

Figure 5.4-4 – Reactor Recirculation System P&ID (Sheet 1 of 2)

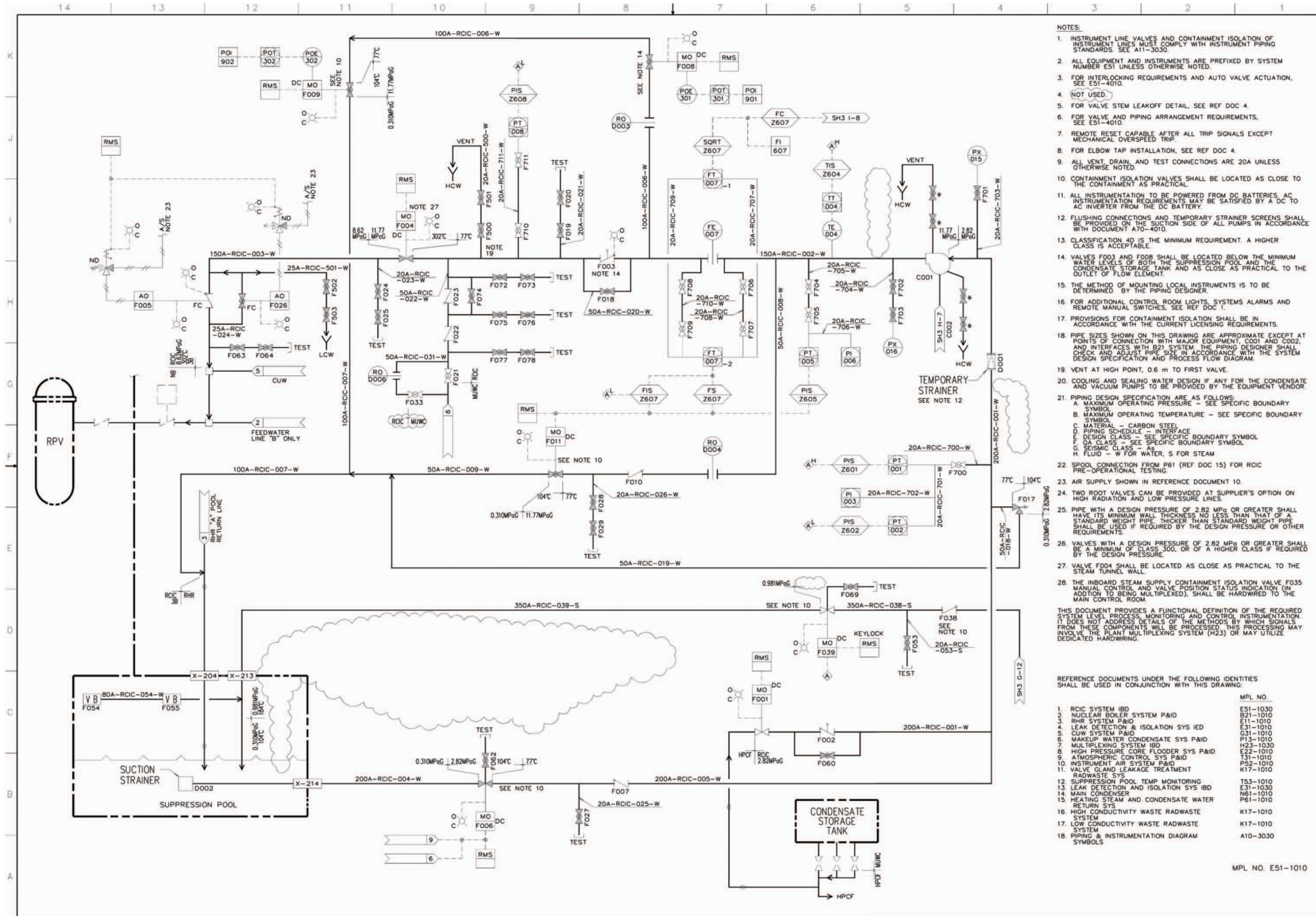


Figure 5.4-8 – Reactor Core Isolation Cooling System P&ID (Sheet 1 of 3)

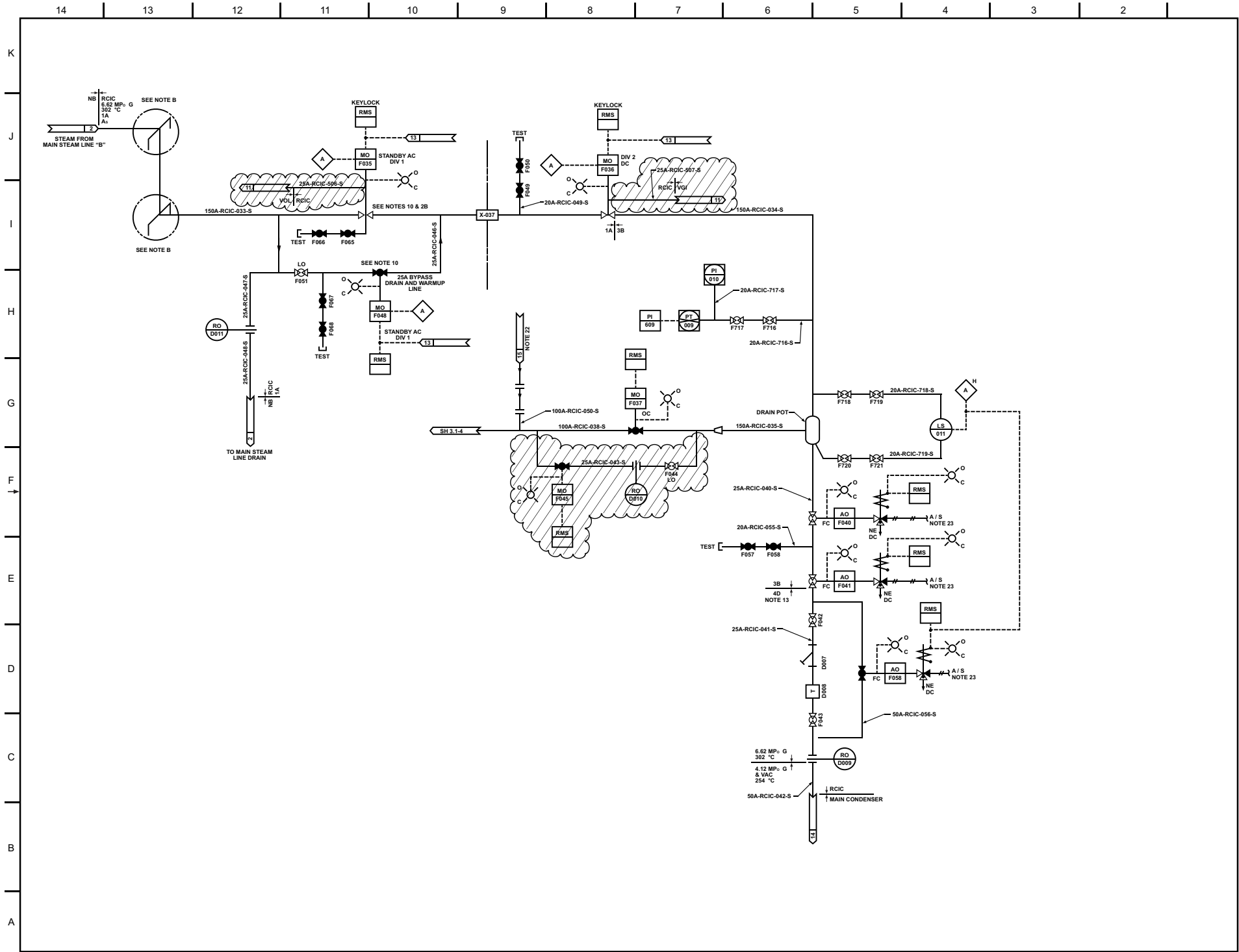


Figure 5.4-8 – Reactor Core Isolation Cooling System P&ID (Sheet 2 of 3)

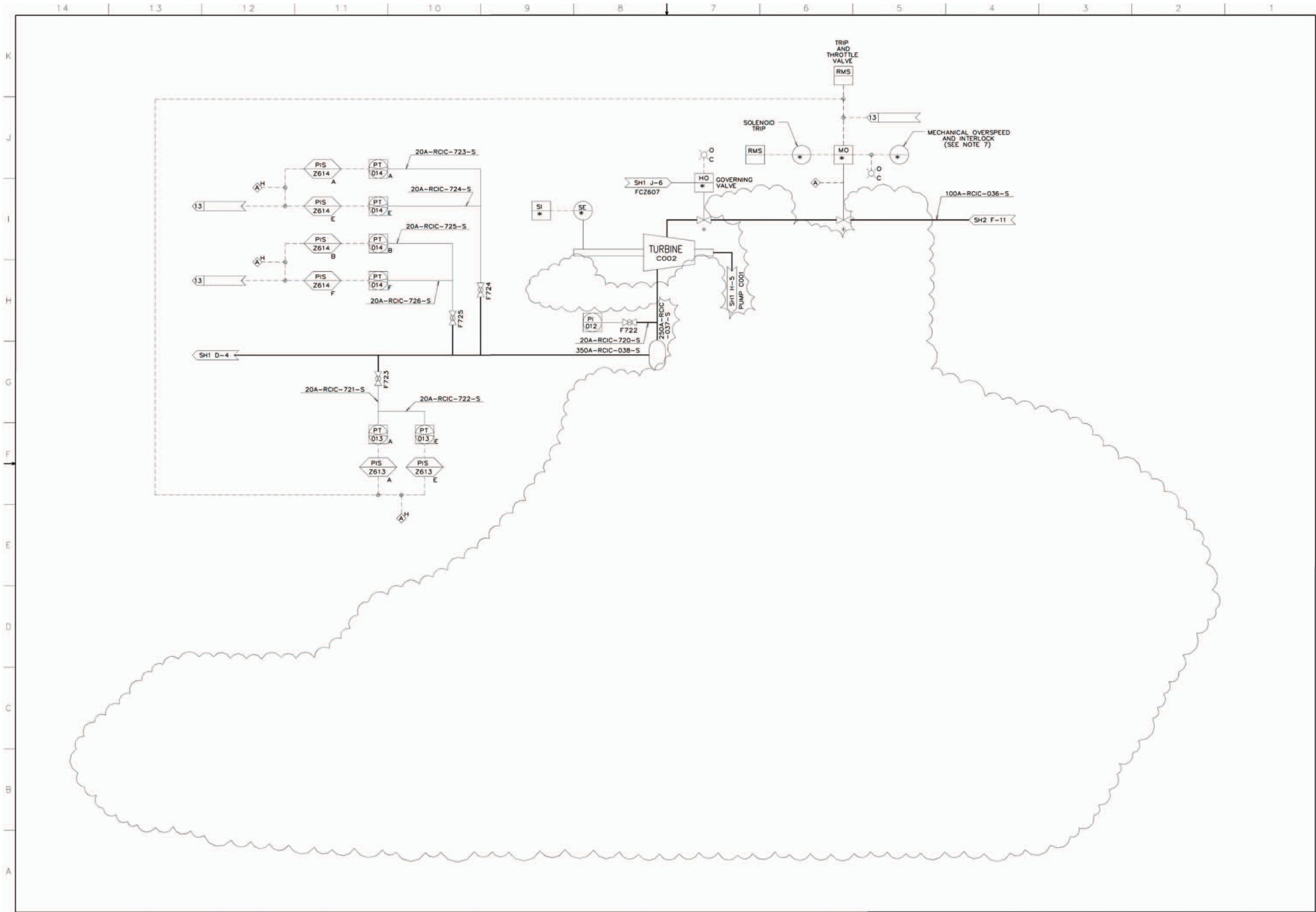
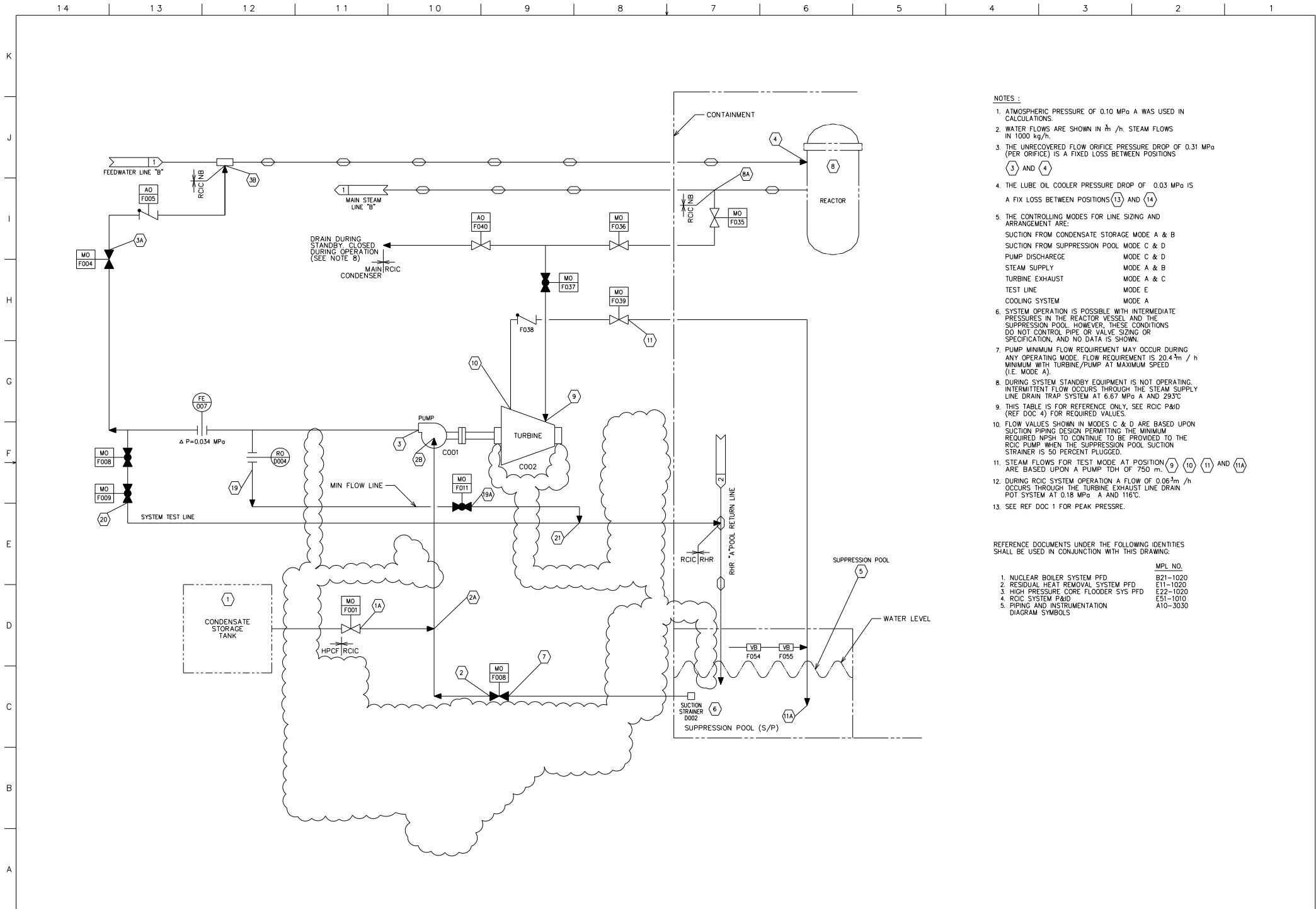


Figure 5.4-8 – Reactor Core Isolation Cooling System P&ID (Sheet 3 of 3)



- NOTES :
1. ATMOSPHERIC PRESSURE OF 0.10 MPa A WAS USED IN CALCULATIONS.
  2. WATER FLOWS ARE SHOWN IN  $\dot{m}$  /h. STEAM FLOWS IN 1000 kg/h.
  3. THE UNRECOVERED FLOW ORIFICE PRESSURE DROP OF 0.31 MPa (PER ORIFICE) IS A FIXED LOSS BETWEEN POSITIONS (3) AND (4).
  4. THE LUBE OIL COOLER PRESSURE DROP OF 0.03 MPa IS A FIX LOSS BETWEEN POSITIONS (13) AND (14).
  5. THE CONTROLLING MODES FOR LINE SIZING AND ARRANGEMENT ARE:  
 SUCTION FROM CONDENSATE STORAGE MODE A & B  
 SUCTION FROM SUPPRESSION POOL MODE C & D  
 PUMP DISCHARGE MODE C & D  
 STEAM SUPPLY MODE A & B  
 TURBINE EXHAUST MODE A & C  
 TEST LINE MODE E  
 COOLING SYSTEM MODE A
  6. SYSTEM OPERATION IS POSSIBLE WITH INTERMEDIATE PRESSURES IN THE REACTOR VESSEL AND THE SUPPRESSION POOL. HOWEVER, THESE CONDITIONS DO NOT CONTROL PIPE OR VALVE SIZING OR SPECIFICATION, AND NO DATA IS SHOWN.
  7. PUMP MINIMUM FLOW REQUIREMENT MAY OCCUR DURING ANY OPERATING MODE. FLOW REQUIREMENT IS 20.4  $\dot{m}^3$  / h MINIMUM WITH TURBINE/PUMP AT MAXIMUM SPEED (I.E. MODE A).
  8. DURING SYSTEM STANDBY EQUIPMENT IS NOT OPERATING. INTERMITTENT FLOW OCCURS THROUGH THE STEAM SUPPLY LINE DRAIN TRAP SYSTEM AT 6.67 MPa A AND 293°C.
  9. THIS TABLE IS FOR REFERENCE ONLY. SEE RCIC P&ID (REF DOC 4) FOR REQUIRED VALUES.
  10. FLOW VALUES SHOWN IN MODES C & D ARE BASED UPON SUCTION PIPING DESIGN PERMITTING THE MINIMUM REQUIRED NPSH TO CONTINUE TO BE PROVIDED TO THE RCIC PUMP WHEN THE SUPPRESSION POOL SUCTION STRAINER IS 50 PERCENT PLUGGED.
  11. STEAM FLOWS FOR TEST MODE AT POSITION (9) (10) (11) AND (11A) ARE BASED UPON A PUMP TDH OF 750 m.
  12. DURING RCIC SYSTEM OPERATION A FLOW OF 0.06  $\dot{m}^3$  /h OCCURS THROUGH THE TURBINE EXHAUST LINE DRAIN POT SYSTEM AT 0.18 MPa A AND 116°C.
  13. SEE REF DOC 1 FOR PEAK PRESSRE.

