ABWR SSAR

Amendment 15 - Page change instruction

The following pages ha e been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back). Bold page numbers represent a page that has been changed by Amendment 15.

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 4	
4.0-ii,iii	**4-ii,iii**
4.1-ii,iii	**4.1-ii,iii**
4.1-1,2	**4.1-1,1.1**
Add	**4.1-2**
4.1-5,6	**4.1-5,6**
4.2-ii	**4.2-ii**
4.2-1	**4.2-1**
4.2-2	**4.2-2**
4.3-ii,iii	**4.3-ii,iii**
4.3-1,2	**4.3-1,2**
4.3-3	**4.3-3**
4.3-4	**4.3-4,5**
4.4-ii,iii	**4.4-ii,iii**
4.4-iv	**4.4-iv**
4.4-1,2	**4.4-1,2**
4.4-3,4	**4.4-3,4**
4.4-5,6	**4.4-5,6**
4.4-7,8	**4.4-7,8**
4.4-9,10	**4.4-9,10**
4.4-11	**4.4-11**
4.5-ii	**4.5-ii**
4.5-4a	**4.5-4.1**
4.6-ii,iii	**4.6-ii,iii**
4.6-iv,v	**4.6-iv v**
4.6-1,1a	**4.6-1,1a**
4.6-9,10	**4.6-9.10**
4.6-11,12	**4.6-11,12**
4.6-13,14	**4.6-13,14**
4.6-15,16	**4.6-15,16**

REMOVE PAGE No.	ADD PAGE No.
4A Cover	4A Cover
4A-ii,iii	4A-ii,iii
4A-1	4A-1
Add	4B Cover
Add	4B-ii
Add	4B-1 - 7
Add	4C Cover
Add	4C-ii
Add	4C-1
CHAPTER 5	
5.0-ii,iii	5.0-ii,iii
5.1-ii	5.1-ii
5.1-1,2	5.1-1,2
5.1-3,4	5.1-3,4
5.1-5,6	5.1-5,6 Fig*
5.1-7,8	5.1-7,8 Fig*
5.1-9	5.1-9,9.1 Fig*
Add	5.1-9.2,9.3 Fig*
Add	5.1-9.4,9.5 Fig*
Add	5.1-9.6 Fig*
5.1-10,11	5.1-10,11
5.2-ii,iii	5.2-ii,iii
5.2-iv,v	5.2-iv,v
5.2-vii,viii	5.2-vii,viii
5.2-ix	5.2-ix
5.2-1,2	5.2-1,2
5.2-3,4	5.2-3,3.1
Add	5.2-4
5.2-5,6	5.2-5,6
5.2-7,8	5.2-7,8
5.2-10	5.2-10

* These figures, 11x17 foldouts, are being sent under separate cover

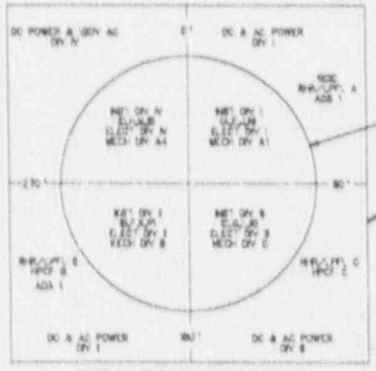
ABWR SSAR

Amendment 15 - Page change instruction

The following pages have been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back). Bold page numbers represent a page that has been changed by Amendment 15.

REMOVE PAGE No.	ADD PAGE No.
5.2-12	**5.2-12**
5.2-13,14	**5.2-13,14**
5.2-15,15.1	**5.2-15,15.1**
5.2-16,17	**5.2-16,17**
5.2-17.1,17.2	**5.2-17.1,17.2**
5.2-18	**5.2-18**
5.2-19,20	**5.2-19,20**
5.2-21,22	**5.2-21,22**
5.2-23,24	**5.2-23,24**
5.2-25,26	**5.2-25,26**
5.2-27,28	**5.2-27,28**
5.2-28a	**5.2-28.1**
5.2-30	**5.2-30**
5.2-31,32	**5.2-31,32**
Add	**5.2-32.1**
5.2-33,34	**5.2-33,34**
5.2-35,36	**5.2-35,36**
5.2-37,38	**5.2-37,38**
5.2-41	**5.2-41**
5.2-42,43	**5.2-42,43**
5.2-44,45	**5.2-44,45** Fig*
5.2-46,47	**5.2-46,47** Fig*
5.2-48,49	**5.2-48,49** Fig*
5.2-50,51	**5.2-50,51** Fig*
Add	**5.2-52,53** Fig*
5.3-1,2	**5.3-1,2**
5.3-2.1	**5.3-2.1**
5.3-2a	--
5.3-3,4	**5.3-3,4**
5.3-5,6	**5.3-5,6**
5.3-6a	**5.3-6.1**
5.3-7,8	**5.3-7,8**
5.3-9,10	**5.3-9,10**
5.3-11,11a	**5.3-11,12**
5.3-12	--
5.3-13,14	**5.3-13,14**
5.4-ii,iii	**5.4-ii,iii**
5.4-vi,vii	**5.4-vi,vii**
5.4-1,2	**5.4-1,2**

REMOVE PAGE No.	ADD PAGE No.
5.4-3,4	**5.4-3,4**
5.4-5,5.1	**5.4-5,5.1**
5.4-6	**5.4-6**
5.4-7,7a	**5.4-7,7.1**
5.4-8	**5.4-8**
5.4-9,10	**5.4-9,10**
5.4-10a	**5.4-10.1**
5.4-11,12	**5.4-11,12**
5.4-13,14	**5.4-13,14**
5.4-14a	**5.4-14.1**
5.4-15,15a	**5.4-15,15.1**
5.4-16,16a	**5.4-16,16.1**
5.4-17,18	**5.4-17,18**
5.4-18a	**5.4-18.1**
5.4-19,20	**5.4-19,20**
5.4-21,21a	**5.4-21,21.1**
5.4-22,22a	**5.4-22,22.1**
5.4-23,24	**5.4-23,24**
5.4-25,26	**5.4-25,26**
5.4-27,28	**5.4-27,28**
5.4-29,30	**5.4-29,30**
5.4-31,31a	**5.4-31,31.1**
5.4-32	**5.4-32**
5.4-33,34	**5.4-33,34**
5.4-35,36	**5.4-35,36**
5.4-37,38	**5.4-37,38**
5.4-39,40	**5.4-39,40**
5.4-41,42	**5.4-41,42**
5.4-43	**5.4-43**
5.4-47,48	**5.4-47,47.1** Fig*
Add	**5.4-48** Fig*
5.4-49,50	**5.4-49,50**
5.4-51,52	**5.4-51,52** Fig*
Add	**5.4-52.1** Fig*
5.4-53,54	**5.4-53,54** Fig*
5.4-55,56	**5.4-55,56** Fig*
5.4-57,58	**5.4-57,58** Fig*
Add	**5.4-58.1,58.2** Fig*
Add	**5.4-58.3** Fig*
5.4-59,60	**5.4-59,60** Fig*
5.4-61,62	**5.4-61,62** Fig*
5.4-63,64	**5.4-63,64** Fig*



ORIENTATION OF THE NUCLEAR BOILER SYSTEM INSTRUMENTS TO MEET SEPARATION REQUIREMENTS INCLUDES ASSOCIATED INSTRUMENT RACKS AND EDDS LOCATION

NOTES

1. ENCLOSED EQUIPMENT
THE OTHER SYSTEMS
UNLESS OTHERWISE
EXAMPLE 1000
EXAMPLE 3000

3. SEE REFERENCE DIAGRAM
FLANGE FOR THE SAFE

5. PIPE SIZES SHOWN ON
EXCEPT AT POINTS OF
EQUIPMENT OR PIPING
CHECK AND ADJUST
THE PIPING LAYOUT FOR
SYSTEM DESIGN SPECIFI

4. THE GLOBE VALVE
SHUTOFF VALVE IS
1304 IF THE SECOND
1304, THE BORON
LINE IS AT A RIGHT

6. (HBD) TO BE CONNECTED
PIPE DOWNSTREAM
DOWNSTREAM
GIVE AS ACCURATE
FEASIBLE, TAPER
"STEAM TURBINE"

8. AIR EXPANSION LEG
BE CHECKED THE DESIGNER
PENETRATION IN THE
AND PIPING INSTALLATION
THE MAXIMUM CHANGE
A FOR ENGINEERING
THE INSULATION AROUND
A" OR ABOVE THE CENTER
THE INSTRUMENT LINE
SHALL BE SLOPED DOWN
AS SHORT AS PRACTICAL
INSULATED FROM THE
TO THE CONDENSING POT
CONDUCTANCE OF 0.000

7. PROVISIONS FOR INSTRUM
BE IN ACCORDANCE WITH
ONE ORIFICE SHALL BE
LINE CONNECTED TO THE
BOUNDARY (NORMAL CONT
MAXIMUM NUMBER OF ORI

8. VALVE MOTOR OPERATOR
OPERATED UNLESS OTHE

9. THE CONDENSING CHAMBER
PIPE, TEE, AND EXTENSION
COUPLED TO 304 REACTOR
304 TO 40H REDUCER,
IN THE HORIZONTAL PLANE
THE 33A BRANCH CONNECTION
VERTICALLY, AND EXTEND
A DOWNWARD SLOPE AT
THE CONTAINMENT WALL
PENETRATING THE CONTAINMENT
ARE REDUCED TO 20A FOR
THE 33A AND 33A PIPE
BEYOND WITH THE ELBOW
ARE CONTRACTS THERMAL
ELEVATION OF THE 40A
INSTRUMENT NOZZLE BY
CHAMBER TEES AND THE
INSTRUMENTATION SHALL

AN ACCEPTABLE ALTERN
CONDENSING POT IN PLACE
AND EXTENSION PIPE WI

10. LOCATE THE TEE AS CL
REACTOR VESSEL.

11. THE MAXIMUM OPERATING
FOR THE PORTION OF THE
HEATED DOWNSTREAM OF
BOXES F014 AND F016 A
D008 AND D007 TO BE
OF THE HWR CONDENSER

12. LOCATE THE DRAIN LINE
EQUIPMENT OR DETECT
AS PRACTICAL TO THE

13. FOR DETAILS SEE DWG

14. THERMAL SLEEVE & SH
ACCOMODATING ALL
STREAMS. OTHER MO
REQUIREMENTS MAY BE

15. SPRING CLOSING CHECK
POSITION BY AIR PRESS
OTHER CHECK VALVE IN
PUMPS IS DESIGNED TO
RECIRCULATING FLOW SHOULD
AUTOMATICALLY IN THE

16. TRANSITION FROM 250A
BY THE PLANT ARRANGE

17. THE LICENSING BASIS FO
SEISMIC CLASS II, THE
DISCHARGE LINE IS DESI

18. THE SECTION OF DRN SC
BOUNDARY TO BELOW
IS SPECIFIED AS MTL CL
(I.S.I.)AND T.ABRICA
IN SERVICE INSPECTION
NOT APPLICABLE AND

