFERENCE PIPING LEG NOZZELS SHALL BE ONE METER (NOMINAL).
18. INSTRUMENT LINES SHALL BE HEAT TRACED.
19. PIPE WITH A DESIGN PRESSURE OF 2.82 MPa OR GREATER SHALL HAVE ITS MINIMUM WALL THICKNESS NO LESS THAN THAT OF A STANDARD WEIGHT PIPE. THICKER THAN STANDARD WEIGHT PIPE SHALL BE USED IF REQUIRED BY THE DESIGN PRESSURE OR OTHER REQUIREMENTS.
20. VALVES WITH A DESIGN PRESSURE OF 2.82 MPa OR GREATER SHALL BE A MINIMUM OF CLASS 300, OR OF A HIGHER CLASS IF REQUIRED BY THE DESIGN PRESSURE.

REFERENCE DOCUMENTS:

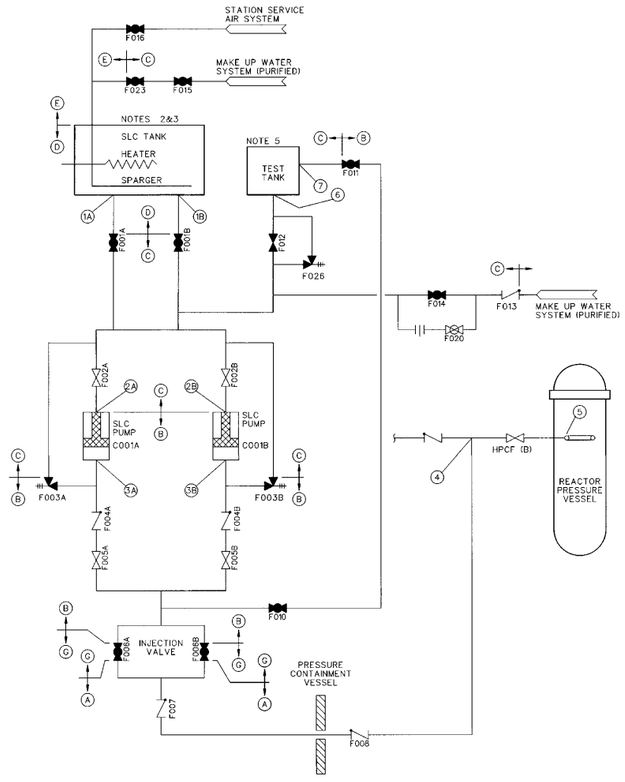
		MPL NO.
1.	PIPING AND INSTRUMENT SYMBOLS DIAGRAM	A10-3030
2.	STANDBY LIQUID CONTROL SYS PFD	C41-1020
3.	STANDBY LIQUID CONTROL SYS IBD	C41-1030
4.	HIGH PRESSURE CORE FLOODER SYS P&ID	E22-1010
5.	REAC WATER CLEANUP SYS IBD	G31-1030
6.	MAKEUP WATER SYS P&ID	P11-1010
7.	STATION SERVICE AIR SYS P&ID	P51-1010
8.	SAMPLING SYS P&ID	P91-1010

LEGEND:

STH – STATIC WATER HEAD
ATP – ATMOSPHERIC PRESSURE

MPL NO. C41-1010

Figure 9.3-1 Standby Liquid Control System P&ID



MODE A — REACTOR INJECTION MODE — NOTE 6

LOCATION	1	2	3	4	5	6	7
FLOW (L/min)	189	189	189	189	189	0	0
PRESS (MPa G)	STH	−0.001	Max 8.43*	7.97	7.92	STH	ATP
TEMP (°C)	30	30	30	30	30	AMT	AMT
MAX ALLOWABLE PRESS LOSS (m)	← 0.12 →			* PEAK PRESS 9.81 MPa G			

MODE B — NON-INJECTION TEST MODE — NOTE 6

LOCATION	6	2	3	7	1	4	5
FLOW (L/min)	189	189	189	189	0	0	0
PRESS (MPa G)	STH	−0.001	Max 8.43*	ATP	STH	RxP	RxP
TEMP (°C)	DWT	DWT	DWT	DWT	30	RxT	RxT
MAX ALLOWABLE PRESS LOSS (m)	← 0.12 →			* PEAK PRESS 9.81 MPa G			

MODE C — INJECTION TEST MODE — NOTE 6

LOCATION	6	2	3	4	5	1	7
FLOW (L/min)	189	189	189	189	189	0	0
PRESS (MPa G)	STH	−0.001	*	*	RxP	STH	ATP
TEMP (°C)	DWT	DWT	DWT	DWT	DWT	30	AMT
MAX ALLOWABLE PRESS LOSS (m)	← 0.12 →						

MODE D — STANDBY MODE

LOCATION	1	2	3	4	5	6	7
FLOW (L/min)	0	0	0	0	0	0	0
PRESS (MPa G)	STH	DWP	DWP	RxP	RxP	ATP	ATP
TEMP (°C)	30	AMT	AMT	RxT	RxT	AMT	AMT
MAX ALLOWABLE PRESS LOSS (m)							

		A	B	C	D	E	F	G
DESIGN PRESSURE	MPa G	8.62	10.79	2.82	STH	0.863	2.82	10.79
DESIGN TEMPERATURE	(°C)	302	66	66	66	66	66	302

VALVE OPENING/CLOSING CONDITION — NOTE 6

	F 001 A&B	F 002 A&B	F 004 A&B	F 005 A&B	F 006 A&B	F 007	F 008	F 010	F 011	F 012	F 014
MODE A	O	O	O	O	O	O	O	X	X	X	X
MODE B	X	O	O	O	X	X	X	P	O	O	X
MODE C	X	O	O	O	O (X)	O	O	X	X	O	X
MODE D	X	O	X	O	X	X	X	X	X	X	X

O: FULL OPEN P: PARTIALLY OPEN X: CLOSE

NOTES:

1. ⊡ SHOWS THE VALUE WHICH IS NOT NEEDED IN A BASIC PLANNING OF THIS SYSTEM.
2. SOLUTION TEMP IN SLC TANK SHALL BE MAINTAINED AT 30±3°C DURING NORMAL PLANT OPERATION.
3. SLC TANK SHALL BE LOCATED SUCH THAT PUMP SUCTION PIPING IS ALWAYS FILLED WITH THE SOLUTION.
4. SLC PUMP SHALL BE ABLE TO INJECT BORON SOLUTION AT REACTOR PRESSURE OF 10.79 MPa G.
5. TEST TANK SHALL BE LOCATED SUCH THAT PUMP SUCTION PIPING IS ALWAYS FILLED WITH WATER.
6. DURING OPERATING MODE A,B OR C, ONLY ONE PUMP IS RUN.

REFERENCE DOCUMENTS:

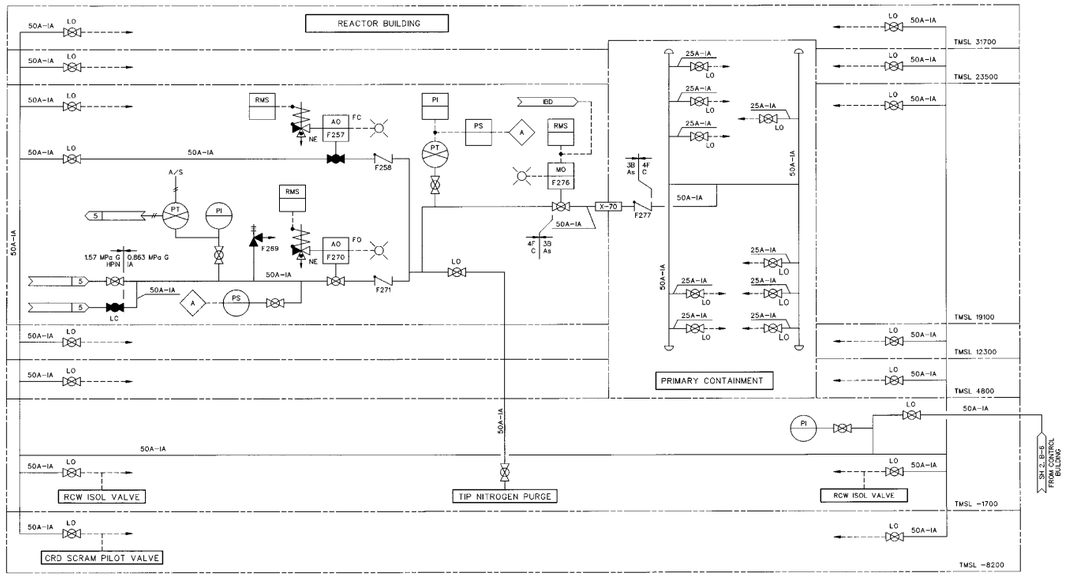
	MPL ITEM NO.
1. STANDBY LIQUID CONTROL SYS IBD	C41–1030
2. STANDBY LIQUID CONTROL SYS P&ID	C41–1010

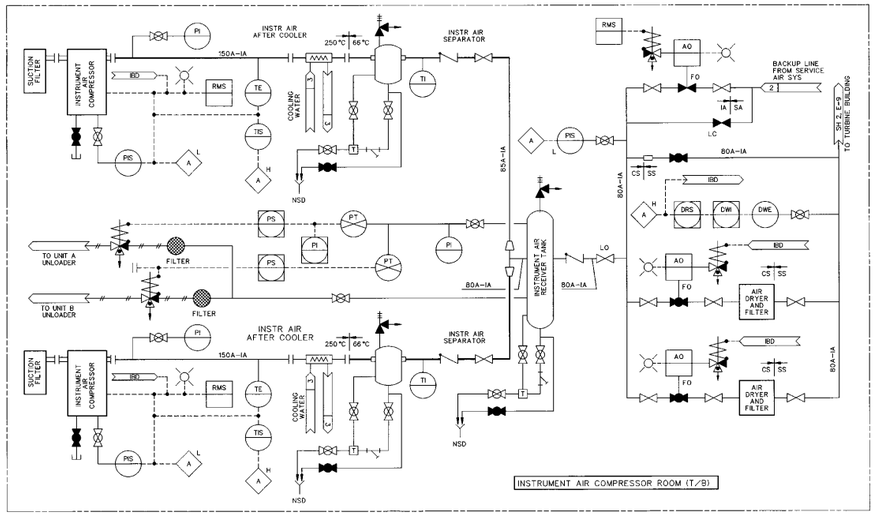
ABREVIATION:

STH : STATIC WATER HEAD
ATP : ATMOSPHERIC PRESSURE
AMT : AMBIENT TEMPERATURE
DWT : SUPPLIED DEMIN WATER TEMPERATURE
DWP : SUPPLIED DEMIN WATER PRESSURE
RxP : REACTOR PRESSURE
RxT : REACTOR TEMPERATURE

MPL NO. C41–1020

Figure 9.3-1a Standby Liquid Control System PFD





NOTES:

1. THE FOLLOWING DESIGN SPECIFICATIONS ARE APPLIED UNLESS OTHERWISE NOTED.

ITEM	APPLICATION		
SYSTEM	1A		
GROUP CLASSIFICATION	4D		
MAXIMUM OPERATING PRESSURE (MPa G)	0.863		
MAXIMUM OPERATING TEMPERATURE (°C)	COMPRESSOR TO AFTER COOLER		250
	OTHER		56
OPERATING TEMP (°C)	60 (MAX)		
PIPE MATERIAL	CS		
	SS		
PIPE WALL THICKNESS	CS	65A AND MORE SCH 40	
		50A AND LESS SCH 80	
	SS	SCH 40	
SEISMIC CATEGORY	PCV BOUNDARY		As
	OTHER		C
FLUID	AIR/NITROGEN		

2. FOLLOWING ITEMS MAY BE CHANGED AT THE DETAIL DESIGN STAGE.
   A. ARRANGEMENT OF COMPONENTS
   B. CONFIGURATION OF PIPING
   C. IDENTIFICATION OF VALVES

REFERENCE DOCUMENTS:

	MPL NO.
1. PIPING AND INSTRUMENT SYMBOLS	A10-3030
2. SERVICE AIR SYSTEM	P51-1010
3. REACTOR BUILDING COOLING WATER SYSTEM	P21-1010
4. ATMOSPHERIC CONTROL SYSTEM	T31-1010
5. HIGH PRESSURE NITROGEN GAS SUPPLY SYSTEM	P54-1010
6. INSTRUMENT AIR SYSTEM IBD	P52-1030
7. RADWASTE SYSTEM	K17-1010

MPL NO. P52-1010

Figure 9.3-6 Instrument Air System P&ID (Sheet 1 of 2)

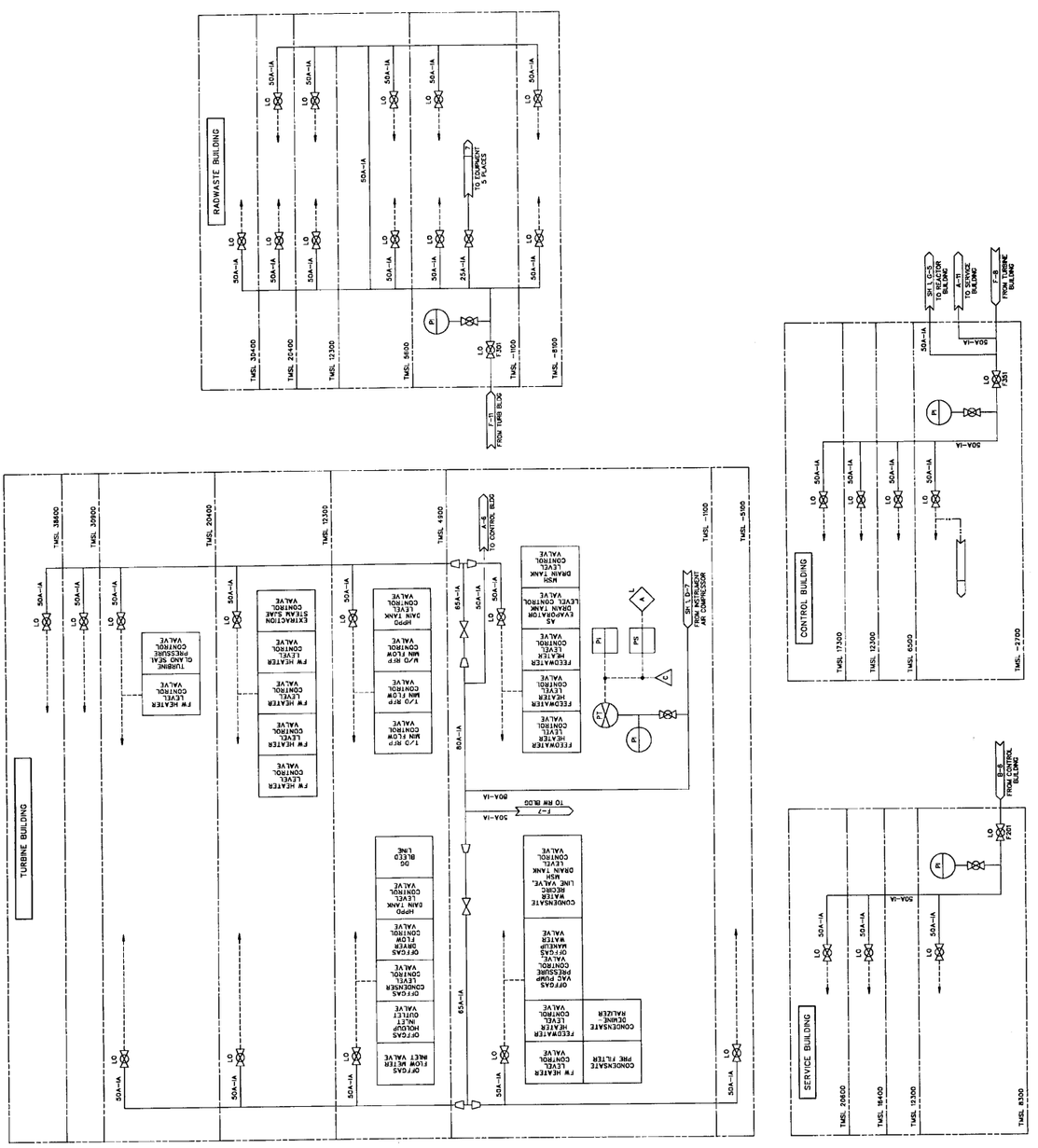
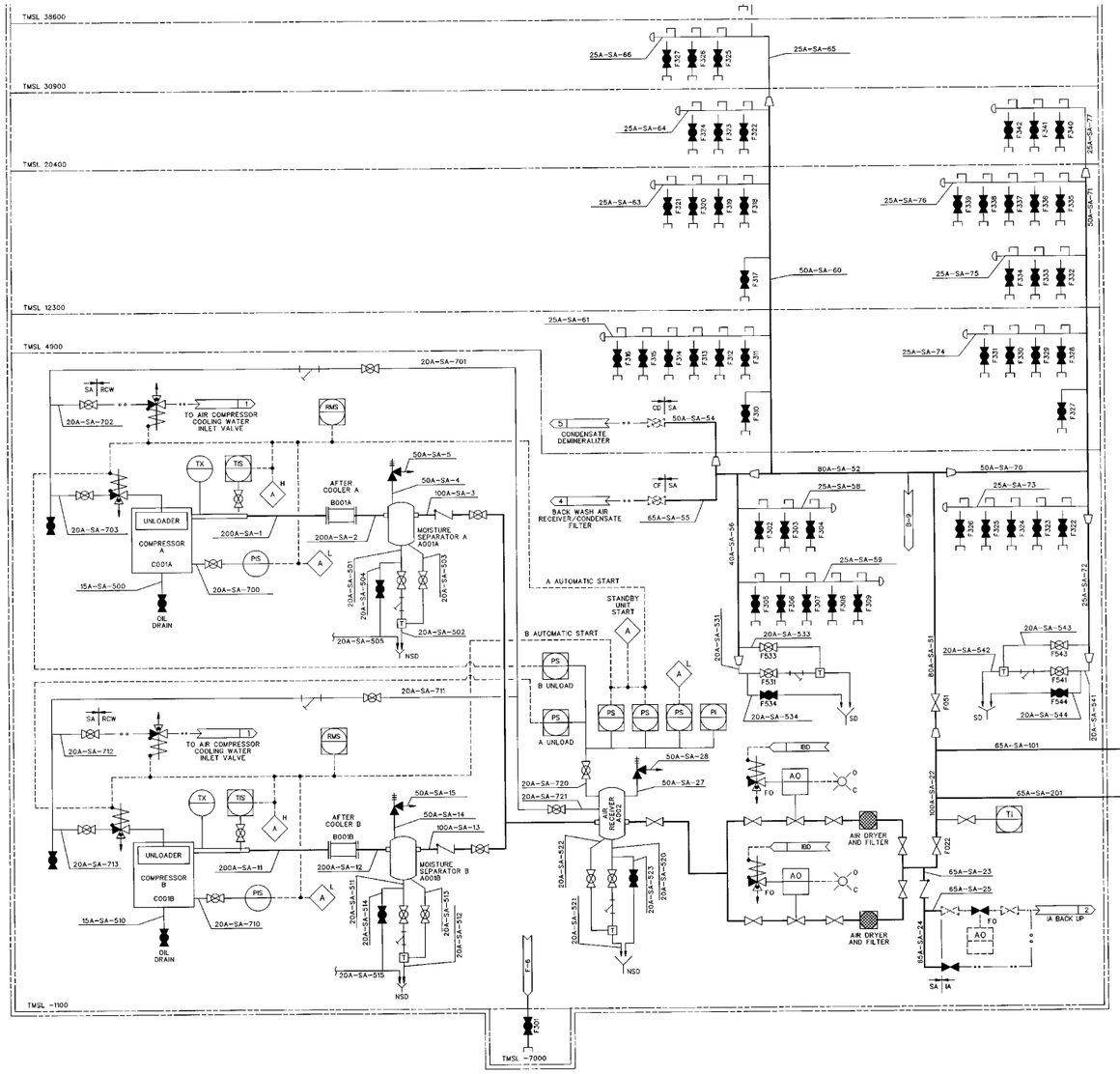


Figure 9.3-6 Instrument Air System P&ID (Sheet 2 of 2)



NOTES:

1. WITH REGARD TO AIR COMPRESSORS THROUGH AIR RECEIVER, THIS DRAWING SHOWS OUTLINE OF TYPICAL CONFIGURATION.
2. BRANCH LINES FOR SA HOSE CONNECTION SHALL BE BASICALLY BRANCHED FROM TOP OR SIDE OF MAIN LINE.
3. SA MAIN LINES SHALL HAVE TRAP SET ON THE LOWEST POINT IF NECESSARY.
4. CONNECTING CONFIGURATION OF PIPING AND VALVE NUMBER AND PIPING NUMBER MAY BE CHANGED IN DETAIL DESIGN STAGE.
5. PIPING DESIGN SPECIFICATIONS ARE AS FOLLOWS EXCEPT FOR SPECIAL DESCRIPTION.

ITEM	PCV BOUNDARY	OTHERS
MAXIMUM OPERATING PRESSURE	0.863 MPa	0.863 MPa
MAXIMUM OPERATING TEMPERATURE	171°C	66°C
MATERIAL	CS MATERIAL OF PIPING LAID UNDER CONCRETE IS SS	
PIPING THICKNESS	65A AND OVER : SCH 40 50A AND LESS : SCH 80 (ALL SS PIPING IS SCH 40)	
DESIGN CLASS	3	7
QC CLASS	B	G
SEISMIC CLASS	As	C
FLUID	AIR	
FLUID RADIOACTIVE LEVEL	B.G.	