REFERENCE DOCUMENTS UNDER THE FOLLOWING IDENTITIES SHALL BE USED IN CONJUNCTION WITH THIS DRAWING:

	MPL NO.
1. NUCLEAR BOILER SYSTEM PFD	B21-1020
2. RESIDUAL HEAT REMOVAL SYSTEM PFD	E11-1020
3. HIGH PRESSURE CORE FLOODER SYS PFD	E22-1020
4. RCIC SYSTEM P&ID	E51-1010
5. PIPING AND INSTRUMENTATION DIAGRAM SYMBOLS	A10-3030

Figure 5.4-9 – Reactor Core Isolation Cooling System PFD (Sheet 1 of 2)

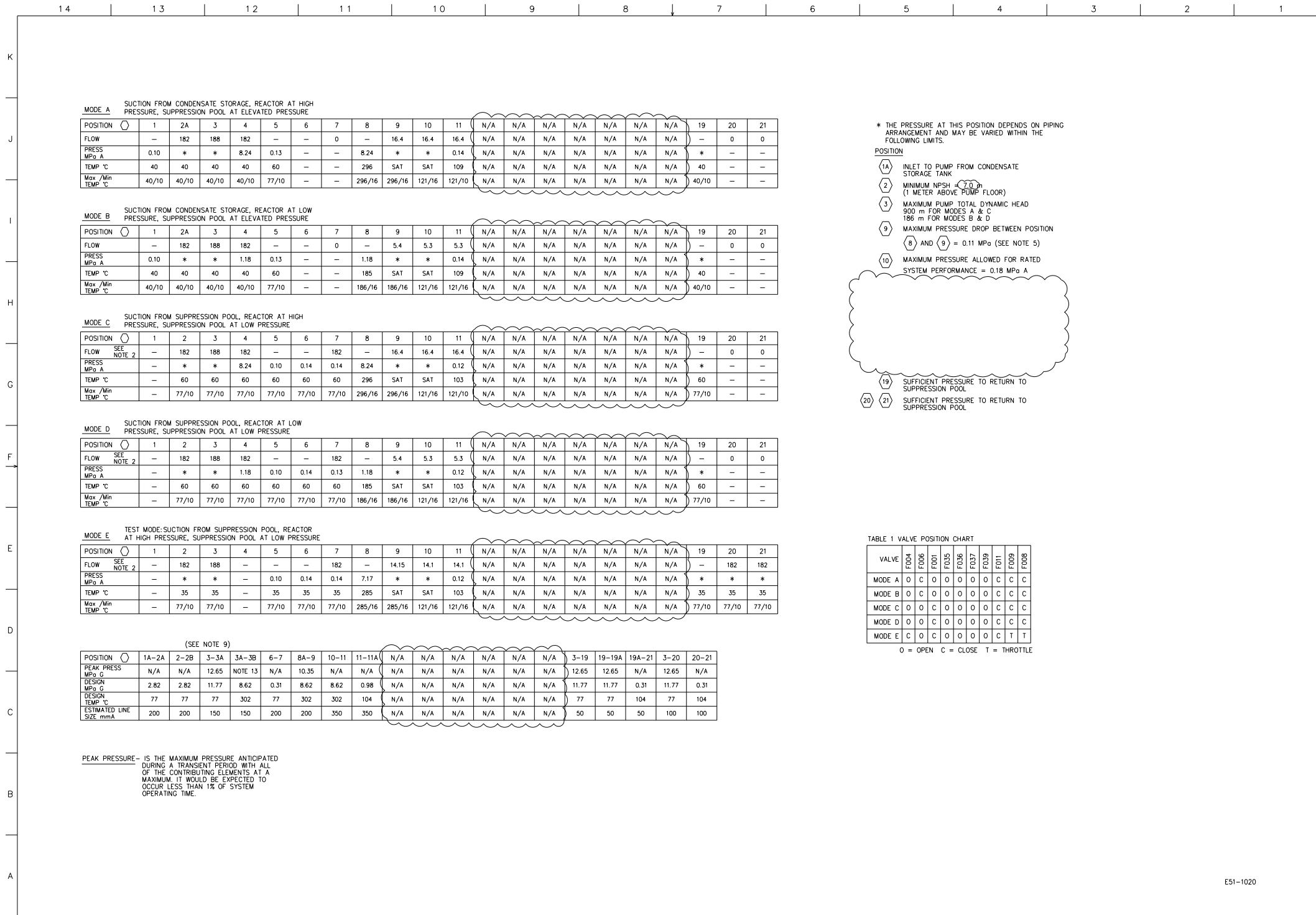


Figure 5.4-9 – Reactor Core Isolation Cooling System PFD (Sheet 2 of 2)

14 13 12 11 10 9 8 7 6 5 4 3 2 1

K  
J  
I  
H  
G  
F  
E  
D  
C  
B  
A

NOTES:

- PIPING HIGH POINT VENTS AND LOW POINT DRAINS ARE TO BE ADDED AS NECESSARY.
- INSTRUMENT LINE DESIGN AND VALVING SHALL BE IN ACCORDANCE WITH INSTRUMENT PIPING SPECIFICATION A11-3030.
- VALVE F028 IS REQUIRED IF THERE IS POTENTIAL FOR OVERPRESSURE.
- FOR ADDITIONAL CONTROL ROOM LIGHTS, SYSTEM ALARMS AND REMOTE MANUAL SWITCHES, SEE THE RHR IBD E11-1030.
- PROVISIONS FOR CONTAINMENT ISOLATION SHALL BE IN ACCORDANCE WITH CURRENT LICENSING REQUIREMENTS.
- VALVE F002 SHALL BE LOCATED AT AN ELEVATION LOWER THAN THE SUPPRESSION POOL MINIMUM WATER LEVEL.
- PUMP C001 COOLING WATER, IF REQUIRED, IS SPECIFIED IN P21-1010.
- ALL PRIMARY CONTAINMENT ISOLATION VALVES SHALL BE LOCATED AS CLOSE AS POSSIBLE TO THE CONTAINMENT PENETRATION.
- ALL MOTOR OPERATED VALVES ARE AC OPERATED UNLESS OTHERWISE NOTED.
- EQUIPMENT IN SUBSYSTEMS A, B AND C SHALL HAVE THE SUFFIX LETTER A, B AND C RESPECTIVELY AFTER THE EQUIPMENT NUMBER.
- FLUSHING CONNECTIONS AND TEMPORARY STRAINER SCREENS ON THE SUCTION SIDE OF ALL PUMPS SHALL BE PROVIDED.
- DRYWELL PIPING RUNS SHALL BE HORIZONTAL OR VERTICAL UPWARDS FROM THE DRYWELL WALL TO THE POINT OF ATTACHMENT WITH THE REACTOR VESSEL.
- THIS HIGH POINT VENT SHALL BE LOCATED AT THE HIGHEST POINT IN THE PIPING OUTSIDE THE DRYWELL BETWEEN VALVES F017 AND F018.
- SUBSYSTEM "A" RETURNS TO RPV THROUGH FEEDWATER LINE "A".
- DISCHARGE LINES FOR COOLING WATER TO BE ROUTED UPSTREAM OF SERVICE WATER RADIATION MONITORS.
- VALVE F014 SHALL BE AS CLOSE AS POSSIBLE TO THE CONNECTIONS TO THE MAIN LINE.
- DESIGN LINE SIZE WILL BE FINALIZED AT THE DETAILED DESIGN PHASE. ACTUAL LINE SIZES DETERMINED BY THE PIPING DESIGNER SHALL MEET THE PROCESS DATA HYDRAULIC REQUIREMENTS.
- CHECK VALVE F006(C) SHALL BE LOCATED AS CLOSE AS PRACTICAL TO THE REACTOR VESSEL NOZZLE.
- VALVES F011A, F011B AND F011C ARE IN ELECTRICAL DIVISIONS 2, 3 AND 1 RESPECTIVELY. THE MANUAL CONTROL SWITCHES FOR VALVES F011A, F011B AND F011C ARE IN ELECTRICAL DIVISIONS 1, 2 AND 3 RESPECTIVELY.
- PIPING DESIGN SPECIFICATIONS ARE AS FOLLOWS:  
A. MAXIMUM OPERATING PRESSURE - SEE SPECIFIC BOUNDARY SYMBOL  
B. MAXIMUM OPERATING TEMPERATURE - SEE SPECIFIC BOUNDARY SYMBOL  
C. MATERIAL - CARBON STEEL  
D. PIPING SCHEDULE - INTERFACE  
E. DESIGN CLASS - SEE SPECIFIC BOUNDARY SYMBOL  
F. QC CLASS - SEE SPECIFIC BOUNDARY SYMBOL  
G. SEISMIC CLASS - RHR - As  
H. FLUID - WATER
- AIR SUPPLY IS FROM INSTRUMENT AIR SYSTEM, SUPPL DOC 15. NITROGEN SUPPLY IS FROM HIGH PRESSURE NITROGEN GAS SUPPLY SYSTEM, SUPPL DOC 4.
- STRAINER TYPE AS SUPPLIED WITH PUMP C002.
- FLANGE CONNECTION USED FOR OCCASIONAL SUPPRESSION POOL DRAINING.
- DRAIN AND VENT PIPING DESIGN CONDITIONS ARE:  
MAXIMUM OPERATING PRESSURE - SAME AS MAIN LINE UPSTREAM OF VALVE (ATMOSPHERIC PRESSURE FROM LAST VALVE TO FUNNEL).  
MAXIMUM OPERATING TEMPERATURE - SAME AS MAIN LINE UPSTREAM OF VALVE (565°C FROM LAST VALVE TO FUNNEL).
- UNIQUE PIPE NUMBERS ARE ASSIGNED SEQUENTIALLY FOR EACH RHR LOOP. RANGES OF NUMBERS ARE ALLOCATED FOR EACH LOOP AND TYPE OF PIPE AS FOLLOWS:

	LOOP A	LOOP B	LOOP C
PROCESS PIPING	001-100	101-200	201-300
DRAIN AND VENT PIPING	500-529	530-559	560-589
INSTRUMENT PIPING	700-729	730-759	760-789

- THE VALVE TYPE FOR F043 AND F044 WILL BE DECIDED IN THE FINAL DESIGN.
- THE RECORDING FUNCTION IS ACCOMPLISHED THROUGH MICROPROCESSOR CHANNEL OUTPUT TO PRINTER.
- TWO ROOT VALVES CAN BE PROVIDED AT THE SUPPLIERS OPTION ON HIGH RADIATION/LOW PRESSURE DRAIN AND VENT LINES.
- BYPASS VALVES F036A,B,C SHALL BE UTILIZED FOR WARMING UP THE RHR PIPING SYSTEM. THE FLOW WILL BE FROM THE REACTOR SIDE. THESE VALVES ARE ALSO USED DURING OPERABILITY TESTING OF TESTABLE CHECK VALVE F006.
- 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.
- 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.
- LOCATE THE GATE VALVE OF THIS SPRING SECTION AT A DISTANCE GREATER THAN OR EQUAL TO 25 PIPE DIAMETERS FROM THE RPV NOZZLE. OTHERWISE, PERFORM STRESS ANALYSIS TO SHOW THAT STRESSES AND FATIGUE ARE ACCEPTABLE PER THE ASME CODE FROM THE CONCERN OF NRC BULLETIN 88-08, SUPPLEMENT 3 (APRIL 11, 1989) ON POTENTIAL THERMAL STRATIFICATION AND STRIPPING DUE TO PERIODIC EXTERNAL LEAKAGE OF THE GATE VALVE.]
- THE THREE RETURN LINES BRINGING FLOW INTO THE SUPPRESSION POOL (S/P) SHALL HAVE AN EXIT DESIGN THAT PROMOTES S/P CIRCULATION AND MIXING FOR EFFICIENT COOLING. CONSIDERATIONS SHALL INCLUDE: (1) DIRECTING THE FLOW HORIZONTALLY WITH THE THREE LINES WORKING TOGETHER TO ACHIEVE CIRCULATION AROUND THE S/P'S ANNULAR SHAPE, (2) DIRECTING THE RETURN FLOW TO AVOID DIRECTLY ENTERING A SUCTION INLET, AND (3) SEPARATE THE RETURN LINES FROM THE SUCTION STRAINERS IN THE ELEVATION PLANE TO THE GREATEST EXTENT PRACTICAL, WITH THE RETURN LINES LOCATED NEAR THE S/P TOP AND THE SUCTION STRAINERS NEAR THE S/P BOTTOM.
- VALVE TO HAVE MANUAL HAND WHEEL OPERABLE AT LOW DELTA PRESSURE FOR POTENTIAL NEED DURING FIRE WATER ADDITION MODE (NOTE VALVES F003C, F017C, AND F018C).
- VALVE F005A SHALL BE LOCATED AS CLOSE AS PRACTICAL TO THE STEAM TUNNEL WALL.

\* SEE SUBSECTION 3.9.1.7.

SUPPLEMENTAL DOCUMENTS UNDER THE FOLLOWING IDENTITIES ARE TO BE USED IN CONJUNCTION WITH THIS DRAWING.