19. WHEN ALL FEEDWATER
CONTROL VALVES ONE
TO BE SHUT-OFF TO
NOZZLES ON THE RPV
MAY CIRCULATE BETWEEN
OPEN CHECK VALVE.

20. ROUTE THE PIPE THROU
DRYWELL AND THE RPV

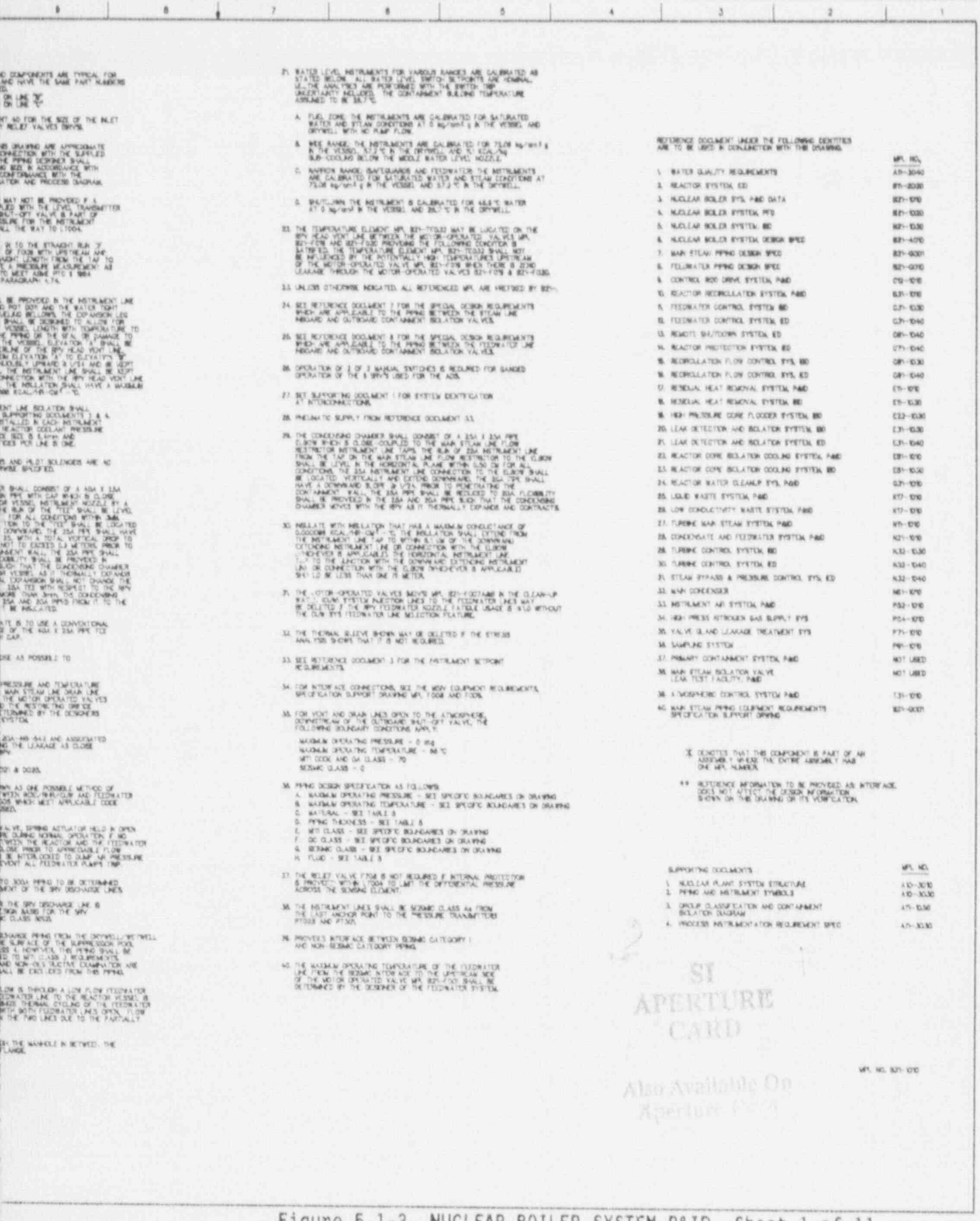


Figure 5.1-3 NUCLEAR BOILER SYSTEM P&ID, Sheet 1 of 11

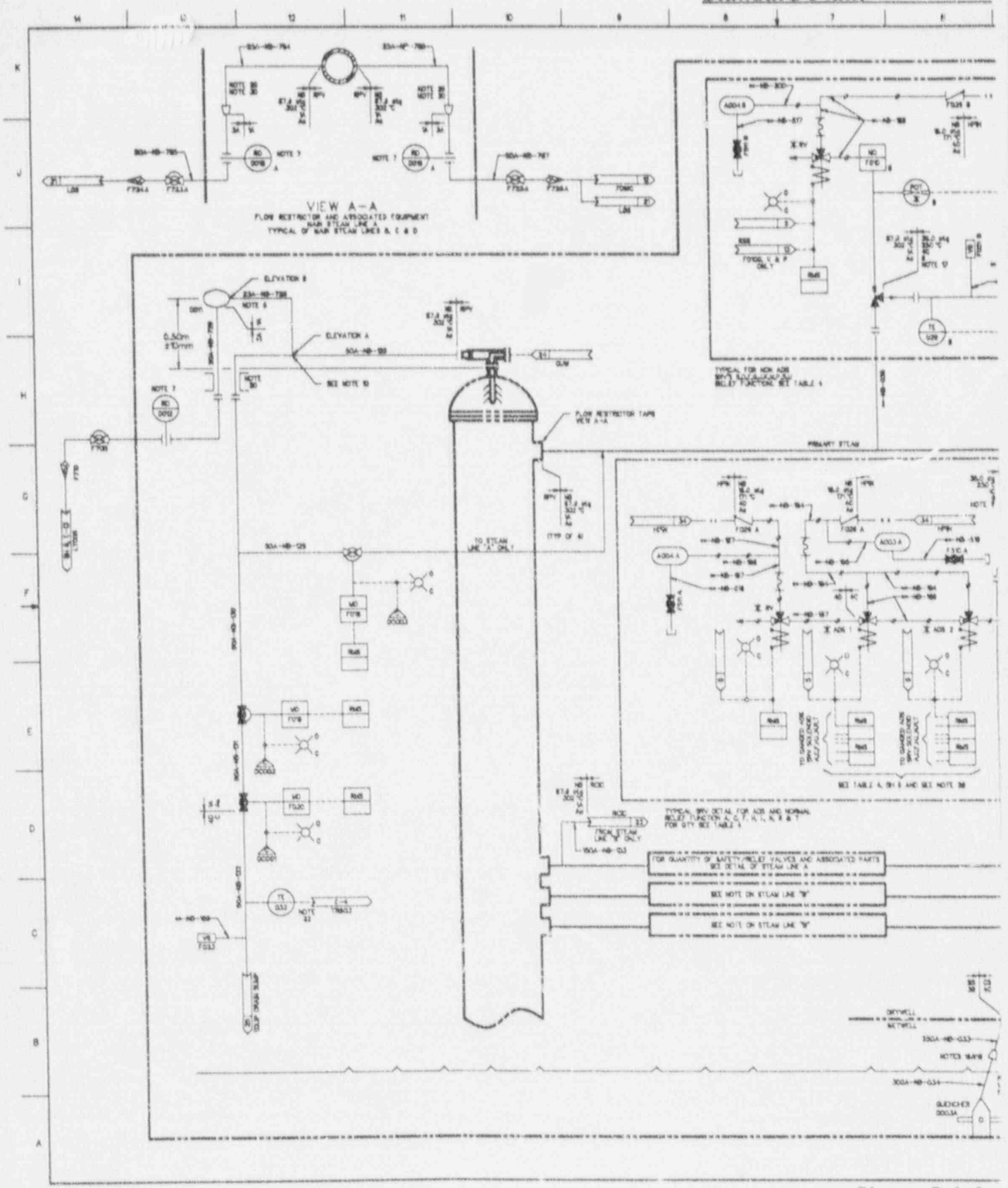
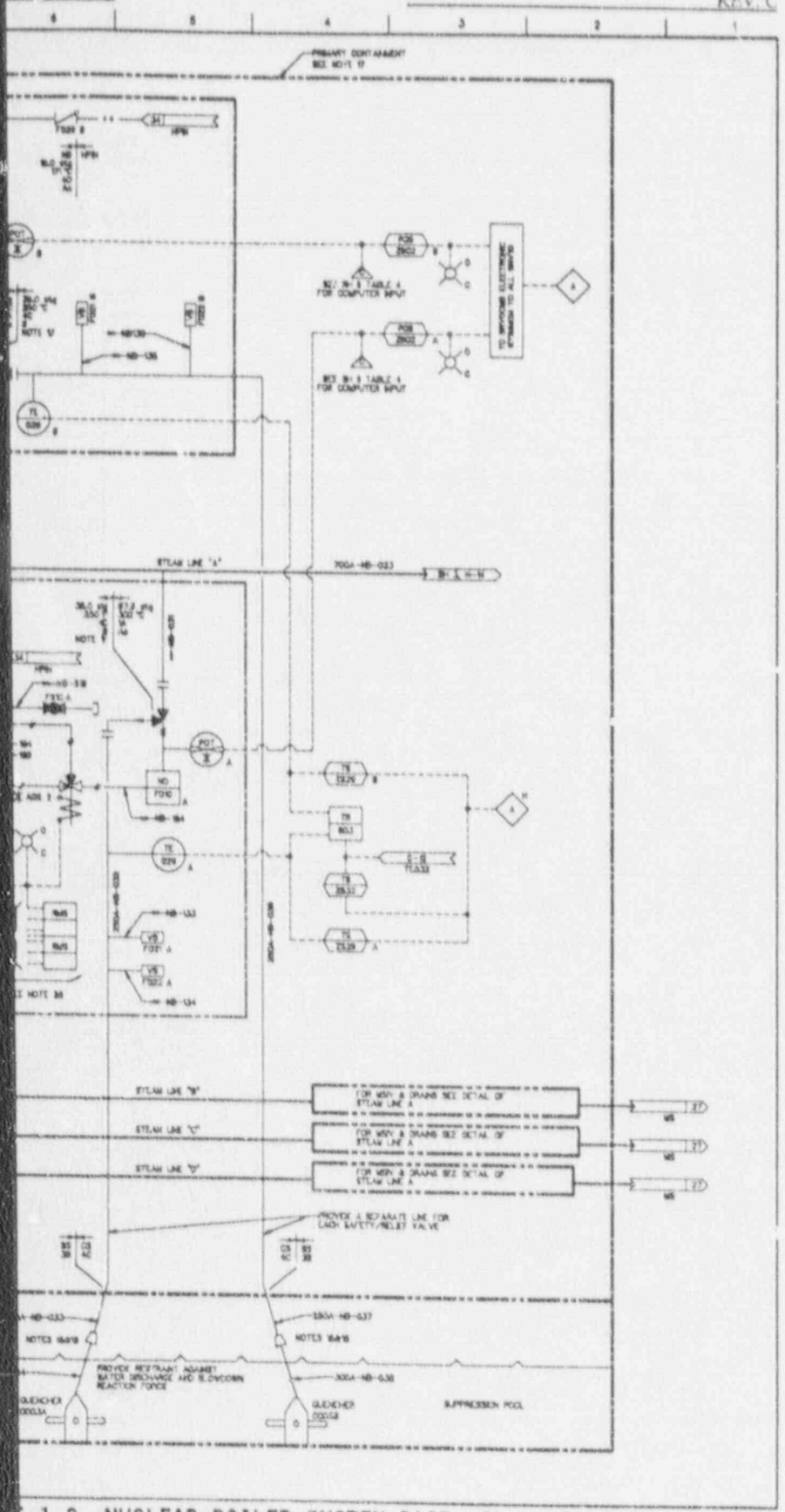
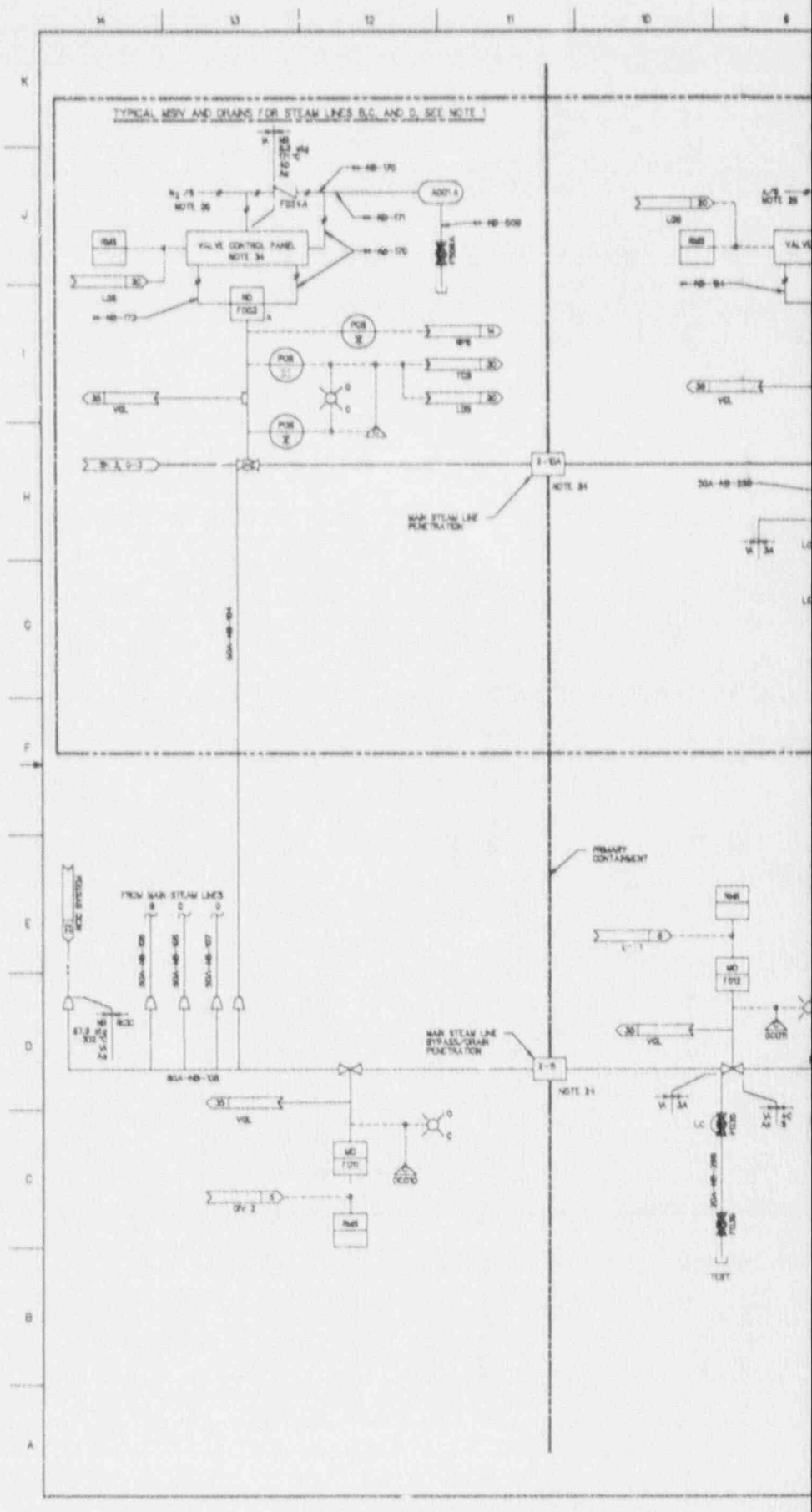

VIEW A-A
FLOW RESTRICTOR AND ASSOCIATED EQUIPMENT
MAIN STEAM LINE A
TYPICAL OF MAIN STEAM LINES B, C & D
ELEVATION B
ELEVATION A
FLOW RESTRICTOR TAPS
VIEW A-A
PRIMARY STEAM
TYPICAL FOR ADS
TYPICAL SRV DETAIL FOR ADS AND NORMAL
RELIEF FUNCTION A, C, F, H, L, N, R & T
FOR QTY SEE TABLE 1
FOR QUANTITY OF SAFETY/RELIEF VALVES AND ASSOCIATED PARTS
SEE DETAIL OF STEAM LINE A
SEE NOTE ON STEAM LINE "B"
SEE NOTE ON STEAM LINE "B"
SEE TABLE A, SH 3 AND SEE NOTE 38
TO SHARED ADS
SRV SOLENOID
AUX SOLENOID
TO SHARED ADS
SRV SOLENOID
AUX SOLENOID
DRYWELL
SUPPRESSION
POOL

Figure 5.1-3



5.1-3 NUCLEAR BOILER SYSTEM P&ID, Sheet 2 of 11


TYPICAL MSIV AND DRAINS FOR STEAM LINES B,C AND D, SEE NOTE 1
VALVE CONTROL PANEL NOTE 34
NOTE 34
MAIN STEAM LINE PENETRATION
PRIMARY CONTAINMENT
FROM MAIN STEAM LINES
MAIN STEAM LINE BYPASS/DRAIN PENETRATION
VGL
LGB
TCB
TCBT

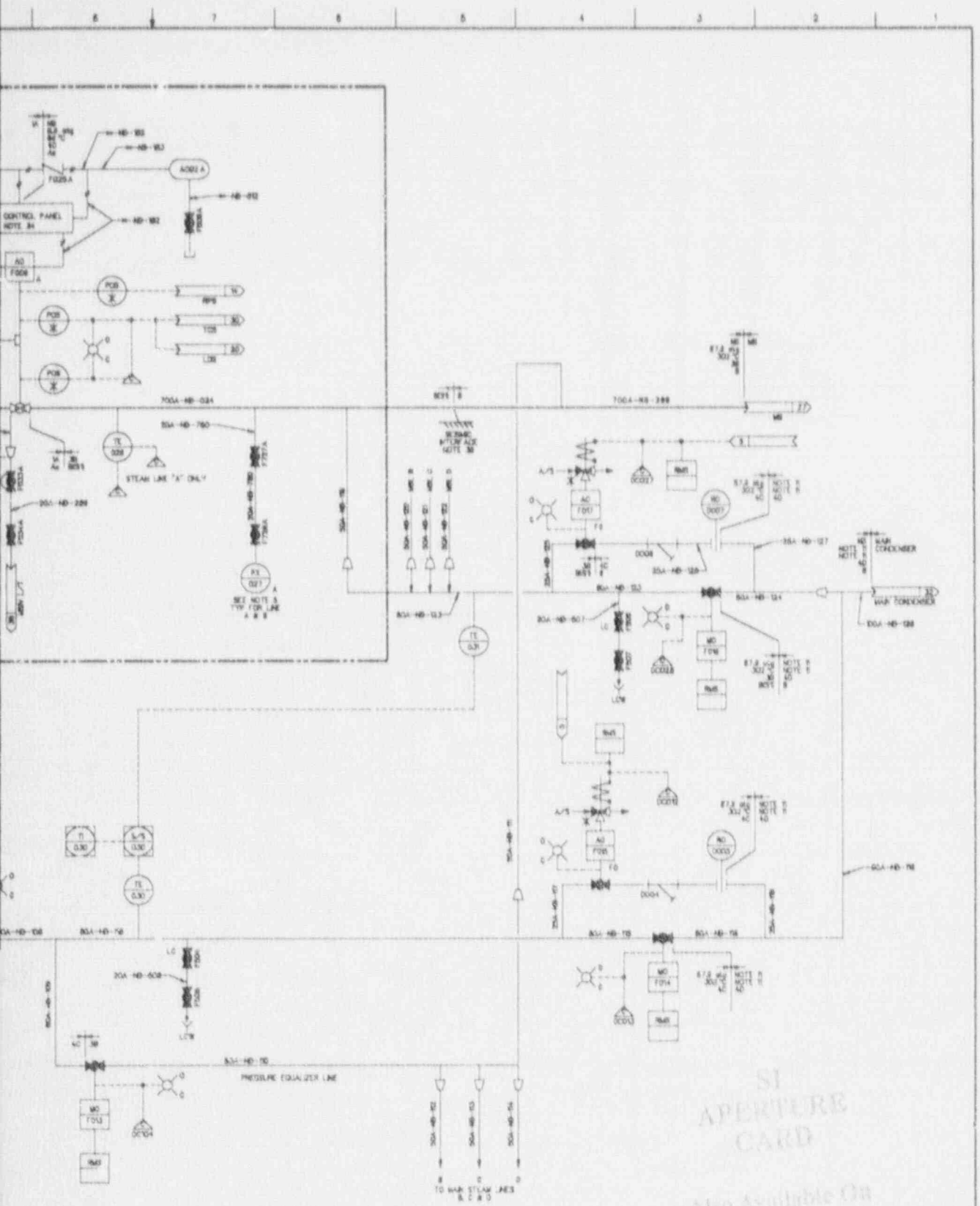


Figure 5.1-3 NUCLEAR BOILER SYSTEM P&ID, Sheet 3 of 11

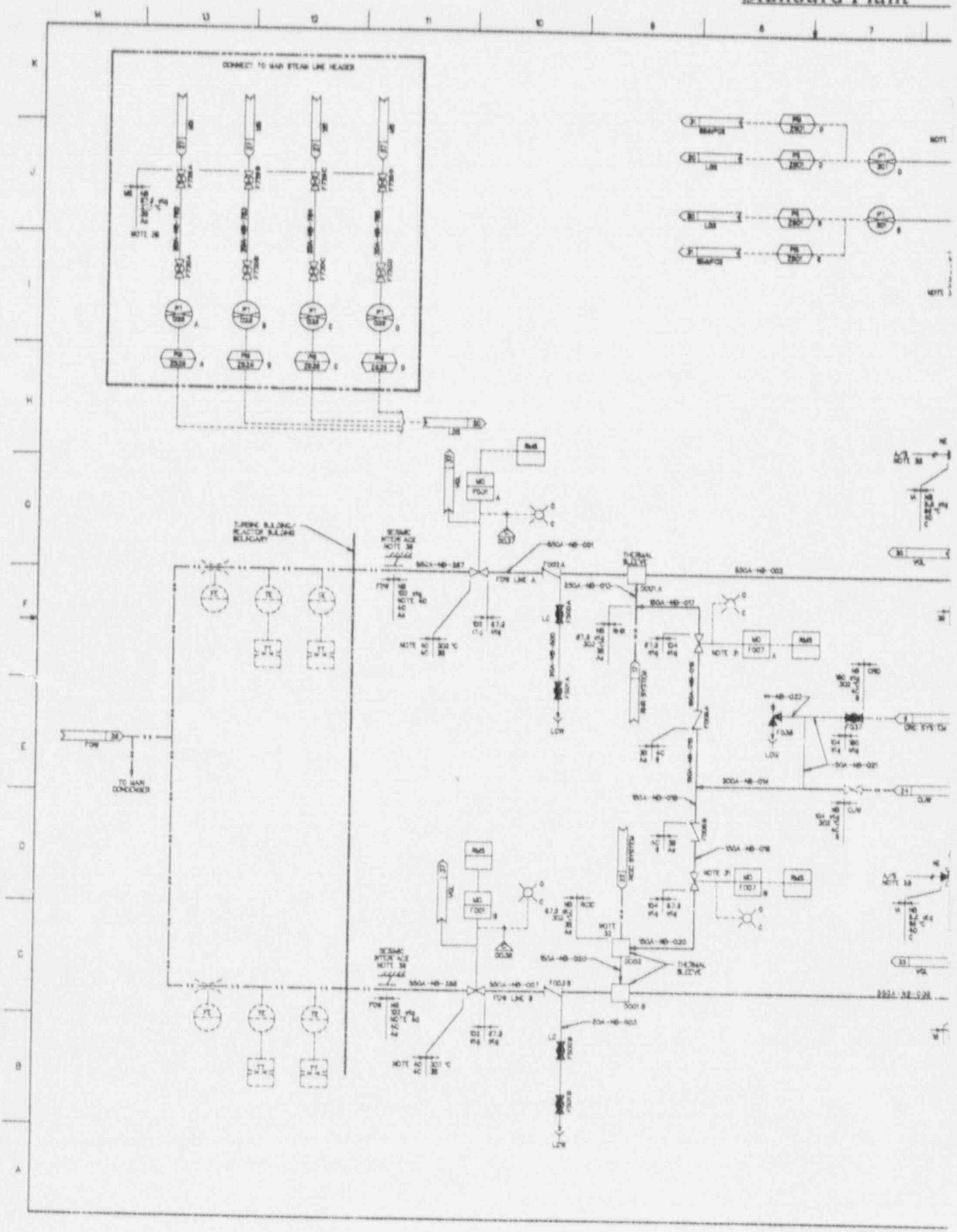


Figure 5.