REFERENCE DOCUMENTS:

	MPL NO.
1. AIR COMPRESSOR COOLING WATER SUBSYSTEM P&ID	P21-1010
2. INSTRUMENT AIR SYSTEM P&ID	P52-1010
3. RADWASTE SYSTEM P&ID	K17-1010
4. CONDENSATE FILTER SYSTEM P&ID	N28-1010
5. CONDENSATE DEMIN SYSTEM P&ID	N27-1010
6. FUEL POOL COOLING & CLEANUP SYS P&ID	G41-1010
7. RWCU SYSTEM P&ID	G31-1010
8. STANDBY LIQUID CONTROL SYS P&ID	C41-1010
9. DECONTAMINATION SYSTEM P&ID	U48-1010
10. STATION SERVICE AIR SYSTEM IBD	P51-1030
11. PIPING AND INSTRUMENT SYMBOLS DIAGRAM	A10-3030

MPL NO. P51-1010

Figure 9.3-7 Station Service Air System P&ID (Sheet 1 of 2)

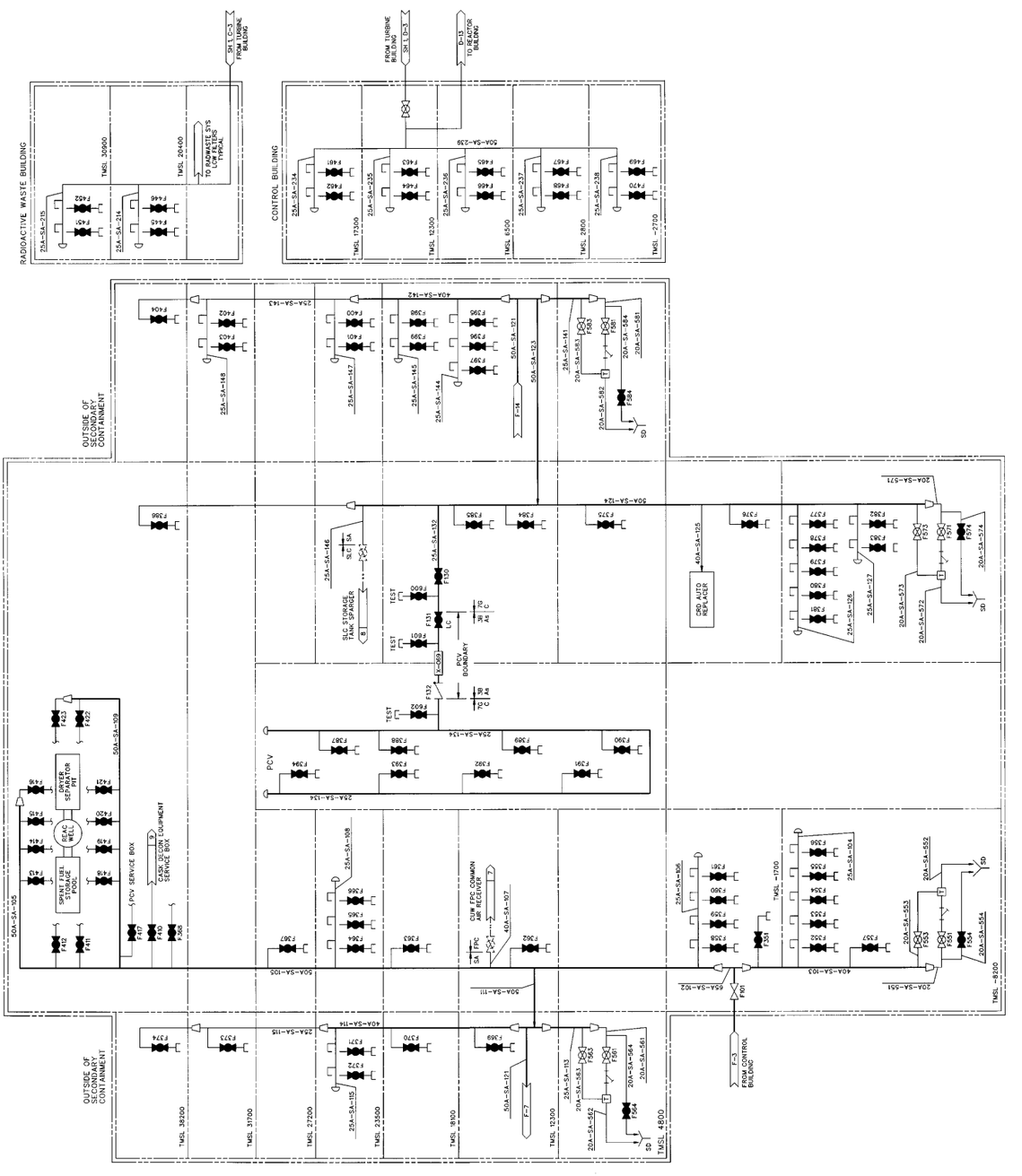


Figure 9.3-7 Station Service Air System P&ID (Sheet 2 of 2)

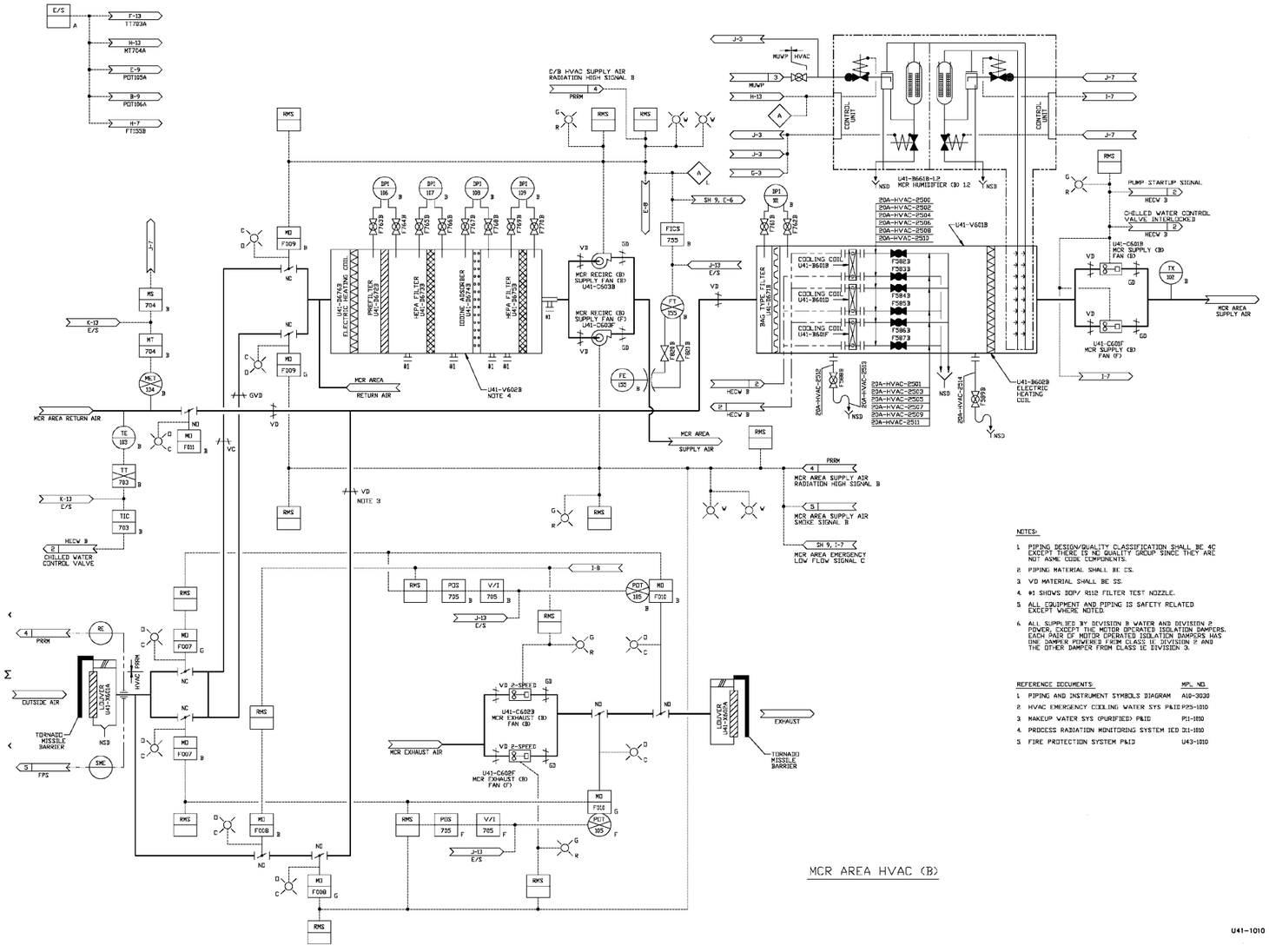


Figure 9.4-1 Control Building HVAC Flow Diagram (Sheet 1 of 5)

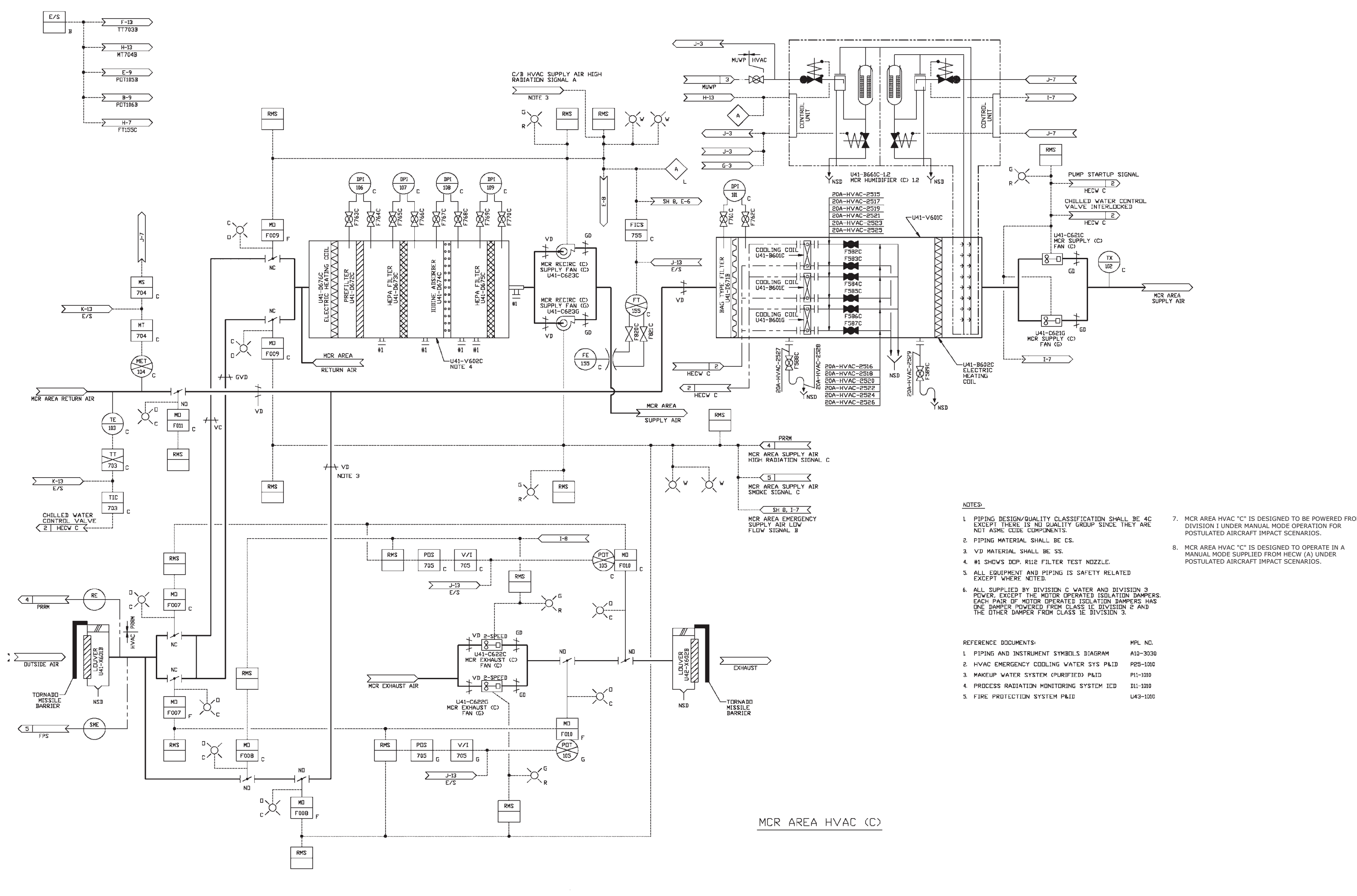


Figure 9.4-1 Control Building HVAC Flow Diagram (Sheet 2 of 5)

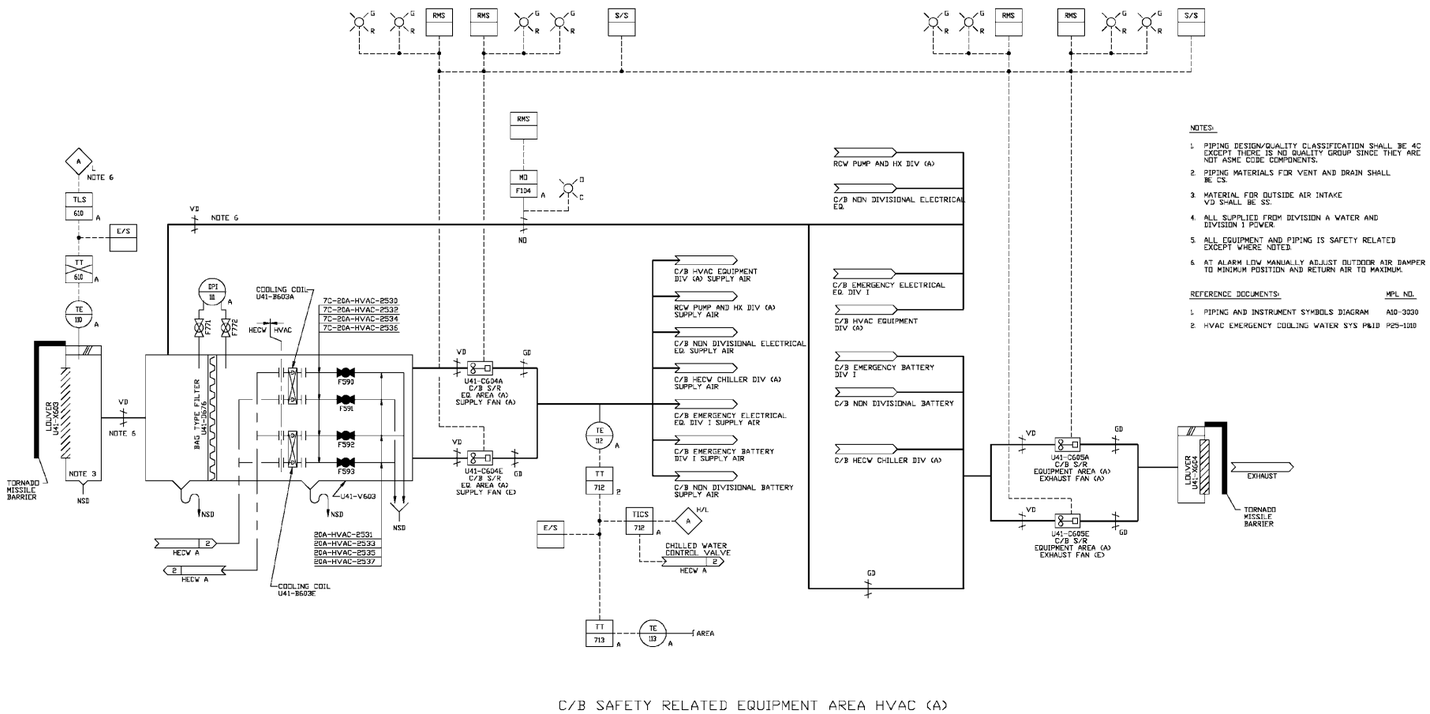
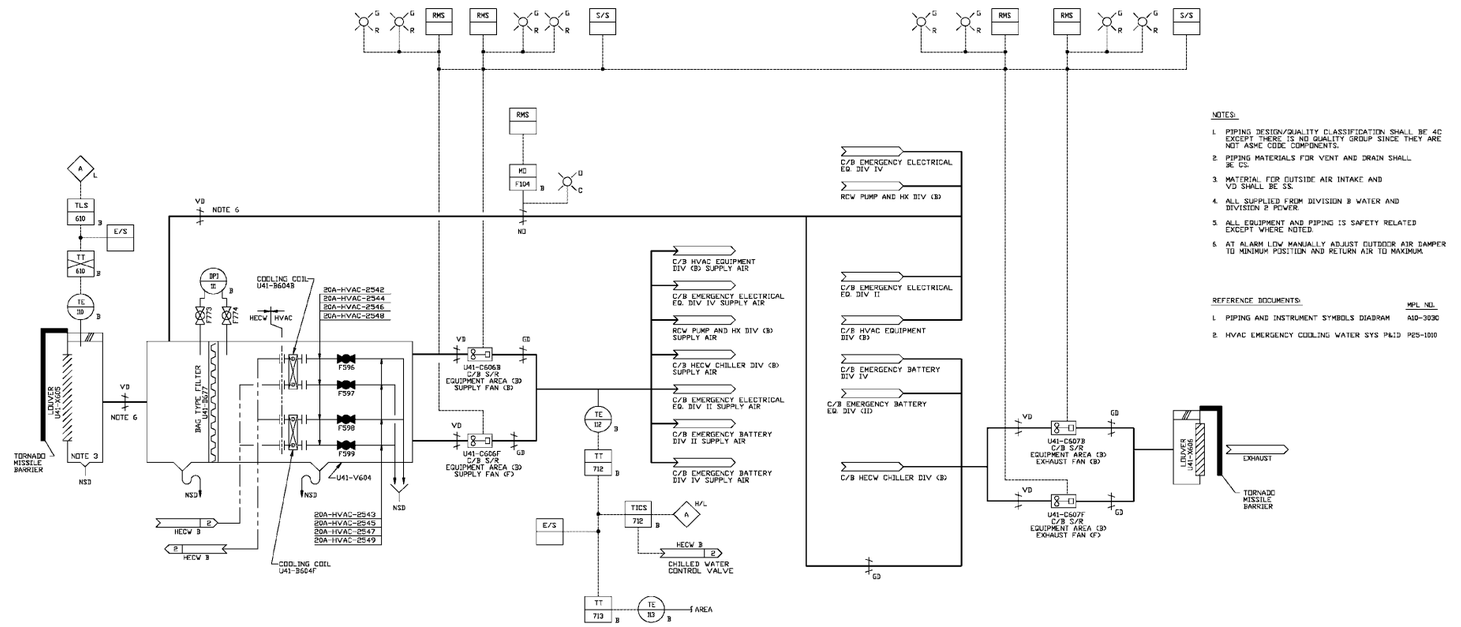
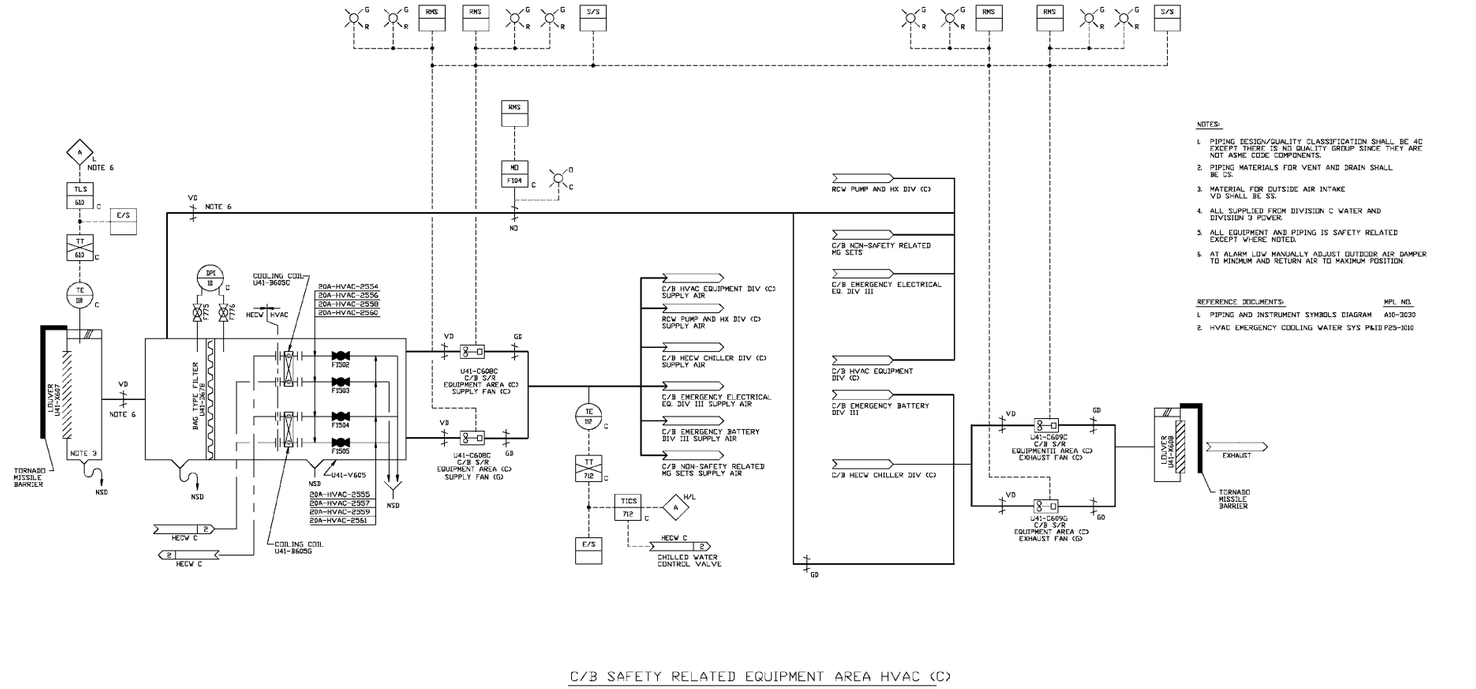


Figure 9.4-1 Control Building HVAC Flow Diagram (Sheet 3 of 5)



C/B SAFETY RELATED EQUIPMENT AREA HVAC (B)

Figure 9.4-1 Control Building HVAC Flow Diagram (Sheet 4 of 5)



NOTES:

1. PIPING DESIGN/QUALITY CLASSIFICATION SHALL BE 4C EXCEPT THERE IS NO QUALITY GROUP SINCE THEY ARE NOT ASME CODE COMPONENTS.
2. PIPING MATERIALS FOR VENT AND DRAIN SHALL BE CS.
3. MATERIAL FOR OUTSIDE AIR INTAKE VD SHALL BE SS.
4. ALL SUPPLIED FROM DIVISION C WATER AND DIVISION 3 POWER.
5. ALL EQUIPMENT AND PIPING IS SAFETY RELATED EXCEPT WHERE NOTED.
6. AT ALARM LOW MANUALLY ADJUST OUTDOOR AIR DAMPER TO MINIMUM AND RETURN AIR TO MAXIMUM POSITION.

