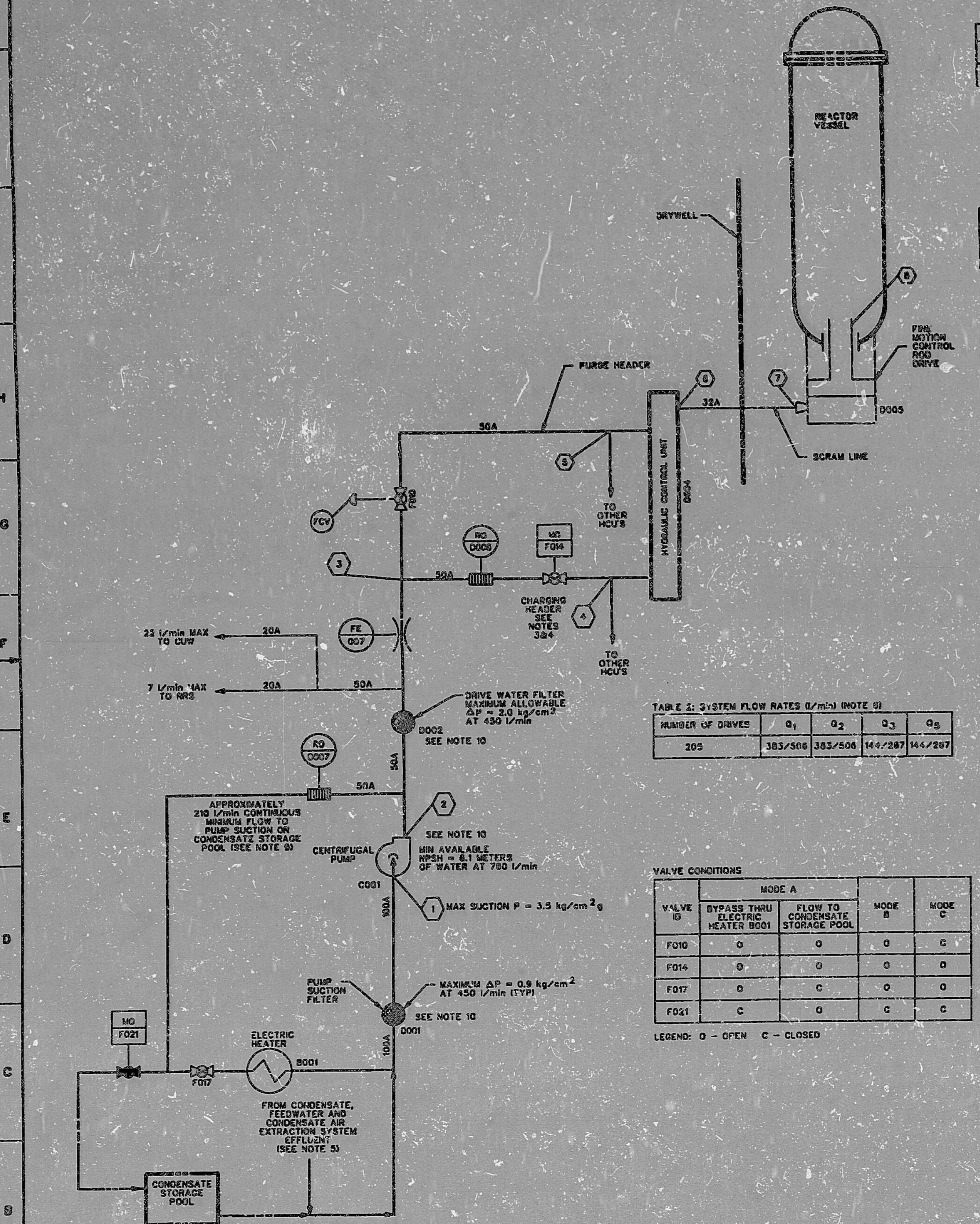

MODE A NORMAL OPERATION – SIZES PURGE WATER HEADERS (SEE NOTES 6 AND 7)

NODE ⬡	1	2	3	4	5	6	7	8
FLOW, l/min	Q_1	Q_2	Q_3	0	Q_5	0.7/1.3	0.7/1.3	0.7/1.3
PRESSURE kg/cm² g	3.5 (MAX)	TDH = 190 kg/cm² (MIN)			PR+2.5 (MIN)	PR+2.0	PR+2.0	PR
		MAX LINE LOSS 5.0 kg/cm²						

CONDITIONS :

1. NORMAL DRIVE OPERATION
2. MIN/MAX PURGE FLOW TO DRIVES.
3. PRESSURE OF REACTOR AT 70.3 kg/cm² g MEASURED AT VESSEL BOTTOM

MODE B SCRAM – SIZES SCRAM LINE

NODE ⬡	1	2	3	4	5	6	7	8
FLOW, l/min	238	238				473	473	473
PRESSURE, kg/cm² g						7.3 kg/cm² MIN 11.8 kg/cm² MAX LINE LOSSES (SEE NOTE 8)		PR

CONDITIONS :

1. DRIVES SCRAMMING
2. FLOWS BASED ON ROD VELOCITY OF 344 cm/Sec
3. PRESSURE OF REACTOR AT 70.3 kg/cm² g MEASURED AT VESSEL BOTTOM