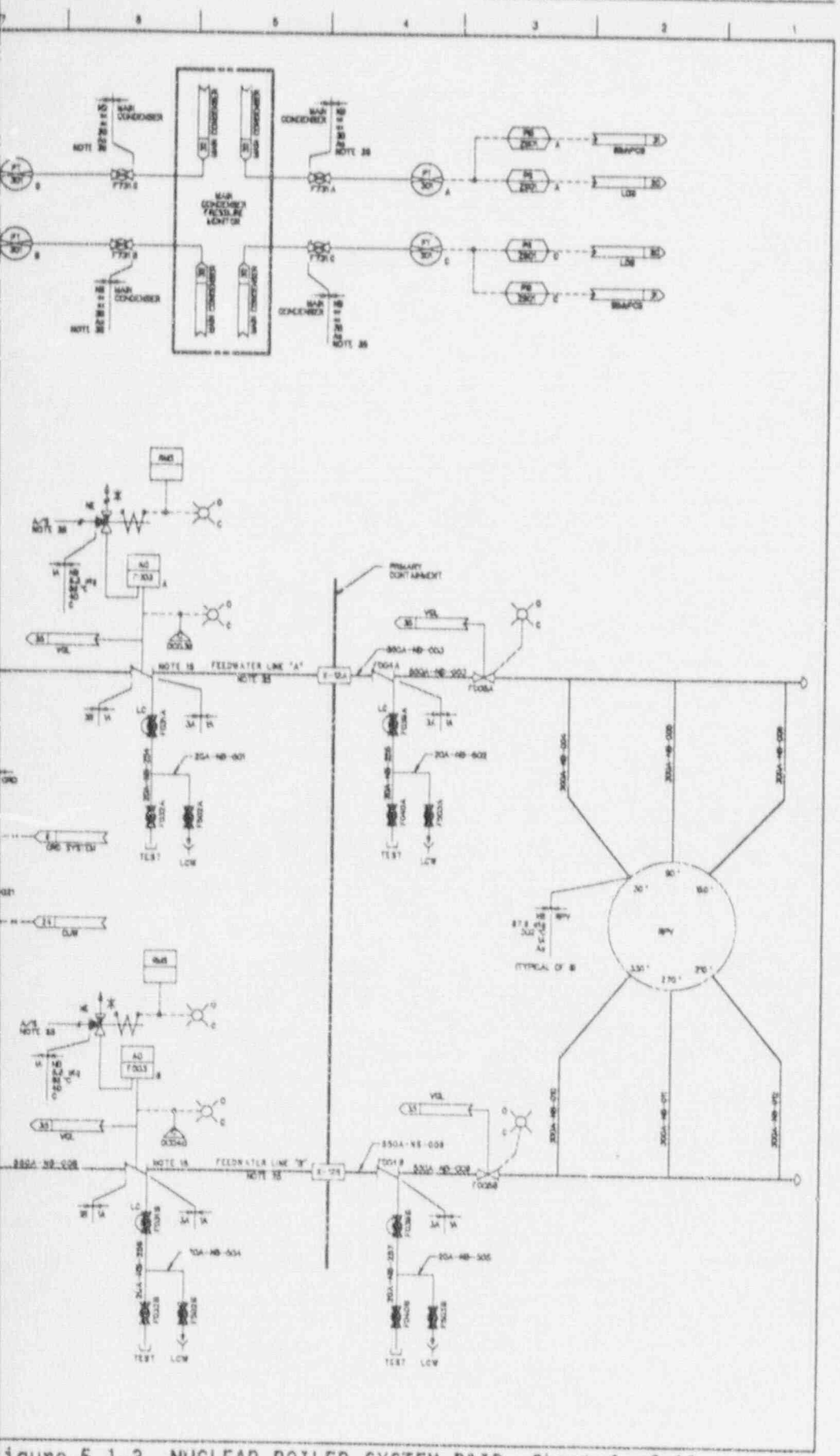
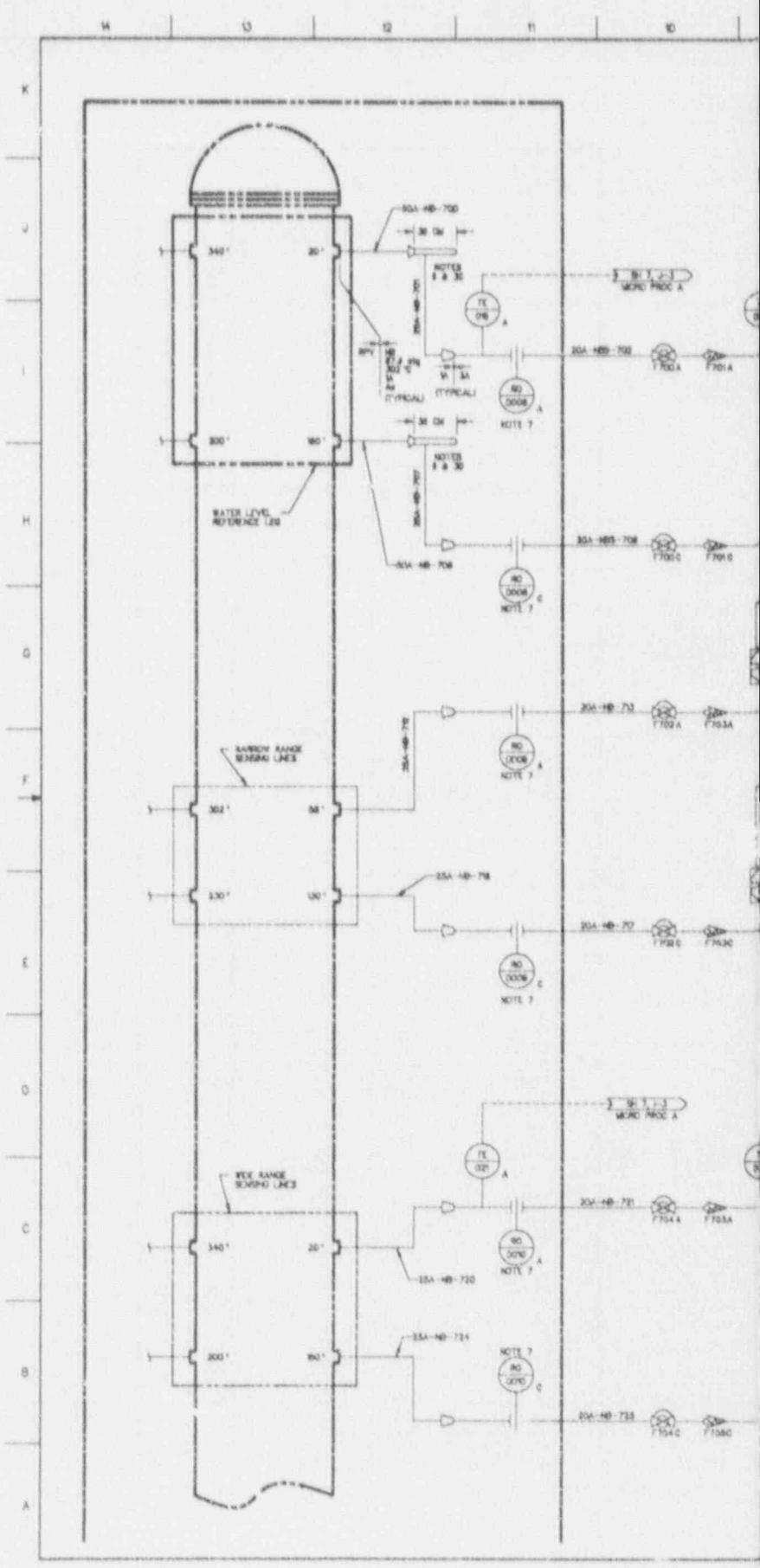


Figure 5.1-3 NUCLEAR BOILER SYSTEM P&ID, Sheet 4 of 11


14
13
12
11
10
K
J
I
H
G
F
E
D
C
B
A
340°
20°
300°
160°
302°
58°
230°
130°
340°
20°
200°
160°
WATER LEVEL REFERENCE 1.2m
NARROW RANGE SENSING LINES
WIDE RANGE SENSING LINES
NOTES 3 & 30
NOTE 7
SEE SHT 1-3 MSMS PROC A

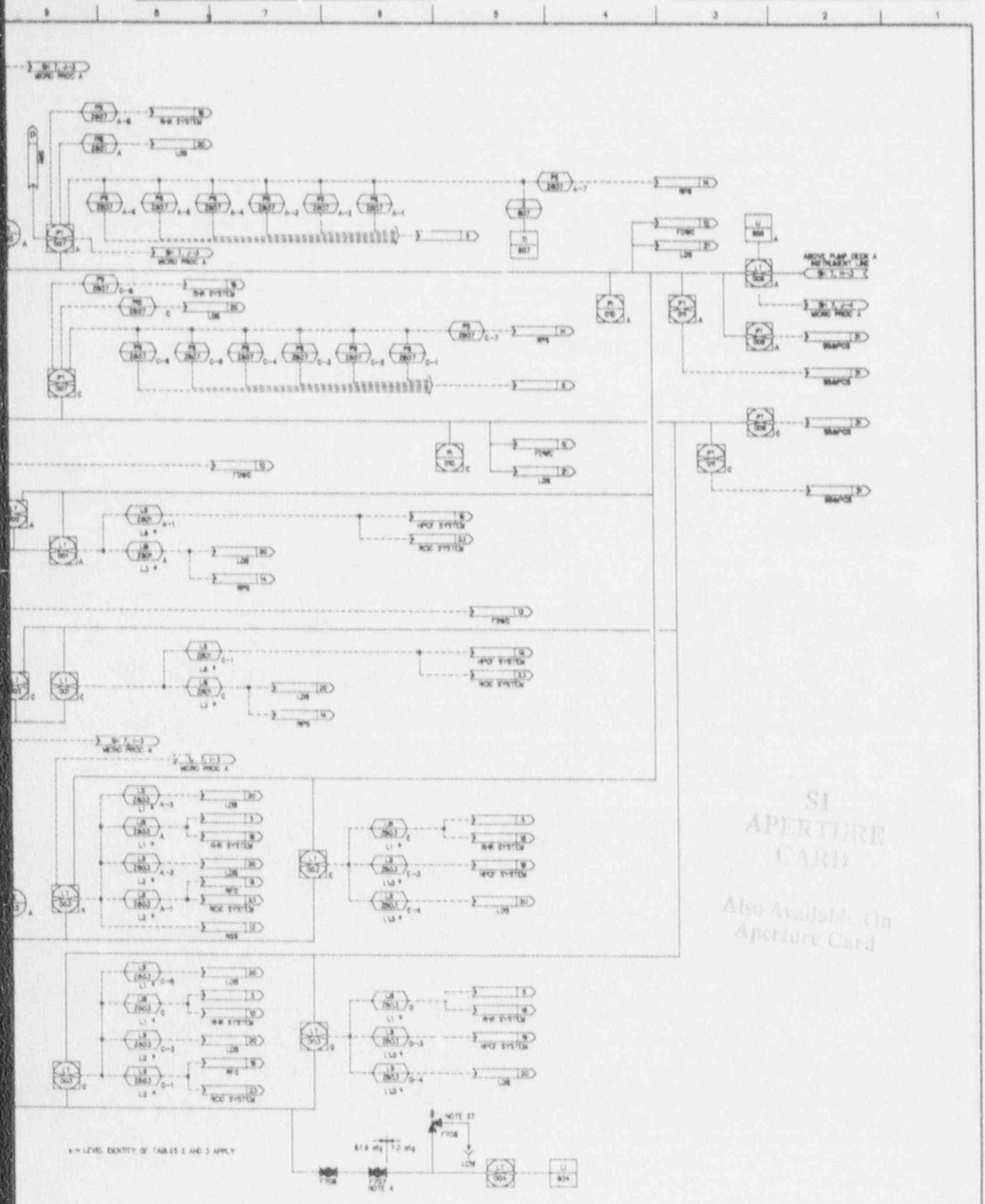


Figure 5.1-3 NUCLEAR BOILER SYSTEM P&ID, Sheet 5 of 11

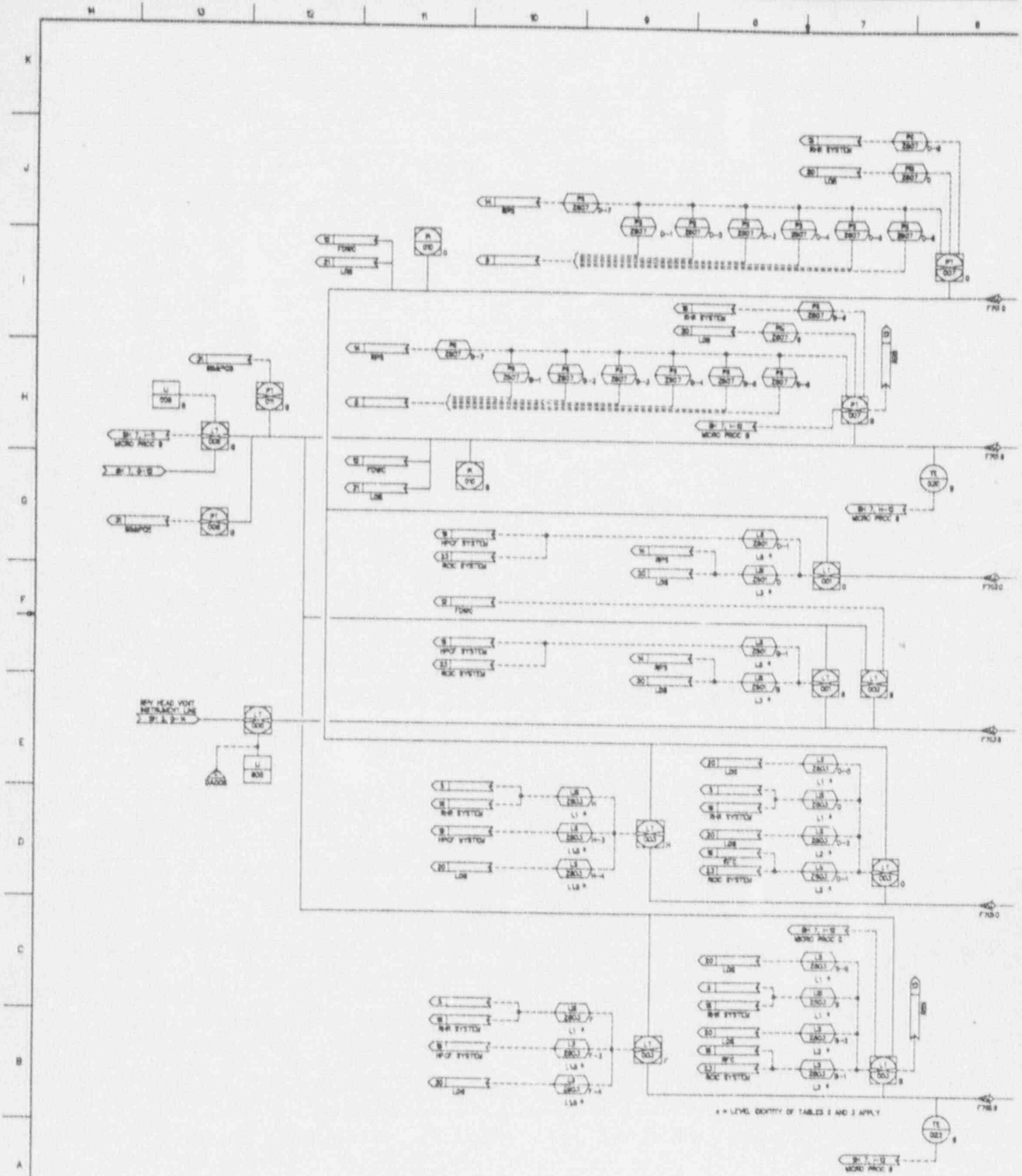
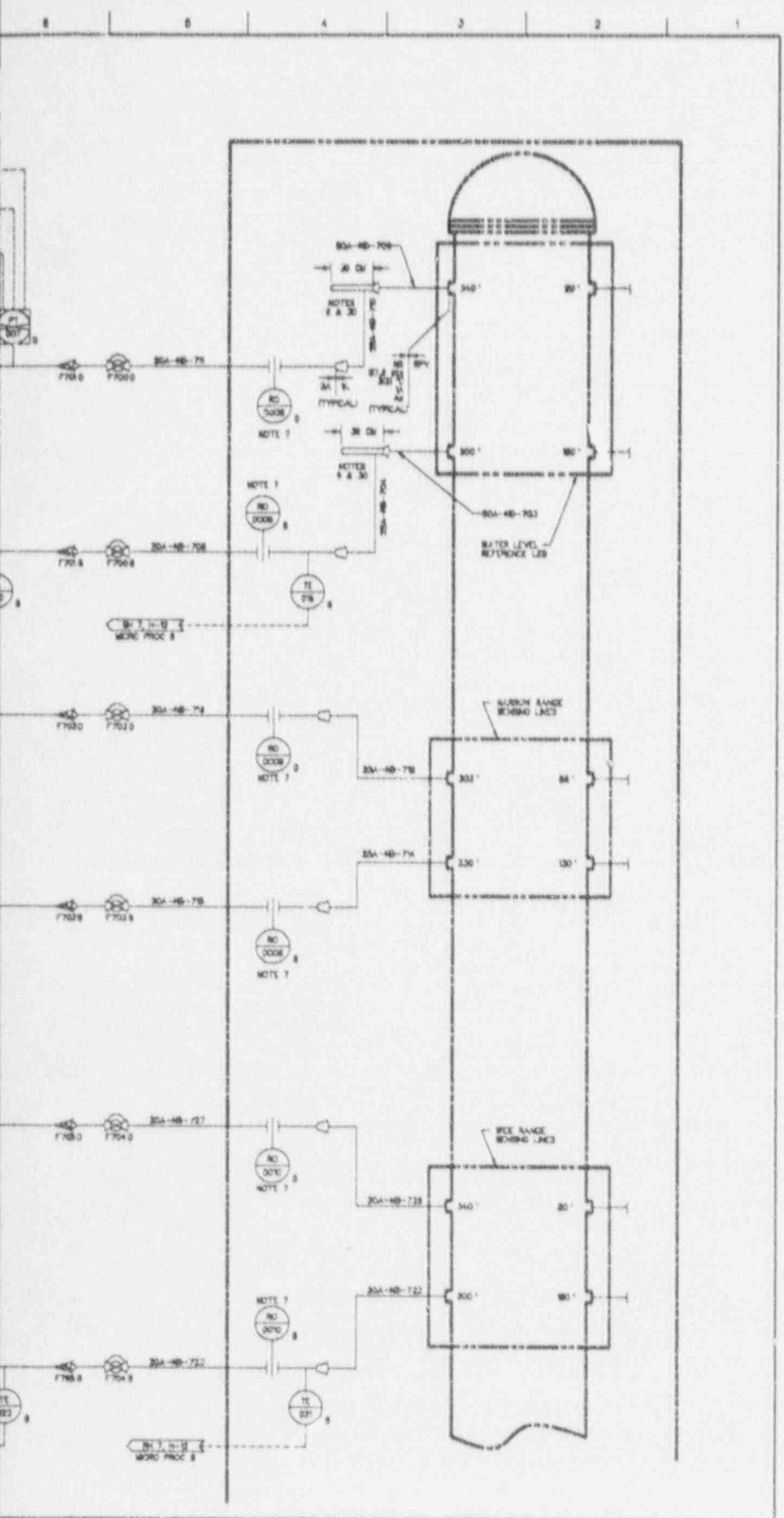
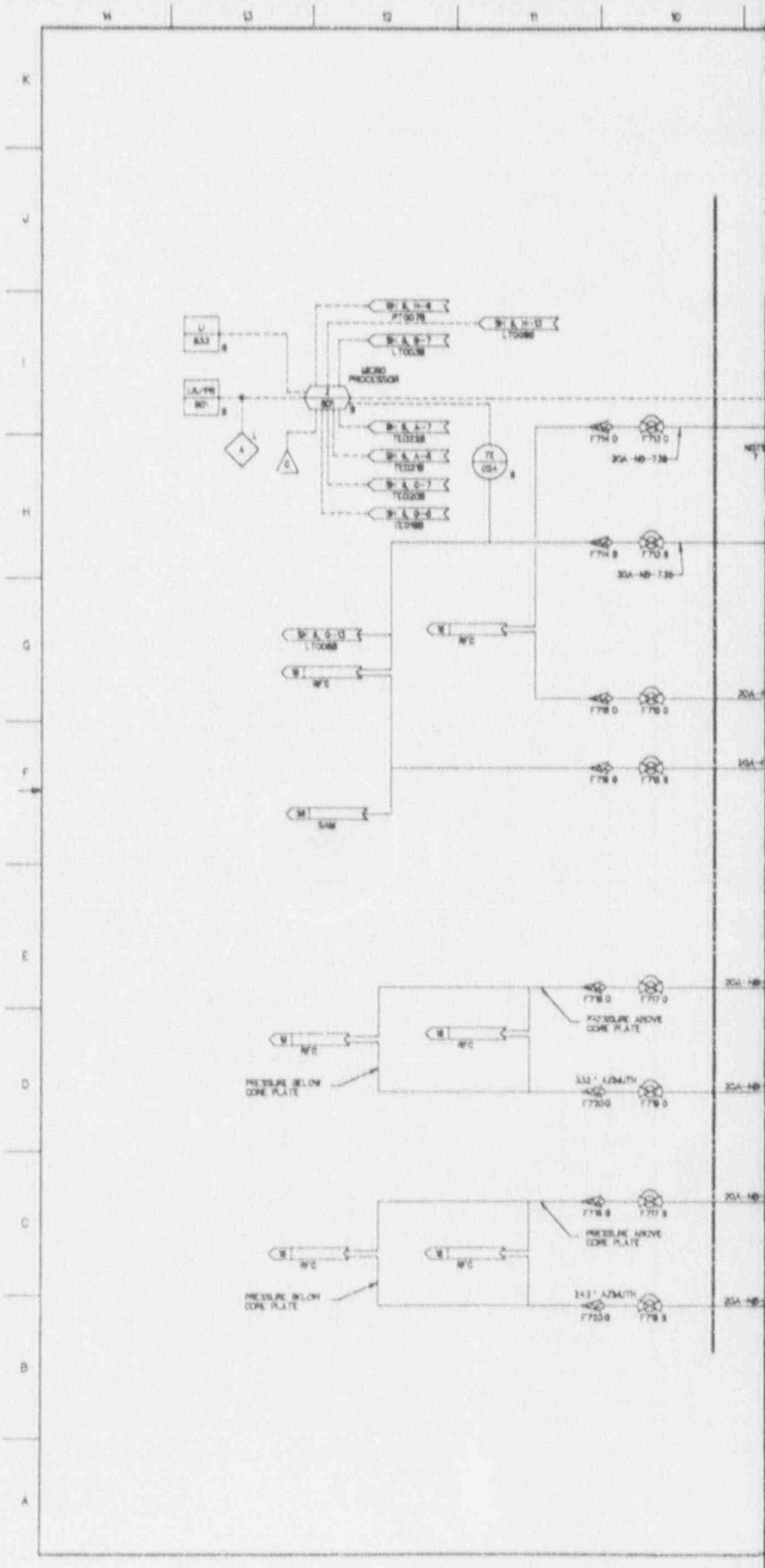