REFERENCE DOCUMENTS: MPL NO.

1. PIPING AND INSTRUMENT SYMBOLS DIAGRAM A10-3030
2. HVAC EMERGENCY COOLING WATER SYS P&ID P25-1010

C/B SAFETY RELATED EQUIPMENT AREA HVAC (C)

U41-1010

Figure 9.4-1 Control Building HVAC Flow Diagram (Sheet 5 of 5)

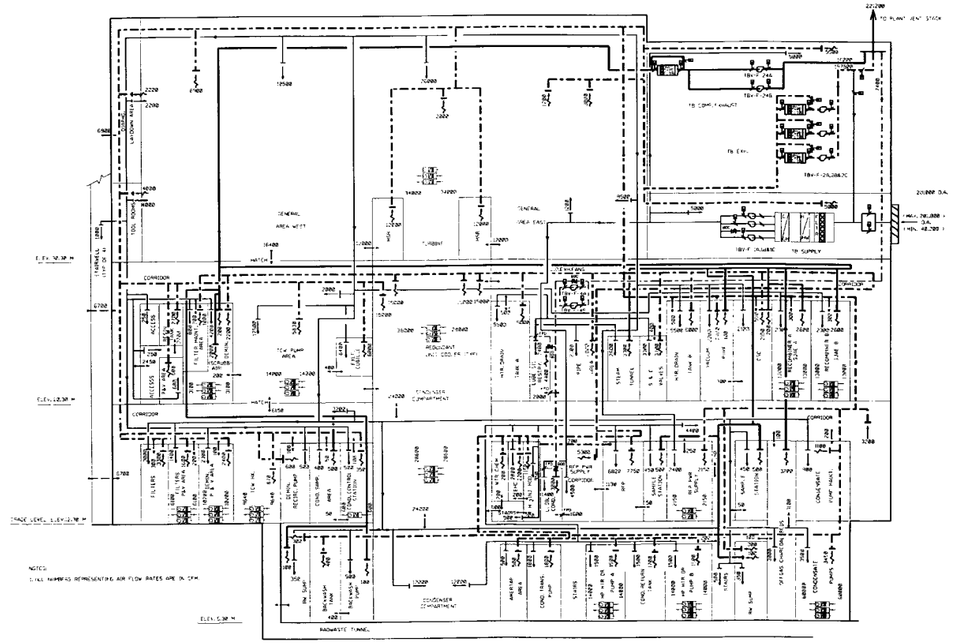


Figure 9.4-2a Turbine Building Ventilation System Air Flow Diagram

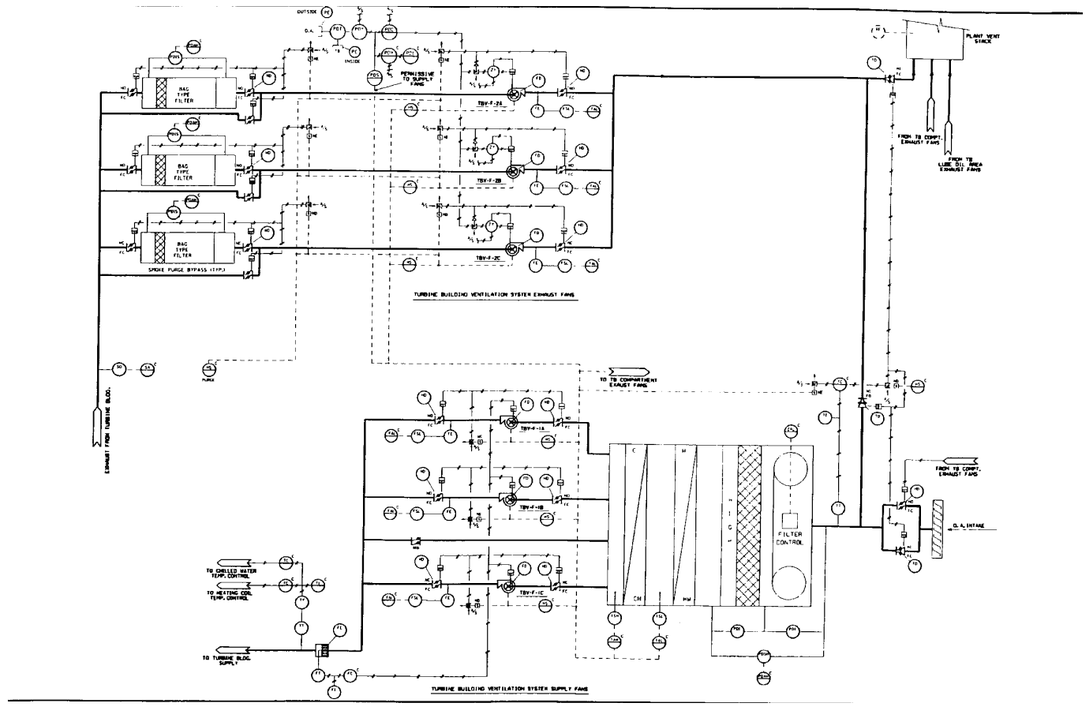


Figure 9.4-2b Turbine Building Ventilation System Control Diagram (Sheet 1 of 2)

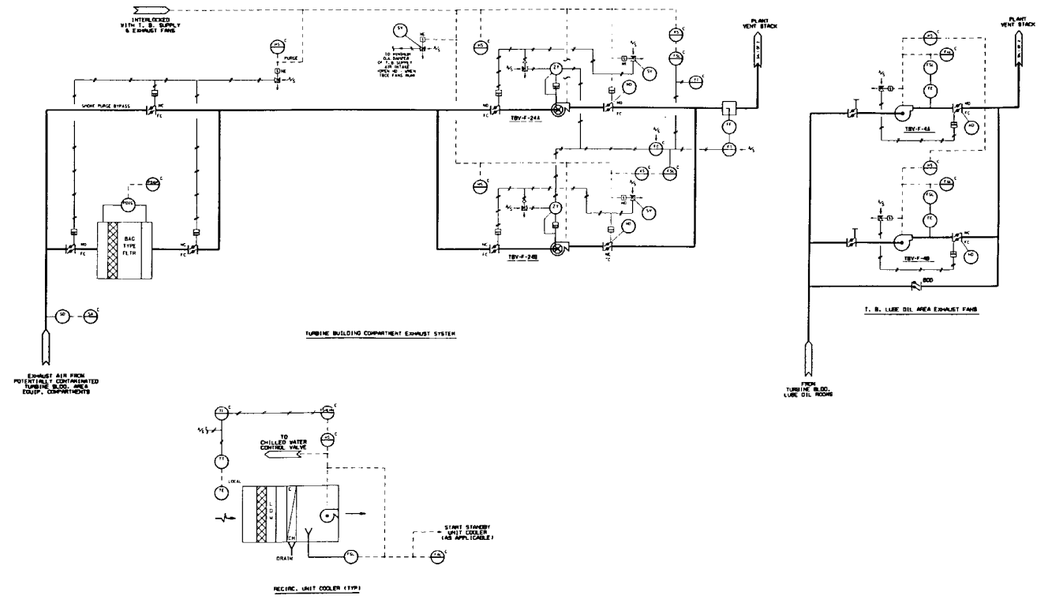


Figure 9.4-2b Turbine Building Ventilation System Control Diagram (Sheet 2 of 2)

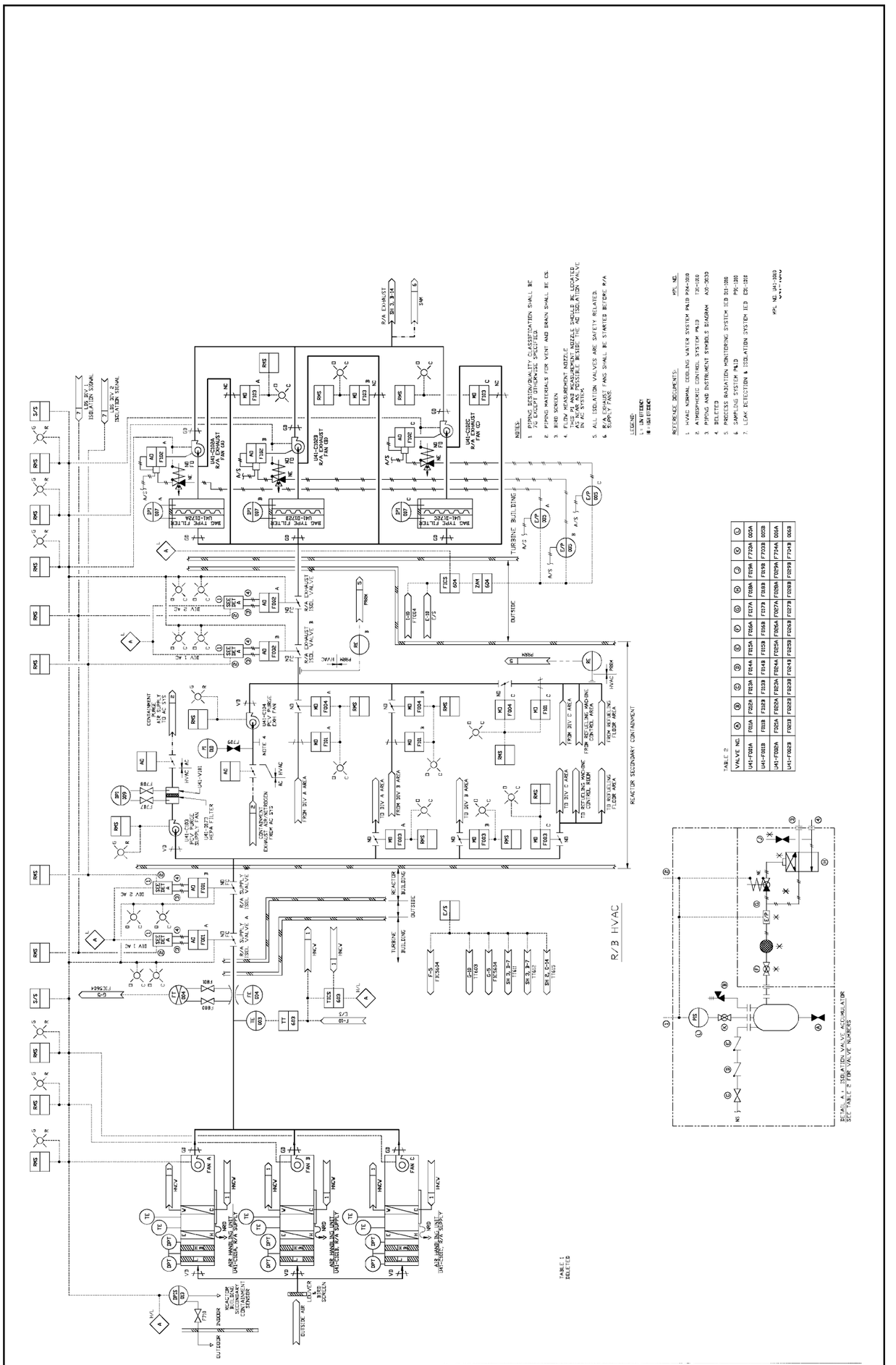
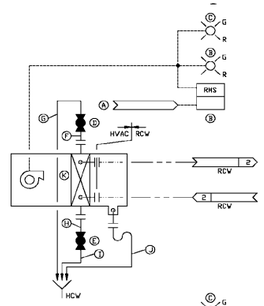
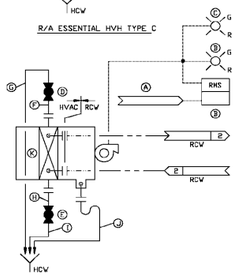


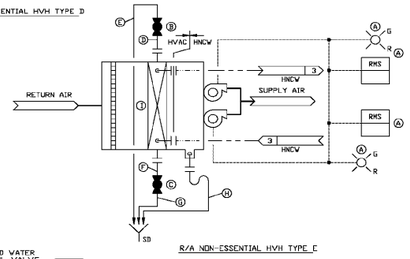
Figure 9.4-3 Secondary Containment HVAC System (Sheet 1 of 3)



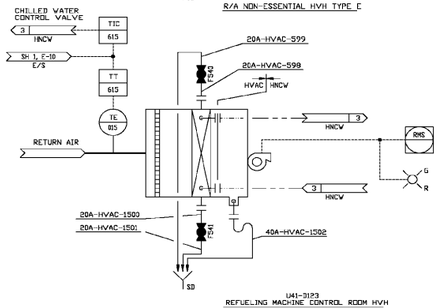
R/A ESSENTIAL HVH TYPE C



R/A ESSENTIAL HVH TYPE D



R/A NON-ESSENTIAL HVH TYPE E



U41-D123
REFUELING MACHINE CONTROL ROOM HVH

TABLE 3: ESSENTIAL HVH

TYPE	EQ. NO.	HVH NAME	HVH INITIATION SIGNAL (A)	PANEL NO. (B)	PANEL NO. (C)	VALVE NO. (D)	VALVE NO. (E)	PIPING SIZE & NO. (F)	PIPING SIZE & NO. (G)	PIPING SIZE & NO. (H)	PIPING SIZE & NO. (I)	PIPING SIZE & NO. (J)	COOLING COIL (K)
B	U41-B101	RCIC PUMP ROOM HVH	RCIC PUMP START SIGNAL			F504	F503	20A-HVAC -508	20-HVAC -509	-510	-511	40-HVAC -512	B101
B	U41-B102	HPCF PUMP (C) ROOM HVH	HPCF PUMP (C) START SIGNAL			F506	F507	-513	-514	-515	-516	-517	B102
B	U41-B103	RHR PUMP (A) ROOM HVH	RHR PUMP (A) START SIGNAL			F508	F509	-518	-519	-520	-521	-522	B103
B	U41-2104	RHR PUMP (C) ROOM HVH	RHR PUMP (C) START SIGNAL			F510	F511	-523	-524	-525	-526	-527	B104
B	U41-B105	RHR PUMP (B) ROOM HVH	RHR PUMP (B) START SIGNAL			F512	F513	-528	-529	-530	-531	-532	B105
B	U41-B106	HPCF PUMP (B) ROOM HVH	HPCF PUMP (B) START SIGNAL			F514	F515	-533	-534	-535	-536	-537	B106
B	U41-B107	FCS ROOM HVH (C)	SECONDARY CONTAINMENT ISOLATION SIGNAL			F516	F517	-538	-539	-540	-541	-542	B107
B	U41-B108	FCS ROOM HVH (B)	SECONDARY CONTAINMENT ISOLATION SIGNAL			F518	F519	-543	-544	-545	-546	-547	B108
B	U41-B111	SGTS ROOM HVH (C)	SECONDARY CONTAINMENT ISOLATION SIGNAL			F524	F525	-558	-559	-560	-561	-562	B111
B	U41-B112	SGTS ROOM HVH (B)	SECONDARY CONTAINMENT ISOLATION SIGNAL			F526	F527	-563	-564	-565	-566	-567	B112
C	U41-B113	CAMS (A) ROOM HVH	SECONDARY CONTAINMENT ISOLATION SIGNAL			F528	F529	-568	-569	-570	-571	-572	B113
C	U41-B114	CAMS (B) ROOM HVH	SECONDARY CONTAINMENT ISOLATION SIGNAL			F530	F531	-573	-574	-575	-576	-577	B114

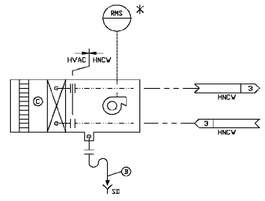
TABLE 4 : NON-ESSENTIAL AIR HANDLING UNIT (NON-SAFETY RELATED)

TYPE	EQ. NO.	HVH NAME	PANEL NO. (A)	VALVE NO. (B)	VALVE NO. (C)	PIPING SIZE & NO. (D)	PIPING SIZE & NO. (E)	PIPING SIZE & NO. (F)	PIPING SIZE & NO. (G)	PIPING SIZE & NO. (H)	COOLING COIL (I)
E	U41-B121A	R/A MS TUNNEL HVH (A) NOTE 3		F536	F537	20A-HVAC -588	20A-HVAC -589	20A-HVAC -590	20A-HVAC -591	40A-HVAC -592	B121A
E	U41-B121B	R/A MS TUNNEL HVH (B) NOTE 3		F538	F539	20A-HVAC -593	20A-HVAC -594	20A-HVAC -595	20A-HVAC -596	40A-HVAC -597	B121B
E	U41-B115	R/A SPCU PUMP ROOM		F	F	20A-HVAC -1503	20A-HVAC -1504	20A-HVAC -1505	20A-HVAC -1516	40A-HVAC -1507	B115
-	U41-B123	R/A REFUELING MACHINE CONTROL ROOM HVH		F	F	20A-HVAC -598	20A-HVAC -599	20A-HVAC -1500	20A-HVAC -1501	40A-HVAC -1502	B123
D	U41-B109	FPC PUMP (A) ROOM HVH		F528	F529	-548	-549	-550	-551	-552	B109
D	U41-B110	FPC PUMP (B) ROOM HVH		F522	F523	-553	-554	-555	-556	-557	B110

TABLE 5 : NON-ESSENTIAL AIR HANDLING UNIT (NON-SAFETY RELATED)

TYPE	EQ. NO.	HVH NAME	PIPE SIZE & NO. (B)	COOLING COIL (C)
MV504	U41-B131A	CRD CONTROL ROOM	20A-HVAC -1514	B131A
MV504	U41-B132A	MG SET ROOM (A) NOTE 4	20A-HVAC -1517	B132A
MV504	U41-B132B	MG SET ROOM (C) NOTE 4	20A-HVAC -1518	B132B
MV504	U41-B133A	NON-DIVISIONAL ELECTRICAL EQUIPMENT ZONE NOTE 4	20A-HVAC -1519	B133
MV504	U41-B134A	ISI ROOM	20A-HVAC -1512	B134A

R/B AND C/B HVAC



R/A NON-ESSENTIAL UNIT TYPE MV504

NOTES:

1. PIPING MATERIALS FOR VENT AND DRAIN SHALL BE CS.
2. PIPING DESIGN/QUALITY CLASSIFICATION SHALL BE 7G EXCEPT OTHERWISE SPECIFIED.
3. THESE HVH'S CAN BE COMBINED INTO A COMMON COIL.
4. THESE UNITS ARE IN CONTROL BUILDING.

REFERENCE DOCUMENTS:

	MPL NO.
1. PIPING AND INSTRUMENT SYMBOLS DIAGRAM	A10-3030
2. REACTOR BLDG COOLING WATER SYS P&ID	P21-1010
3. HVAC NORMAL COOLING WATER SYS P&ID	P24-1010

Figure 9.4-3 Secondary Containment HVAC System (Sheet 2 of 3)

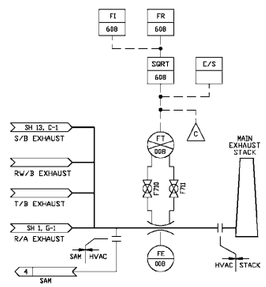
TABLE 6 : EMERGENCY ISOLATION DAMPER
(SAFETY-RELATED)

DAMPER NAME	DAMPER NO.
SECONDARY CONTAINMENT SUPPLY DAMPER	F001A
SECONDARY CONTAINMENT SUPPLY DAMPER	F001B
SECONDARY CONTAINMENT EXHAUST DAMPER	F002A
SECONDARY CONTAINMENT EXHAUST DAMPER	F002B

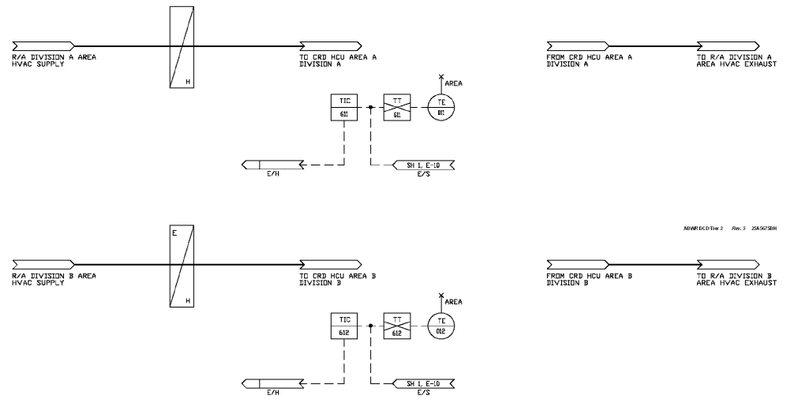
NOTES:

1. PIPING DESIGN/QUALITY CLASSIFICATION SHALL BE 7G EXCEPT OTHERWISE SPECIFIED.
2. PIPING MATERIALS FOR VENT AND DRAIN SHALL BE CS.