	MPL NO.
1. RESIDUAL HEAT REMOVAL SYSTEM PFD	E11-1020
2. RESIDUAL HEAT REMOVAL SYSTEM IBD	E11-1030
3. SAMPLING SYSTEM P&ID	P91-1010
4. HIGH PRESSURE NITROGEN GAS SUPPLY SYSTEM P&ID	P54-1010
5. REACTOR WATER CLEANUP SYSTEM P&ID	G31-1010
6. FUEL POOL COOLING AND CLEANUP SYSTEM P&ID	G41-1010
7. VALVE GLAND LEAKAGE TREATMENT, RADWASTE SYSTEM P&ID	K17-1010
8. MAKE-UP WATER SYSTEM (CONDENSATE) P&ID	P13-1010
9. REMOTE SHUTDOWN SYSTEM IED	C61-1040
10. HIGH PRESSURE CORE FLOODER P&ID	E22-1010
11. REACTOR CORE ISOLATION COOLING SYSTEM P&ID	E51-1010
12. NUCLEAR BOILER SYSTEM P&ID	B21-1010
13. HIGH CONDUCTIVITY WASTE, RADWASTE SYSTEM P&ID	K17-1010
14. REACTOR BUILDING COOLING WATER SYSTEM P&ID	P21-1010
15. INSTRUMENT AIR SYSTEM P&ID	P52-1010
16. NOT USED	
17. NUCLEAR BOILER SYSTEM IBD	B21-1030
18. SAMPLING SYSTEM P&ID (INCLUDES PASS)	P91-1010
19. FIRE PROTECTION SYSTEM P&ID	U43-1010
20. LOW CONDUCTIVITY WASTE, RADWASTE SYSTEM P&ID	K17-1010
21. REACTOR ICD	B11-2020

SUPPORTING DOCUMENTS

1. PIPING AND INSTRUMENT SYMBOLS	A10-3030
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LEGEND:

—|— LEAK TESTABLE DOUBLE DISC GATE VALVE

MPL NO. E11-1010

Figure 5.4-10 – Residual Heat Removal System P&ID (Sheet 1 of 7)

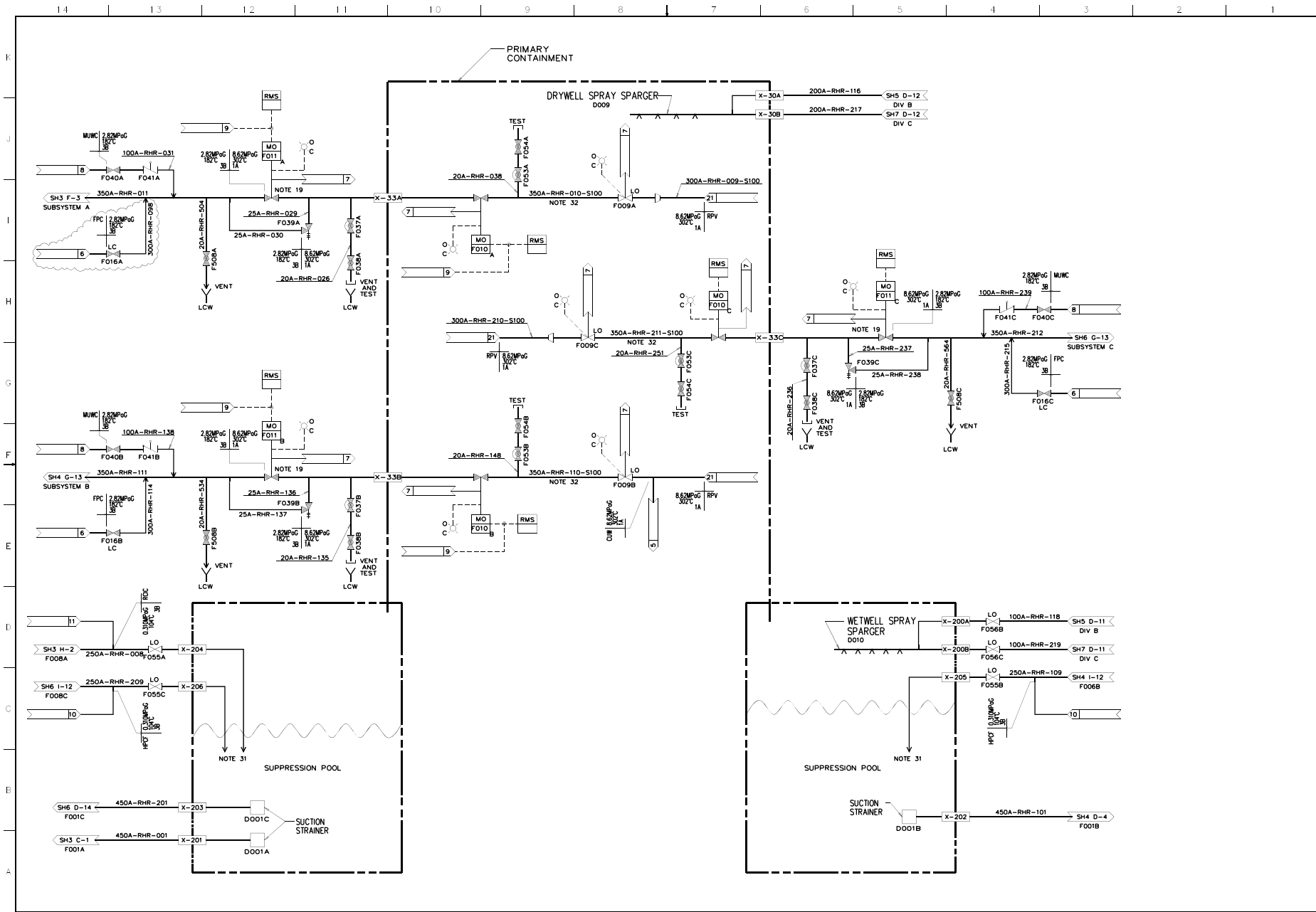


Figure 5.4-10 – Residual Heat Removal System P&ID (Sheet 2 of 7)



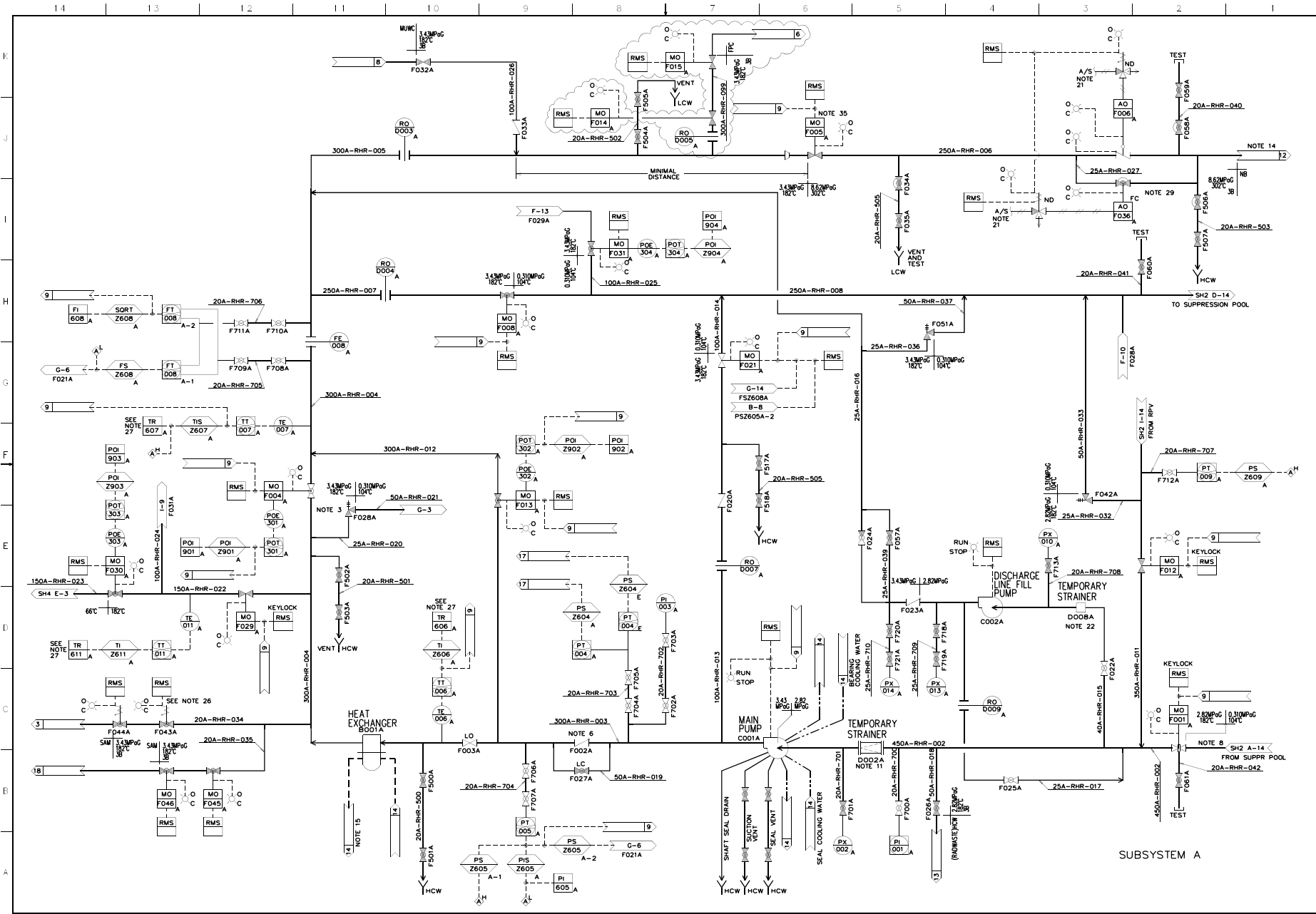


Figure 5.4-10 – Residual Heat Removal System P&ID (Sheet 3 of 7)

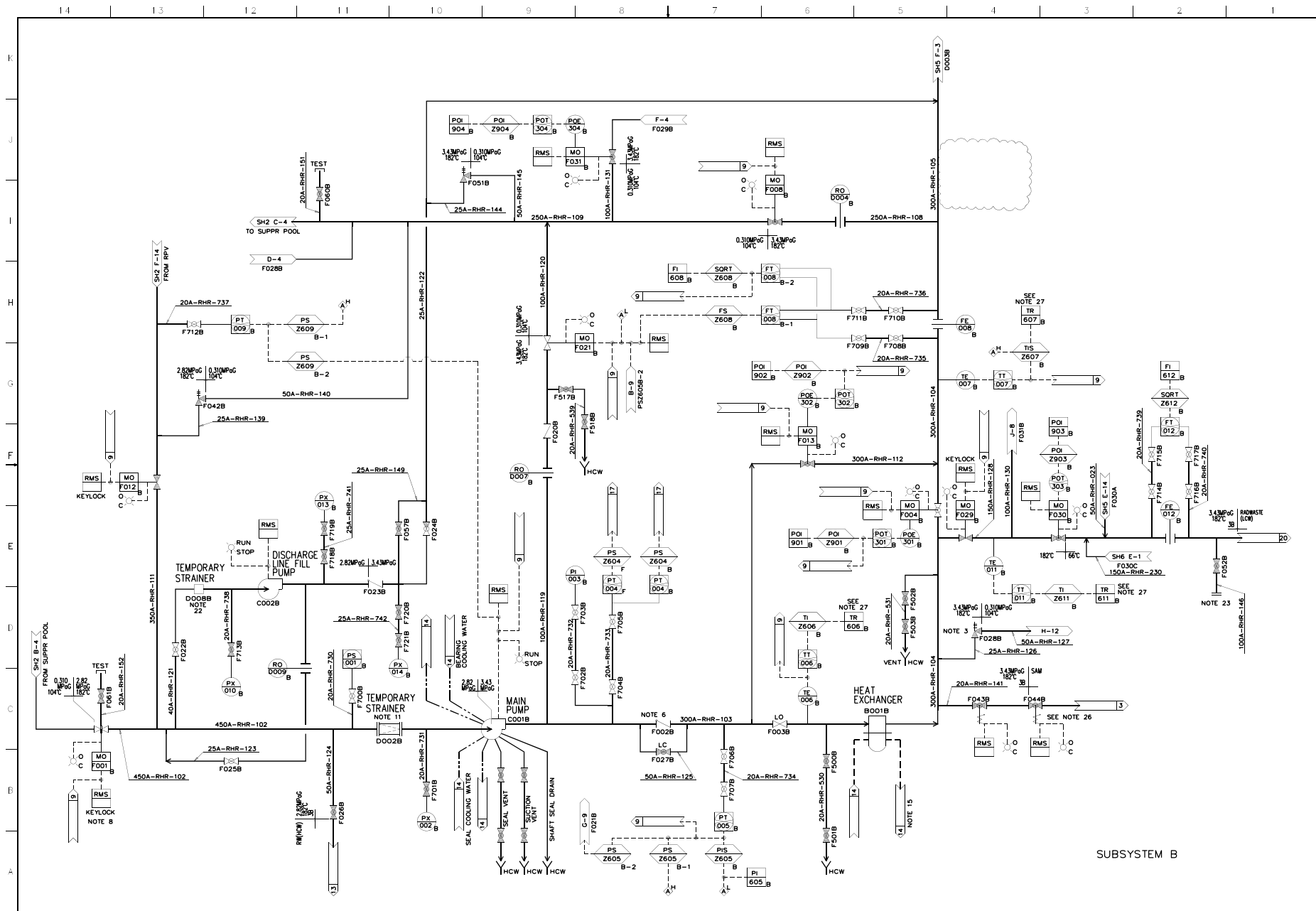


Figure 5.4-10 – Residual Heat Removal System P&ID (Sheet 4 of 7)

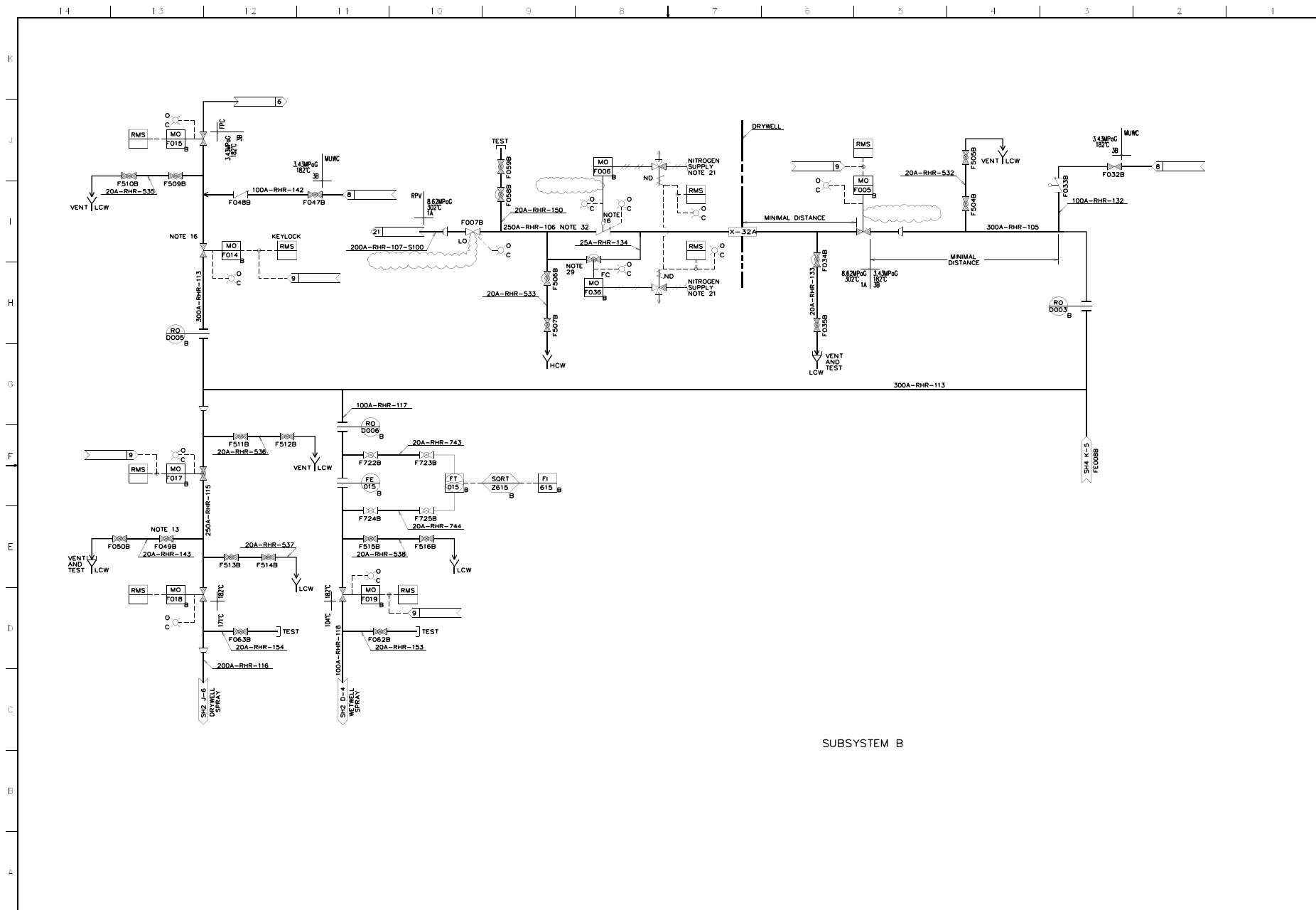


Figure 5.4-10 – Residual Heat Removal System P&ID (Sheet 5 of 7)