Figure 5.1-3 NI



.1-3 NUCLEAR BOILER SYSTEM P&ID, Sheet 6 of 11


MICRO PROCESSOR
PRESSURE ABOVE CORE PLATE
PRESSURE BELOW CORE PLATE
PRESSURE ABOVE CORE PLATE
PRESSURE BELOW CORE PLATE

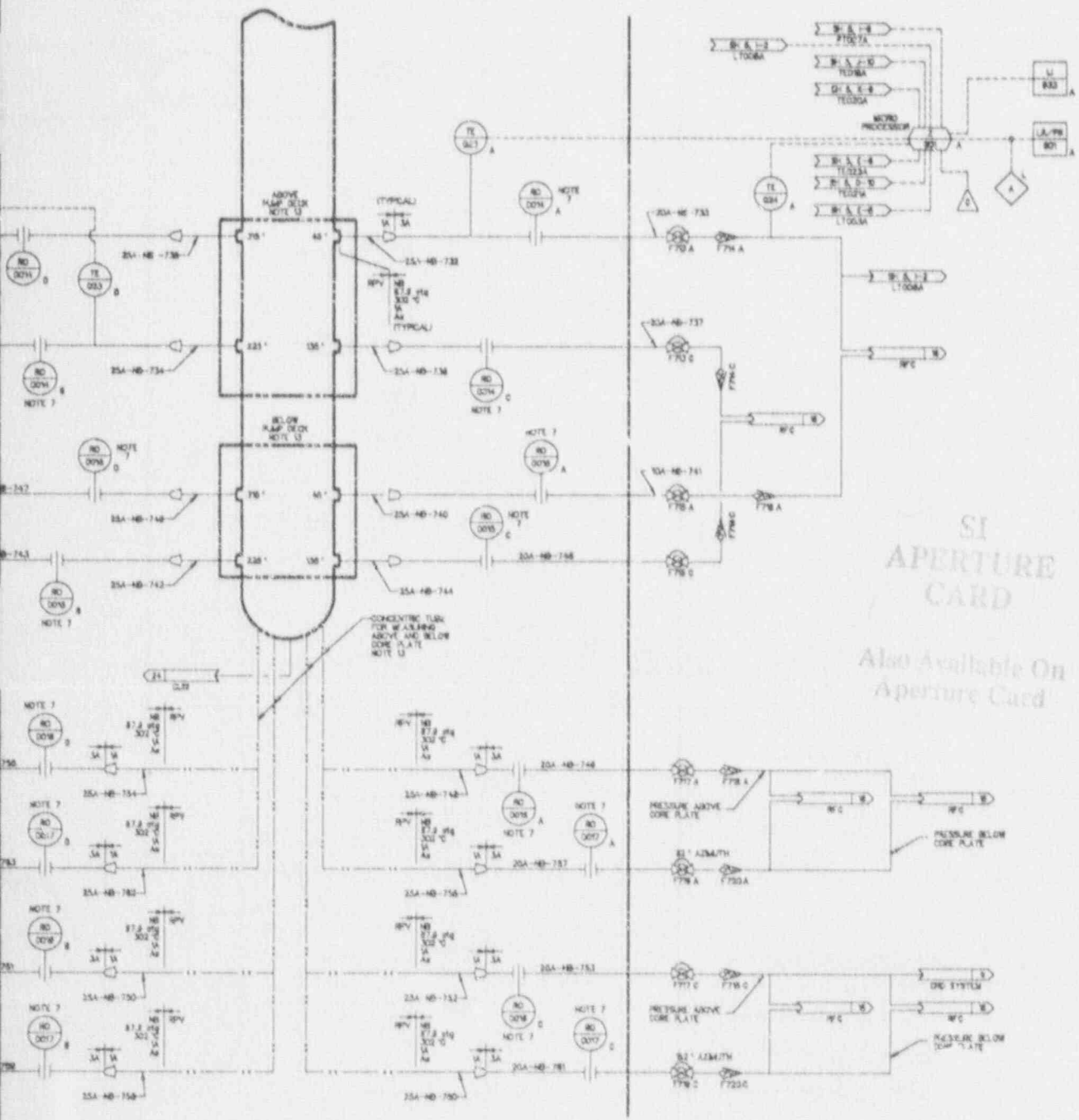


Figure 5.1-3 NUCLEAR BOILER SYSTEM P&ID, Sheet 7 of 11

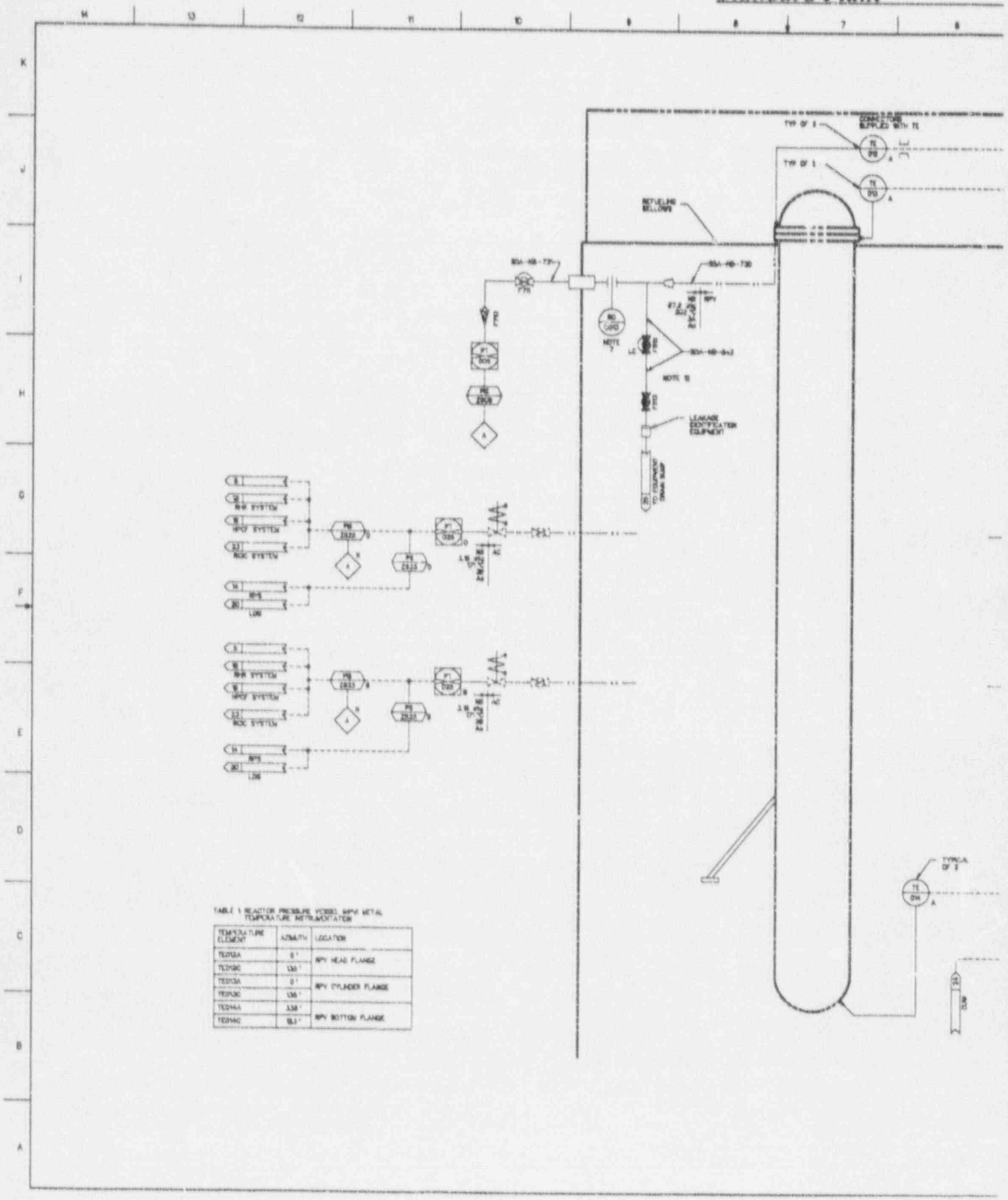
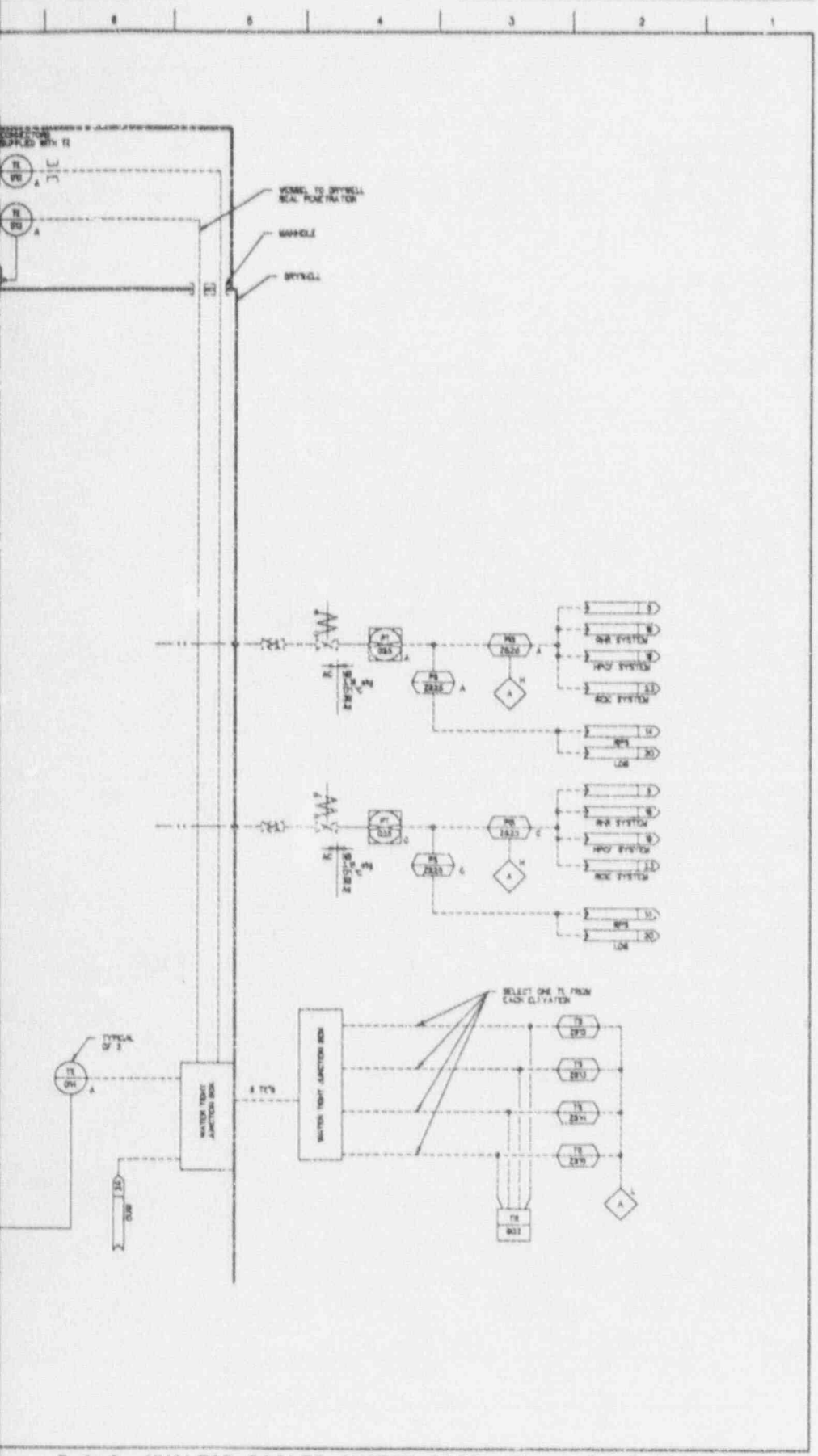


TABLE 1 REACTOR PRESSURE VESSEL (RPV) METAL TEMPERATURE INSTRUMENTATION

TEMPERATURE ELEMENT	AZIMUTH	LOCATION
TE-[illegible]A	0°	RPV HEAD FLANGE
TE-[illegible]C	135°	
TE-[illegible]A	0°	RPV CYLINDER FLANGE
TE-[illegible]C	135°	
TE-[illegible]A	338°	RPV BOTTOM FLANGE
TE-[illegible]C	180°	

Figure 5.1-3 NU



ure 5.1-3 NUCLEAR BOILER SYSTEM P&ID, Sheet 8 of 11

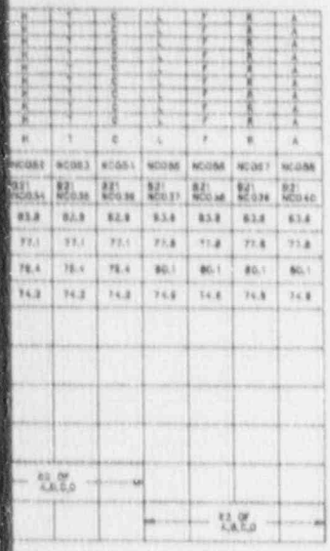
TABLE 4: SUFFIX LETTER ASSIGNMENTS FOR SAFETY/RELIEF VALVES AND ASSOCIATED EQUIPMENT

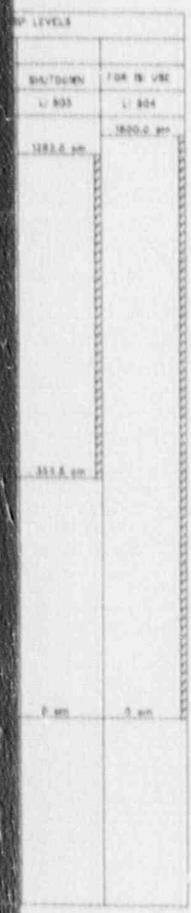
SAFETY/RELIEF VALVE PSID		P	J	N	Q	R	B	K	E	V	D	N
TEMPERATURE ELEMENT TE028		P	J	N	Q	R	B	K	E	V	D	N
SOLENOID VALVE	ASD 1											N
	ASD 2											N
	SV	P	J	N	Q	R	B	K	E	V	D	N
ACCUMULATOR	ASD1											N
	ASD4	P	J	N	Q	R	B	K	E	U	D	N
CHECK VALVE	TD28											N
	TD85	P	J	N	Q	R	B	K	E	V	D	N
SRV OPEN CLOSE MONITORING & SYSTEM	COMPUTER INPUT 4	NC041	NC042	NC043	NC044	NC045	NC046	NC047	NC048	NC049	NC050	NC051
4 COMPUTER INPUT 4		B21 NC033	B21 NC034	B21 NC035	B21 NC036	B21 NC037	B21 NC038	B21 NC045	B21 NC030	B21 NC031	B21 NC032	B21 NC033
SPRING SET PRESSURE (kg/cm² g)		80.8	80.8	81.8	81.8	81.8	81.8	83.2	83.2	83.2	83.2	83.8
V-RING RESET PRESSURE (kg/cm² g)		75.2	75.2	75.9	75.8	75.8	75.8	76.8	76.8	76.8	76.8	77.1
RELIEF SET PRESSURE (kg/cm² g)		76.8	71.3	78.0	78.0	78.0	78.0	78.7	78.7	78.7	78.7	78.4
RELIEF RESEAT PRESSURE (kg/cm² g)		71.4	70.1	71.8	72.8	72.8	72.8	73.8	73.8	73.8	73.8	74.8
	PT067A THRU D/ PS-2607A-E THRU D-E	RX OF A,B,C,D										
	PT067A THRU D/ PS-2607A-B THRU D-B		RX OF A,B,C,D									
	PT067A THRU D/ PS-2607A-1 THRU D-1			←		RX OF A,B,C,D		→				
	PT067A THRU D/ PS-2607A-3 THRU D-3							←		RX OF A,B,C,D	→	
	PT067A THRU D/ PS-2607A-5 THRU D-5											←
	PT067A THRU D/ PS-2607A-7 THRU D-7											