REFERENCE DOCUMENTS:		MPL NO.
1.	PIPING AND INSTRUMENT SYMBOLS DIAGRAM	A1C-3030
2.	DELETED	
3.	PROCESS RADIATION MONITORING SYS P&ID	D11-1013
4.	SAMPLING SYSTEM P&ID	P51-1010



EXHAUST AIR MEASUREMENT



R/B HVAC

Figure 9.4-3 Secondary Containment HVAC System (Sheet 3 of 3)

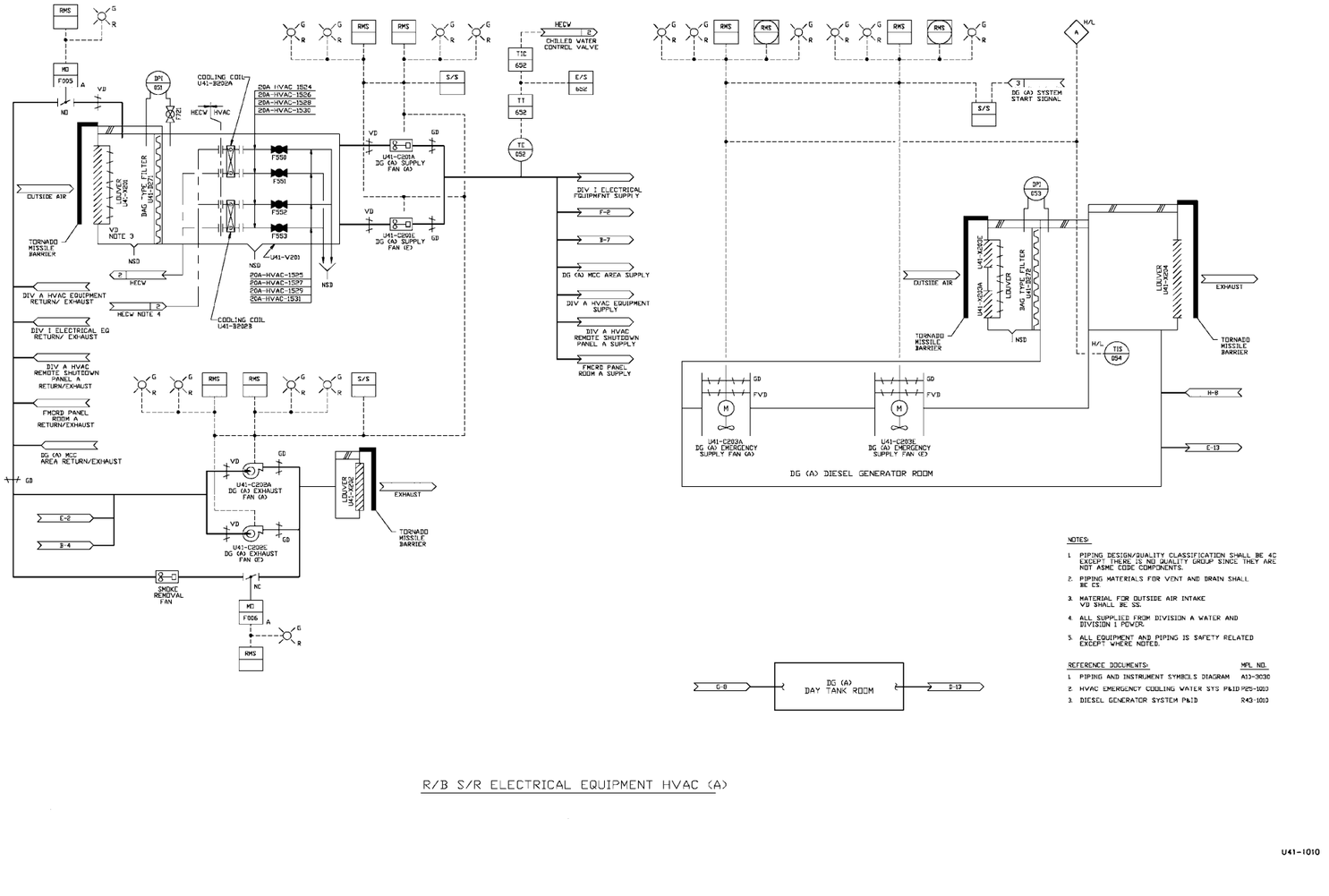
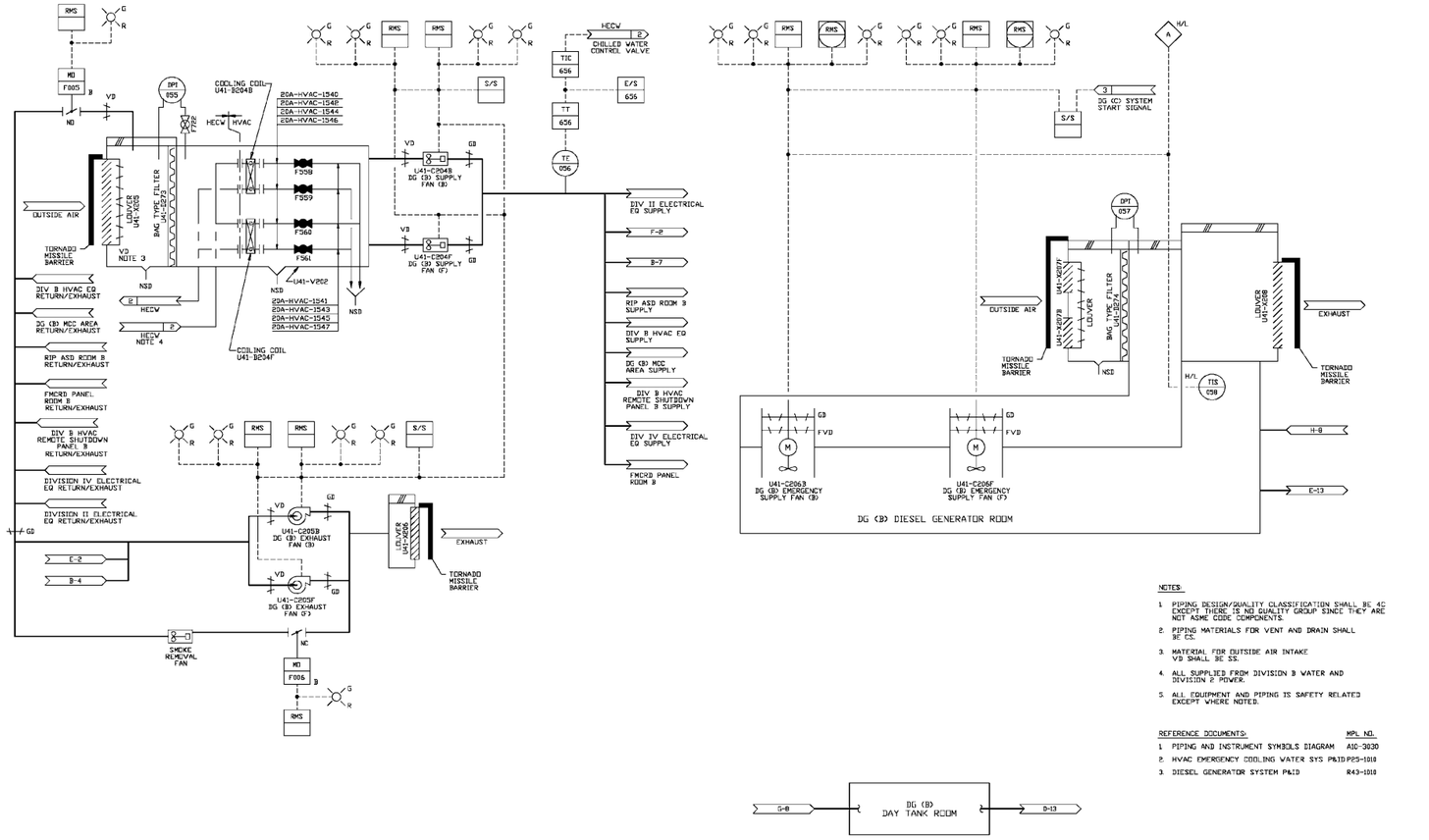


Figure 9.4-4 R/B Safety-Related Electrical Equipment HVAC System (Sheet 1 of 3)



NOTES:

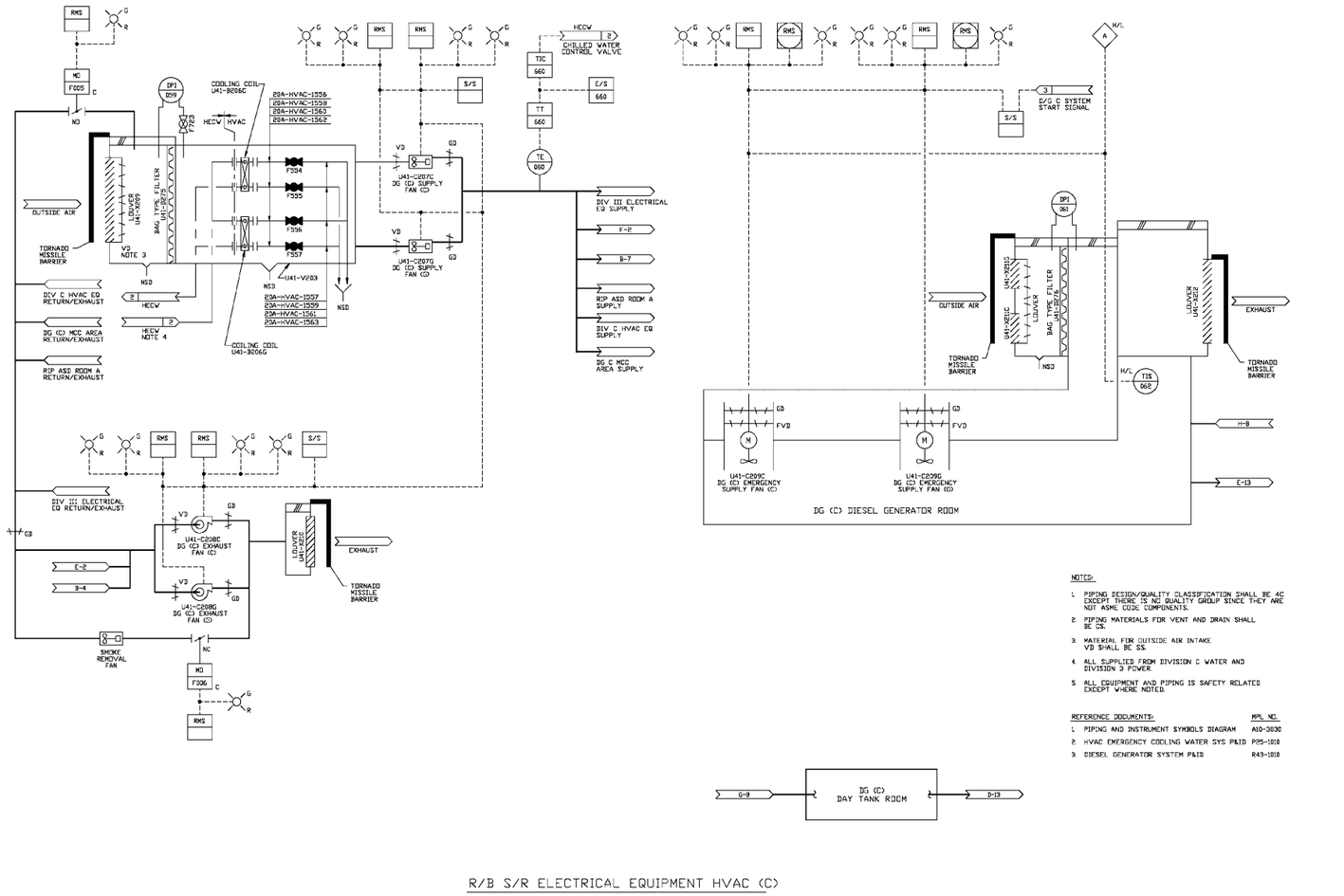
1. PIPING DESIGN/QUALITY CLASSIFICATION SHALL BE 4C EXCEPT THERE IS NO QUALITY GROUP SINCE THEY ARE NOT ASME CODE COMPONENTS.
2. PIPING MATERIALS FOR VENT AND DRAIN SHALL BE CS.
3. MATERIAL FOR OUTSIDE AIR INTAKE V3 SHALL BE SS.
4. ALL SUPPLIED FROM DIVISION B WATER AND DIVISION 2 POWER.
5. ALL EQUIPMENT AND PIPING IS SAFETY RELATED EXCEPT WHERE NOTED.

REFERENCE DOCUMENTS:	MPL NO.
1. PIPING AND INSTRUMENT SYMBOLS DIAGRAM	A1C-3030
2. HVAC EMERGENCY COOLING WATER SYS P&ID	P23-1018
3. DIESEL GENERATOR SYSTEM P&ID	R43-1018

R/B S/R ELECTRICAL EQUIPMENT HVAC (B)

U41-1010

Figure 9.4-4 R/B Safety-Related Electrical Equipment HVAC System (Sheet 2 of 3)



NOTES:

1. PIPING DESIGN/QUALITY CLASSIFICATION SHALL BE 4C EXCEPT THERE IS NO QUALITY GROUP SINCE THEY ARE NOT ASME CODE COMPONENTS.
2. PIPING MATERIALS FOR VENT AND DRAIN SHALL BE CS.
3. MATERIAL FOR OUTSIDE AIR INTAKE VD SHALL BE SS.
4. ALL SUPPLIED FROM DIVISION C WATER AND DIVISION 3 POWER.
5. ALL EQUIPMENT AND PIPING IS SAFETY RELATED EXCEPT WHERE NOTED.

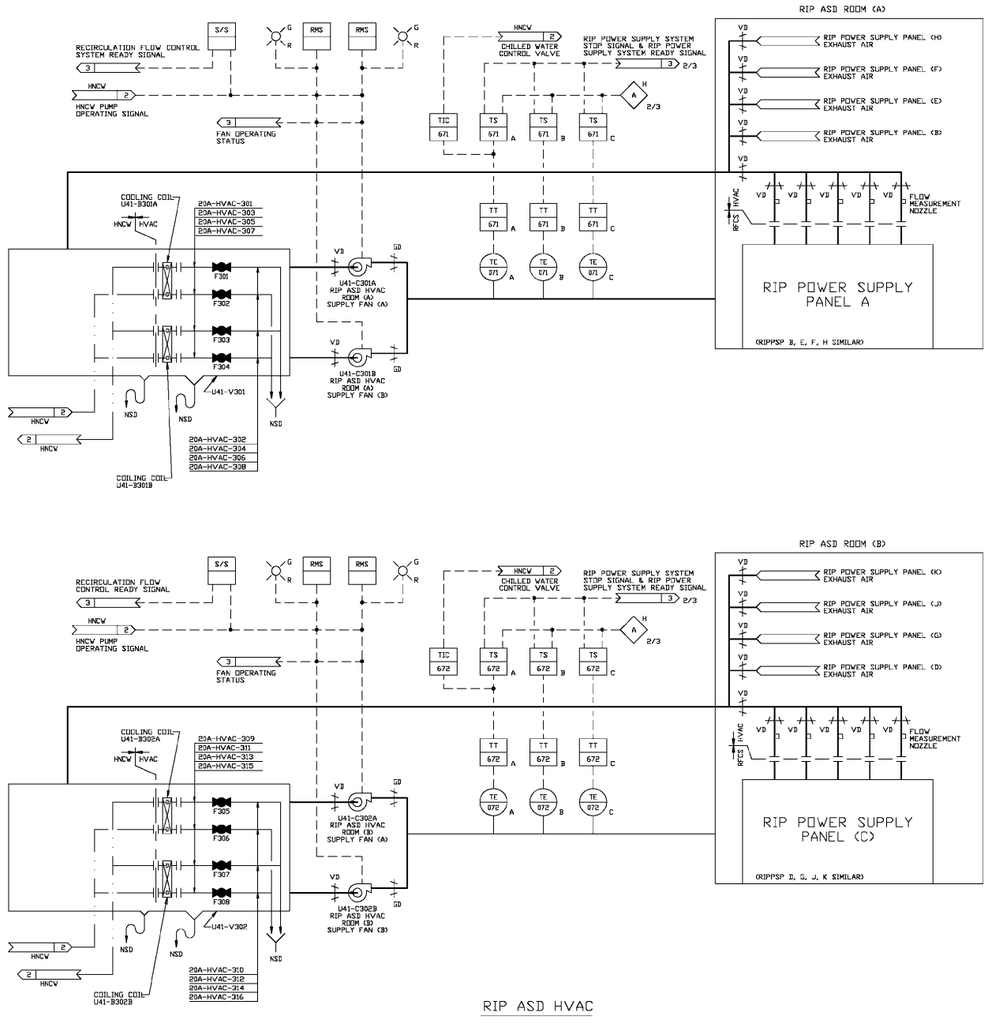
REFERENCE DOCUMENTS:

		MFL NO.
1.	PIPING AND INSTRUMENT SYMBOLS DIAGRAM	A10-3030
2.	HVAC EMERGENCY COOLING WATER SYS P&ID	P25-1010
3.	DIESEL GENERATOR SYSTEM P&ID	R43-1010

R/B S/R ELECTRICAL EQUIPMENT HVAC (C)

U41-1010

Figure 9.4-4 R/B Safety-Related Electrical Equipment HVAC System (Sheet 3 of 3)

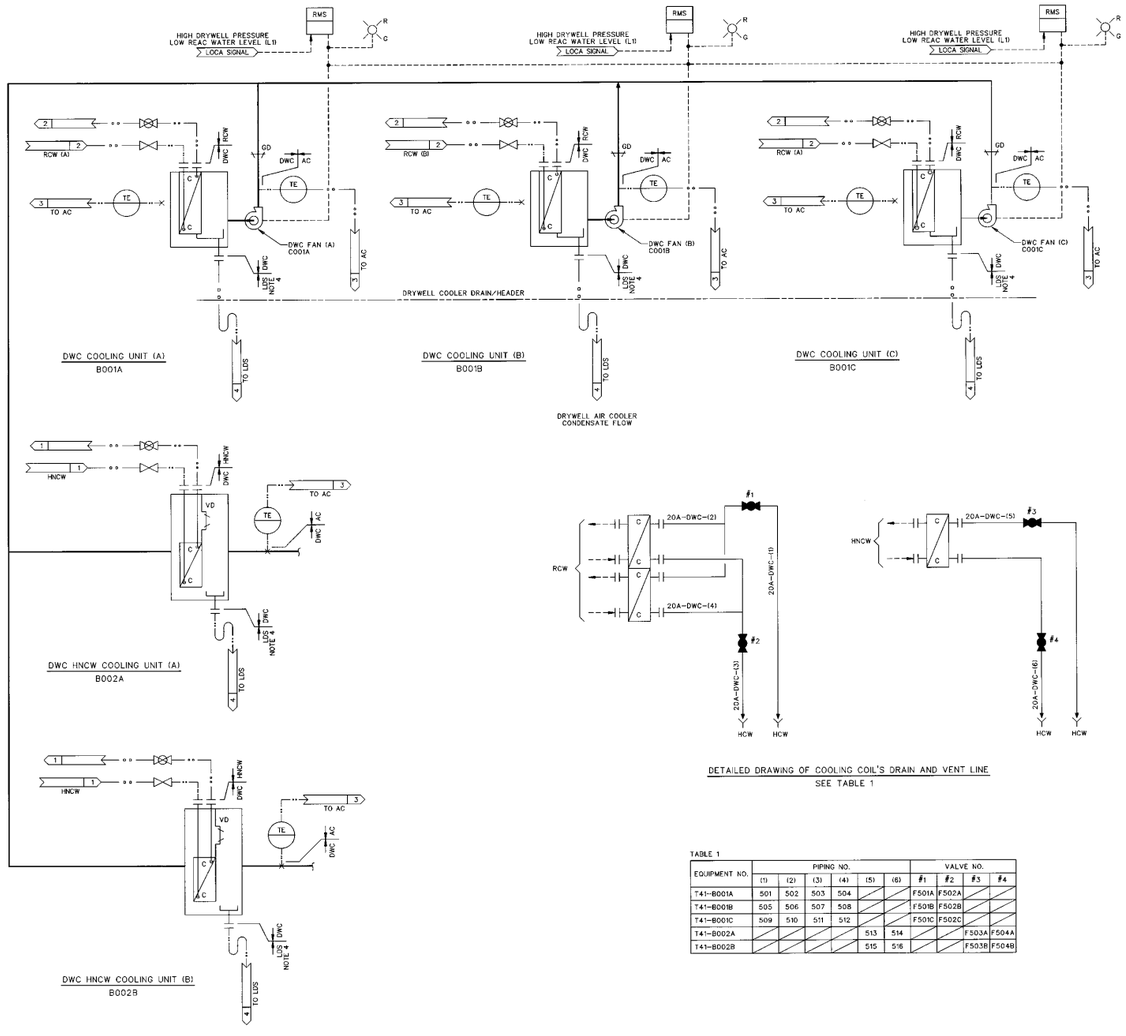


NOTES:

1. PIPING DESIGN/QUALITY CLASSIFICATION SHALL BE 7G EXCEPT OTHERWISE SPECIFIED.
2. PIPING MATERIALS FOR VENT AND DRAIN SHALL BE CS.
3. ALL EQUIPMENT AND PIPING IS NON SAFETY RELATED.

REFERENCE DOCUMENTS:		MPL NO.
1.	PIPING AND INSTRUMENT SYMBOLS DIAGRAM	A10-3030
2.	HVAC NORMAL COOLING WATER SYS P&ID	P24-1010
3.	RECIRCULATION FLOW CONTROL SYS P&ID	C81-1010

Figure 9.4-5 Reactor Internal Pump Control Panel Room HVAC System



DETAILED DRAWING OF COOLING COIL'S DRAIN AND VENT LINE
SEE TABLE 1

NOTES:

1. TWO OF DWC FANS ARE OPERATED UNDER NORMAL CONDITIONS.
2. ALL FANS ARE STOPPED WITH LOCA SIGNAL.
3. DESIGN CONDITION OF THIS SYSTEM IS AS FOLLOWS.