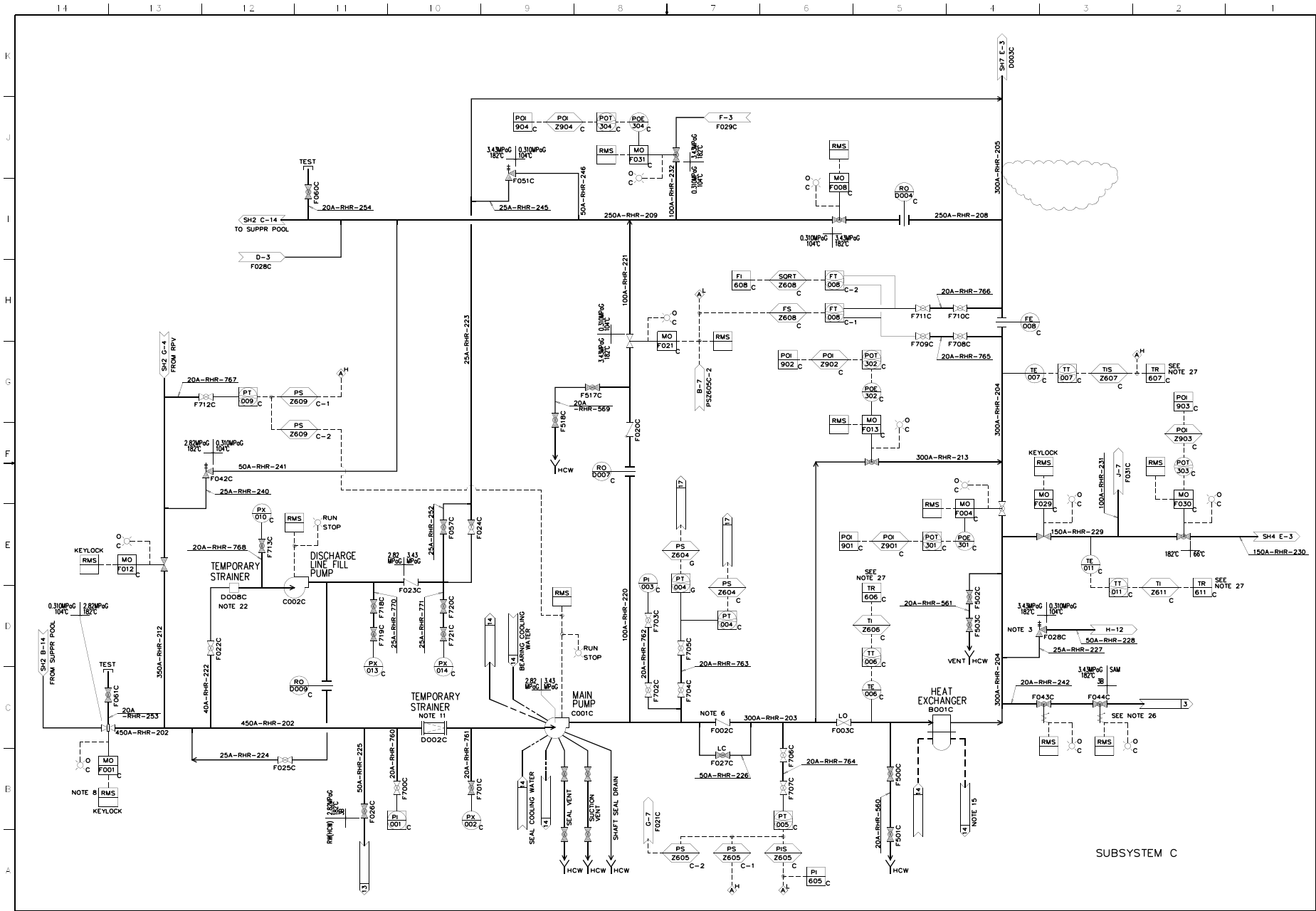


Figure 5.4-10 – Residual Heat Removal System P&ID (Sheet 6 of 7)

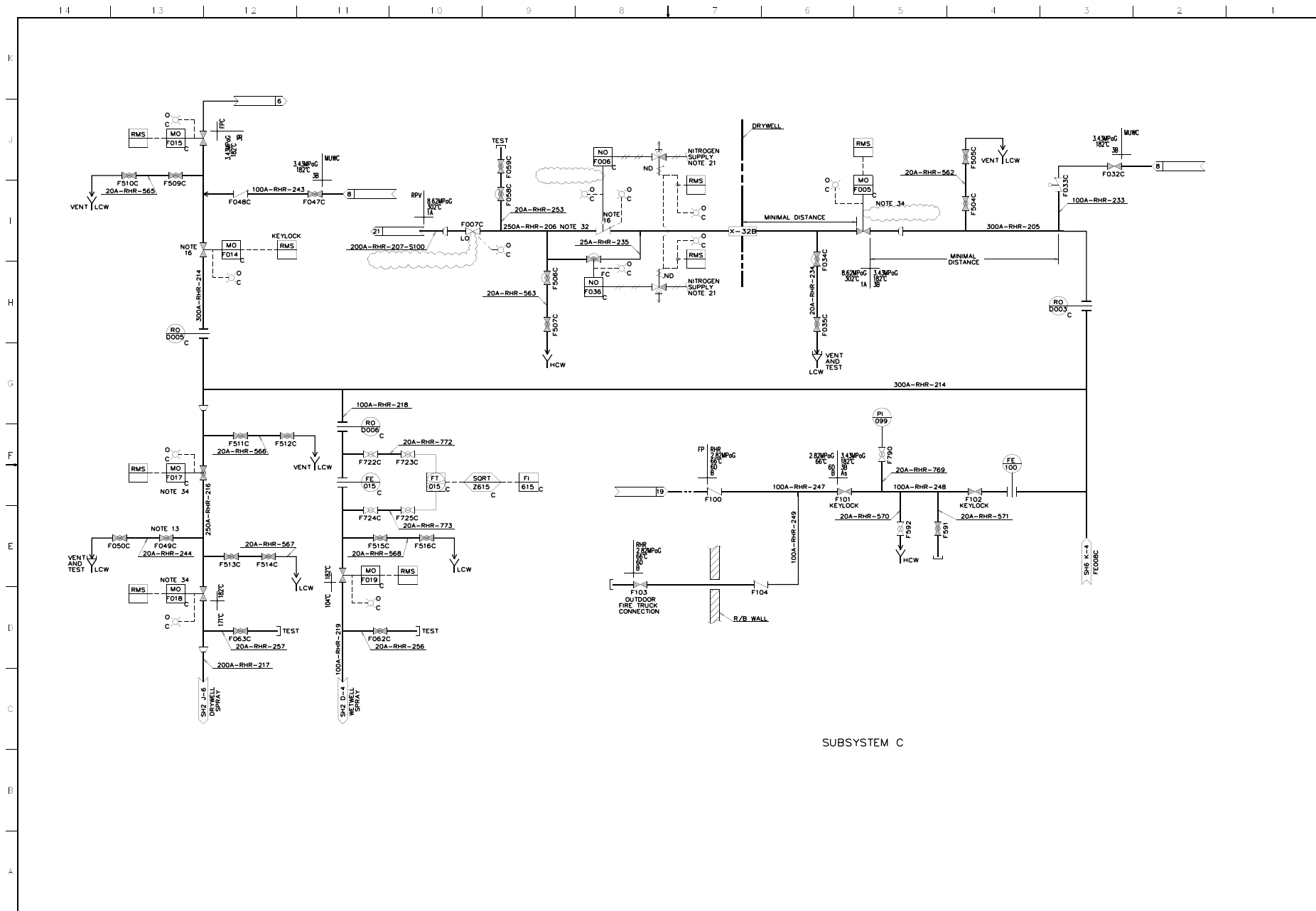


Figure 5.4-10 – Residual Heat Removal System P&ID (Sheet 7 of 7)

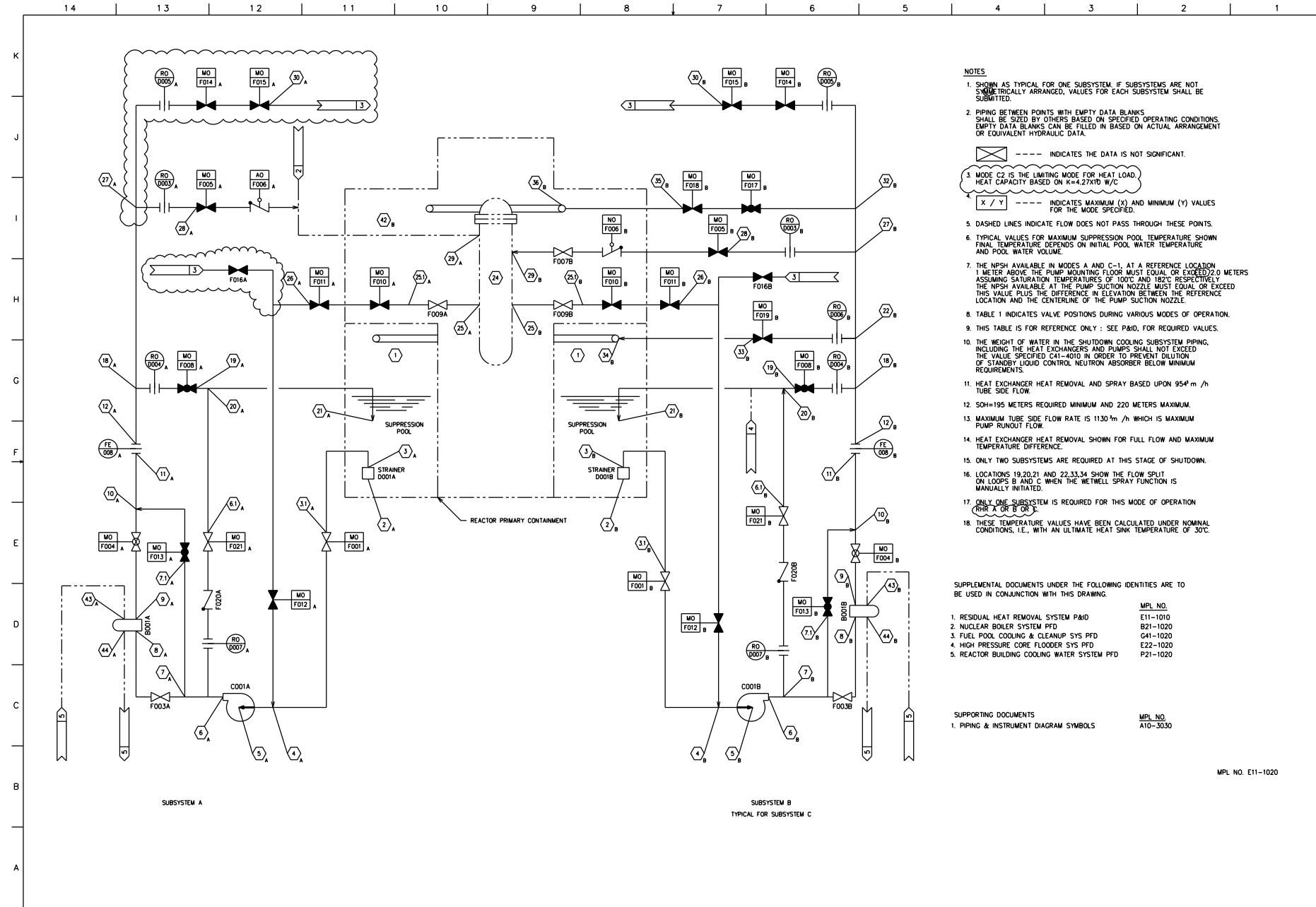
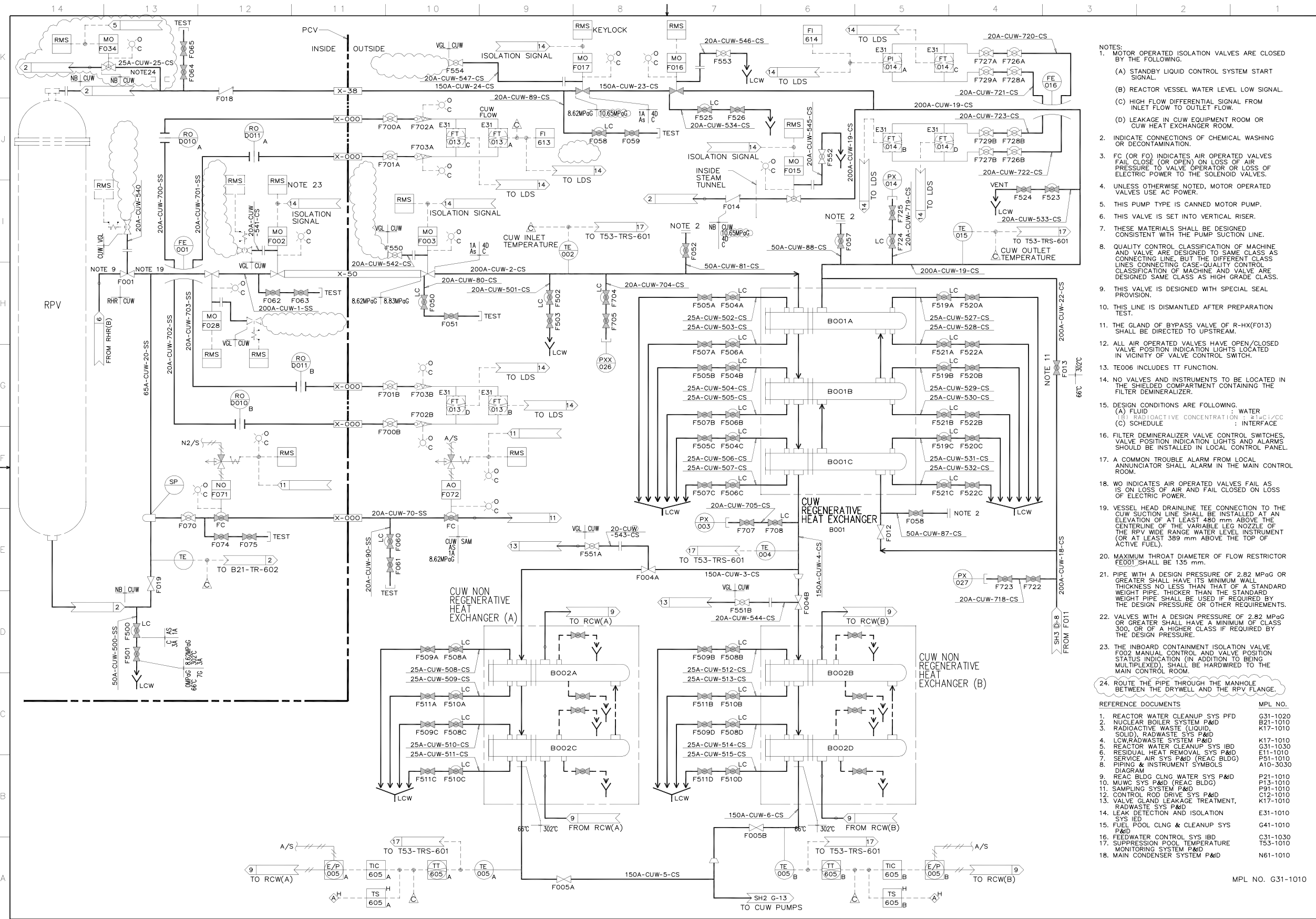


Figure 5.4-11 – Residual Heat Removal System PFD (Sheet 1 of 2)