4 COMPUTER INPUTS FOR SRV POSITION SEE PERFORMANCE MONITORING AND CONTROL SYSTEM CRI-4010

TABLE 2 ELEVATOR CORRELATION CHART

REFERENCE	(COLD VESSEL) INCHES ABOVE VESSEL ZERO	REFERENCE	REACTOR VESSEL WATER LEVEL (LEVEL 8 + 0.5") (SEE TABLE 3)	CONTROL ROOM WATER LEVEL INDICATION AND R (SEE NOTE 2)			
				POST ACCIDENT MONITOR	SAFEGUARDS		FEEDWATER
				FUEL ZONE RANGE	WIDE RANGE	NARROW RANGE	
				LI-3041A&B	LR-2601A-3 C,D,F,J&P	LR-2601A-3 B,D&G	
INSTRUMENT LINE NOZZLE	1750.6 cm	TOP INSIDE OF HEAD					
	1633.8 cm						
	1594.1 cm	MAIN STEAM LINE NOZZLES			660.4 cm		
						508.0 cm	508.0 cm
			8 1384.3 cm			494.4 cm	494.4 cm
							448.8 cm
	1313.1 cm	HI ALARM NORMAL WATER LEVEL LOW ALARM	7 1353.8 cm				423.8 cm
			6 1330.3 cm				
			5 1306.7 cm			380.8 cm	380.8 cm
	1287.3 cm	SEPARATOR				355.6 cm	355.6 cm
	1224.2 cm	BOTTOM OF DRYER SKIRT					
INSTRUMENT LINE NOZZLE (NARROW RANGE)	1223.0 cm		4 1184.1 cm		283.2 cm		
				127.0 cm			
			3 1035.0 cm		138.1 cm		
			2 878.8 cm		34.7 cm		
	901.85 cm	TOP OF THE ACTIVE FUEL (TAF)		0 cm	0 cm	0 cm	0 cm
INSTRUMENT LINE NOZZLE (WIDE RANGE)	897.8 cm						
	190.5 cm	UPPER		-381.0 cm			
UPPER PUMP DECK	184.2 cm 150.2 cm	INSTRUMENT LINE NOZZLES					
LOWER PUMP DECK	178.6 cm	LOWER					
	0 cm	BOTTOM HEAD					





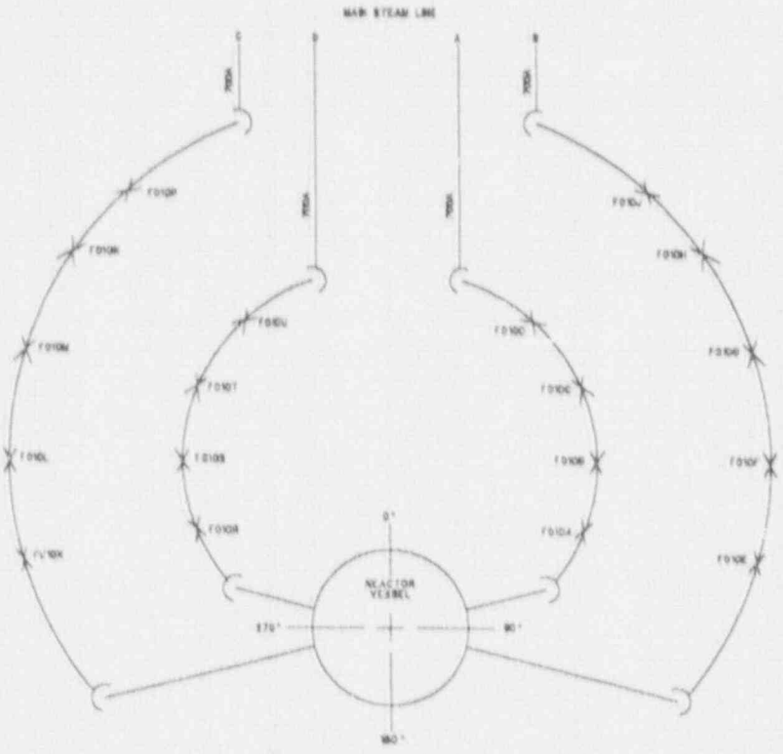


FIG. 3
SAFETY/RELIEF VALVE ORIENTATION AND STEAM PIPING LINE SIZES

TABLE 3 WATER LEVEL TRIP FUNCTION

REACTOR VESSEL WATER LEVEL	DESCRIPTION OF TRIPS	INSTRUMENT PROVIDING TRIP SIGNAL	NOTES
8	TRIPS RCIC TURBINE	L9-263A-1 THRU D-1	NARROW RANGE
	TRIP HPCF INJECTION VALVES	L9-263A-1 THRU D-1	NARROW RANGE
	CLOSE MAIN TURBINE STOP VALVES TRIPS FEEDWATER PUMPS	SEE REFERENCE DOCUMENT 12	NARROW RANGE
7	HIGH LEVEL ALARM	SEE REFERENCE DOCUMENT 12	NARROW RANGE
4	LOW LEVEL ALARM AND FLOW RUN BACK OR TRIP OF FEED PUMPS		NARROW RANGE
3	BORAMS REACTOR	L8-263A THRU D	NARROW RANGE
	CLOSE RHR SHUTDOWN COOLING ISOLATION VALVES	L8-263A THRU D	NARROW RANGE
	CLOSE CONTAINMENT ISOL VALVES (26 EXCEPT RHR COOLING AND LOW FCS VALVES AND MSIV'S	L8-263A THRU D	NARROW RANGE
	TRIP 4 OF RRS PUMPS	SEE REFERENCE DOCUMENT 5	NARROW RANGE
2	INITIATES RCIC	L9-263A-1 THRU D-1	WIDE RANGE
	TRIP REMAINING 2 RRS PUMPS	L3-263A-1 THRU D-1	WIDE RANGE
	CLOSE DW ISOL VALVES	L3-263A-1 THRU D-2	WIDE RANGE
1A	INITIATES HPCF B & C	L3-263E-3 THRU H-3	WIDE RANGE
	CLOSE MSIV'S & DW COOLING SYSTEM ISOL VALVES	L3-263E-4 THRU H-4	WIDE RANGE
1	INITIATES ADS (WITH CONCURRENT HIGH DRYWELL PRESSURE)	L15-263A THRU H	WIDE RANGE
	INITIATES RHR/LPFL MODE	L15-263A THRU H	WIDE RANGE

Figure 5.1-3 NUCLEAR BOILER SYSTEM P&ID, Sheet 9 of 11

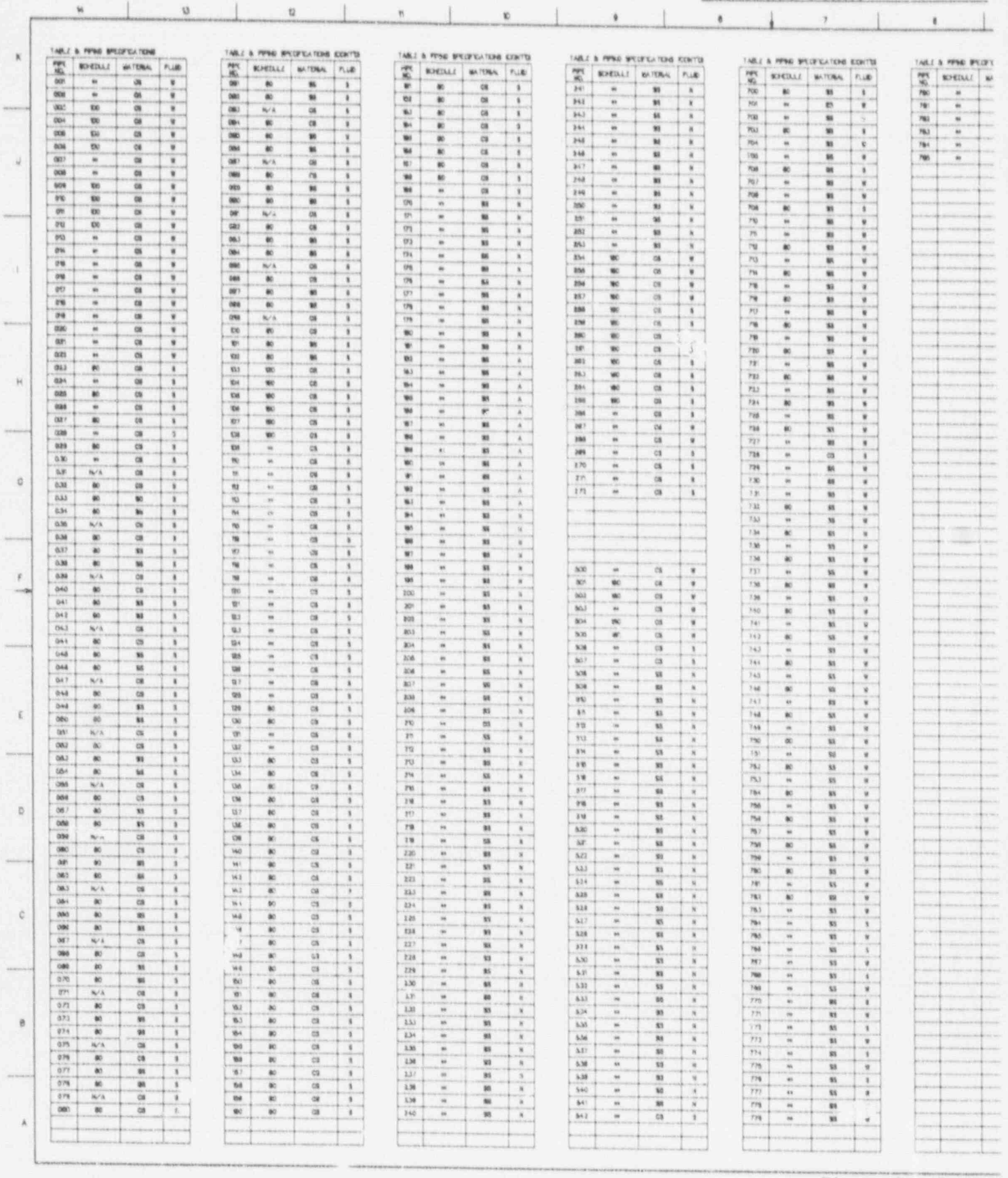


Figure 5.1-3 NUCI

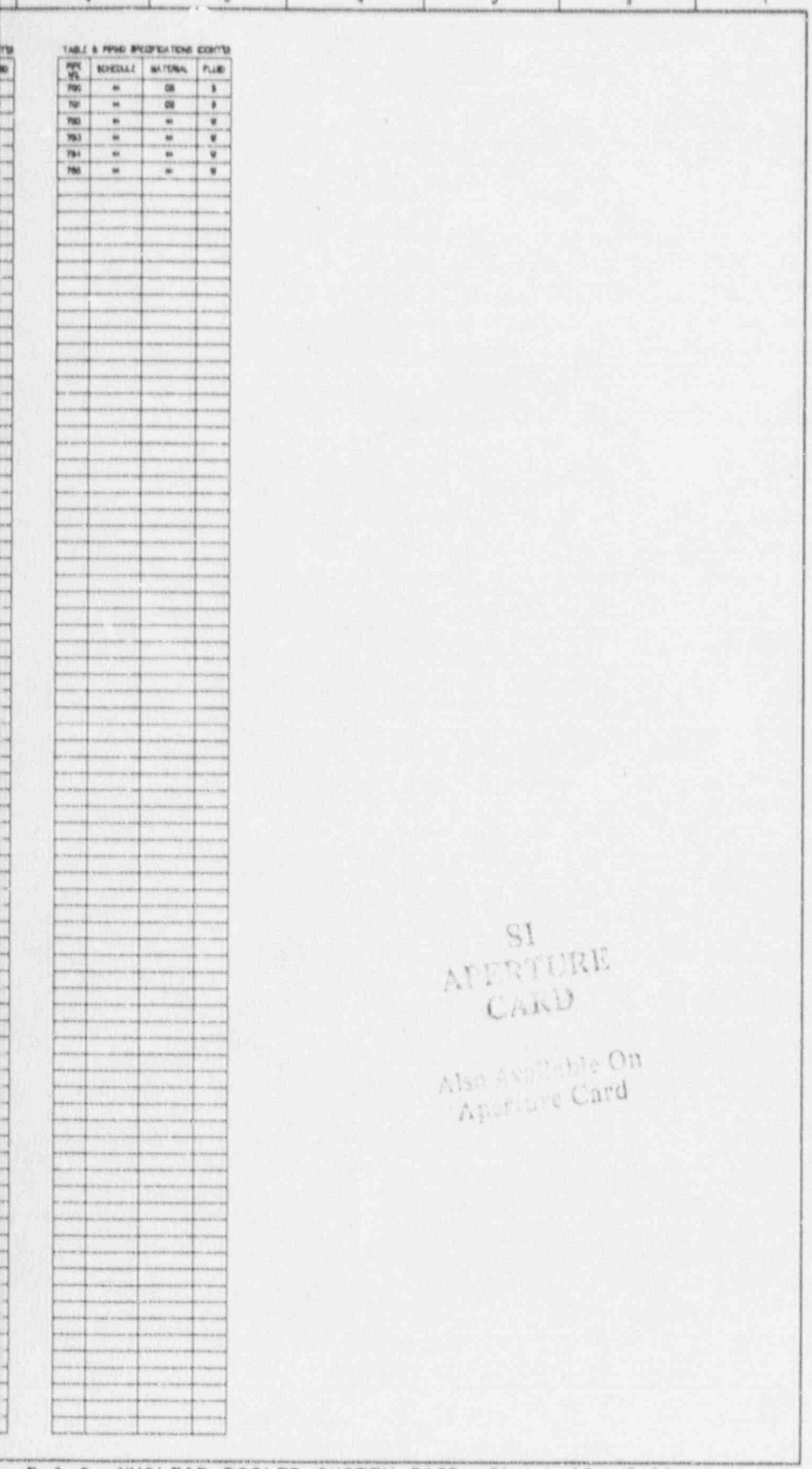


TABLE 5 PIPING SPECIFICATIONS (CONT'D)

PIPING SYS.	SCHEDULE	MATERIAL	FLUID
790	**	CS	S
791	**	CS	S
792	**	**	W
793	**	**	W
794	**	**	W
795	**	**	W

e 5.1-3 NUCLEAR BOILER SYSTEM P&ID, Sheet 10 of 11

TABLE 6 : PIPE NUMBERS FOR THE MAIN STEAM LINES

MAIN STEAM LINE	MSIV TO THE OUTBOARD MSIV	OUTBOARD MSIV TO SEISMIC INTERFACE	SEISMIC INTERFACE TO MAIN STEAM SYSTEM	OUTBOARD MSIV TEST LINE	
				OUTBOARD MSIV TO REDUCER	DOWNSTREAM OF REDUCER
A	700A-MB-033	700A-MB-034	700A-MB-266	80A-MB-258	80A-MB-189
B	700A-MB-035	700A-MB-026	700A-MB-270	80A-MB-260	80A-MB-191
C	700A-MB-027	700A-MB-028	700A-MB-271	80A-MB-261	80A-MB-263
D	700A-MB-029	700A-MB-030	700A-MB-272	80A-MB-264	80A-MB-268

TABLE 7 : PIPE NUMBERS FOR THE SAFETY/RELIEF VALVE (SRV) DISCHARGE LINES

SRV	SRV DISCHARGE LINE				VACUUM BREAKER LINES	
	MSL TO SRV NOTE 3	SRV TO DIAPHRAGM FLOOR	DIAPHRAGM FLOOR TO REDUCER	REDUCER TO QUENCHER	UPSTREAM	DOWNSTREAM
F010A	150A-MB-031	250A-MB-032	250A-MB-033	300A-MB-034	250A-MB-133	250A-MB-134
F010B	150A-MB-035	250A-MB-036	250A-MB-037	300A-MB-038	250A-MB-135	250A-MB-136
F010C	150A-MB-038	250A-MB-040	250A-MB-041	300A-MB-042	250A-MB-137	250A-MB-138
F010D	150A-MB-043	250A-MB-044	250A-MB-045	300A-MB-046	250A-MB-139	250A-MB-140
F010E	150A-MB-047	250A-MB-048	250A-MB-049	300A-MB-050	250A-MB-141	250A-MB-142
F010F	150A-MB-051	250A-MB-052	250A-MB-053	300A-MB-054	250A-MB-143	250A-MB-144
F010G	150A-MB-055	250A-MB-056	250A-MB-057	300A-MB-058	250A-MB-145	250A-MB-146
F010H	150A-MB-059	250A-MB-060	250A-MB-061	300A-MB-062	250A-MB-147	250A-MB-148
F010J	150A-MB-063	250A-MB-064	250A-MB-065	300A-MB-066	250A-MB-149	250A-MB-150
F010K	150A-MB-067	250A-MB-068	250A-MB-069	300A-MB-070	250A-MB-151	250A-MB-152
F010L	150A-MB-071	250A-MB-072	250A-MB-073	300A-MB-074	250A-MB-153	250A-MB-154
F010M	150A-MB-075	250A-MB-076	250A-MB-077	300A-MB-078	250A-MB-155	250A-MB-156
F010N	150A-MB-079	250A-MB-080	250A-MB-081	300A-MB-082	250A-MB-157	250A-MB-158
F010P	150A-MB-083	250A-MB-084	250A-MB-085	300A-MB-086	250A-MB-159	250A-MB-160
F010R	150A-MB-087	250A-MB-088	250A-MB-089	300A-MB-090	250A-MB-161	250A-MB-162
F010S	150A-MB-091	250A-MB-092	250A-MB-093	300A-MB-094	250A-MB-163	250A-MB-164
F010T	150A-MB-095	250A-MB-096	250A-MB-097	300A-MB-098	250A-MB-165	250A-MB-166
F010U	150A-MB-099	250A-MB-100	250A-MB-101	300A-MB-102	250A-MB-167	250A-MB-168