SEISMIC CLASS		C
DESIGN/QUALITY CLASS		7G
MATERIALS	(PIPING)	CARBON STEEL
	(DUCT)	GALVANIZED SHEET
	(COOLING COIL)	COOPER TUBE & ALUMINUM FIN

4. THIS CONDENSATE LINE USES STAINLESS STEEL UNTIL LOS INSTRUMENT AND THIS LINE CAN CHANGE DWC SYS.

REFERENCE DOCUMENTS:

		MPL NO.
1.	HVAC NORMAL COOLING WATER SYSTEM P&ID	P24-1010
2.	REAC BLDG COOLING WATER SYS P&ID	P21-1010
3.	ATMOSPHERIC CONTROL SYSTEM P&ID	D23-1010
4.	LEAK DETECTION & ISOLATION SYS IED	E31-1040
5.	PIPING AND INSTRUMENT SYMBOLS DIAGRAM	A10-3030

TABLE 1

EQUIPMENT NO.	PIPING NO.						VALVE NO.			
	(1)	(2)	(3)	(4)	(5)	(6)	#1	#2	#3	#4
T41-B001A	501	502	503	504			F501A	F502A		
T41-B001B	505	506	507	508			F501B	F502B		
T41-B001C	509	510	511	512			F501C	F502C		
T41-B002A					513	514			F503A	F504A
T41-B002B					515	516			F503B	F504B

MPL NO. T41-1010

Figure 9.4-8 Drywell Cooling System P&ID

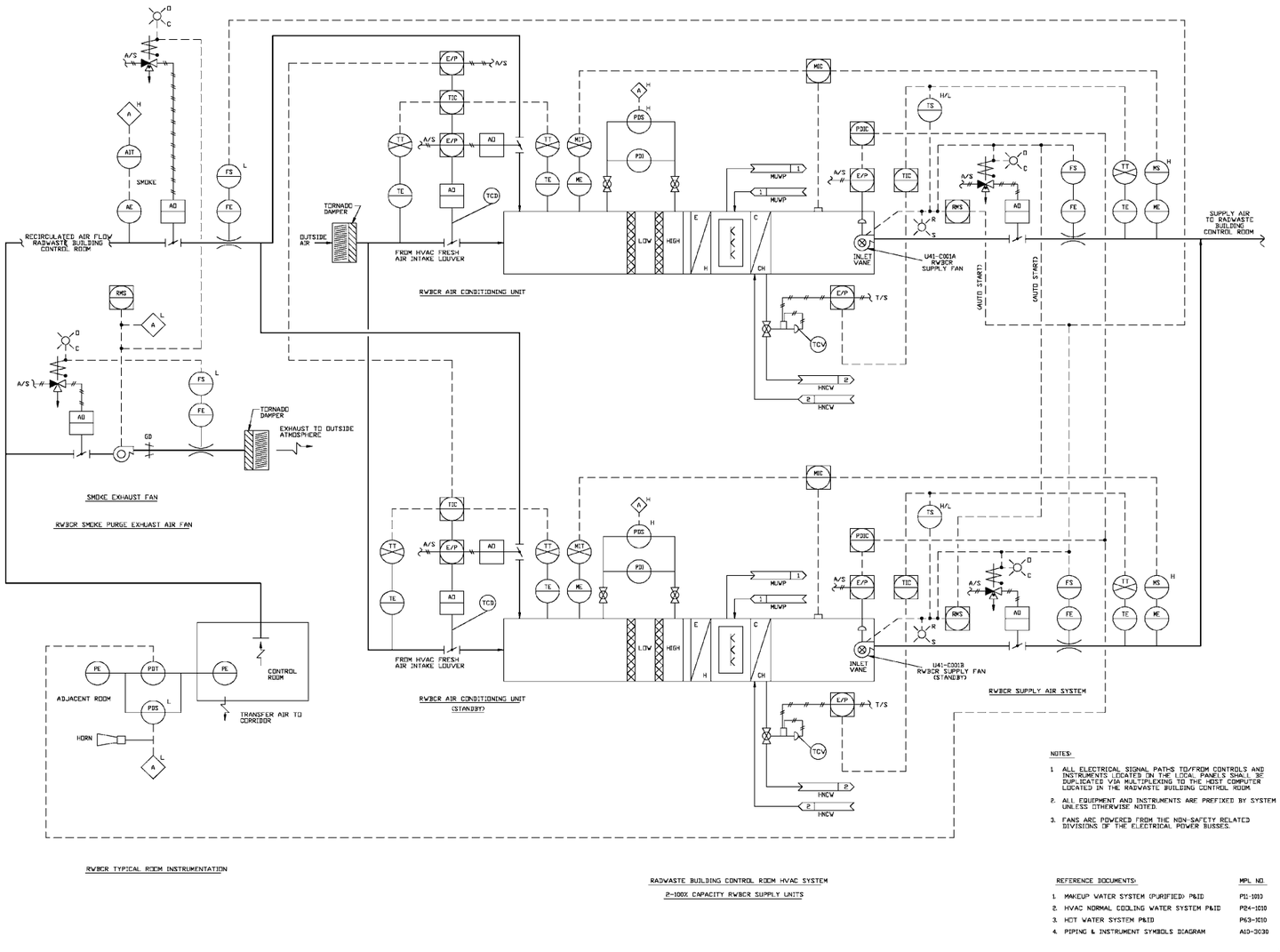
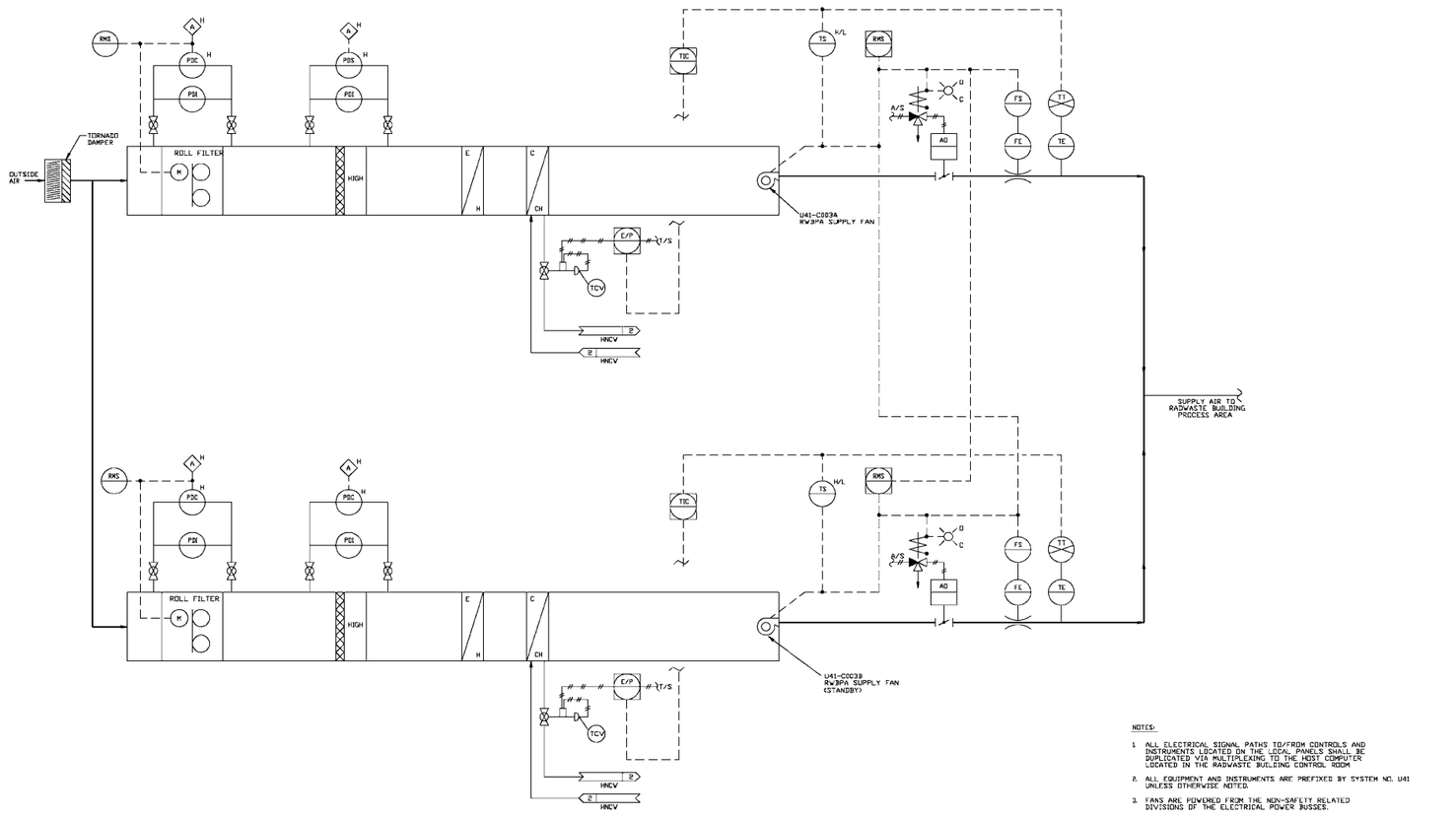


Figure 9.4-10 Radwaste Building HVAC (Sheet 1 of 3)



NOTES:

1. ALL ELECTRICAL SIGNAL PATHS TO/FROM CONTROLS AND INSTRUMENTS LOCATED ON THE LOCAL PANELS SHALL BE DUPLICATED VIA MULTIPLEXING TO THE HOST COMPUTER LOCATED IN THE RADWASTE BUILDING CONTROL ROOM.
2. ALL EQUIPMENT AND INSTRUMENTS ARE PREFIXED BY SYSTEM NO. U41 UNLESS OTHERWISE NOTED.
3. FANS ARE POWERED FROM THE NON-SAFETY RELATED DIVISIONS OF THE ELECTRICAL POWER BUSSES.

RADWASTE HVAC SUPPLY PROCESS AREA SUBSYSTEM

2-100% CAPACITY RWBPA SUPPLY UNITS

REFERENCE DOCUMENTS:	MPL NO.
1. PIPING & INSTRUMENT SYMBOLS DIAGRAM	A10-3030
2. HVAC NORMAL COOLING WATER SYSTEM P&ID	P24-1010
3. HOT WATER SYSTEM P&ID	P63-1010

U41-1010

Figure 9.4-10 Radwaste Building HVAC (Sheet 2 of 3)

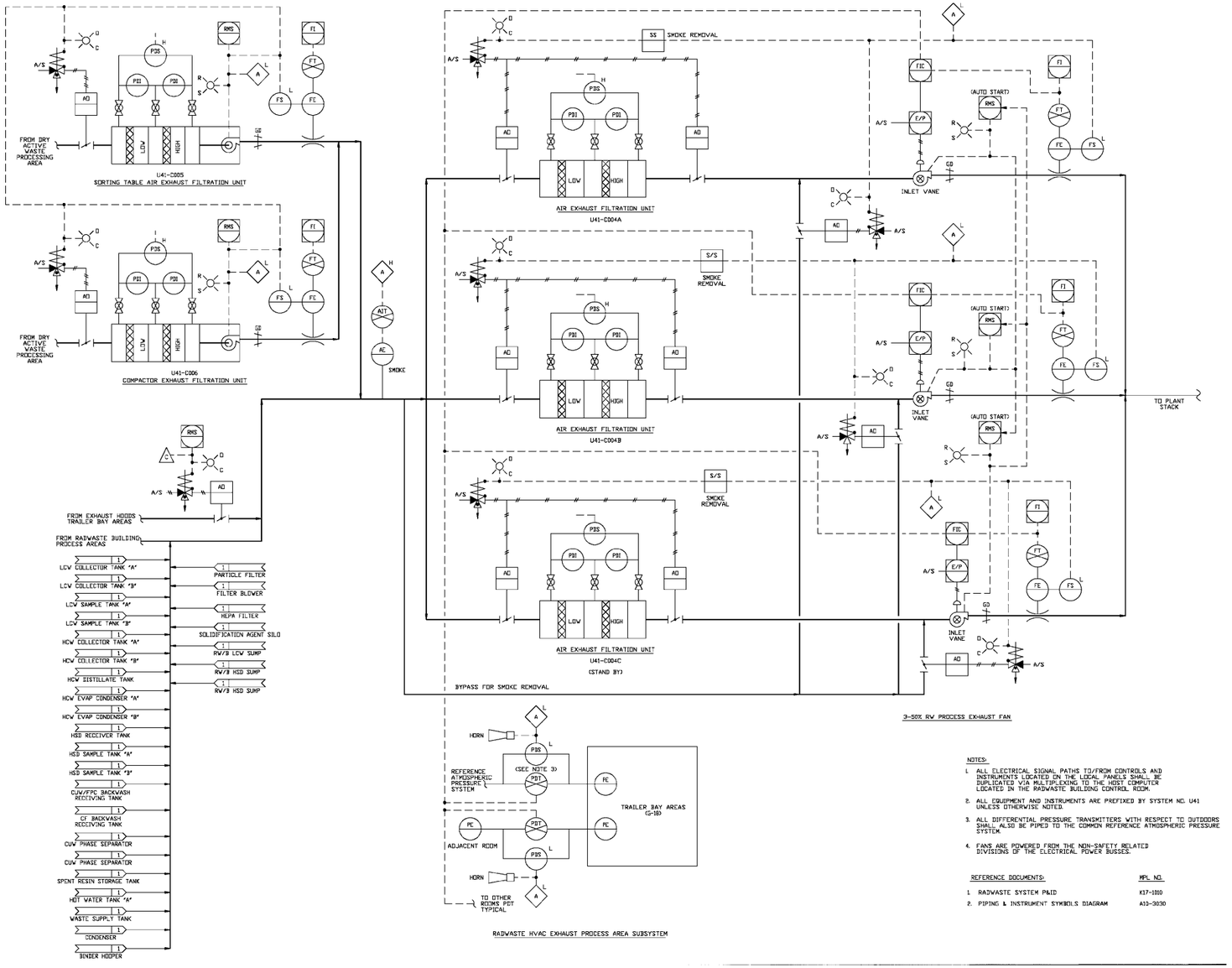


Figure 9.4-10 Radwaste Building HVAC (Sheet 3 of 3)

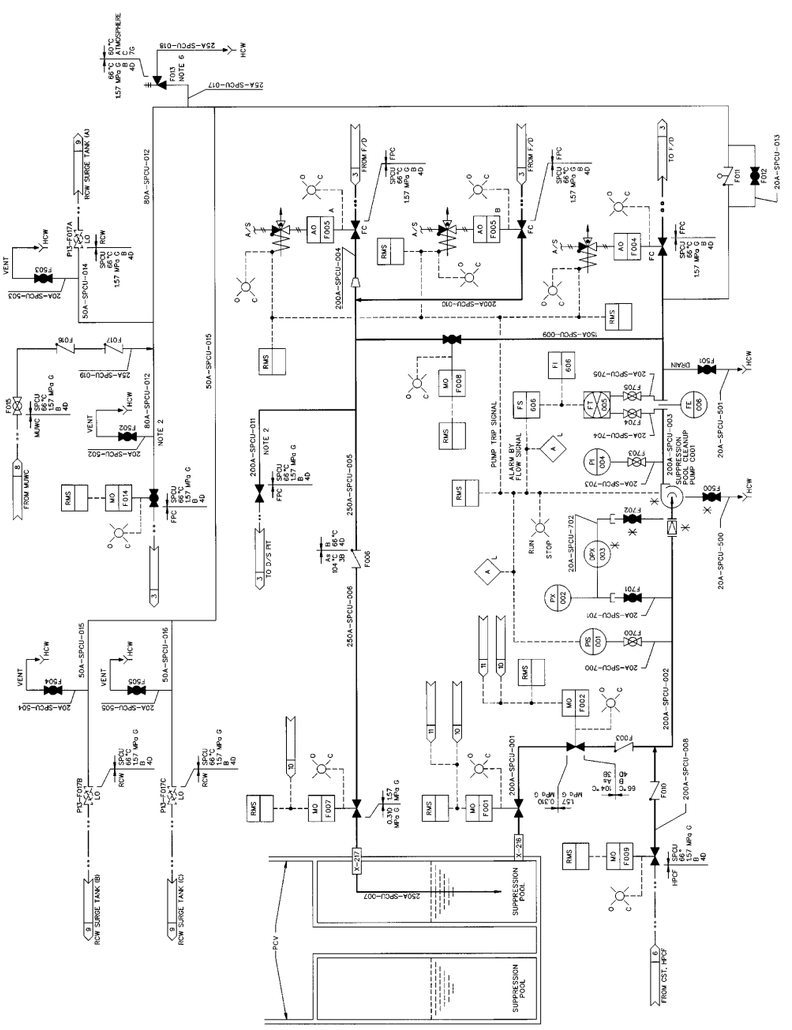
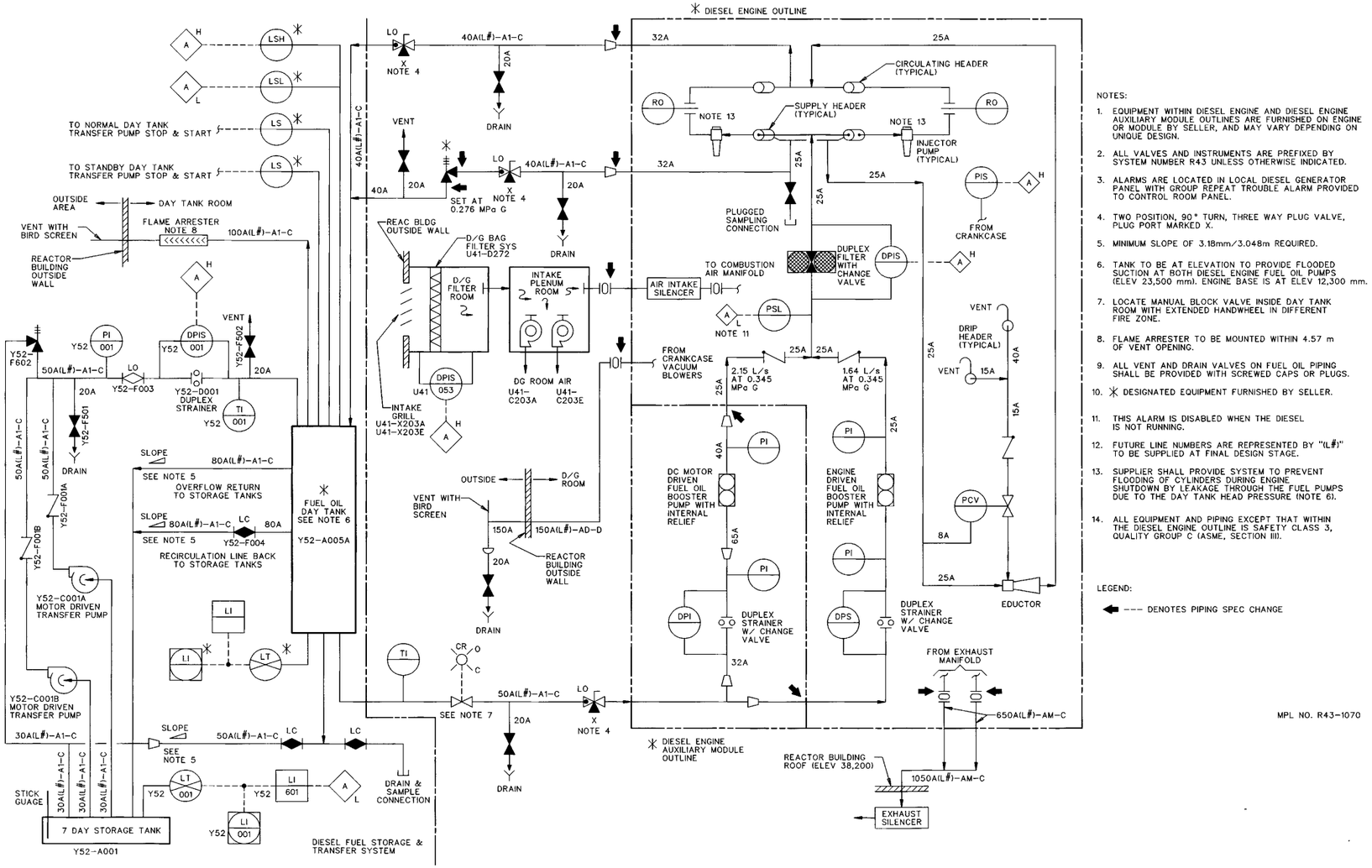


Figure 9.5-1 Suppression Pool Cleanup System P&ID

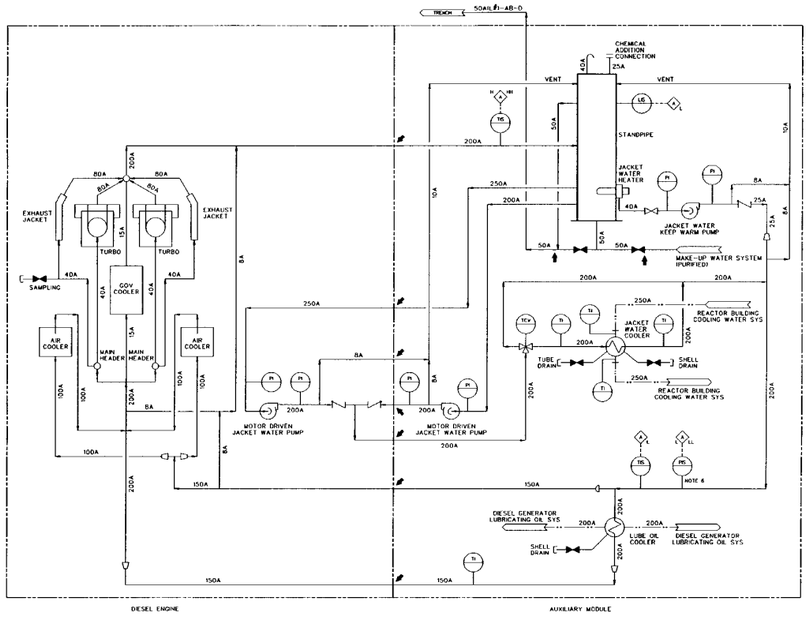


NOTES:

1. EQUIPMENT WITHIN DIESEL ENGINE AND DIESEL ENGINE AUXILIARY MODULE OUTLINES ARE FURNISHED ON ENGINE OR MODULE BY SELLER, AND MAY VARY DEPENDING ON UNIQUE DESIGN.
2. ALL VALVES AND INSTRUMENTS ARE PREFIXED BY SYSTEM NUMBER R43 UNLESS OTHERWISE INDICATED.
3. ALARMS ARE LOCATED IN LOCAL DIESEL GENERATOR PANEL WITH GROUP REPEAT TROUBLE ALARM PROVIDED TO CONTROL ROOM PANEL.
4. TWO POSITION, 90° TURN, THREE WAY PLUG VALVE, PLUG PORT MARKED X.
5. MINIMUM SLOPE OF 3.18mm/3.048m REQUIRED.
6. TANK TO BE AT ELEVATION TO PROVIDE FLOODED SUCTION AT BOTH DIESEL ENGINE FUEL OIL PUMPS (ELEV 23,500 mm). ENGINE BASE IS AT ELEV 12,300 mm.
7. LOCATE MANUAL BLOCK VALVE INSIDE DAY TANK ROOM WITH EXTENDED HANDWHEEL IN DIFFERENT FIRE ZONE.
8. FLAME ARRESTER TO BE MOUNTED WITHIN 4.57 m OF VENT OPENING.
9. ALL VENT AND DRAIN VALVES ON FUEL OIL PIPING SHALL BE PROVIDED WITH SCREWED CAPS OR PLUGS.
10. ✳ DESIGNATED EQUIPMENT FURNISHED BY SELLER.
11. THIS ALARM IS DISABLED WHEN THE DIESEL IS NOT RUNNING.
12. FUTURE LINE NUMBERS ARE REPRESENTED BY "(L#)" TO BE SUPPLIED AT FINAL DESIGN STAGE.
13. SUPPLIER SHALL PROVIDE SYSTEM TO PREVENT FLOODING OF CYLINDERS DURING ENGINE SHUTDOWN BY LEAKAGE THROUGH THE FUEL PUMPS DUE TO THE DAY TANK HEAD PRESSURE (NOTE 6).
14. ALL EQUIPMENT AND PIPING EXCEPT THAT WITHIN THE DIESEL ENGINE OUTLINE IS SAFETY CLASS 3, QUALITY GROUP C (ASME, SECTION III).