- NOTES:
- MOTOR OPERATED ISOLATION VALVES ARE CLOSED BY THE FOLLOWING.
    - (A) STANDBY LIQUID CONTROL SYSTEM START SIGNAL.
    - (B) REACTOR VESSEL WATER LEVEL LOW SIGNAL.
    - (C) HIGH FLOW DIFFERENTIAL SIGNAL FROM INLET FLOW TO OUTLET FLOW.
    - (D) LEAKAGE IN CUW EQUIPMENT ROOM OR CUW HEAT EXCHANGER ROOM.
  - INDICATE CONNECTIONS OF CHEMICAL WASHING OR DECONTAMINATION.
  - FC (OR FO) INDICATES AIR OPERATED VALVES FAIL CLOSE (OR OPEN) ON LOSS OF AIR PRESSURE TO VALVE OPERATOR OR LOSS OF ELECTRIC POWER TO THE SOLENOID VALVES.
  - UNLESS OTHERWISE NOTED, MOTOR OPERATED VALVES USE AC POWER.
  - THIS PUMP TYPE IS CANNED MOTOR PUMP.
  - THIS VALVE IS SET INTO VERTICAL RISER.
  - THESE MATERIALS SHALL BE DESIGNED CONSISTENT WITH THE PUMP SUCTION LINE.
  - QUALITY CONTROL CLASSIFICATION OF MACHINE AND VALVE ARE DESIGNED TO SAME CLASS AS CONNECTING LINE, BUT THE DIFFERENT CLASS LINES CONNECTING CASE-QUALITY CONTROL CLASSIFICATION OF MACHINE, AND VALVE ARE DESIGNED SAME CLASS AS HIGH GRADE CLASS.
  - THIS VALVE IS DESIGNED WITH SPECIAL SEAL PROVISION.
  - THIS LINE IS DISMANTLED AFTER PREPARATION TEST.
  - THE GLAND OF BYPASS VALVE OF R-HX(F013) SHALL BE DIRECTED TO UPSTREAM.
  - ALL AIR OPERATED VALVES HAVE OPEN/CLOSED VALVE POSITION INDICATION LIGHTS LOCATED IN VICINITY OF VALVE CONTROL SWITCH.
  - TE006 INCLUDES TT FUNCTION.
  - NO VALVES AND INSTRUMENTS TO BE LOCATED IN THE SHIELDED COMPARTMENT CONTAINING THE FILTER DEMINERALIZER.
  - DESIGN CONDITIONS ARE FOLLOWING.
    - (A) FLUID
    - (B) RADIOACTIVE CONCENTRATION
    - (C) SCHEDULE
    - INTERFACE
  - FILTER DEMINERALIZER VALVE CONTROL SWITCHES, VALVE POSITION INDICATION LIGHTS AND ALARMS SHOULD BE INSTALLED IN LOCAL CONTROL PANEL.
  - A COMMON TROUBLE ALARM FROM LOCAL ANNUNCIATOR SHALL ALARM IN THE MAIN CONTROL ROOM.
  - WO INDICATES AIR OPERATED VALVES FAIL AS IS ON LOSS OF AIR AND FAIL CLOSED ON LOSS OF ELECTRIC POWER.
  - VESSEL HEAD DRAINLINE TEE CONNECTION TO THE CUW SUCTION LINE SHALL BE INSTALLED AT AN ELEVATION OF AT LEAST 480 mm ABOVE THE CENTERLINE OF THE VARIABLE LEG NOZZLE OF THE RPV WIDE RANGE WATER LEVEL INSTRUMENT (OR AT LEAST 389 mm ABOVE THE TOP OF ACTIVE FUEL).
  - MAXIMUM THROAT DIAMETER OF FLOW RESTRICTOR FE001 SHALL BE 135 mm.
  - PIPE WITH A DESIGN PRESSURE OF 2.82 MPaG OR GREATER SHALL HAVE ITS MINIMUM WALL THICKNESS NO LESS THAN THAT OF A STANDARD WEIGHT PIPE, THICKER THAN THE STANDARD WEIGHT PIPE SHALL BE USED IF REQUIRED BY THE DESIGN PRESSURE OR OTHER REQUIREMENTS.
  - VALVES WITH A DESIGN PRESSURE OF 2.82 MPaG OR GREATER SHALL HAVE A MINIMUM OF CLASS 300, OR OF A HIGHER CLASS IF REQUIRED BY THE DESIGN PRESSURE.
  - THE INBOARD CONTAINMENT ISOLATION VALVE F002 MANUAL CONTROL AND VALVE POSITION STATUS INDICATION (IN ADDITION TO BEING MULTIPLEXED), SHALL BE HARDWIRED TO THE MAIN CONTROL ROOM.
  - ROUTE THE PIPE THROUGH THE MANHOLE BETWEEN THE DRYWELL AND THE RPV FLANGE.

REFERENCE DOCUMENTS

REFERENCE DOCUMENTS	MPL NO.
1. REACTOR WATER CLEANUP SYS PFD	G31-1020
2. NUCLEAR BOILER SYSTEM P&ID	B21-1010
3. RADIOACTIVE WASTE (LIQUID, SOLID), RADWASTE SYS P&ID	K17-1010
4. LW RADWASTE SYSTEM P&ID	K17-1010
5. REACTOR WATER CLEANUP SYS IBD	G31-1030
6. RESIDUAL HEAT REMOVAL SYS P&ID	E11-1010
7. SERVICE AIR SYS P&ID (REAC BLDG)	P51-1010
8. PIPING & INSTRUMENT SYMBOLS DIAGRAM	A10-3030
9. REAC BLDG CLNG WATER SYS P&ID	P21-1010
10. MUWC SYS P&ID (REAC BLDG)	P13-1010
11. SAMPLING SYSTEM P&ID	P91-1010
12. CONTROL ROD DRIVE SYS P&ID	C12-1010
13. VALVE GLAND LEAKAGE TREATMENT, RADWASTE SYS P&ID	K17-1010
14. LEAK DETECTION AND ISOLATION SYS IED	E31-1010
15. FUEL POOL CLNG & CLEANUP SYS P&ID	G41-1010
16. FEEDWATER CONTROL SYS IBD	C31-1030
17. SUPPRESSION POOL TEMPERATURE MONITORING SYSTEM P&ID	T53-1010
18. MAIN CONDENSER SYSTEM P&ID	N61-1010

MPL NO. G31-1010

Figure 5.4-12 – Reactor Water Cleanup System P&ID (Sheet 1 of 4)



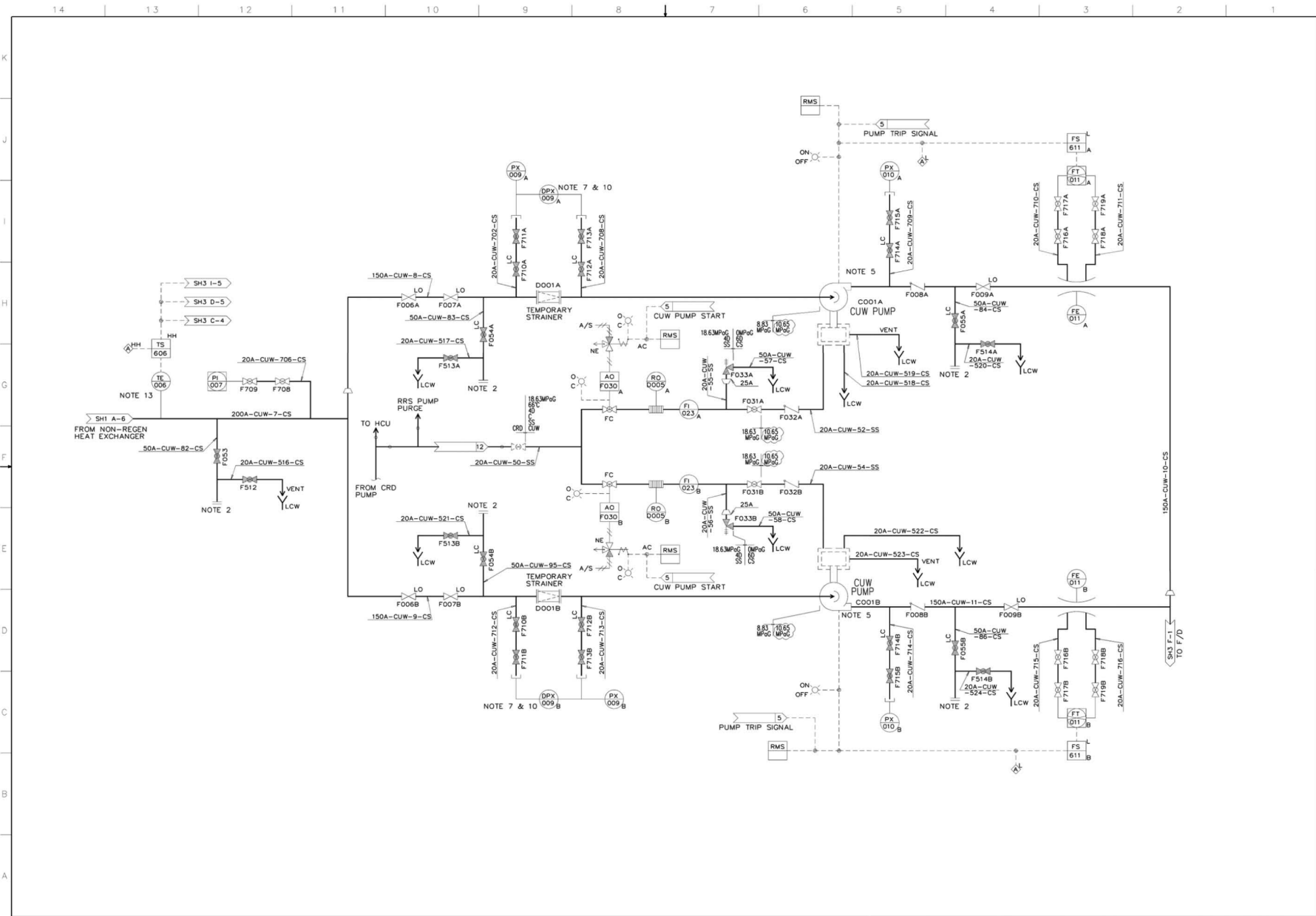


Figure 5.4-12 – Reactor Water Cleanup System P&ID (Sheet 2 of 4)

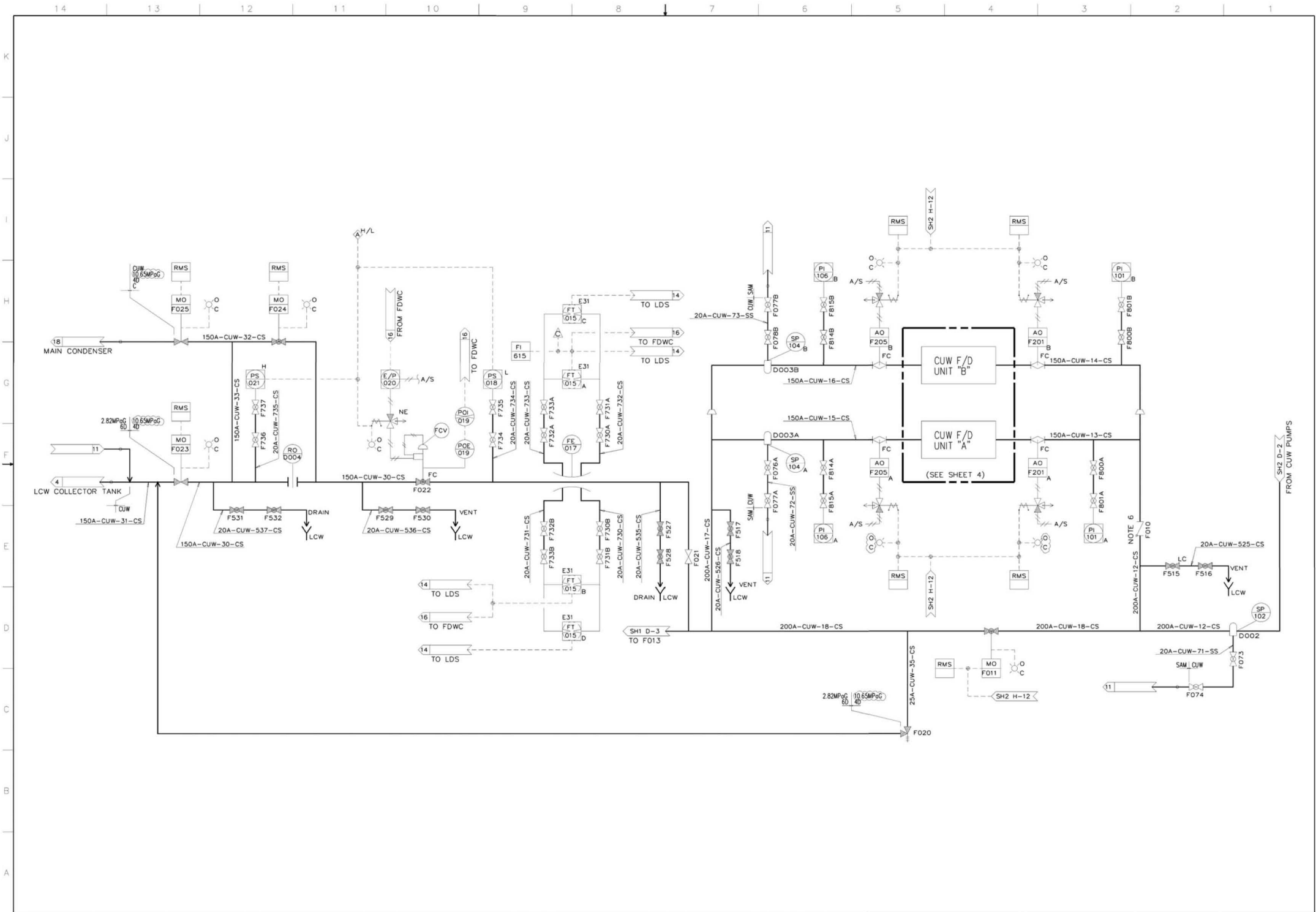


Figure 5.4-12 – Reactor Water Cleanup System P&ID (Sheet 3 of 4)

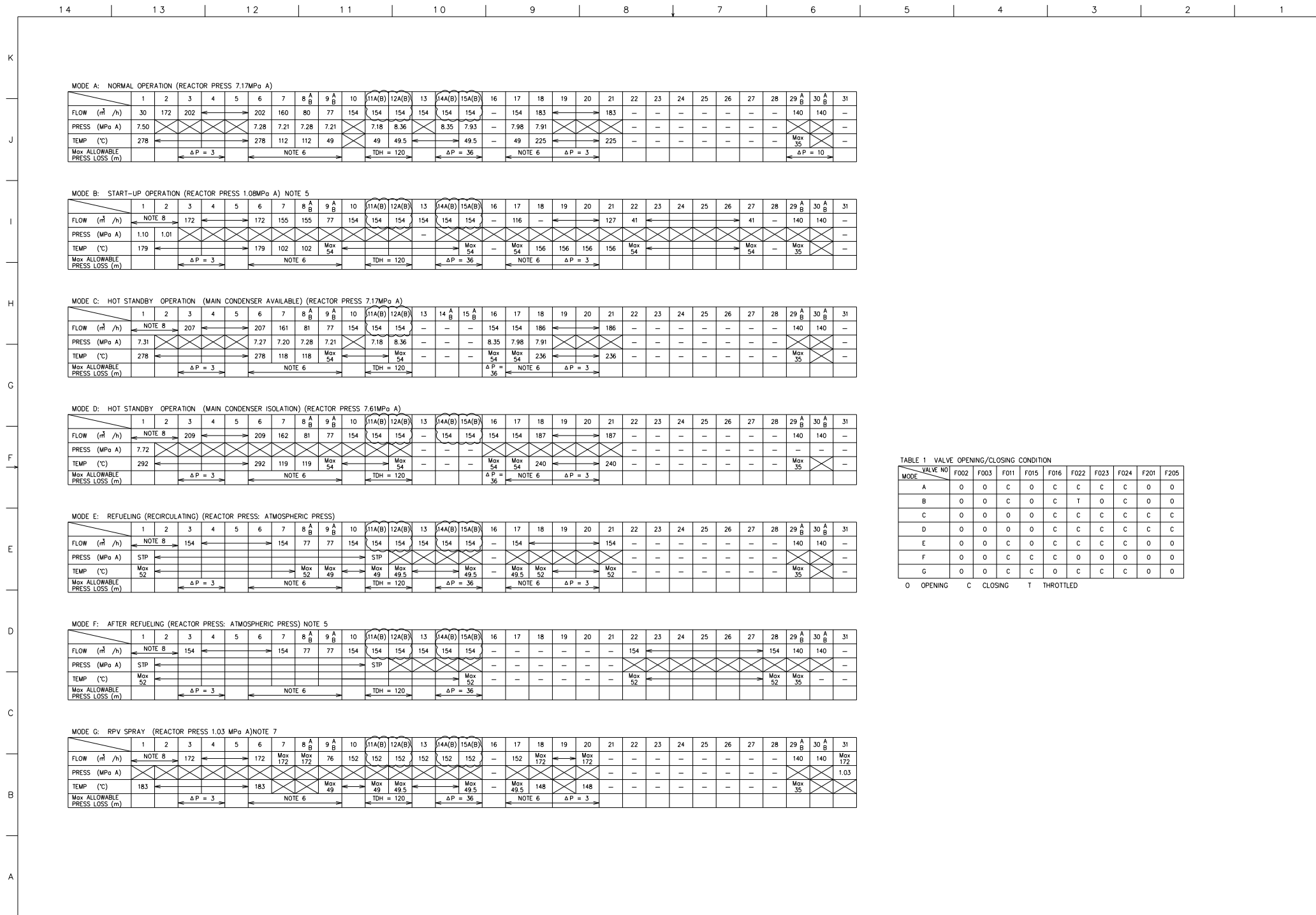


Figure 5.4-13 – Reactor Water Cleanup System PFD (Sheet 2 of 2)