TABLE 8 : PIPE NUMBERS FOR THE MAIN STEAM ISOLATION VALVE (MSIV) PNEUMATIC LINES

MSIV	DPDWHO-CHECK VALVE TO MSIV	DPDWHO-PISTON ACCUMULATOR	DPDWHO-VALVE CONTROL PANEL TO MSIV	VENT LINE
F008A	1"-MB-170	1"-MB-171	1"-MB-172	1"-MB-608
F008B	1"-MB-173	1"-MB-174	1"-MB-175	1"-MB-608
F008C	1"-MB-176	1"-MB-177	1"-MB-178	1"-MB-610
F008D	1"-MB-179	1"-MB-180	1"-MB-181	1"-MB-611
F008A	1"-MB-182	1"-MB-183	1"-MB-184	1"-MB-612
F008B	1"-MB-185	1"-MB-186	1"-MB-187	1"-MB-613
F008C	1"-MB-188	1"-MB-189	1"-MB-190	1"-MB-614
F008D	1"-MB-191	1"-MB-192	1"-MB-193	1"-MB-615

TABLE 10 : PIPE NUMBERS FOR THE MAIN STEAM LINE (MSL) INSTRUMENT LINES

MAIN STEAM LINE	MSL FLOW RESTRICTOR INSTRUMENT LINES				MSL PRESSURE TEST POINT
	INSTRUMENT LINE TO LOS		INSTRUMENT LINE TO LOS & PDMS		
	MSL TO REDUCER	REDUCER TO EXCESS FLOW CHECK VALVE	MSL TO REDUCER	REDUCER TO EXCESS FLOW CHECK VALVE	
A	25A-MB-764	20A-MB-765	25A-MB-768	20A-MB-767	20A-MB-780
B	25A-MB-766	20A-MB-769	25A-MB-770	20A-MB-771	20A-MB-781
C	25A-MB-772	20A-MB-773	25A-MB-774	20A-MB-775	"
D	25A-MB-776	20A-MB-777	25A-MB-778	20A-MB-779	"

TABLE 11 : PIPE NUMBERS FOR THE SAFETY/RELIEF VALVE (SRV) PNEUMATIC LINES

SRV	ADS PNEUMATIC LINES				PNEUMATIC LINES FOR POWER-ACTUATED RELIEF		
	CHECK VALVE TO SOV "ADS 1" TO SRV	BRANCH LINE FROM ACCUMULATOR	BRANCH LINE FROM SOV "ADS 1" TO SOV "ADS 2"	ACCUMULATOR VENT LINE	CHECK VALVE TO SOV "ADS 2" (ADS SRV) OR SRV (NON-ADS SRV)	BRANCH LINE FROM ACCUMULATOR	ACCUMULATOR VENT LINE
F010A	1"-GD-194	1"-MB-196	1"-MB-194	1"-MB-518	1"-MB-197	1"-MB-199	1"-MB-517
F010B					1"-MB-198	1"-MB-200	1"-MB-519
F010C	1"-MB-201	1"-MB-202	1"-MB-203	1"-MB-518	1"-GD-204	1"-MB-206	1"-MB-520
F010D					1"-MB-208	1"-MB-207	1"-MB-521
F010E					1"-MB-205	1"-MB-209	1"-MB-522
F010F	1"-MB-210	1"-MB-211	1"-MB-212	1"-MB-513	1"-MB-213	1"-MB-214	1"-MB-534
F010G					1"-MB-215	1"-MB-216	1"-MB-535
F010H	1"-MB-217	1"-MB-218	1"-MB-219	1"-MB-538	1"-MB-220	1"-MB-221	1"-MB-537
F010J					1"-MB-222	1"-MB-223	1"-MB-536
F010K					1"-MB-224	1"-MB-225	1"-MB-539
F010L	1"-MB-226	1"-MB-227	1"-MB-228	1"-MB-530	1"-MB-229	1"-MB-230	1"-MB-531
F010M					1"-MB-231	1"-MB-232	1"-MB-532
F010N	1"-MB-233	1"-MB-234	1"-MB-235	1"-MB-533	1"-MB-236	1"-MB-237	1"-MB-534
F010P					1"-MB-238	1"-MB-239	1"-MB-540
F010R	1"-MB-240	1"-MB-241	1"-MB-242	1"-MB-538	1"-MB-243	1"-MB-244	1"-MB-537
F010S					1"-MB-245	1"-MB-246	1"-MB-538
F010T	1"-MB-247	1"-MB-248	1"-MB-249	1"-MB-539	1"-MB-250	1"-MB-251	1"-MB-540
F010U					1"-MB-252	1"-MB-253	1"-MB-541

Figure 5.1-3 NUCLEAR BOILER SYSTEM P&ID, Sheet 1 of 11

NOTES:

1. ALL SIGNALS ARE TRANSMITTED AS SERIAL DATA TO EACH TLU OR SLU THROUGH EACH SERIAL OUTPUT.

2. FOUR TEMPERATURE ELEMENTS SHALL BE LOCATED AT APPROXIMATELY EQUAL INTERVALS IN THE VERTICAL DIRECTION SO AS TO MONITOR AMBIENT TEMPERATURES OVER THE FULL HEIGHT OF THE DRYWELL.

3. TEMPERATURE DETECTORS SHALL BE LOCATED OR SHIELDED SO THAT THE DETECTOR IS SENSITIVE TO THE AIR TEMPERATURE AND NOT THE RADIATED HEAT FROM HOT EQUIPMENT.

4. ALL INSTRUMENT LINES THAT CONNECT TO THE REACTOR COOLANT PRESSURE BOUNDARY AND PENETRATE THE CONTAINMENT WALL SHALL HAVE A 0.30 MIN. RESTRICTING ORIFICE INSIDE THE CONTAINMENT. SEE SUPPORTING DOCUMENTS E&S FOR ADDITIONAL REQUIREMENTS.

5. EACH INSTRUMENT LINE THROUGH THE CONTAINMENT WALL SHALL HAVE TWO ISOLATION VALVES OUTSIDE THE CONTAINMENT LOCATED AS CLOSE TO THE CONTAINMENT AS PRACTICAL.

6. SOLENOID OPERATED GLOBE VALVES MAY BE ADOPTED FOR THE AIR OPERATED VALVES.

7. THIS DOCUMENT PROVIDES A FUNCTIONAL DEFINITION OF THE REQUIRED SYSTEM LEVEL PROCESS MONITORING AND CONTROL INSTRUMENTATION. IT DOES NOT ADDRESS DETAILS OF THE METHODS BY WHICH SIGNALS FROM THESE COMPONENTS WILL BE PROCESSED. THIS PROCESSING MAY INVOLVE THE PLANT MULTIPLEXING SYSTEM (MOS) OR MAY UTILIZE HARDWIRING. SPECIFIC ELECTRICAL ISOLATION REQUIREMENTS SHOWN ON THIS DRAWING MAY BE UNNECESSARY IF MULTIPLEXED SIGNAL TRANSMISSION PROVIDES INHERENT ISOLATION.

8. ALL ALARMS SHALL BE LOCATED IN THE MAIN CONTROL ROOM.

9. TEMPERATURE SWITCHES (TS) SHALL BE PROVIDED WITH TEMPERATURE INDICATOR EITHER ON THE SWITCHES OR ON COMMON METER MODULES.

10. THE LDS SHALL BE DESIGNED IN ACCORDANCE WITH THE SYSTEM DESIGN SPECIFICATION (E31-1010). OTHER PRIMARY CONTAINMENT ISOLATION (PCIV) VALVES, WHICH ARE PART OF OTHER SYSTEMS, ARE NOT SHOWN IN THIS I.D. THOSE VALVES ARE SHOWN ON THE LDS/MID - INTERLOCK BLOCK DIAGRAM (E31-10.30).

11. FOR REACTOR WATER LEVELS MONITORING, SEE B31-1010.

12. FOR DRYWELL PRESSURE MONITORING, SEE B21-1010.

13. FOR DETECTION OF RADIATION LEAKAGE INTO COOLING WATER SUPPLY TO RECIRC PUMP, RHR, AND CUW HEAT EXCHANGERS, SEE (11)-1040.

14. LETTER DESIGNATIONS FOR FOUR DIVISIONS ARE AS FOLLOWS:

    A, E, J, N = DIVISION 1
    B, F, K, P = DIVISION 2
    C, G, L, R = DIVISION 3
    D, H, M, S = DIVISION 4

15. IF HEAT TRACING OF SAMPLE LINE IS NECESSARY TO PREVENT CONDENSATION, THE MAXIMUM ALLOWABLE SAMPLE TEMPERATURE IS LIMITED BY THE PHOTO MULTIPLIER TUBES IN THE MONITORING CHANNELS.

16. BALL VALVE MAY BE ADOPTED FOR THIS GATE VALVE.

17. DTM, TLU, SLU, OLU ARE PART OF SAFETY SYSTEM LOGIC AND CONTROL. (SEE REFERENCE DOCUMENT 12).

    A. DTMs SHOWN ON SHEETS 3 & 4 PROCESS SENSOR INPUTS FOR MSIV ISOLATION TRIP LOGIC.

    B. DTMs SHOWN ON SHEETS 3 & 4 PROCESS SENSOR INPUTS FOR ECCS ISOLATION TRIP LOGIC.

    C. DTMs SHOWN ON SHEETS 7 & 10 PROCESS SENSOR INPUTS FOR AUXILIARY ESF ISOLATION TRIP LOGIC.

    D. TLUs AND OLUs SHOWN ON SHEET 3 AND SHEET 4 PROCESS 2-OUT-OF-4 COINCIDENCE LOGIC FOR MSIV CLOSURE TRIP.

    E. SLUs SHOWN ON SHEETS 3 & 4 PROCESS 2-OUT-OF-4 COINCIDENCE LOGIC FOR ECCS ISOLATION.

    F. SLUs SHOWN ON SHEETS 7 & 10 PROCESS 2-OUT-OF-4 COINCIDENCE LOGIC FOR AUXILIARY ESF ISOLATION.

18. RWCU, MCR, EWS AND NEMS ARE PART OF THE MULTIPLEXING SYSTEM (NO.3).

19. ALL INSTRUMENT LINES ARE 20A-SS (STAINLESS STEEL) SCHEDULE 40, SAMPLING LINES ARE 32A-SS SCHEDULE 40.

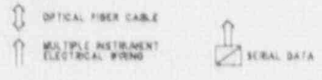
REFERENCES

	M/L NO.
1. REACTOR CORE ISOLATION COOLING SYSTEM P&ID	E31-1010
2. NUCLEAR BOILER SYSTEM P&ID	B21-1010
3. LIQUID WASTE SYSTEM P&ID	E17-1010
4. SAMPLING SYSTEM P&ID	P81-1010
5. PROCESS RADIATION MONITORING SYSTEM IED	D11-1040
6. VALVE GLAND LEAKAGE TREATMENT SYSTEM	F71-1010
7. INSTRUMENT AIR SYSTEM P&ID	P53-1010
8. ESSENTIAL MULTIPLEXING SYSTEM	N33-4010
9. LEAK DETECTION & ISOLATION SYSTEM IBD	C31-1030
10. REACTOR PROTECTION SYSTEM IED	C71-1040
11. STANDBY LIQUID CONTROL SYSTEM IBD	C41-1030
12. SAFETY SYSTEM & LOGIC CONTROL DS	AJ2-63E*
13. PERFORMANCE MONITORING & CONTROL SYSTEM DS	D81-4010
14. NEUTRON MONITORING SYSTEM IED	C51-1010
15. SUPPRESSION POOL CLEAN-UP SYSTEM P&ID	G51-1010
16. REACTOR BUILDING WATER CLEAN-UP SYSTEM P&ID	P21-1010
17. HVAC NORMAL COOLING WATER SYSTEM P&ID	P34-1010
18. STANDBY GAS TREATMENT SYSTEM P&ID	T22-1010
19. ATMOSPHERIC CONTROL SYSTEM P&ID	T31-1010
20. FLAMMABILITY CONTROL SYSTEM P&ID	T48-1010
21. HEATING, VENTILATING & AIR CONDITIONING P&ID	U41-1010
22. REACTOR WATER CLEANUP SYSTEM P&ID	G31-1010
23. RADIOACTIVE DRAIN TRANSFER SYSTEM P&ID	E17-1010

SUPPORTING DOCUMENTS

	M/L NO.
1. PIPING AND INSTRUMENT DIAGRAM SYMBOLS	A10-3330
2. PROCESS INSTRUMENTATION	A11-3030
3. GROUP CLASSIFICATION & CONTAINMENT ISOLATION DIAG	A11-1030

LEGEND



ABBREVIATIONS

OLU = OUTPUT LOGIC UNIT
TLU = TRIP LOGIC UNIT
DTM = DIGITAL TRIP MODULE
RMU = REMOTE MULTIPLEXING UNIT
SLU = SAFETY SYSTEM LOGIC UNIT
EMS = ESSENTIAL MULTIPLEXING SYSTEM
NEMS = NON-ESSENTIAL MULTIPLEXING SYSTEM

M/L NO. C31-1040

Figure 5.2-8 LEAK DETECTION AND ISOLATION SYSTEM IED, Sheet 1 of 10

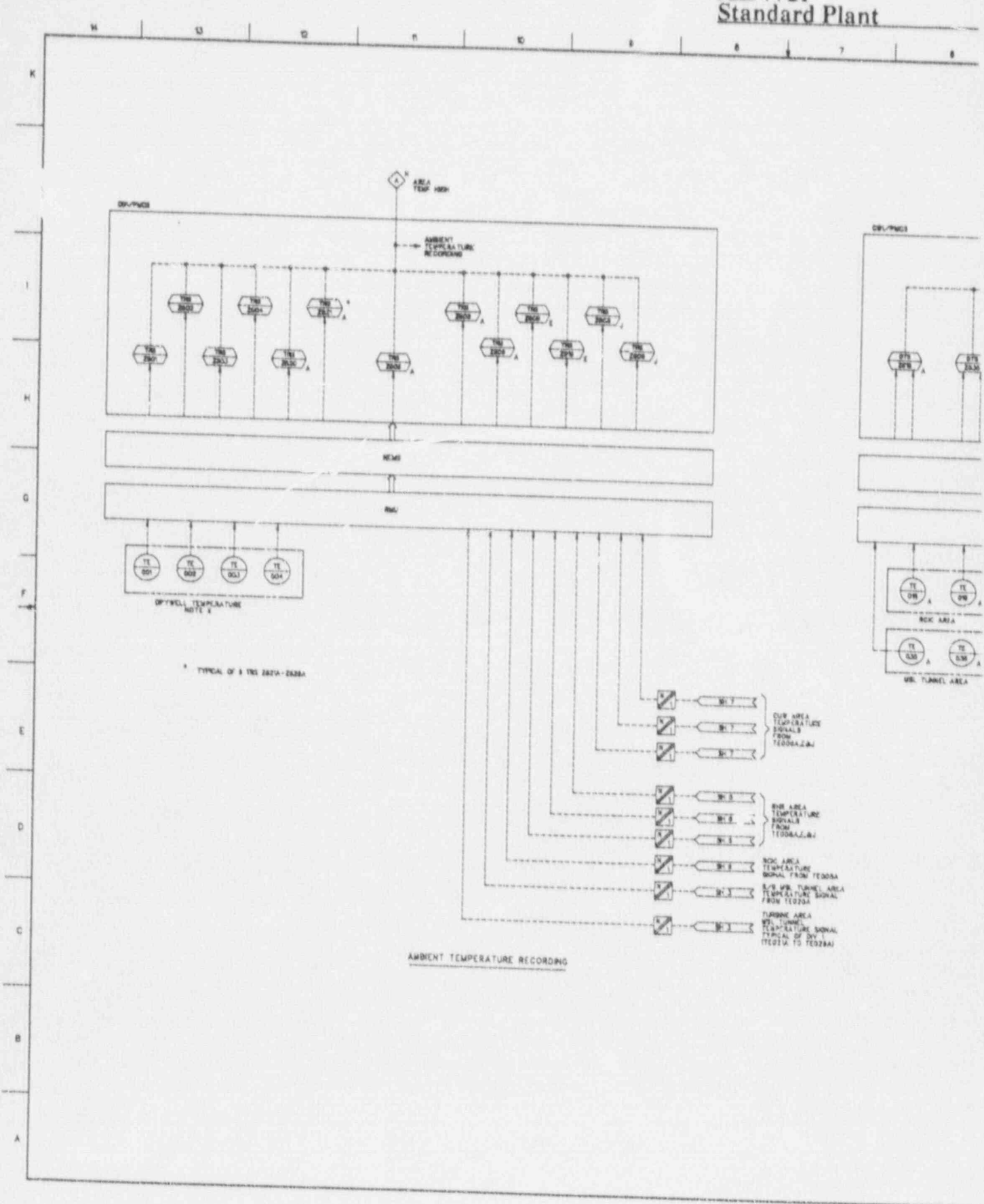
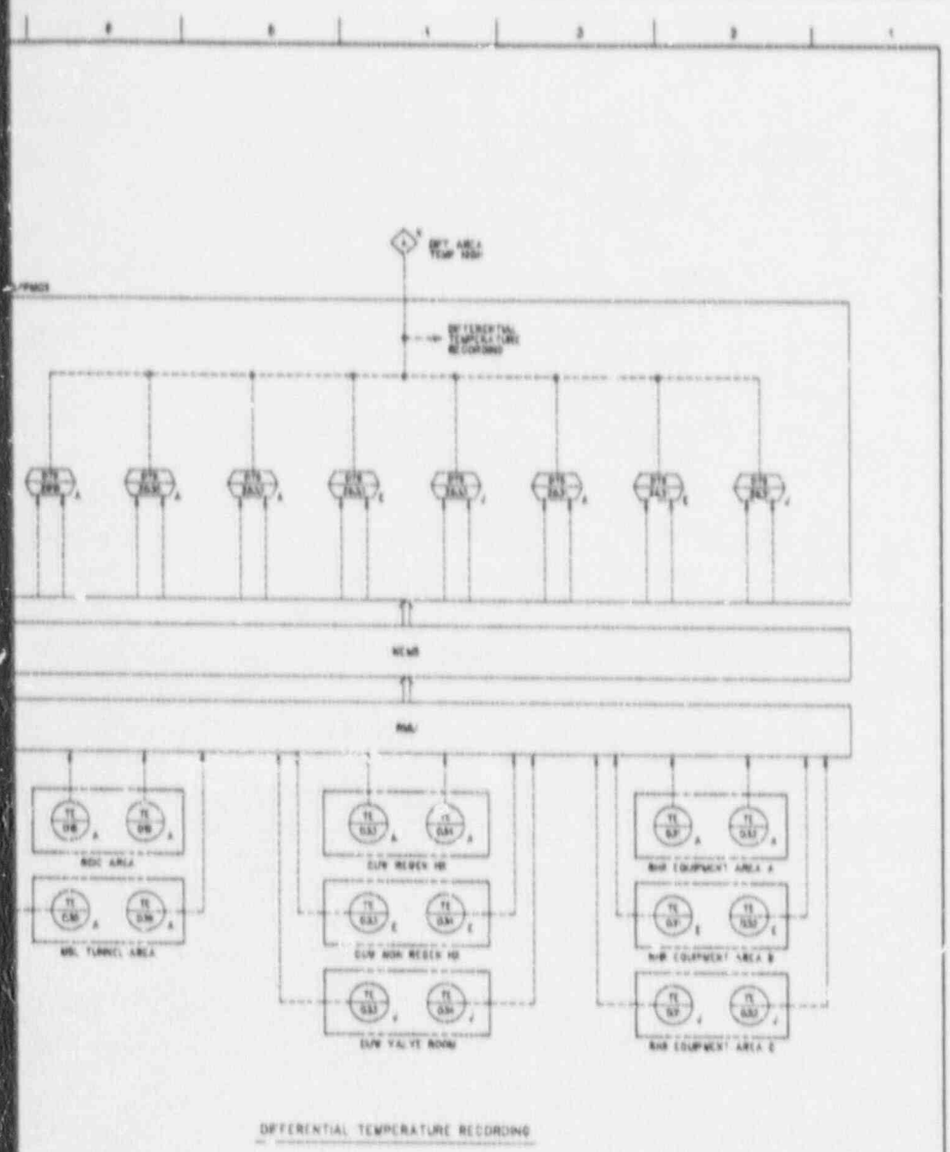
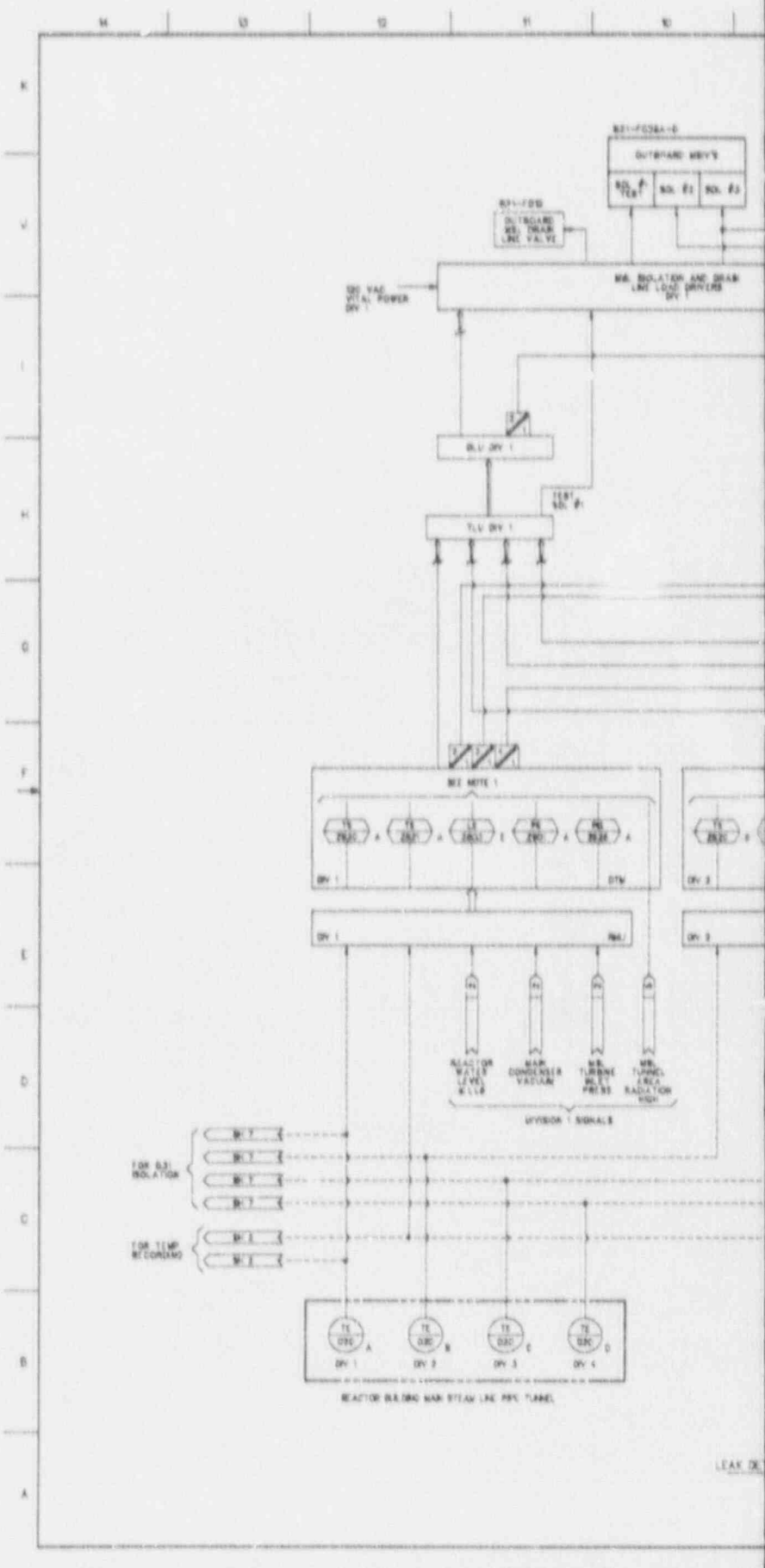