MPL NO. R43-1070

Figure 9.5-6 Standby Diesel Generator Fuel Oil and Combustion Air Intake and Exhaust Systems



NOTES:

1. ALL EQUIPMENT, PIPING, INSTRUMENTS AND CONTROLS ARE FURNISHED BY DIESEL GENERATOR SELLER UNLESS OTHERWISE NOTED AND MAY VARY DEPENDING ON UNIQUE DESIGN.
2. EQUIPMENT WITHIN DIESEL ENGINE OUTLINE FURNISHED ON ENGINE BY SELLER.
3. EQUIPMENT WITHIN AUXILIARY MODULE OUTLINE IS SAFETY CLASS 3, QUALITY GROUP C AND IS FURNISHED BY SELLER.
4. FOR SPECIFICS OF THE DIESEL GENERATOR CONTROL SYSTEMS, SEE SELLER'S CONTROL PANEL SCHEMATICS.
5. FUTURE LINE NUMBERS ARE REPRESENTED BY "nLFI" TO BE SUPPLIED AT FINAL DESIGN STAGE.
6. THIS ALARM IS DISABLED WHEN THE DIESEL IS NOT RUNNING.

LEGEND:
◄--- DENOTES PIPING SPEC CHANGE

MFL NO 8A3-1040

Figure 9.5-7 Standby Diesel Generator Jacket Cooling Water System

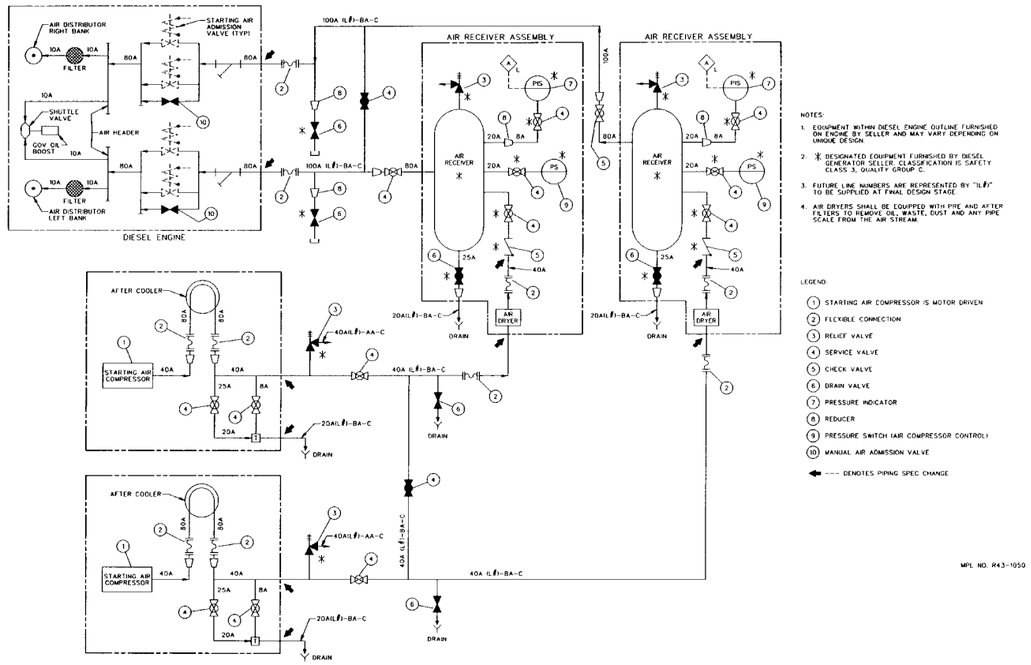


Figure 9.5-8 Standby Diesel Generator Starting Air System