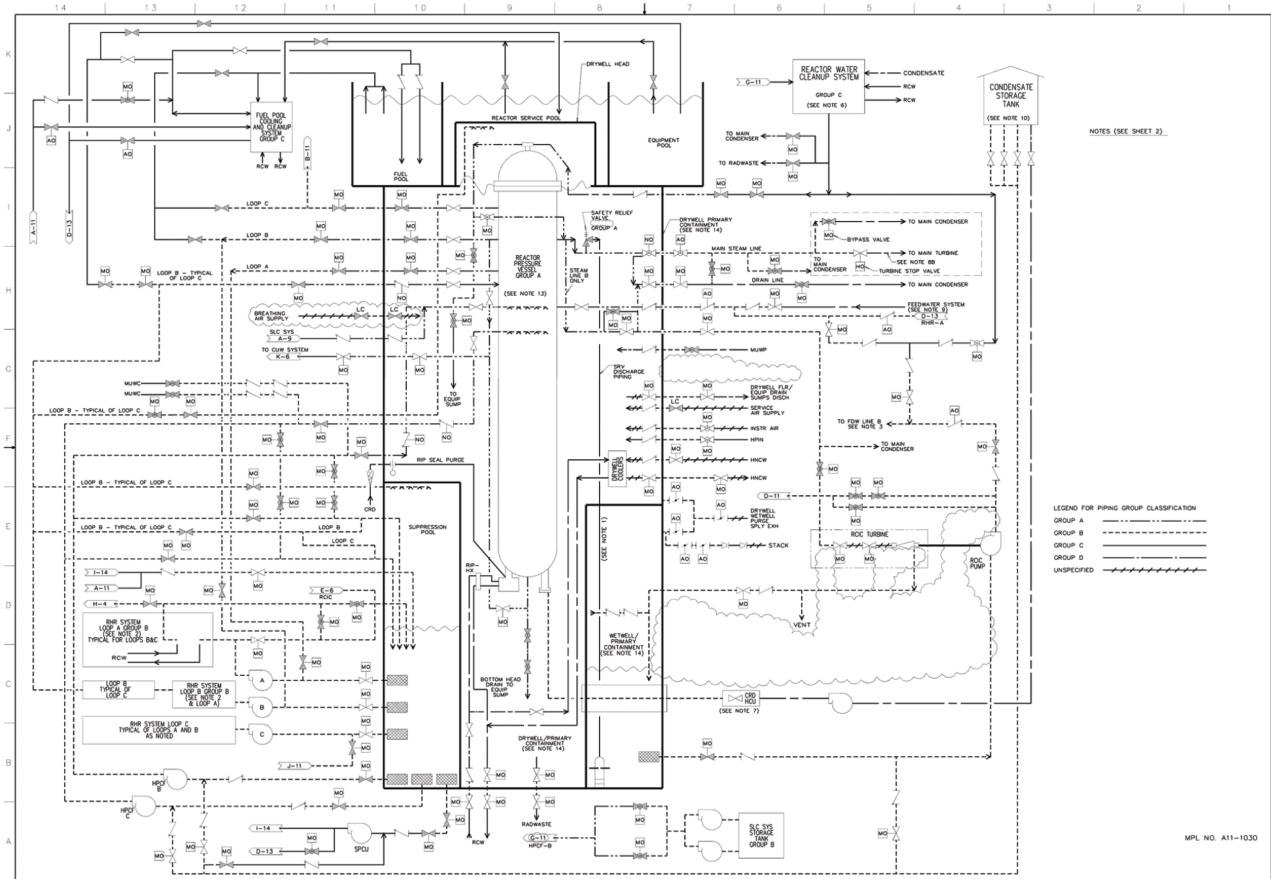


Figure 6.2-38 – Plant Requirements, Group Classification and Containment Isolation Diagram (Sheet 1 of 2)

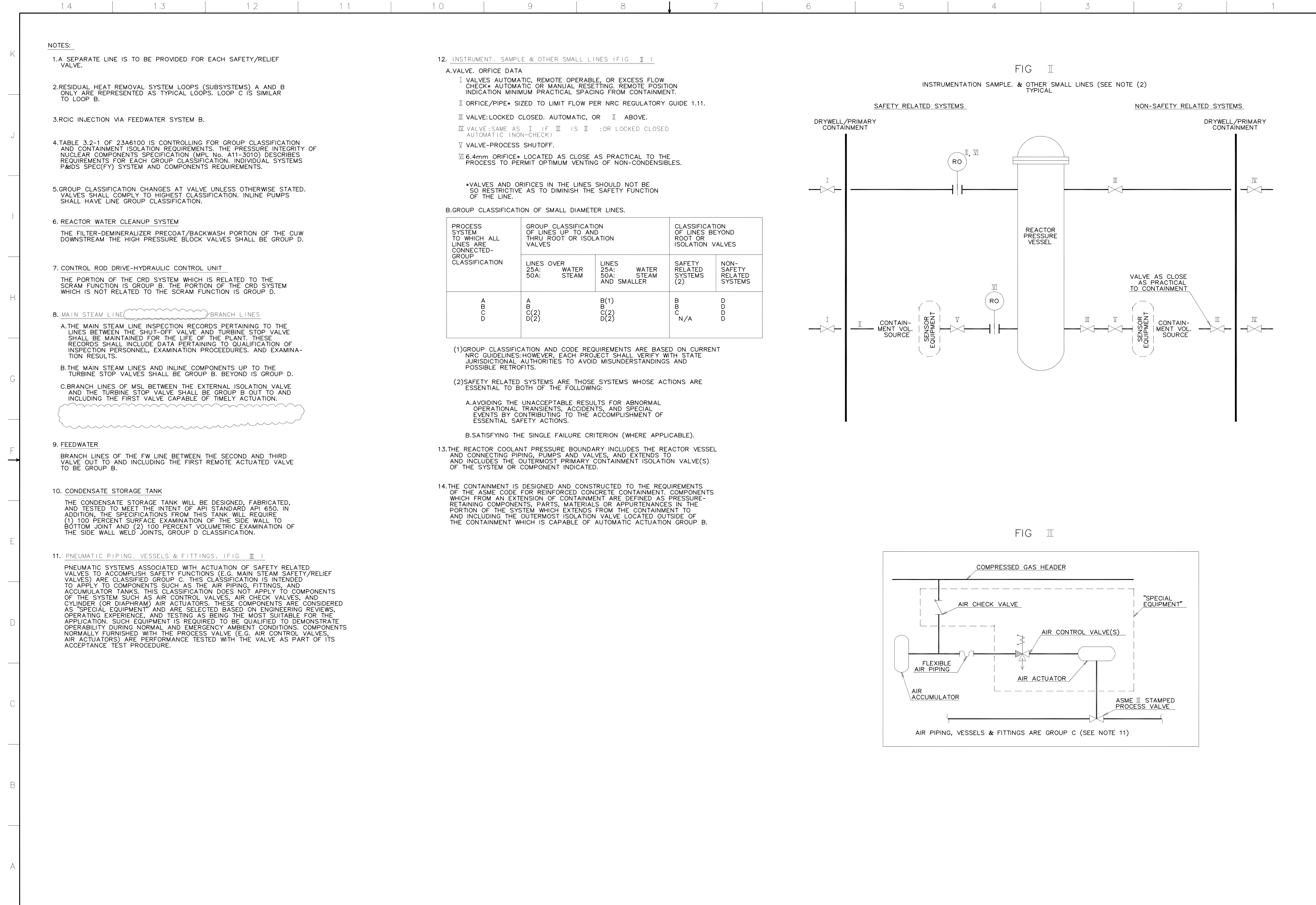
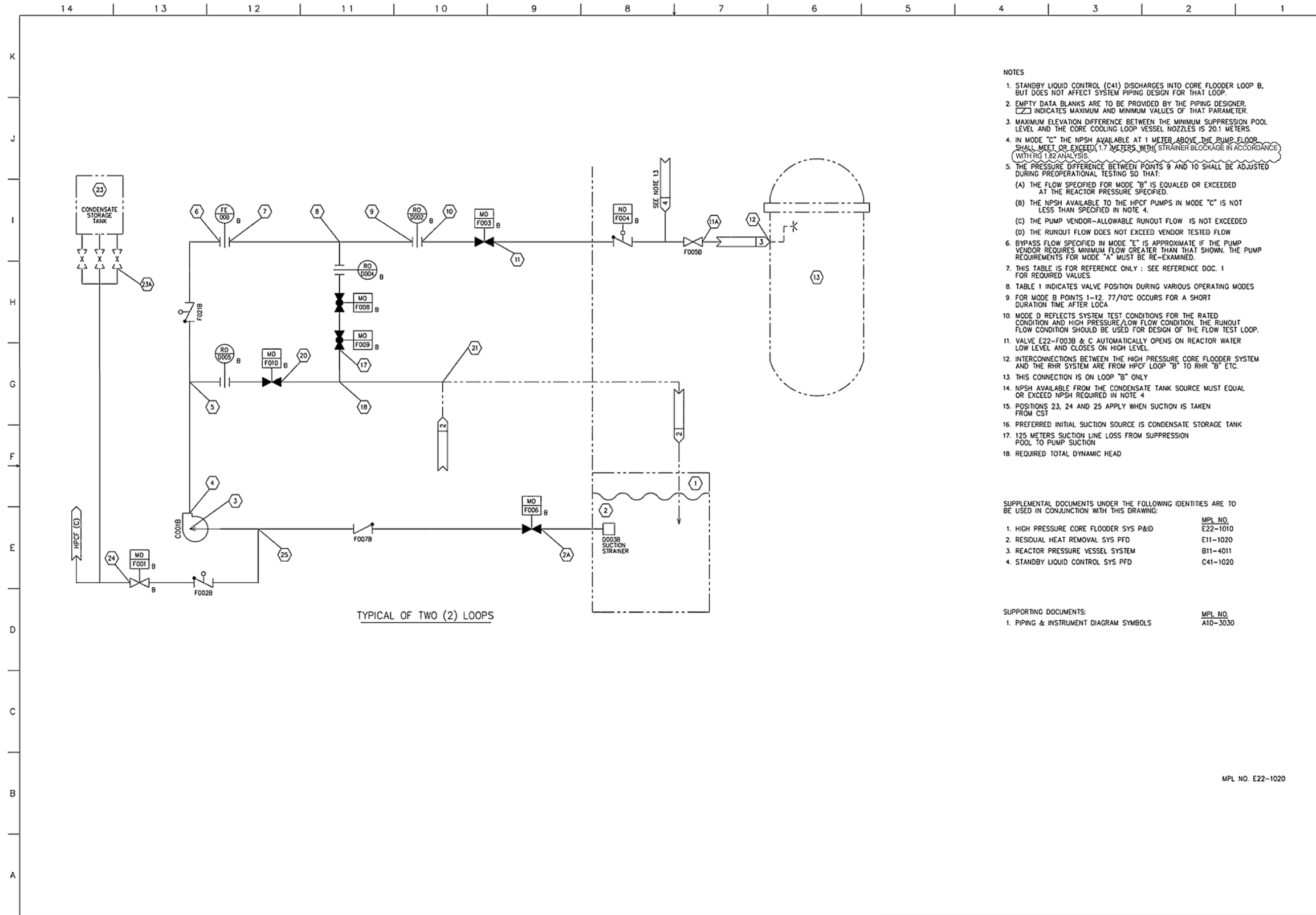


Figure 6.2-38 – Plant Requirements, Group Classification and Containment Isolation Diagram (Sheet 2 of 2)



- NOTES
- STANDBY LIQUID CONTROL (C41) DISCHARGES INTO CORE FLOODER LOOP B, BUT DOES NOT AFFECT SYSTEM PIPING DESIGN FOR THAT LOOP.
  - EMPTY DATA BLANKS ARE TO BE PROVIDED BY THE PIPING DESIGNER.   INDICATES MAXIMUM AND MINIMUM VALUES OF THAT PARAMETER.
  - MAXIMUM ELEVATION DIFFERENCE BETWEEN THE MINIMUM SUPPRESSION POOL LEVEL AND THE CORE COOLING LOOP VESSEL NOZZLES IS 20.1 METERS.
  - IN MODE "C" THE NPSH AVAILABLE AT 1 METER ABOVE THE PUMP FLOOR SHALL MEET OR EXCEED 1.7 METERS WITH STRAINER BLOCKAGE IN ACCORDANCE WITH RG 1.82 ANALYSIS.
  - THE PRESSURE DIFFERENCE BETWEEN POINTS 9 AND 10 SHALL BE ADJUSTED DURING PREOPERATIONAL TESTING SO THAT:
    - THE FLOW SPECIFIED FOR MODE "B" IS EQUALED OR EXCEEDED AT THE REACTOR PRESSURE SPECIFIED.
    - THE NPSH AVAILABLE TO THE HPCF PUMPS IN MODE "C" IS NOT LESS THAN SPECIFIED IN NOTE 4.
    - THE PUMP VENDOR-ALLOWABLE RUNOUT FLOW IS NOT EXCEEDED
    - THE RUNOUT FLOW DOES NOT EXCEED VENDOR TESTED FLOW
  - BYPASS FLOW SPECIFIED IN MODE "E" IS APPROXIMATE IF THE PUMP VENDOR REQUIRES MINIMUM FLOW GREATER THAN THAT SHOWN, THE PUMP REQUIREMENTS FOR MODE "A" MUST BE RE-EXAMINED.
  - THIS TABLE IS FOR REFERENCE ONLY : SEE REFERENCE DOC. 1 FOR REQUIRED VALUES.
  - TABLE 1 INDICATES VALVE POSITION DURING VARIOUS OPERATING MODES
  - FOR MODE B POINTS 1-12, 77/10°C OCCURS FOR A SHORT DURATION TIME AFTER LOCA
  - MODE D REFLECTS SYSTEM TEST CONDITIONS FOR THE RATED CONDITION AND HIGH PRESSURE/LOW FLOW CONDITION. THE RUNOUT FLOW CONDITION SHOULD BE USED FOR DESIGN OF THE FLOW TEST LOOP.
  - VALVE E22-F003B & C AUTOMATICALLY OPENS ON REACTOR WATER LOW LEVEL AND CLOSES ON HIGH LEVEL.
  - INTERCONNECTIONS BETWEEN THE HIGH PRESSURE CORE FLOODER SYSTEM AND THE RHR SYSTEM ARE FROM HPCF LOOP "B" TO RHR "B" ETC.
  - THIS CONNECTION IS ON LOOP "B" ONLY
  - NPSH AVAILABLE FROM THE CONDENSATE TANK SOURCE MUST EQUAL OR EXCEED NPSH REQUIRED IN NOTE 4
  - POSITIONS 23, 24 AND 25 APPLY WHEN SUCTION IS TAKEN FROM CST
  - PREFERRED INITIAL SUCTION SOURCE IS CONDENSATE STORAGE TANK
  - 125 METERS SUCTION LINE LOSS FROM SUPPRESSION POOL TO PUMP SUCTION
  - REQUIRED TOTAL DYNAMIC HEAD