Figure 5.2-8 LEAK DETE



DIFFERENTIAL TEMPERATURE RECORDING


OUTBOARD MSIV'S
OUTBOARD MS. DRAIN LINE VALVE
MSL ISOLATION AND DRAIN LINE LOAD DRIVERS DIV 1
120 VAC VITAL POWER DIV 1
SEE NOTE 1
DIV 1
DIV 2
DIV 3
DIV 4
REACTOR WATER LEVEL 8 LOW
MAIN CONDENSER VACUUM
M.S. TURBINE INLET PRESS
M.S. TUNNEL AREA RADIATION HIGH
DIVISION 1 SIGNALS
FOR MSL ISOLATION
FOR T (MP RECORDING)
REACTOR BUILDING MAIN STEAM LINE PIPE TUNNEL

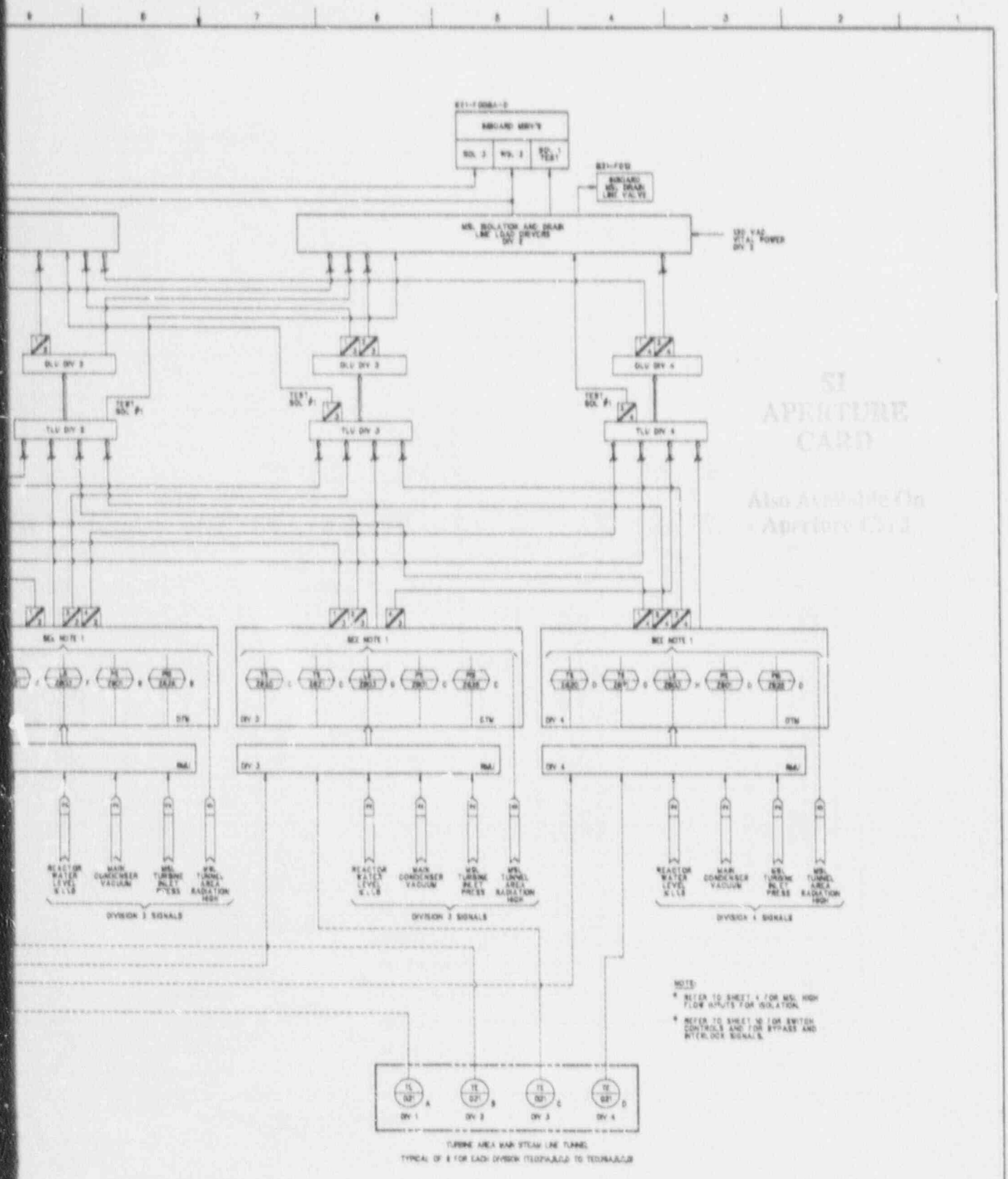


Figure 5.2-8 LEAK DETECTION AND ISOLATION SYSTEM IED, Sheet 3 of 10

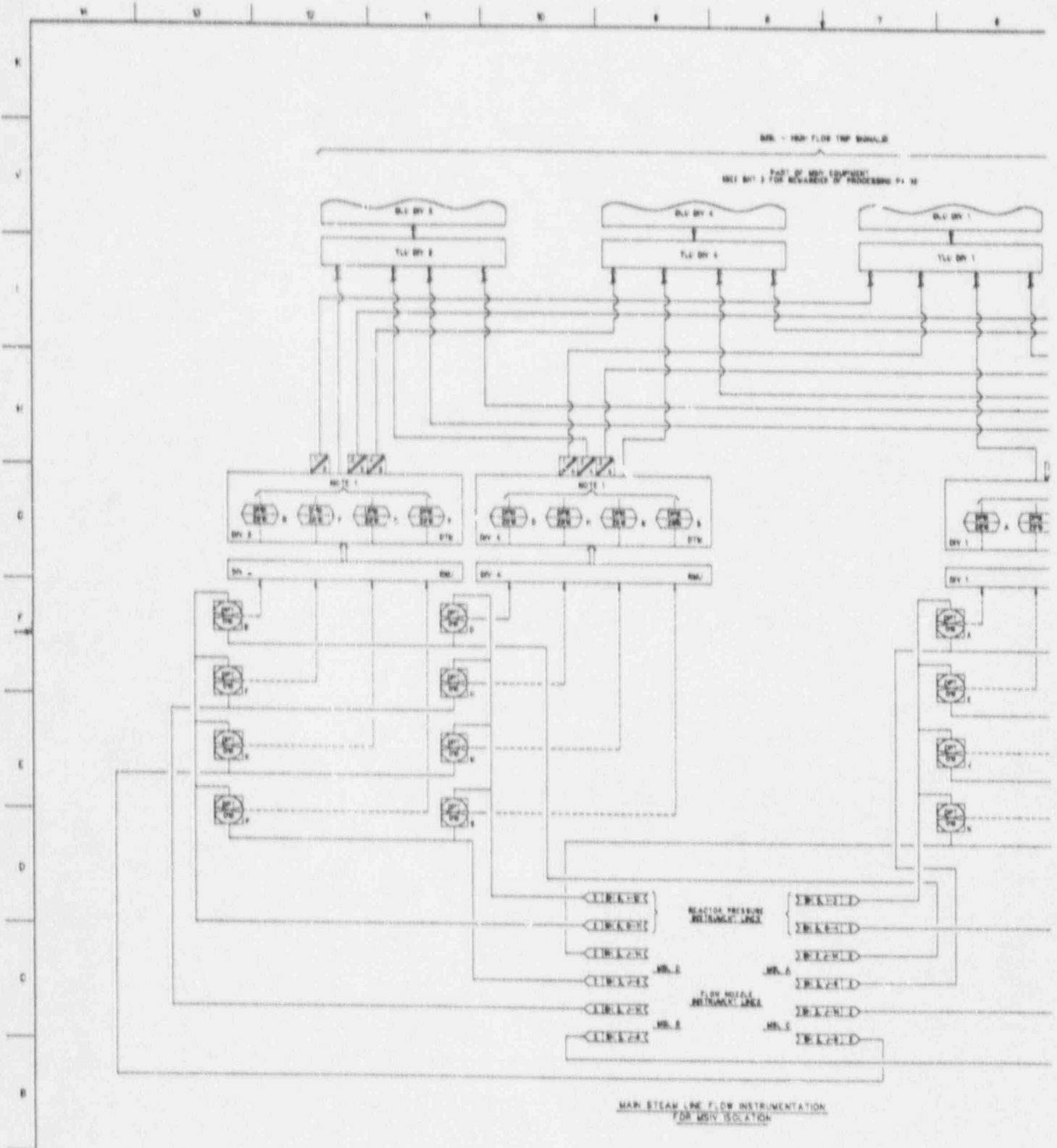
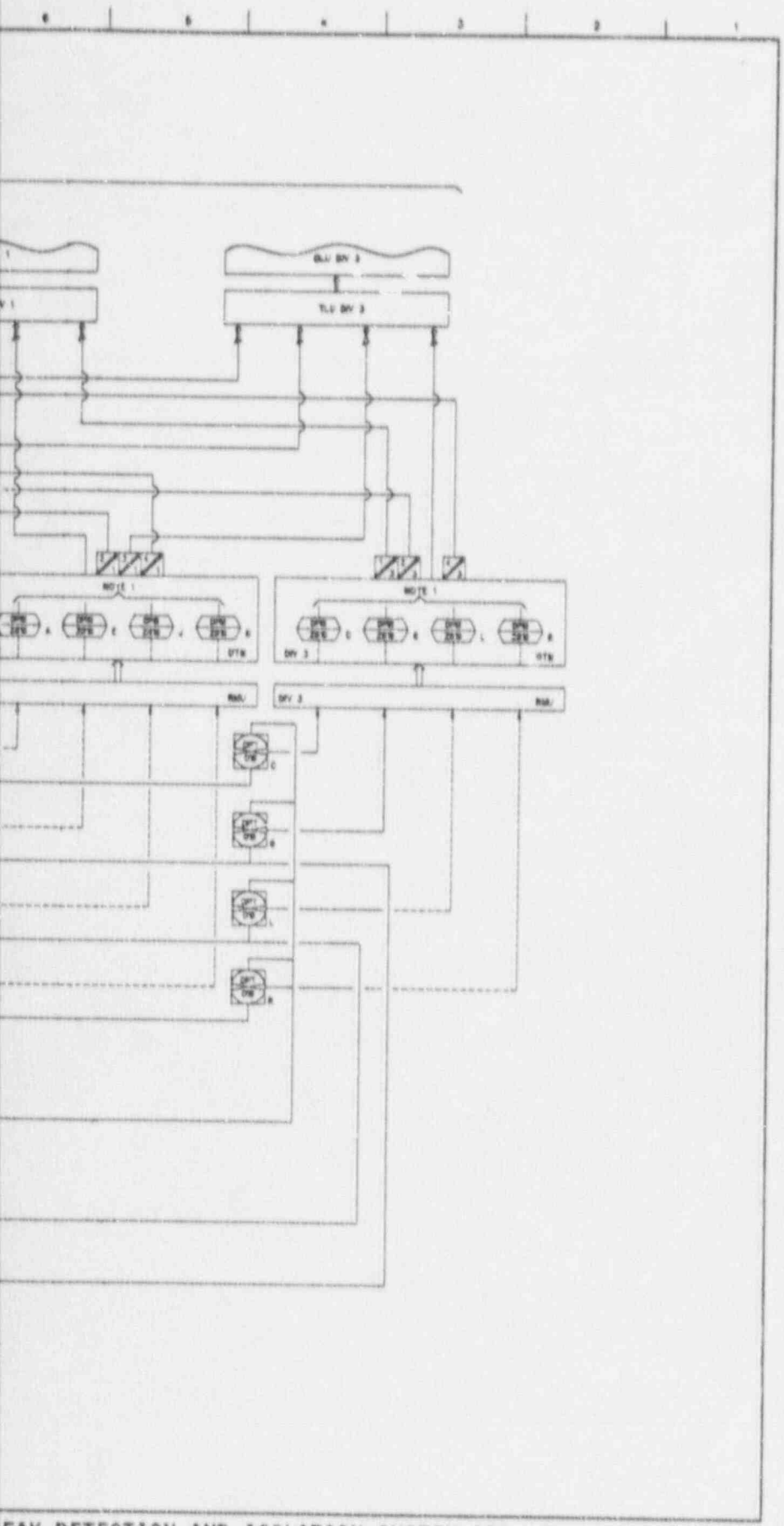
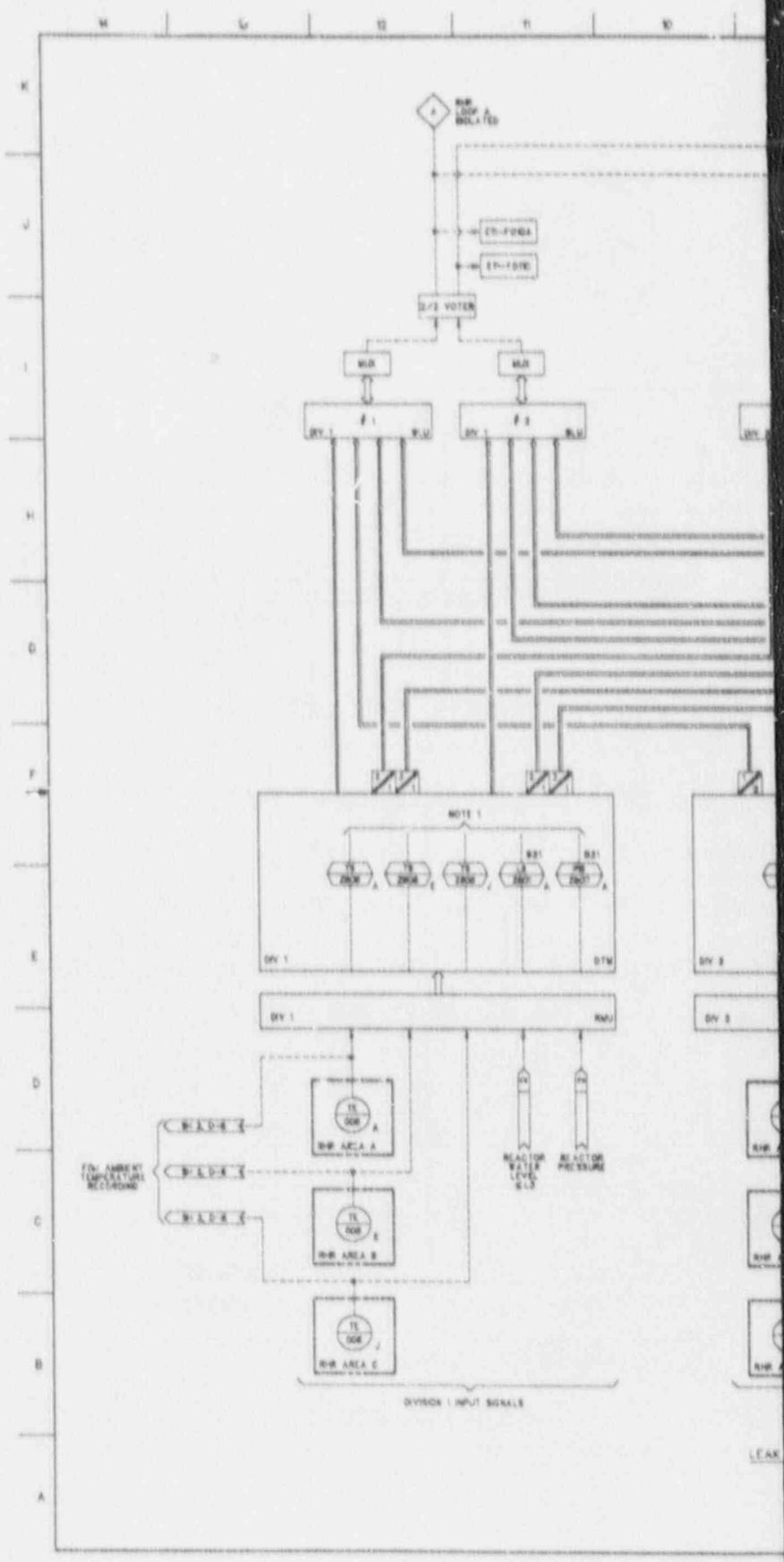