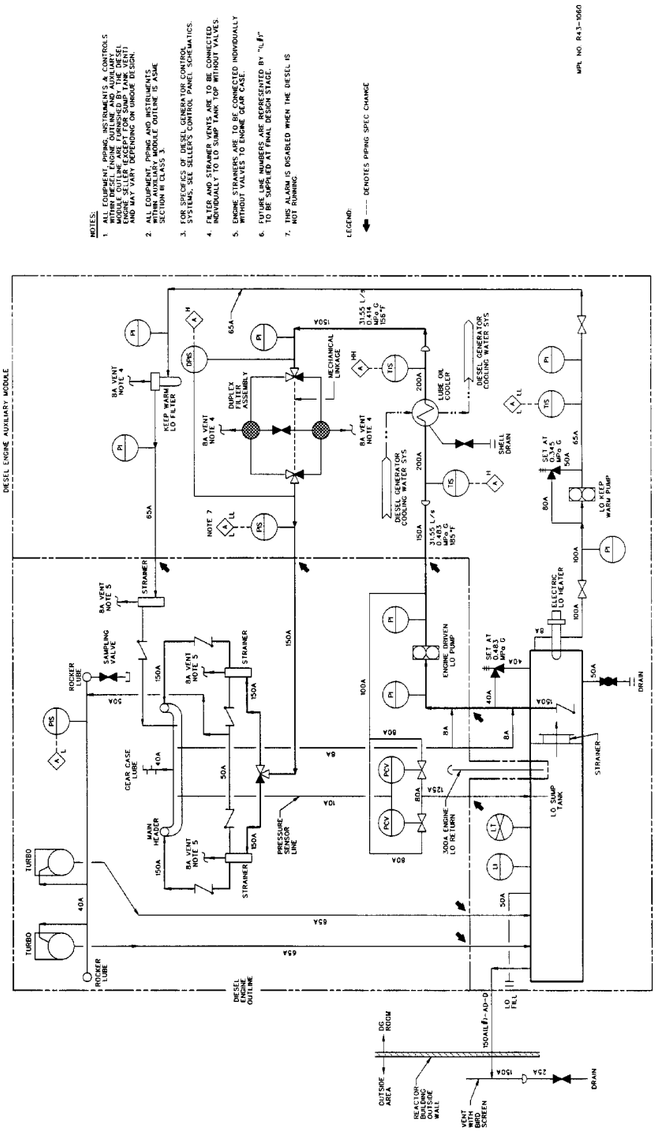


Figure 9.5-9 Standby Diesel Generator Lubricating Oil System

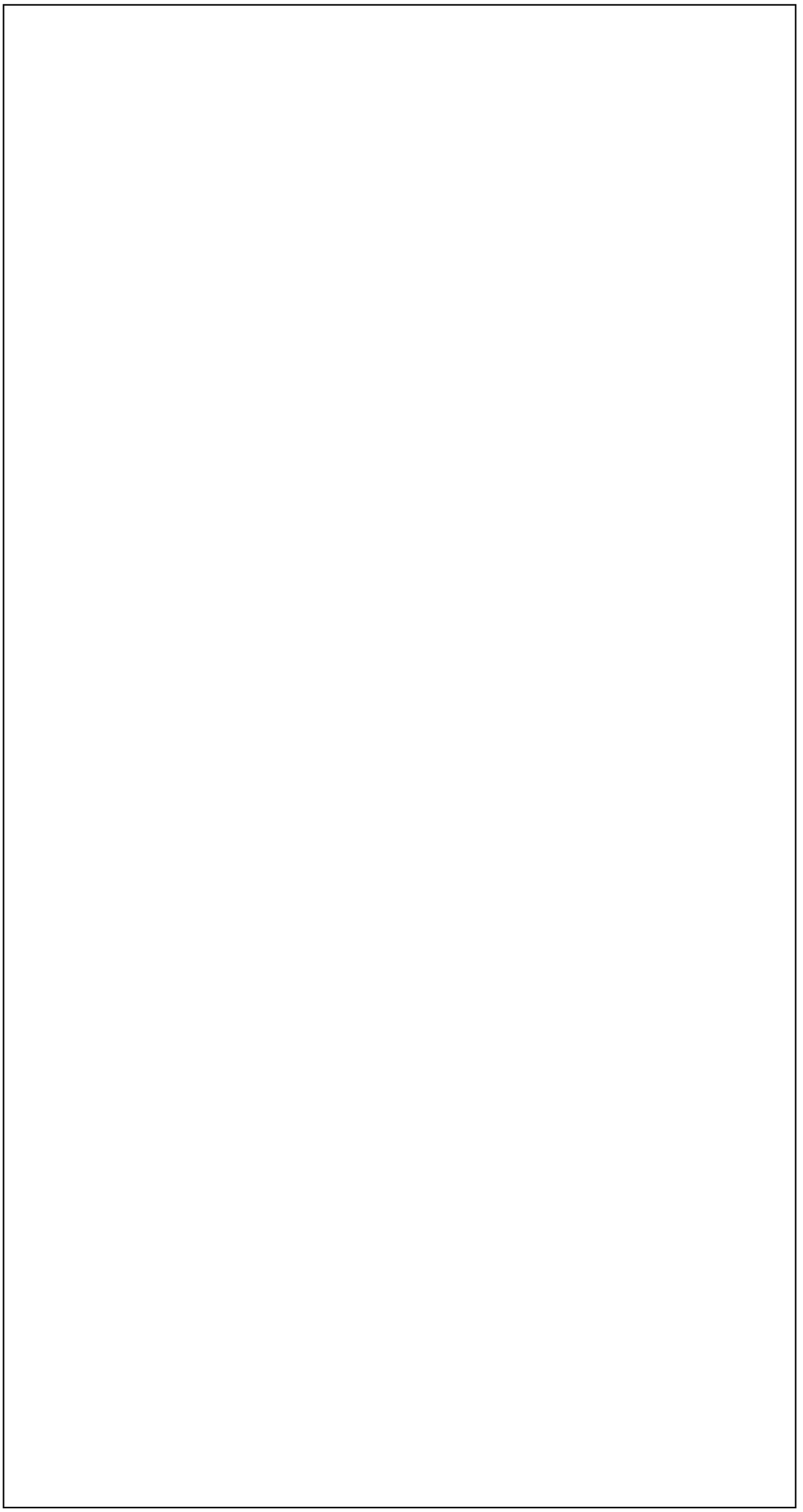


Figure 9A.4-1 Reactor Building Fire Protection at Elevation -8200 mm

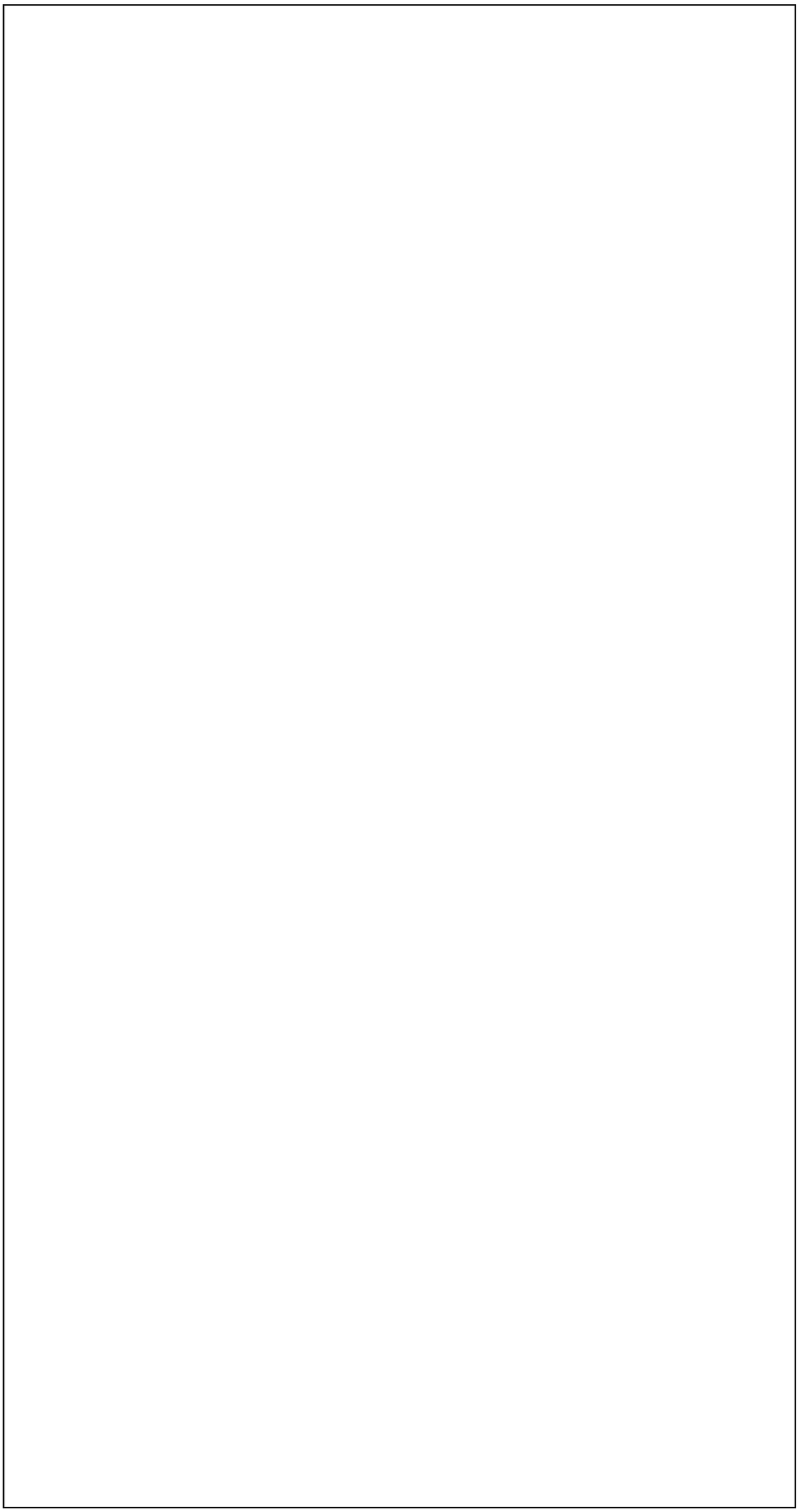


Figure 9A.4-2 Reactor Building Fire Protection at Elevation -1700 mm

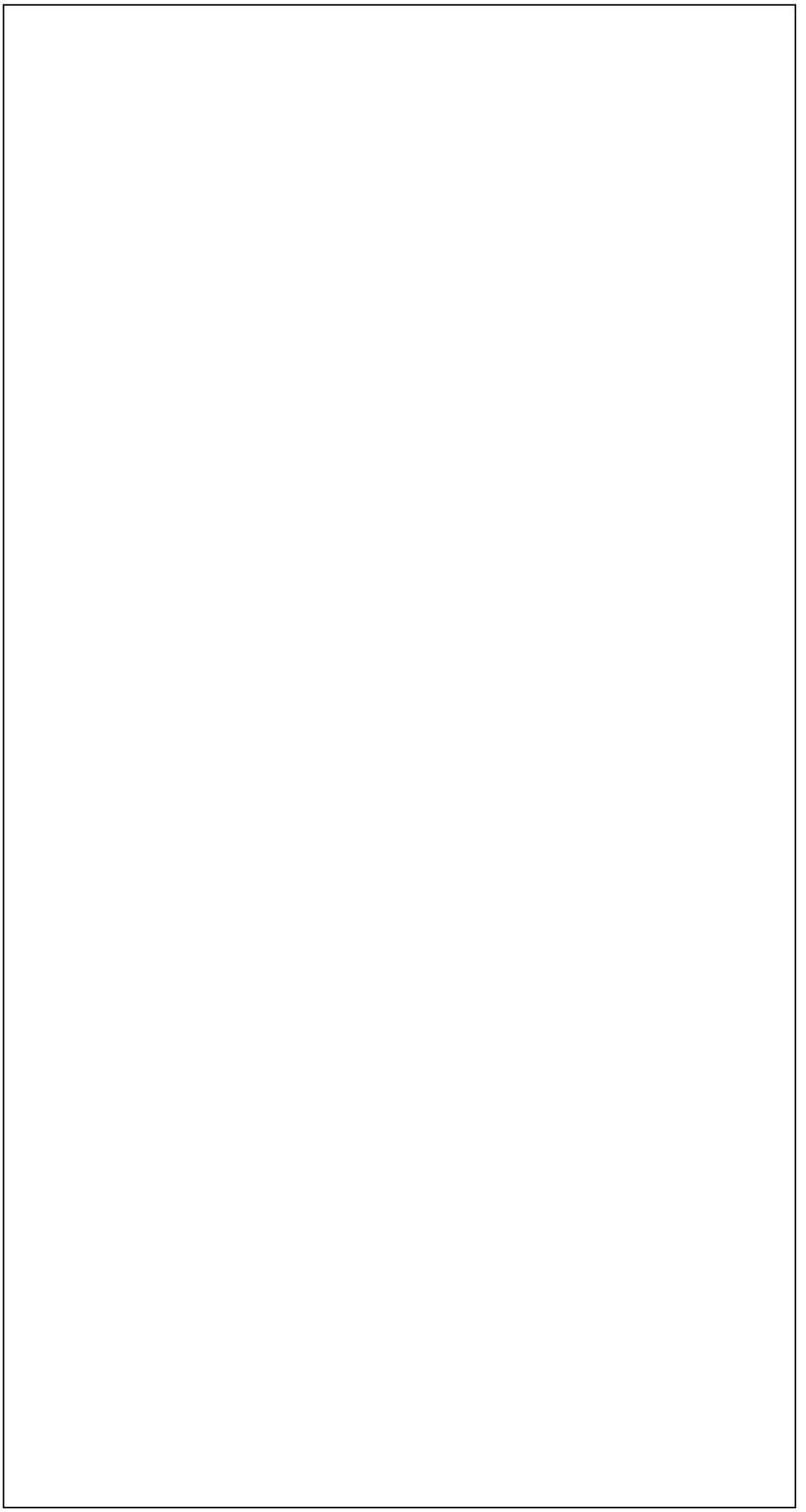


Figure 9A.4-3 Reactor Building Fire Protection at Elevation 4800/8500 mm

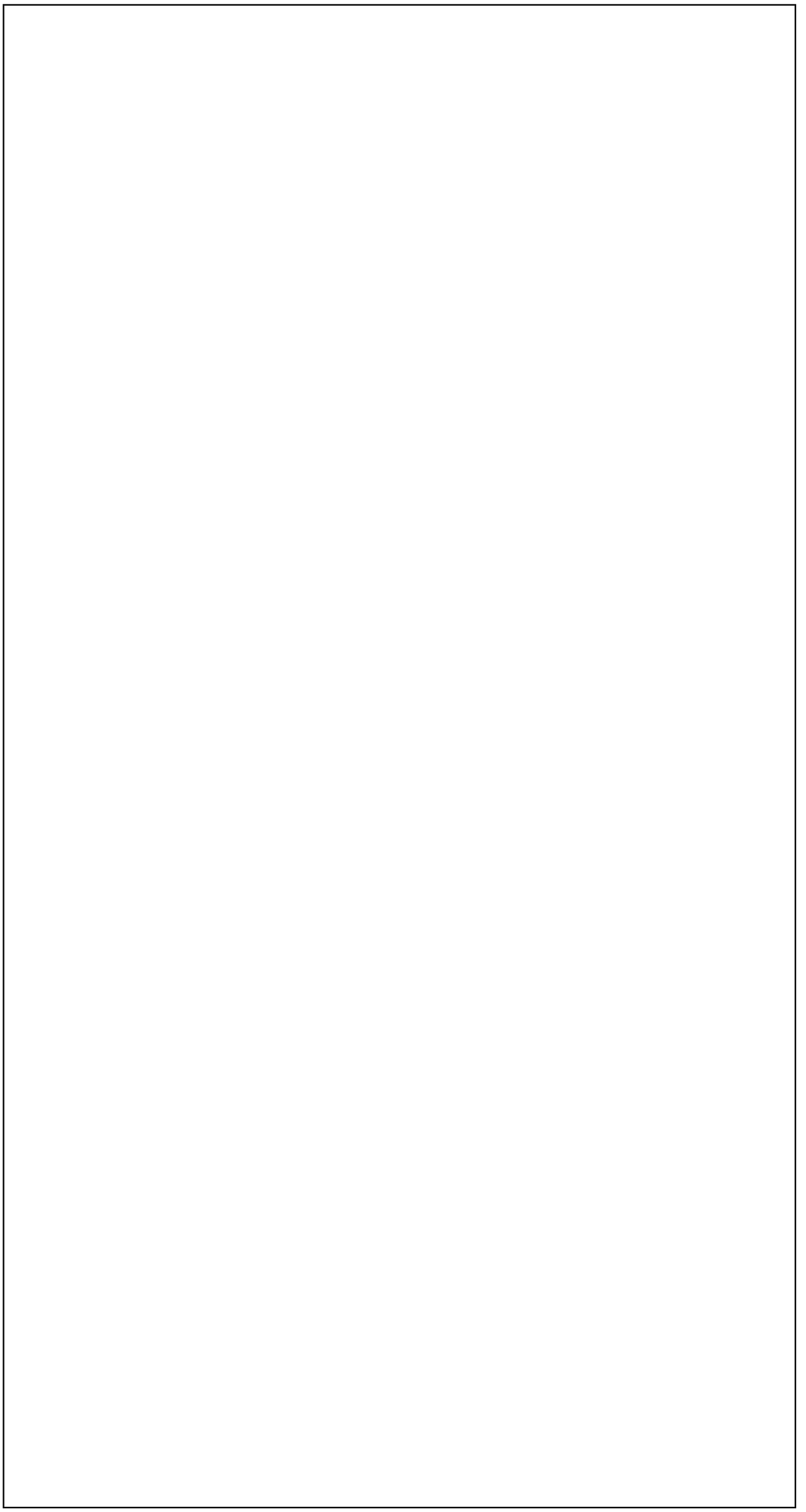


Figure 9A.4-4 Reactor Building Fire Protection at Elevation 12300 mm

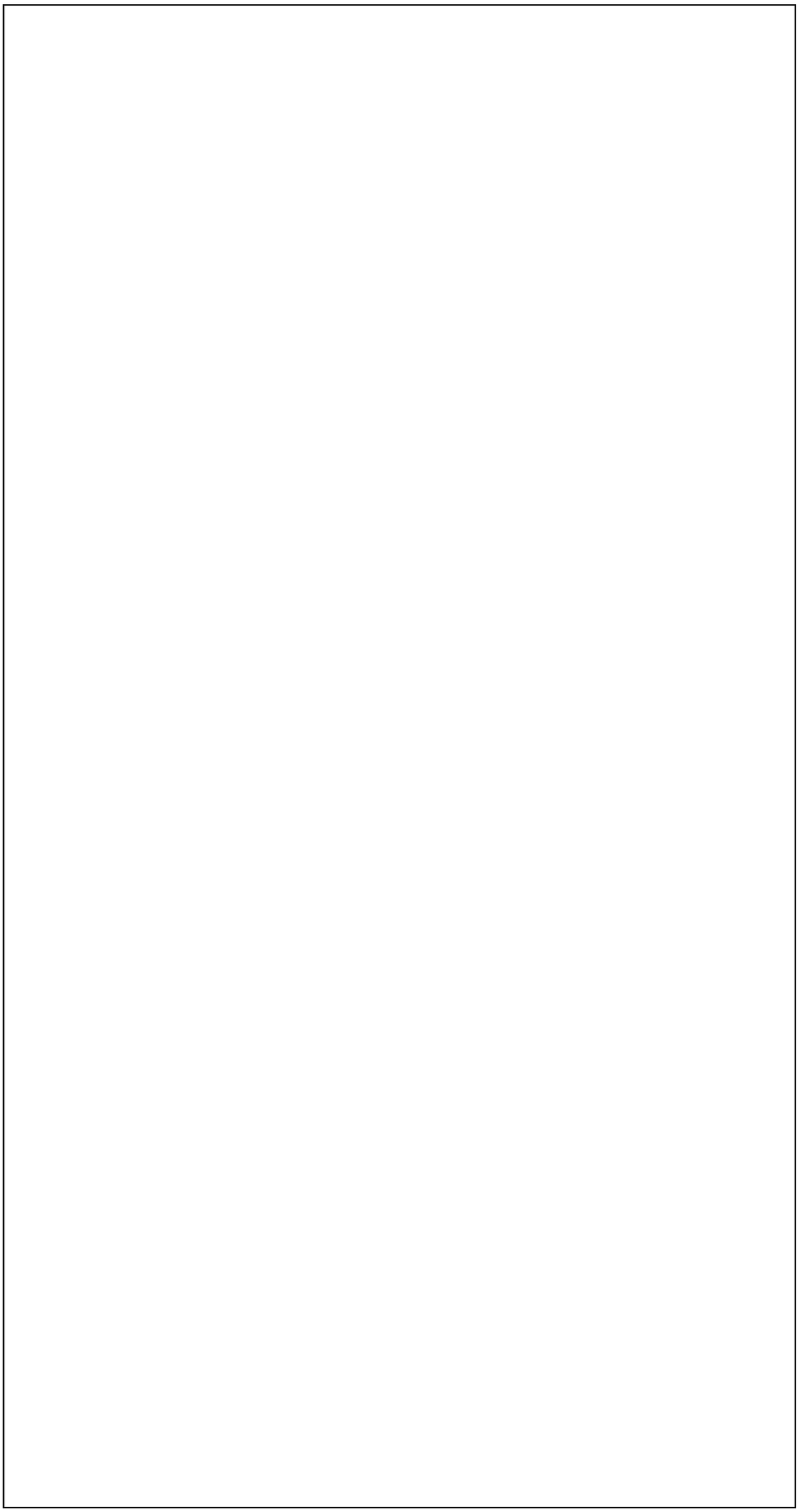


Figure 9A.4-5 Reactor Building Fire Protection at Elevation 18100 mm

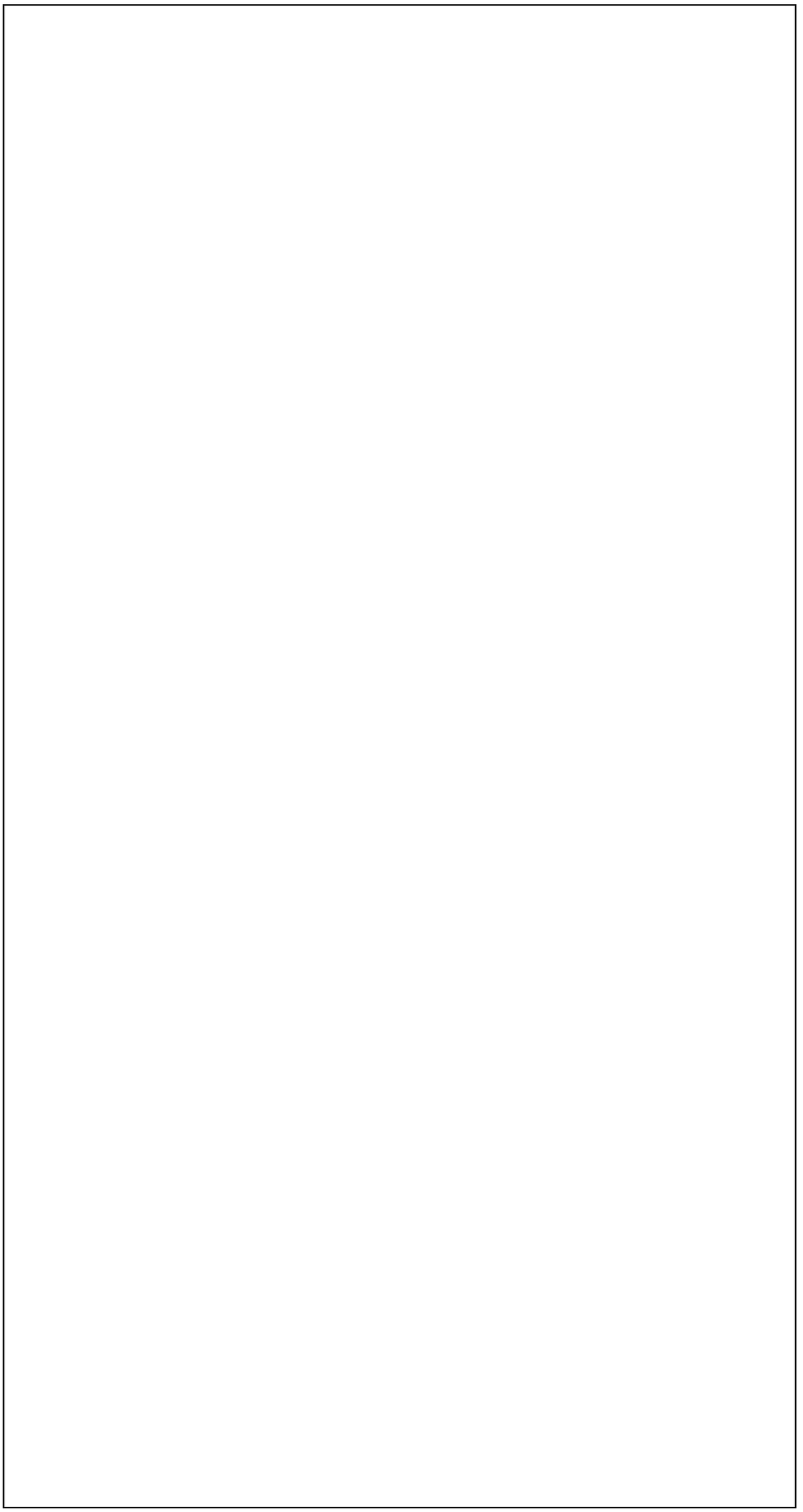


Figure 9A.4-6 Reactor Building Fire Protection at Elevation 23500 mm

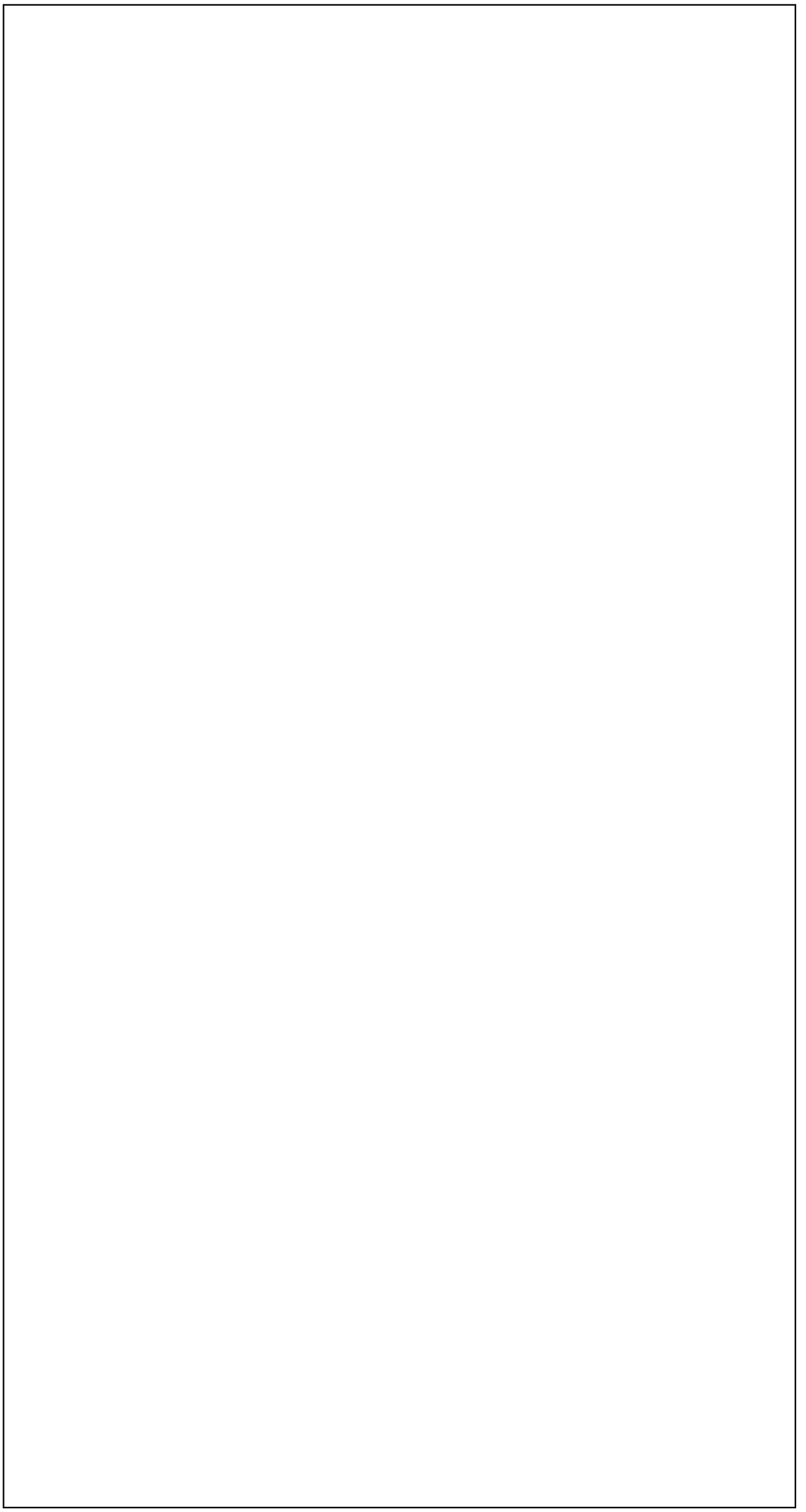


Figure 9A.4-7 Reactor Building Fire Protection at Elevation 27200 mm