SUPPLEMENTAL DOCUMENTS UNDER THE FOLLOWING IDENTITIES ARE TO BE USED IN CONJUNCTION WITH THIS DRAWING:

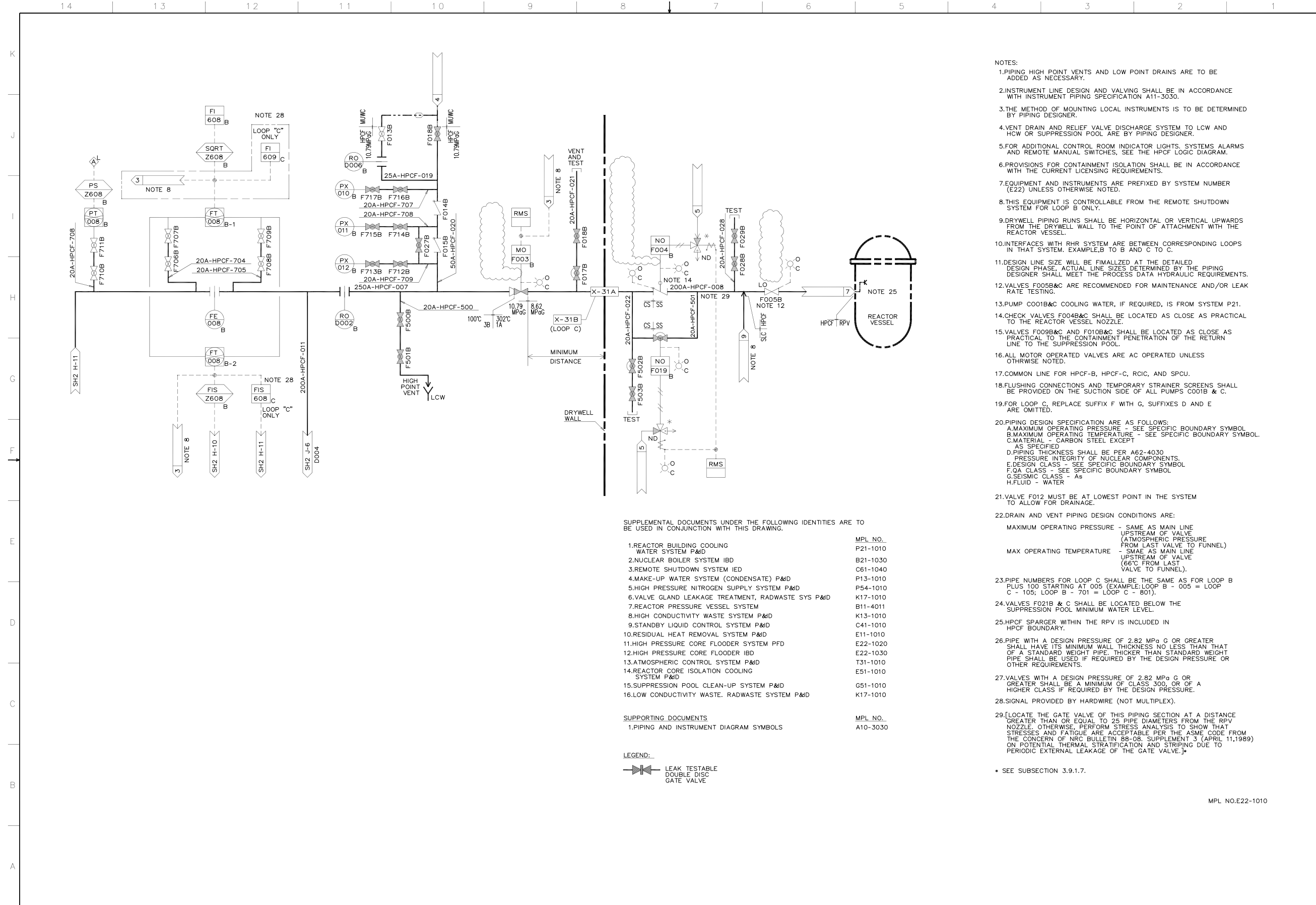
1. HIGH PRESSURE CORE FLOODER SYS P&ID	MPL NO. E22-1010
2. RESIDUAL HEAT REMOVAL SYS PFD	E11-1020
3. REACTOR PRESSURE VESSEL SYSTEM	B11-4011
4. STANDBY LIQUID CONTROL SYS PFD	C41-1020

SUPPORTING DOCUMENTS:

1. PIPING & INSTRUMENT DIAGRAM SYMBOLS	MPL NO. A10-3030
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MPL NO. E22-1020

Figure 6.3-1 – High Pressure Core Flooder System PFD (Sheet 1 of 2)

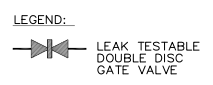


- NOTES:
1. PIPING HIGH POINT VENTS AND LOW POINT DRAINS ARE TO BE ADDED AS NECESSARY.
  2. INSTRUMENT LINE DESIGN AND VALVING SHALL BE IN ACCORDANCE WITH INSTRUMENT PIPING SPECIFICATION A11-3030.
  3. THE METHOD OF MOUNTING LOCAL INSTRUMENTS IS TO BE DETERMINED BY PIPING DESIGNER.
  4. VENT DRAIN AND RELIEF VALVE DISCHARGE SYSTEM TO LOW AND HCW OR SUPPRESSION POOL ARE BY PIPING DESIGNER.
  5. FOR ADDITIONAL CONTROL ROOM INDICATOR LIGHTS, SYSTEMS ALARMS AND REMOTE MANUAL SWITCHES, SEE THE HPCF LOGIC DIAGRAM.
  6. PROVISIONS FOR CONTAINMENT ISOLATION SHALL BE IN ACCORDANCE WITH THE CURRENT LICENSING REQUIREMENTS.
  7. EQUIPMENT AND INSTRUMENTS ARE PREFIXED BY SYSTEM NUMBER (E22) UNLESS OTHERWISE NOTED.
  8. THIS EQUIPMENT IS CONTROLLABLE FROM THE REMOTE SHUTDOWN SYSTEM FOR LOOP B ONLY.
  9. DRYWELL PIPING RUNS SHALL BE HORIZONTAL OR VERTICAL UPWARDS FROM THE DRYWELL WALL TO THE POINT OF ATTACHMENT WITH THE REACTOR VESSEL.
  10. INTERFACES WITH RHR SYSTEM ARE BETWEEN CORRESPONDING LOOPS IN THAT SYSTEM. EXAMPLE, B TO B AND C TO C.
  11. DESIGN LINE SIZE WILL BE FINALIZED AT THE DETAILED DESIGN PHASE. ACTUAL LINE SIZES DETERMINED BY THE PIPING DESIGNER SHALL MEET THE PROCESS DATA HYDRAULIC REQUIREMENTS.
  12. VALVES F005B&C ARE RECOMMENDED FOR MAINTENANCE AND/OR LEAK RATE TESTING.
  13. PUMP CO01B&C COOLING WATER, IF REQUIRED, IS FROM SYSTEM P21.
  14. CHECK VALVES F004B&C SHALL BE LOCATED AS CLOSE AS PRACTICAL TO THE REACTOR VESSEL NOZZLE.
  15. VALVES F009B&C AND F010B&C SHALL BE LOCATED AS CLOSE AS PRACTICAL TO THE CONTAINMENT PENETRATION OF THE RETURN LINE TO THE SUPPRESSION POOL.
  16. ALL MOTOR OPERATED VALVES ARE AC OPERATED UNLESS OTHERWISE NOTED.
  17. COMMON LINE FOR HPCF-B, HPCF-C, RCIC, AND SPCU.
  18. FLUSHING CONNECTIONS AND TEMPORARY STRAINER SCREENS SHALL BE PROVIDED ON THE SUCTION SIDE OF ALL PUMPS CO01B & C.
  19. FOR LOOP C, REPLACE SUFFIX F WITH G, SUFFIXES D AND E ARE OMITTED.
  20. PIPING DESIGN SPECIFICATION ARE AS FOLLOWS:  
 A. MAXIMUM OPERATING PRESSURE - SEE SPECIFIC BOUNDARY SYMBOL  
 B. MAXIMUM OPERATING TEMPERATURE - SEE SPECIFIC BOUNDARY SYMBOL  
 C. MATERIAL - CARBON STEEL EXCEPT AS SPECIFIED  
 D. PIPING THICKNESS SHALL BE PER A62-4030  
 E. PRESSURE INTEGRITY OF NUCLEAR COMPONENTS  
 F. DESIGN CLASS - SEE SPECIFIC BOUNDARY SYMBOL  
 G. SEISMIC CLASS - As  
 H. FLUID - WATER
  21. VALVE F012 MUST BE AT LOWEST POINT IN THE SYSTEM TO ALLOW FOR DRAINAGE.
  22. DRAIN AND VENT PIPING DESIGN CONDITIONS ARE:  
 MAXIMUM OPERATING PRESSURE - SAME AS MAIN LINE UPSTREAM OF VALVE (ATMOSPHERIC PRESSURE FROM LAST VALVE TO FUNNEL)  
 MAX OPERATING TEMPERATURE - SAME AS MAIN LINE UPSTREAM OF VALVE (66°C FROM LAST VALVE TO FUNNEL).
  23. PIPE NUMBERS FOR LOOP C SHALL BE THE SAME AS FOR LOOP B PLUS 100 STARTING AT 005 (EXAMPLE: LOOP B - 005 = LOOP C - 105; LOOP B - 701 = LOOP C - 801).
  24. VALVES F021B & C SHALL BE LOCATED BELOW THE SUPPRESSION POOL MINIMUM WATER LEVEL.
  25. HPCF SPARGER WITHIN THE RPV IS INCLUDED IN HPCF BOUNDARY.
  26. 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.
  27. 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.
  28. SIGNAL PROVIDED BY HARDWIRE (NOT MULTIPLEX).
  29. LOCATE THE GATE VALVE OF THIS PIPING SECTION AT A DISTANCE GREATER THAN OR EQUAL TO 25 PIPE DIAMETERS FROM THE RPV NOZZLE. OTHERWISE, PERFORM STRESS ANALYSIS TO SHOW THAT STRESSES AND FATIGUE ARE ACCEPTABLE PER THE ASME CODE FROM THE CONCERN OF NRC BULLETIN 88-08, SUPPLEMENT 3 (APRIL 11, 1989) ON POTENTIAL THERMAL STRATIFICATION AND STRIPING DUE TO PERIODIC EXTERNAL LEAKAGE OF THE GATE VALVE.

SUPPLEMENTAL DOCUMENTS UNDER THE FOLLOWING IDENTITIES ARE TO BE USED IN CONJUNCTION WITH THIS DRAWING.

1. REACTOR BUILDING COOLING WATER SYSTEM P&ID	MPL NO. P21-1010
2. NUCLEAR BOILER SYSTEM IBD	B21-1030
3. REMOTE SHUTDOWN SYSTEM IED	C61-1040
4. MAKE-UP WATER SYSTEM (CONDENSATE) P&ID	P13-1010
5. HIGH PRESSURE NITROGEN SUPPLY SYSTEM P&ID	P54-1010
6. VALVE GLAND LEAKAGE TREATMENT, RADWASTE SYS P&ID	K17-1010
7. REACTOR PRESSURE VESSEL SYSTEM	B11-4011
8. HIGH CONDUCTIVITY WASTE SYSTEM P&ID	K13-1010
9. STANDBY LIQUID CONTROL SYSTEM P&ID	C41-1010
10. RESIDUAL HEAT REMOVAL SYSTEM P&ID	E11-1010
11. HIGH PRESSURE CORE FLOODER SYSTEM P&ID	E22-1020
12. HIGH PRESSURE CORE FLOODER IBD	E22-1030
13. ATMOSPHERIC CONTROL SYSTEM P&ID	T31-1010
14. REACTOR CORE ISOLATION COOLING SYSTEM P&ID	E51-1010
15. SUPPRESSION POOL CLEAN-UP SYSTEM P&ID	G51-1010
16. LOW CONDUCTIVITY WASTE, RADWASTE SYSTEM P&ID	K17-1010

SUPPORTING DOCUMENTS	MPL NO.
1. PIPING AND INSTRUMENT DIAGRAM SYMBOLS	A10-3030



\* SEE SUBSECTION 3.9.1.7.

MPL NO. E22-1010

Figure 6.3-7 – High Pressure Core Flooder System P&ID (SHEET 1 OF 2)

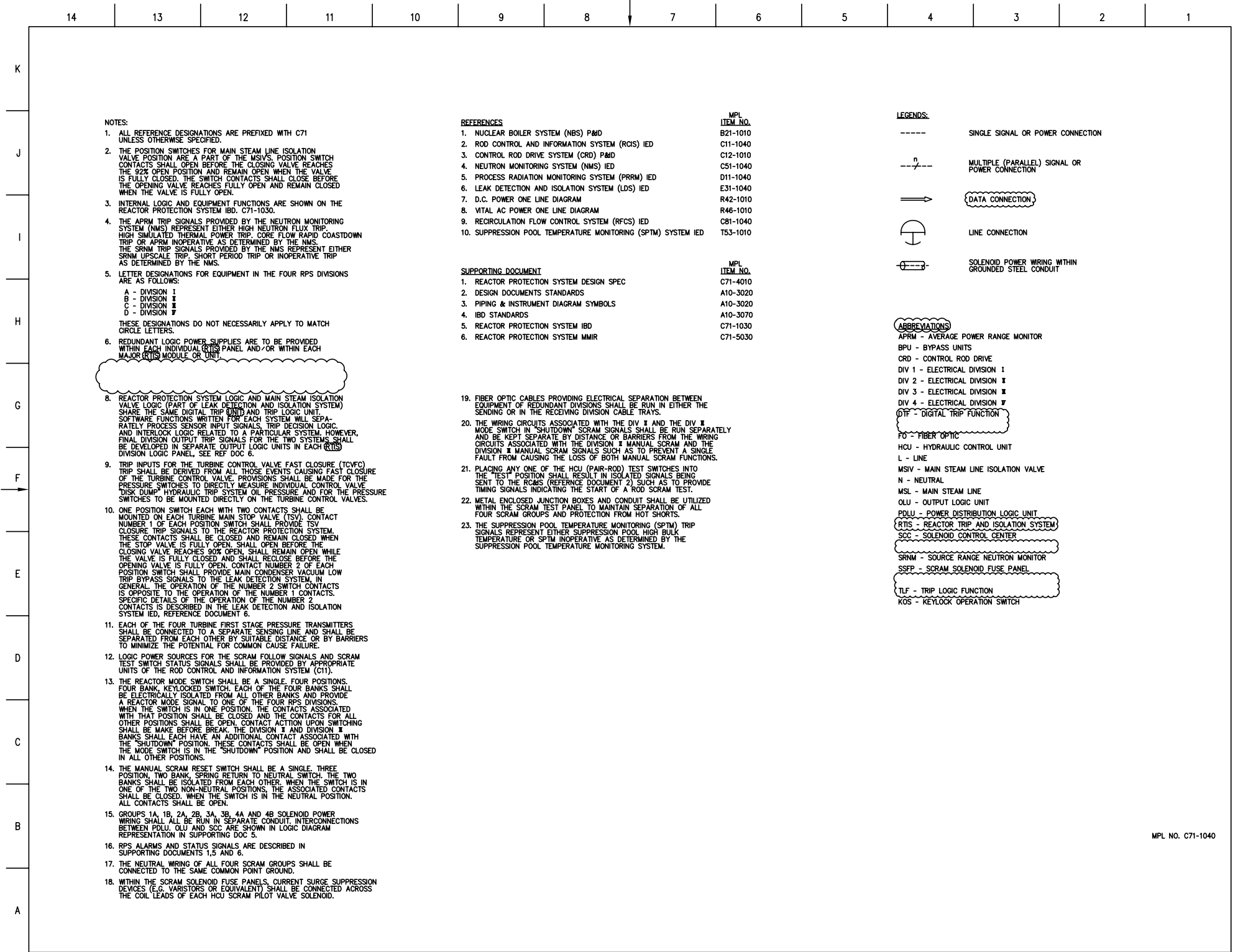


Figure 7.2-9 – Reactor Protection System IED (Sheet 1 of 11)