MODE C SCRAM COMPLETED – SIZES THE PUMP SUCTION LINE

NODE ⬡	1	2	3	4	5	6	7	8
FLOW, l/min	763 MAX	780 MAX	521	521 MAX	0	SEE NOTES 3&4		
PRESSURE, kg/cm² g	TDH=110 kg/cm² MIN					SEE NOTES 3&4		PR

CONDITIONS :

1. SCRAMMING OF DRIVES COMPLETED
2. MAXIMUM CRD SUPPLY PUMP FLOW
3. PRESSURE OF REACTOR (PR) AT 0 kg/cm² g

TABLE 1: DESIGN PRESSURE/TEMPERATURE

NODE ⬡	1	2	3	4	5	6	7	8
PRESSURE, kg/cm² g	14.0	190	190	190	190	130	190	87.9
TEMP °C	66	68	66	66	66	66	66	302

TABLE 2: SYSTEM FLOW RATES (l/min) (NOTE 6)

NUMBER OF DRIVES	Q_1	Q_2	Q_3	Q_5
205	383/506	383/506	144/287	144/287

VALVE CONDITIONS

VALVE ID	MODE A		MODE B	MODE C
	BYPASS THRU ELECTRIC HEATER B001	FLOW TO CONDENSATE STORAGE POOL		
F010	O	O	O	C
F014	O	O	O	O
F017	O	C	O	O
F021	C	O	C	C

LEGEND: O – OPEN C – CLOSED

NOTES :

1. DESIGN PRESSURE, TEMPERATURE AND LINE SIZE WILL BE FINALIZED AT THE DETAILED DESIGN PHASE. ACTUAL LINE SIZES DETERMINED BY PIPING DESIGNER SHALL MEET THE PROCESS DATA HYDRAULIC REQUIREMENTS.
2. THE TERM PR IS DEFINED AS THE REACTOR PRESSURE IMMEDIATELY ABOVE THE CORE PLATE.
3. PUMP RUNOUT CAPACITY OF 780 l/min SHALL NOT BE EXCEEDED. ORIFICE REDUCES THE PRESSURE AT THE INSERT LINE SO THAT NO GREATER THAN A TOTAL OF 521 l/min WILL LEAK THROUGH ALL THE DRIVES WHEN PR = 0 kg/cm² g. LEAKAGE FLOW AT NODES ⟨7⟩ AND ⟨8⟩ IS EQUAL TO 521 DIVIDED BY NUMBER OF DRIVES.
4. RESTRICTING ORIFICE D006 IS COMPOSED OF MULTIPLE ORIFICES CONNECTED IN SERIES. SEE MPL FOR THE QUANTITIES OF ORIFICES. THE PRESSURE DROP EACH ORIFICE IS 17.8 kg/cm² AT 780 l/min .
5. LINE FROM THE CONDENSATE, FEEDWATER AND CONDENSATE AIR EXTRACTION SYSTEM (N21) SHALL BE SIZED TO MAINTAIN A FLOW RATE APPROXIMATELY TWICE NORMAL (MODE A) CRD SYSTEM FLOW RATE. SURPLUS FLOW WILL BE DIVERTED TO CONDENSATE STORAGE POOL (CSP). CSP WILL PROVIDE AN ALTERNATE SOURCE OF WATER FOR THE CRD SYSTEM IF SYSTEM N21 IS NOT AVAILABLE.
6. XX/YY MEANS MIN/MAX CONDITIONS
7. SEE TABLE 2 FOR MAXIMUM AND MINIMUM VALUES OF Q1, Q2 , Q3 AND Q5 . NOMINAL PUMP FLOW AT Q_1 AND Q2 IS 450 l/min BASED ON NOMINAL PURGE FLOW OF 1.0 l/min AT LOCATIONS 6, 7 AND 8.
8. LINE LOSSES ARE FOR THE SCRAM LINES ONLY. TOTAL COMBINED LOSSES FOR THE HCU AND SCRAM LINES ARE 17.0 kg/cm2 MINIMUM AND 21.5 kg/cm² MAXIMUM.
9. ACTUAL FLOW WILL BE DETERMINED DURING THE DETAILED DESIGN PHASE.
10. TYPICAL OF BOTH LOOPS. ONLY ONE LOOP SHOWN.

FIG 4.6-9

MPL NO. C12-1020

EQUIPMENT CLASS CODE ____

SAFETY RELATED: THIS ITEM IS OR CONTAINS A SAFETY RELATED ITEM ☐ YES ☐ NO
IEEE CLASS 1E NUCLEAR SAFETY RELATED ☐ YES ☐ NO

SIGNATURES	DAY	MO	YR
WB TORRES	28	8	91
FE WILHELM	27	9	91
GA BAYLIS	27	9	91
RA OSE	27	9	91

APPLIED PRACTICES ____
UNLESS OTHERWISE SPECIFIED
TOLERANCES ON :
2 PLACE DECIMALS ± FRACTIONS ±
3 PLACE DECIMALS ± ANGLES ±

GE Nuclear Energy — GENERAL ELECTRIC COMPANY San Jose CA

DOC TYPE: PFD

CONTROL ROD DRIVE SYSTEM

FMF CERT PRGM

9-29-91 | 103E1790 | 0

DWH 5133 | C | 1 | F

AP-A887R0 1

SI APERTURE CARD

PDR RIDS

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