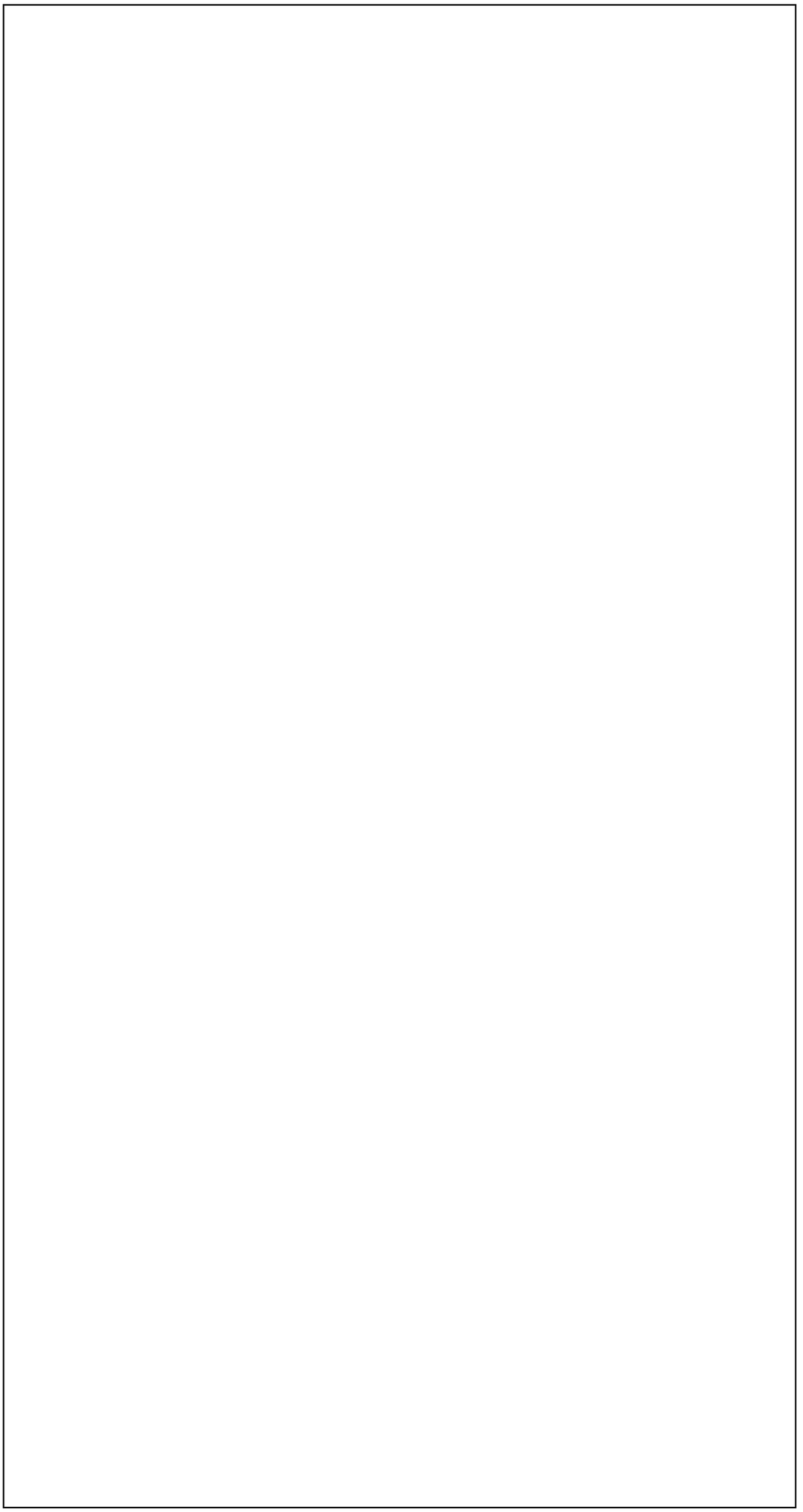


Figure 9A.4-8 Reactor Building Fire Protection at Elevation 31700/38200 mm

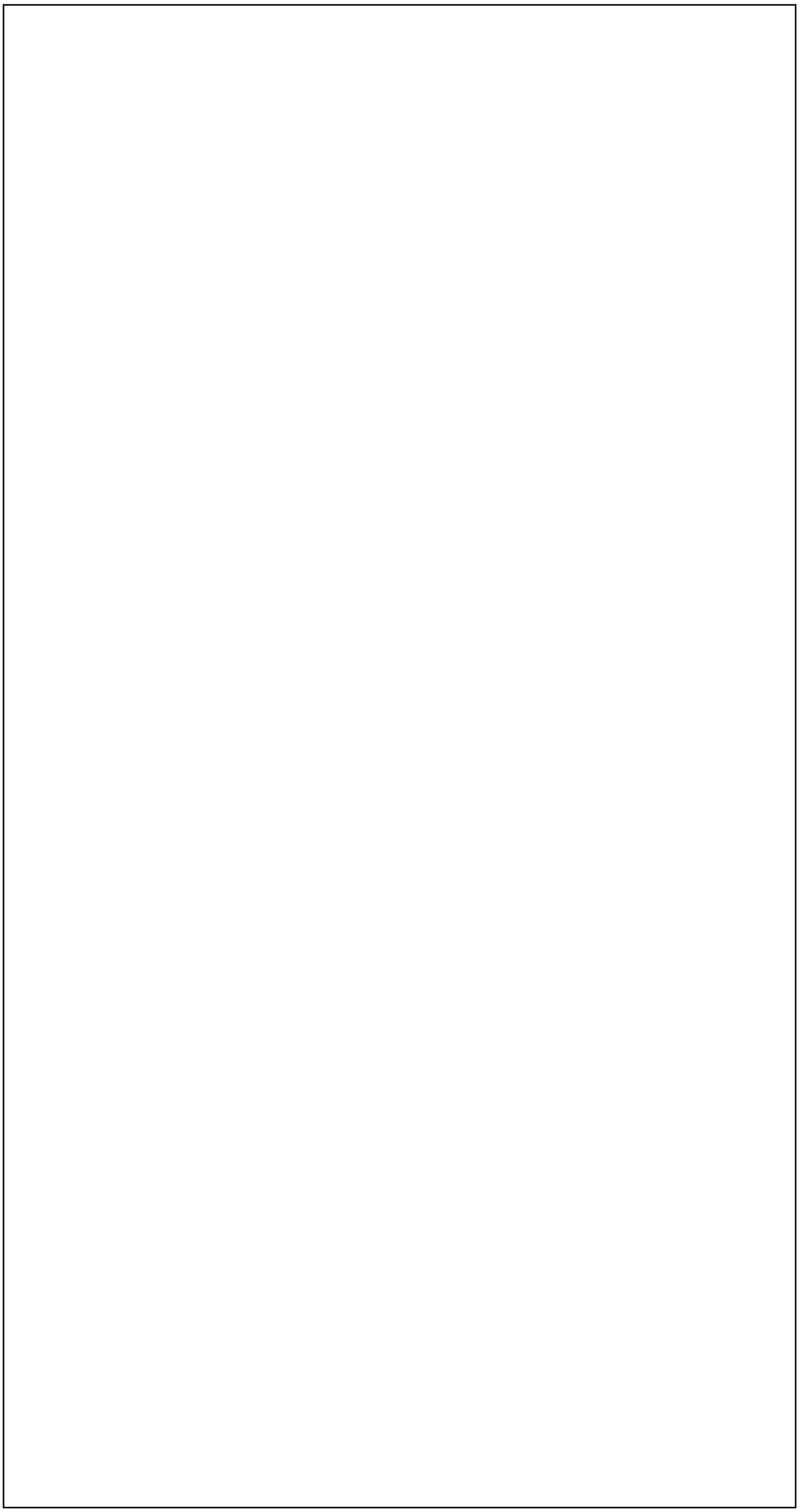


Figure 9A.4-9 Reactor Building Fire Protection, Section A-A

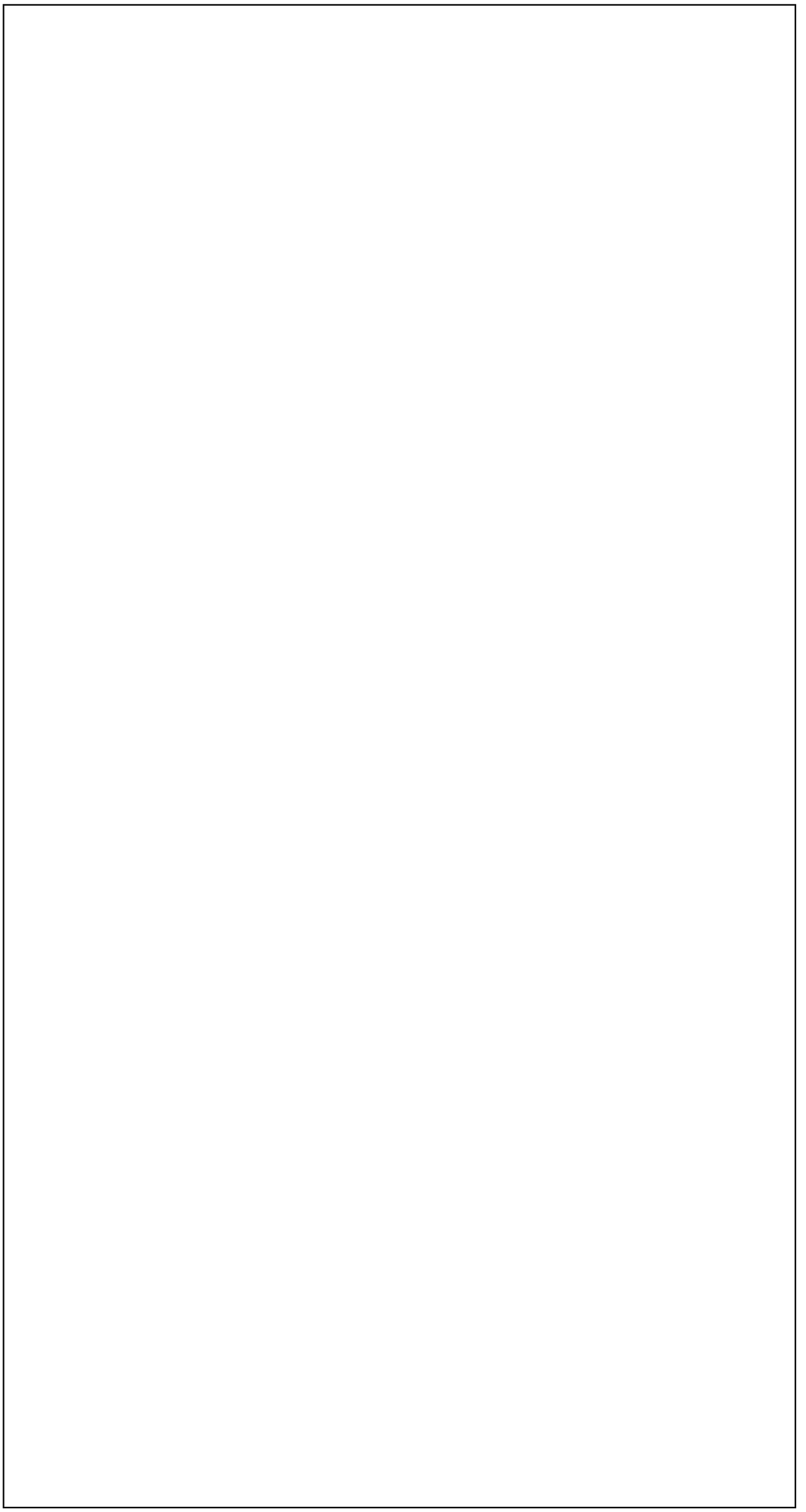


Figure 9A.4-10 Reactor Building Fire Protection, Section B-B

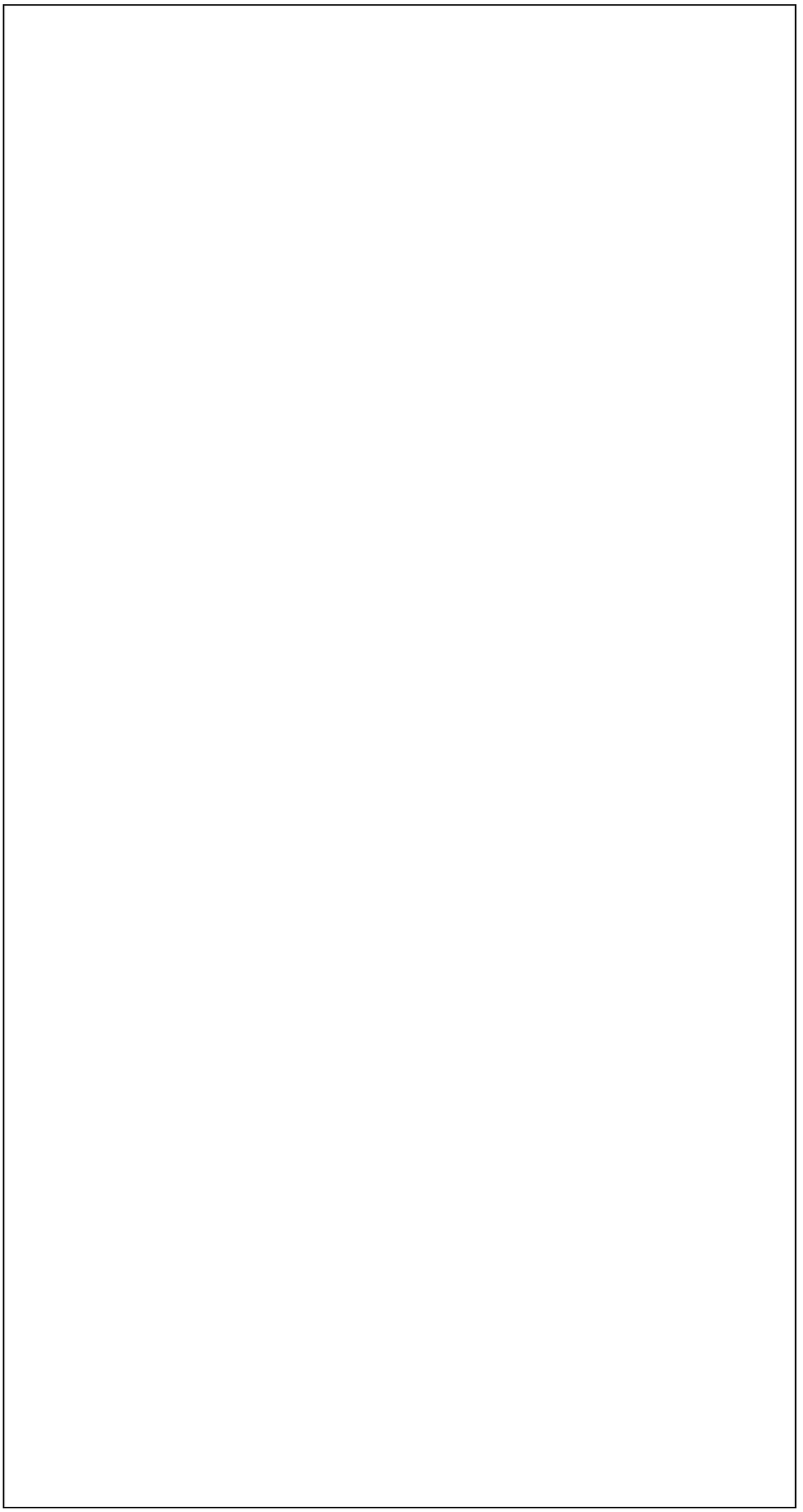


Figure 9A.4-11 Control Building Fire Protection, Section B-B

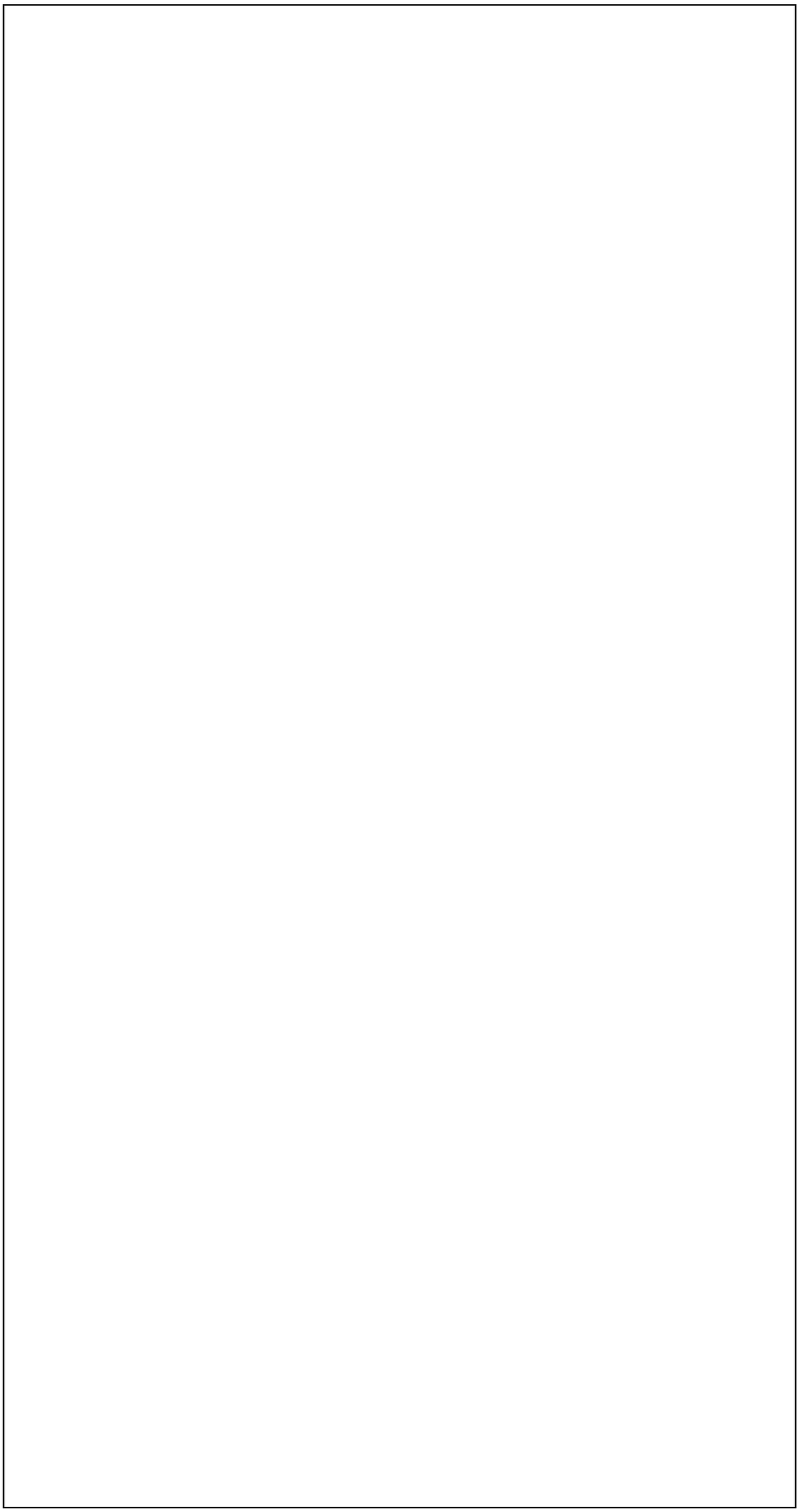


Figure 9A.4-12 Control Building Fire Protection at Elevation -8200 mm

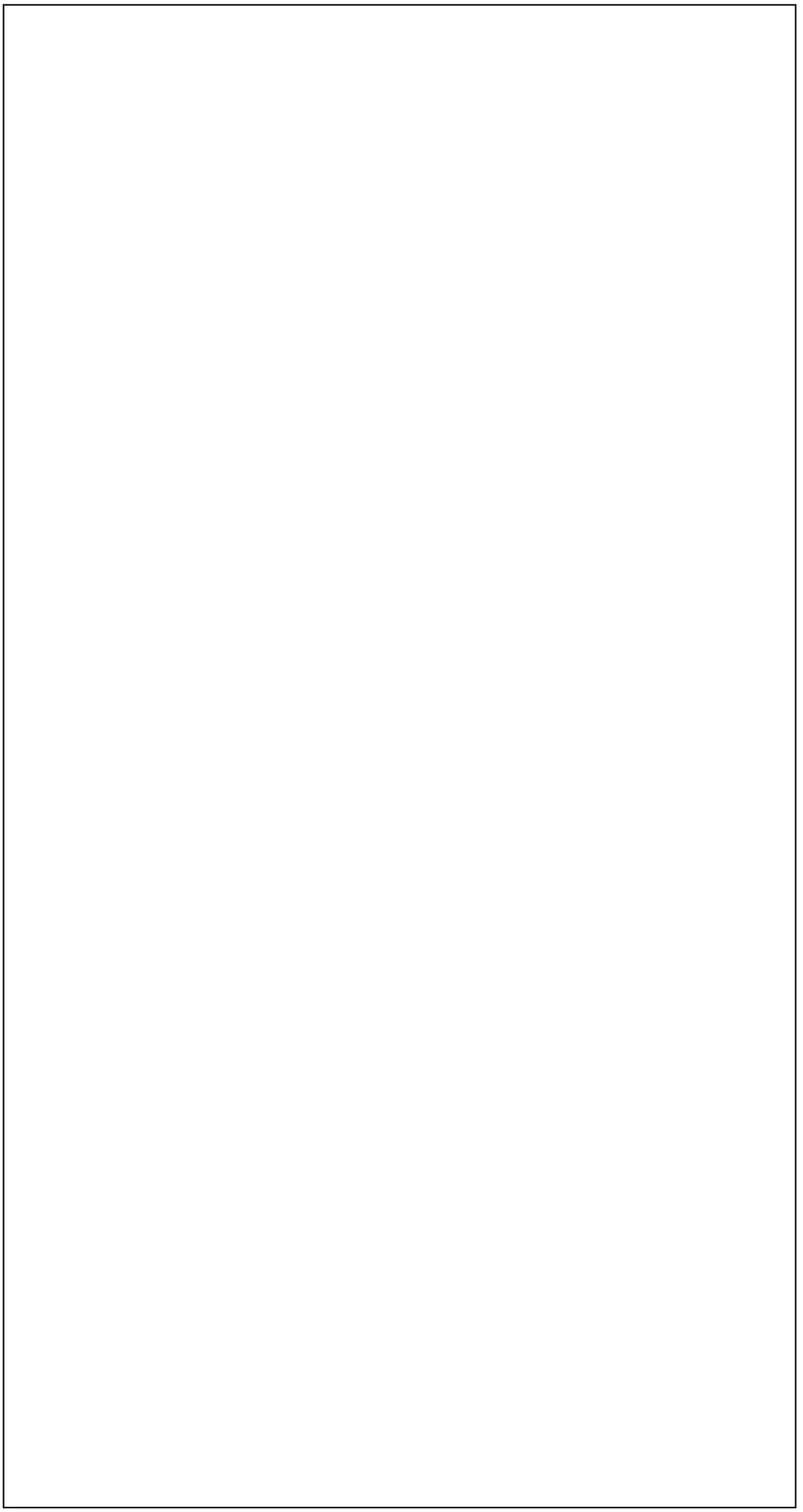


Figure 9A.4-13 Control Building Fire Protection at Elevation -2150 mm

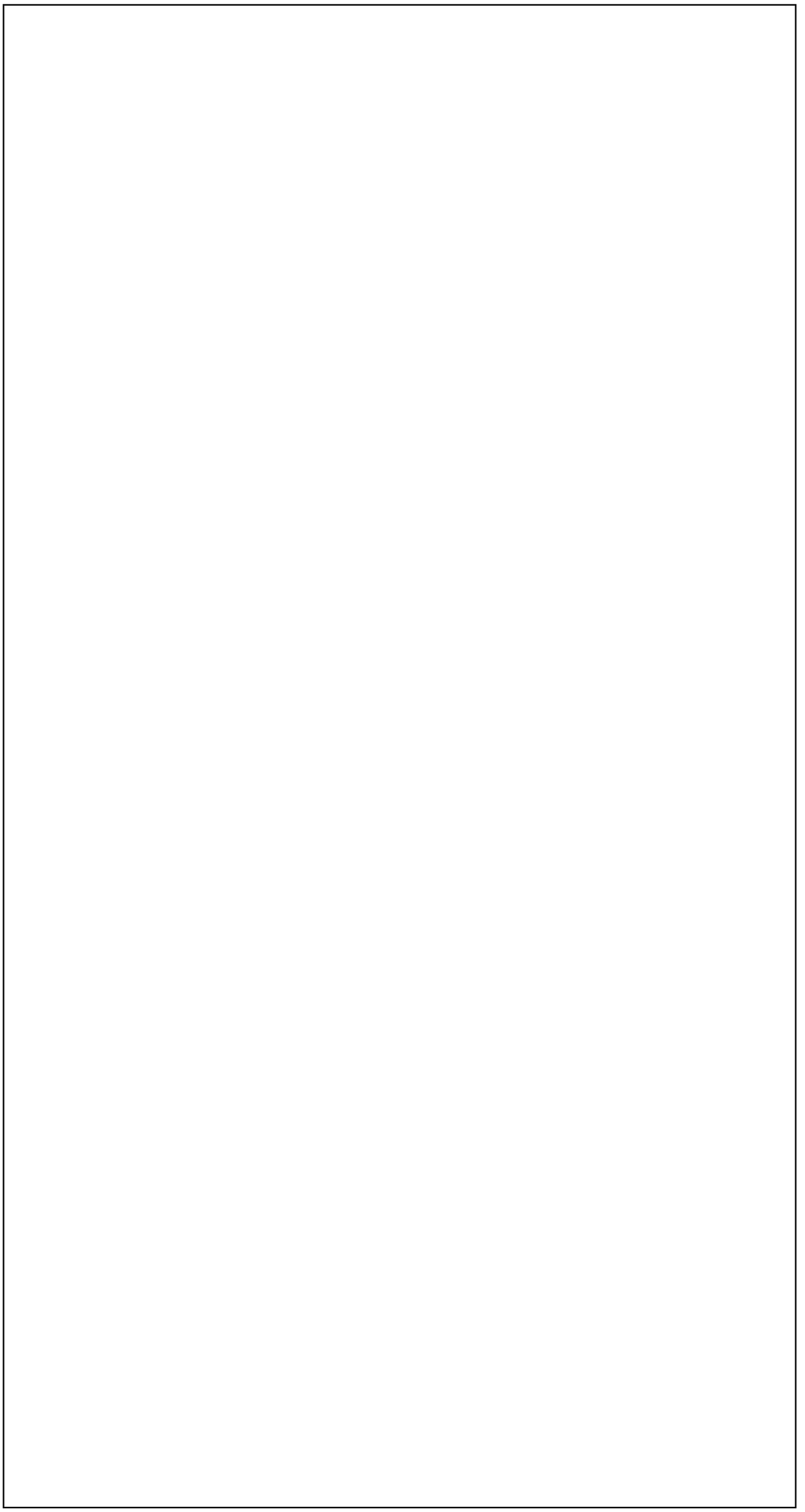


Figure 9A.4-14 Control Building Fire Protection at Elevation 3500 mm

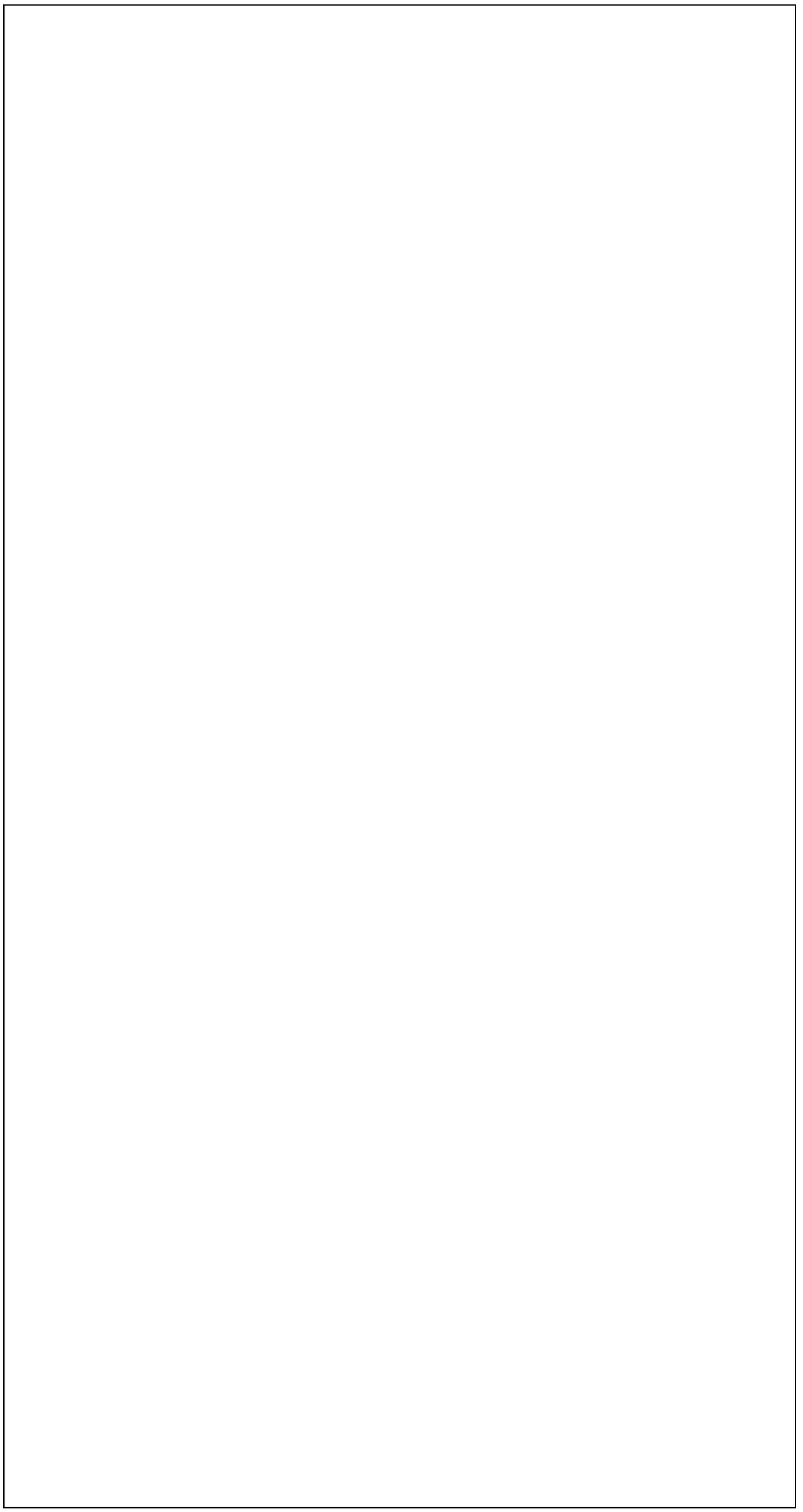


Figure 9A.4-15 Control Building Fire Protection at Elevation 7900 mm