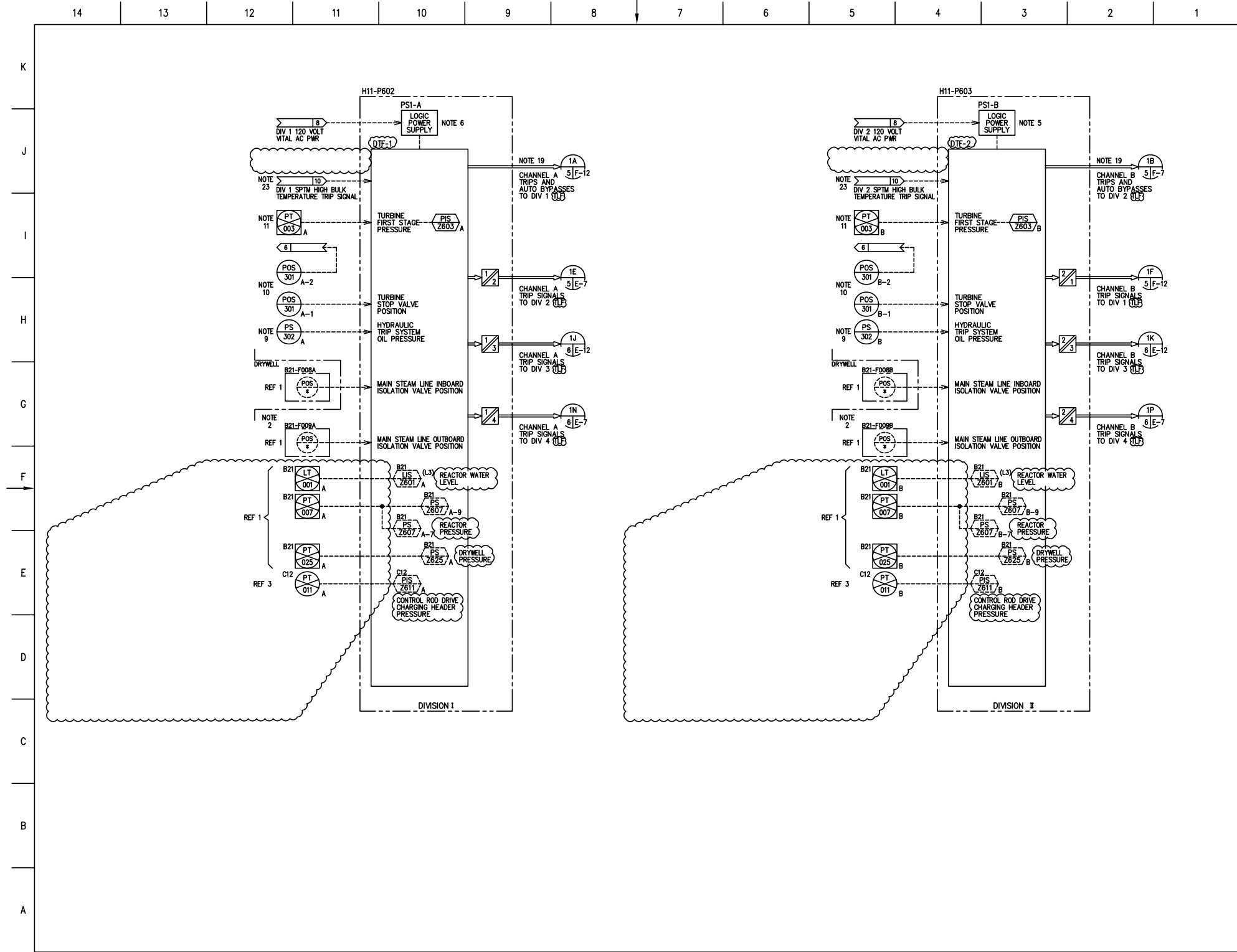


Figure 7.2-9 – Reactor Protection System IED (Sheet 2 of 11)

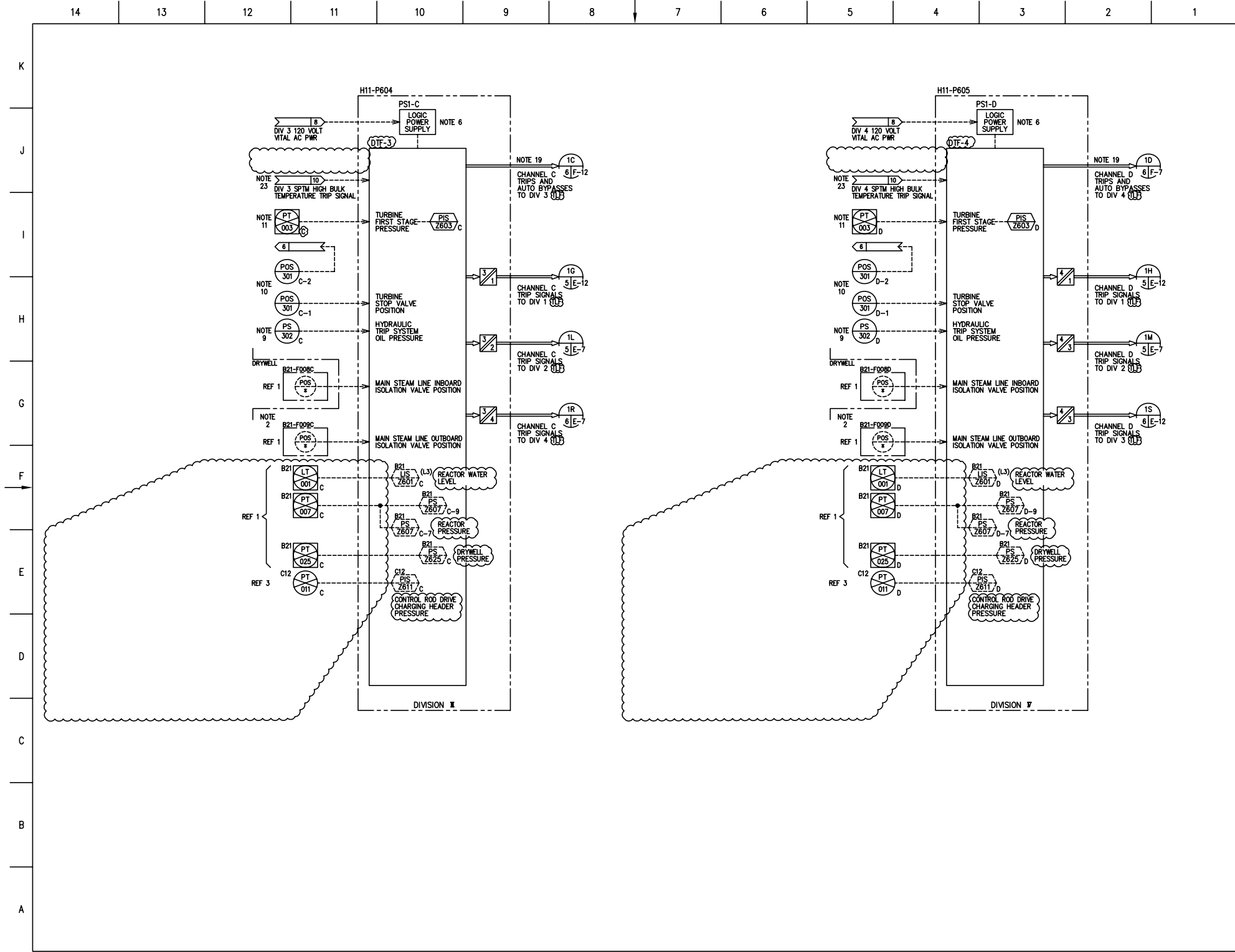


Figure 7.2-9 – Reactor Protection System IED (Sheet 3 of 11)

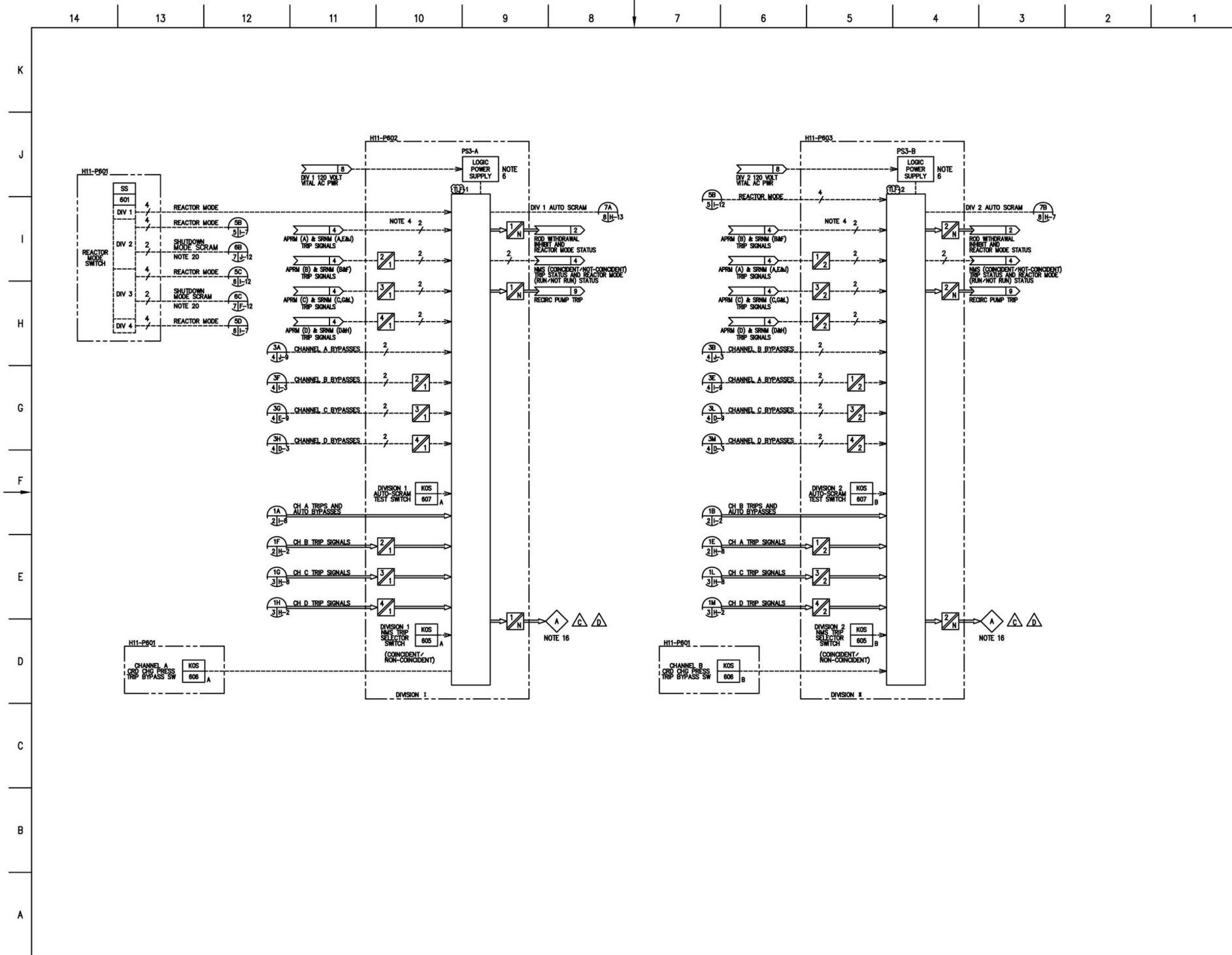


Figure 7.2-9 – Reactor Protection System IED (Sheet 5 of 11)

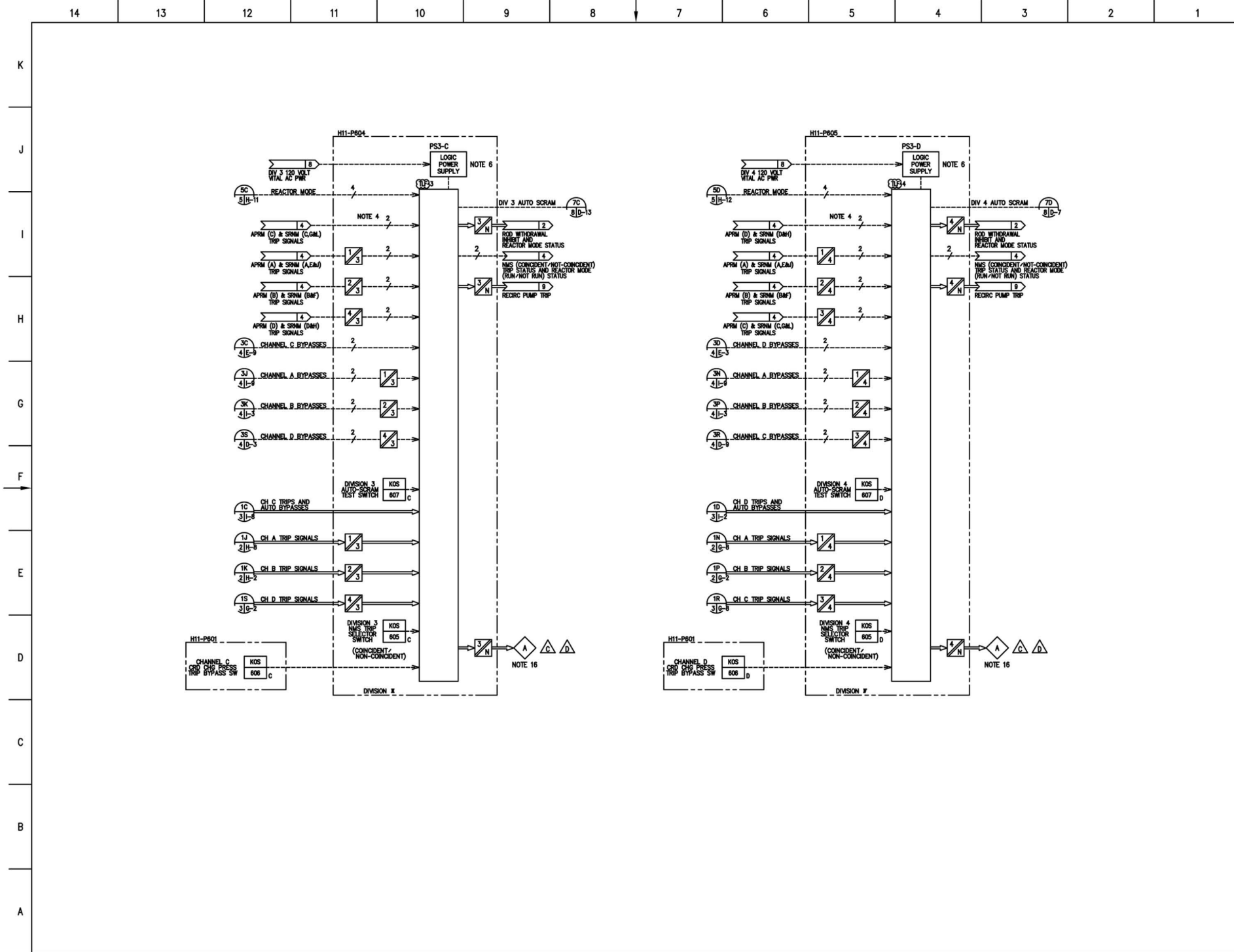


Figure 7.2-9 – Reactor Protection System IED (Sheet 6 of 11)