Figure 5.2-8 LEAK DET



EAK DETECTION AND ISOLATION SYSTEM IED, Sheet 4 of 10


2/3 VOTER
MUX
MUX
NOTE 1
DIV 1
DIV 3
DIVISION I INPUT SIGNALS
REACTOR WATER LEVEL (L3)
REACTOR PRESSURE

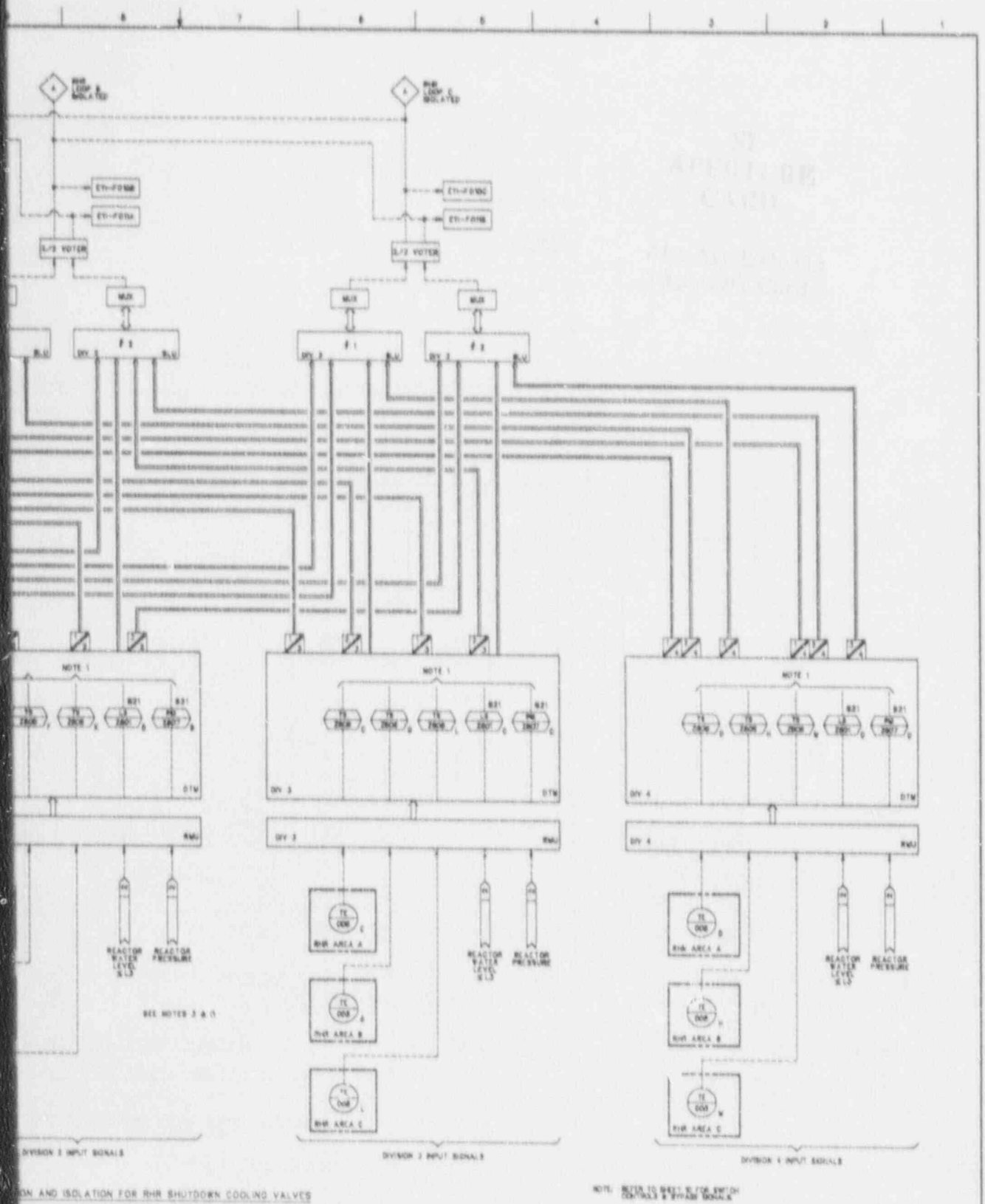


Figure 5.2-8 LEAK DETECTION AND ISOLATION SYSTEM IED, Sheet 5 of 10

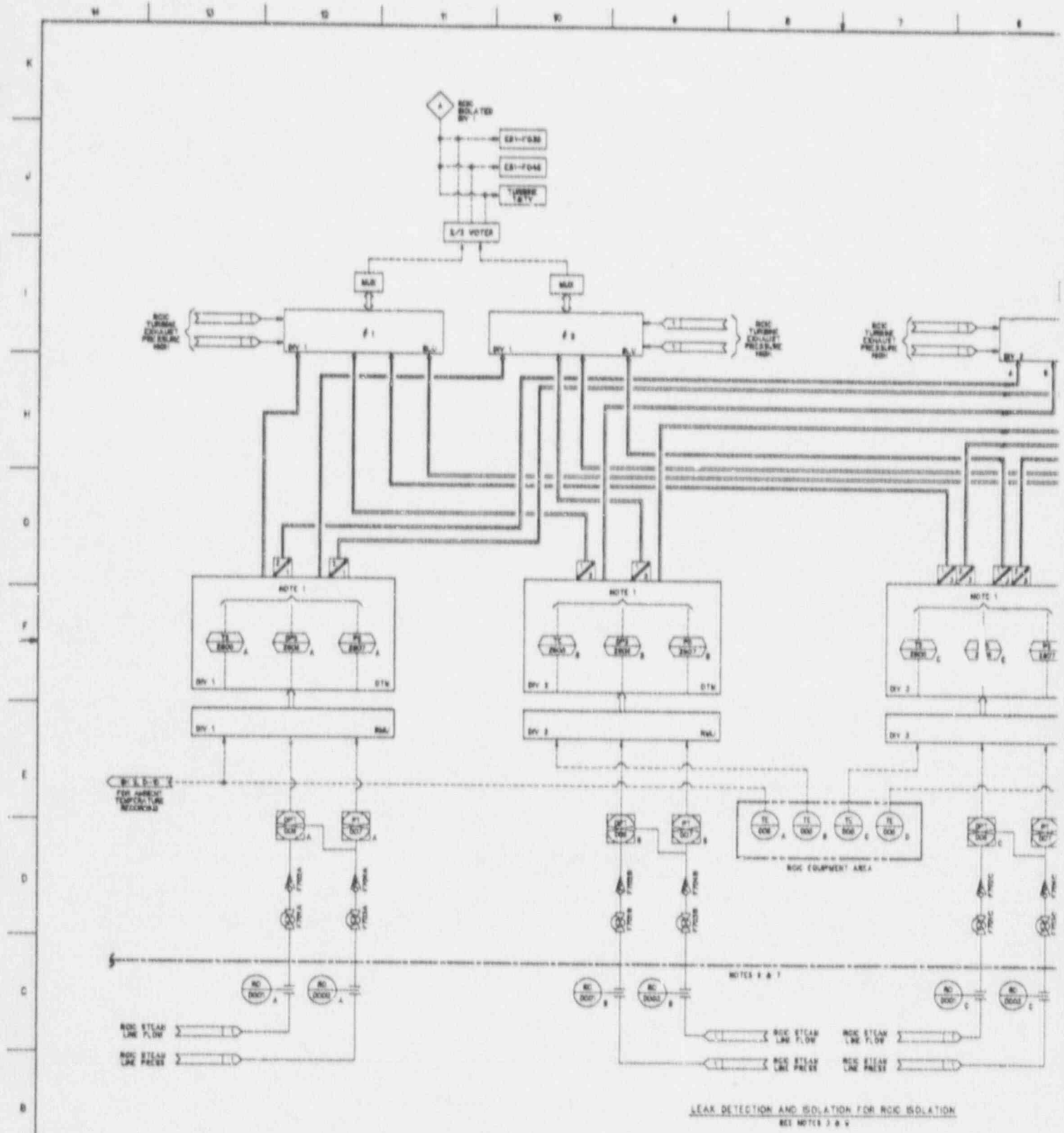
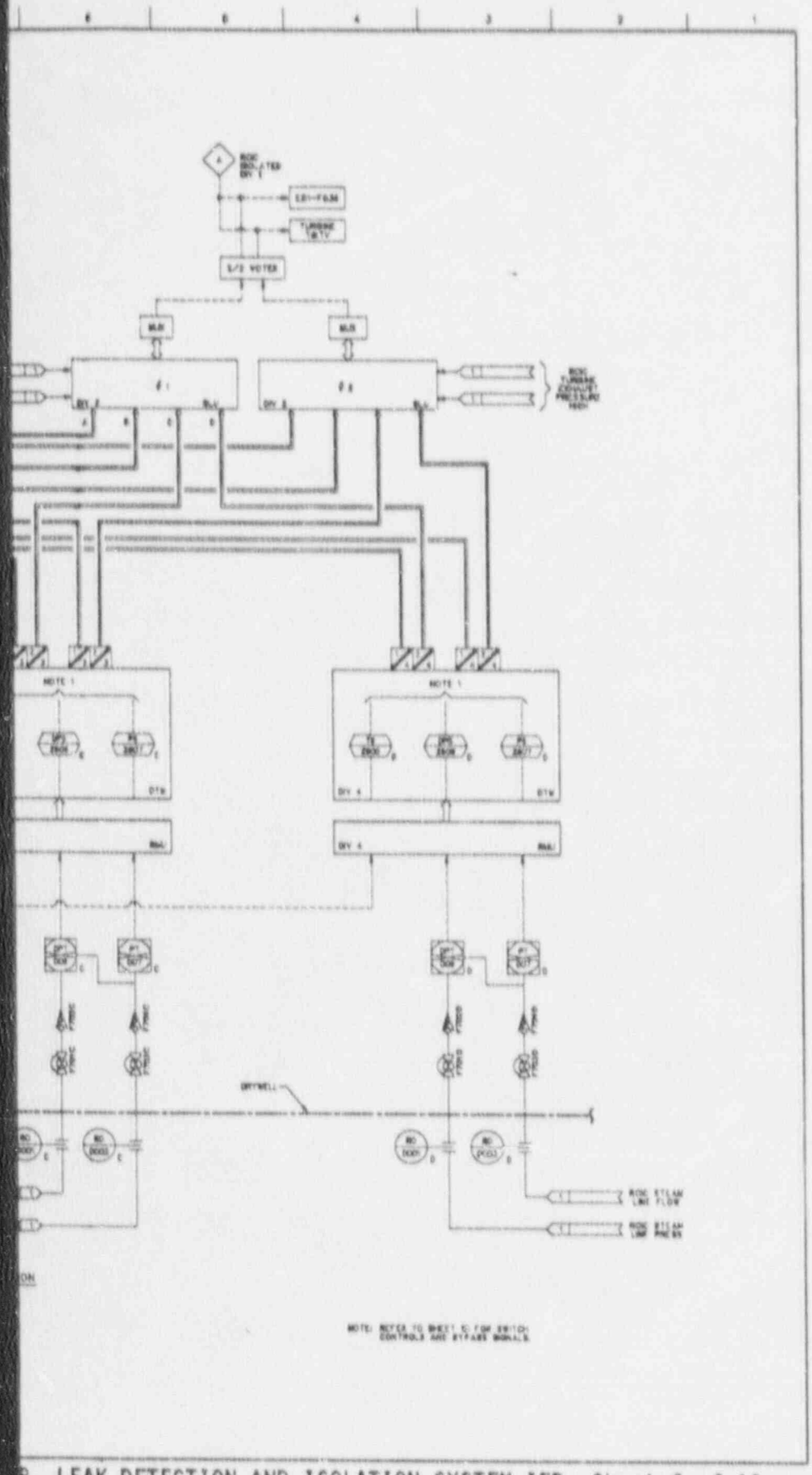
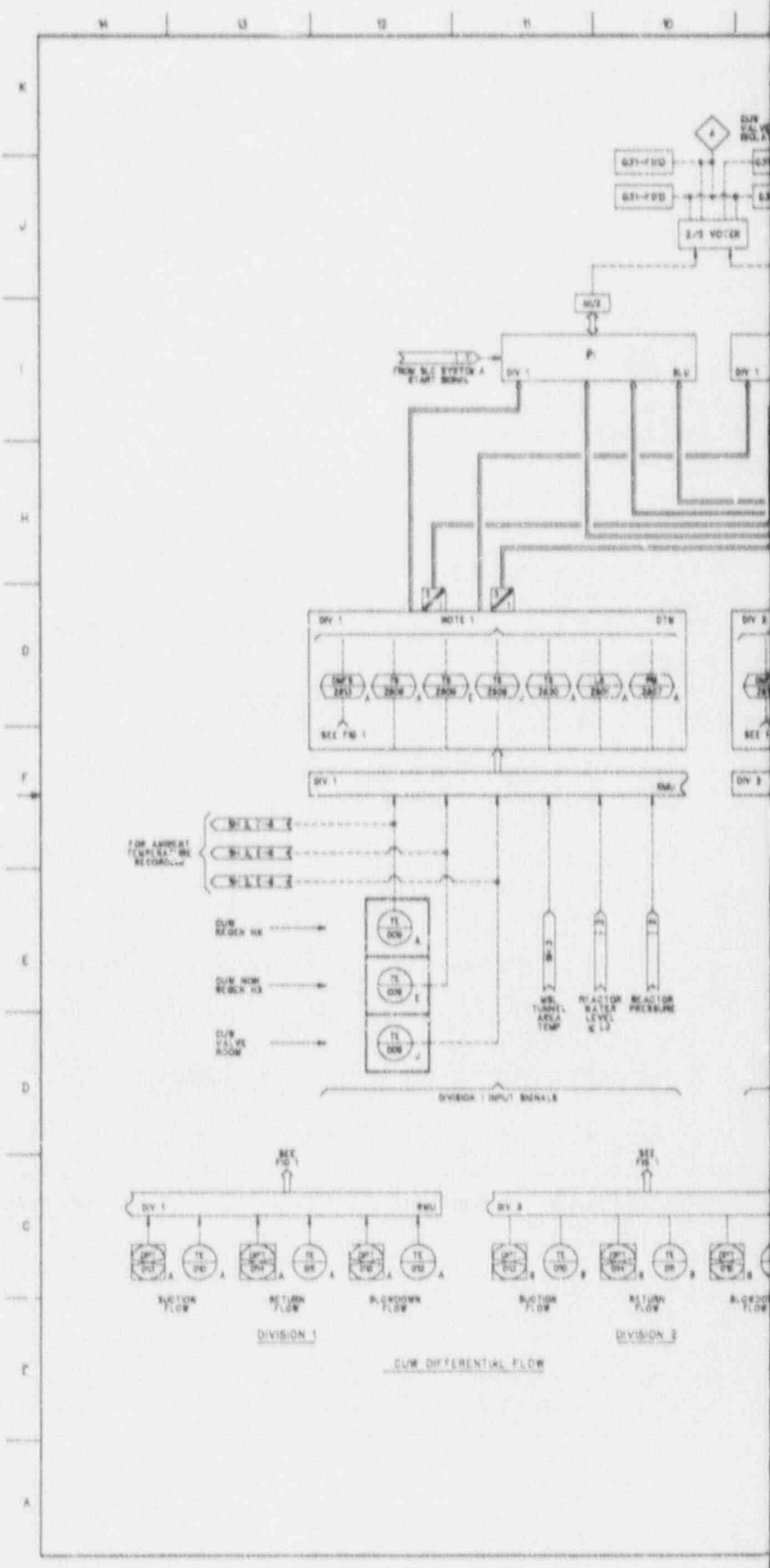
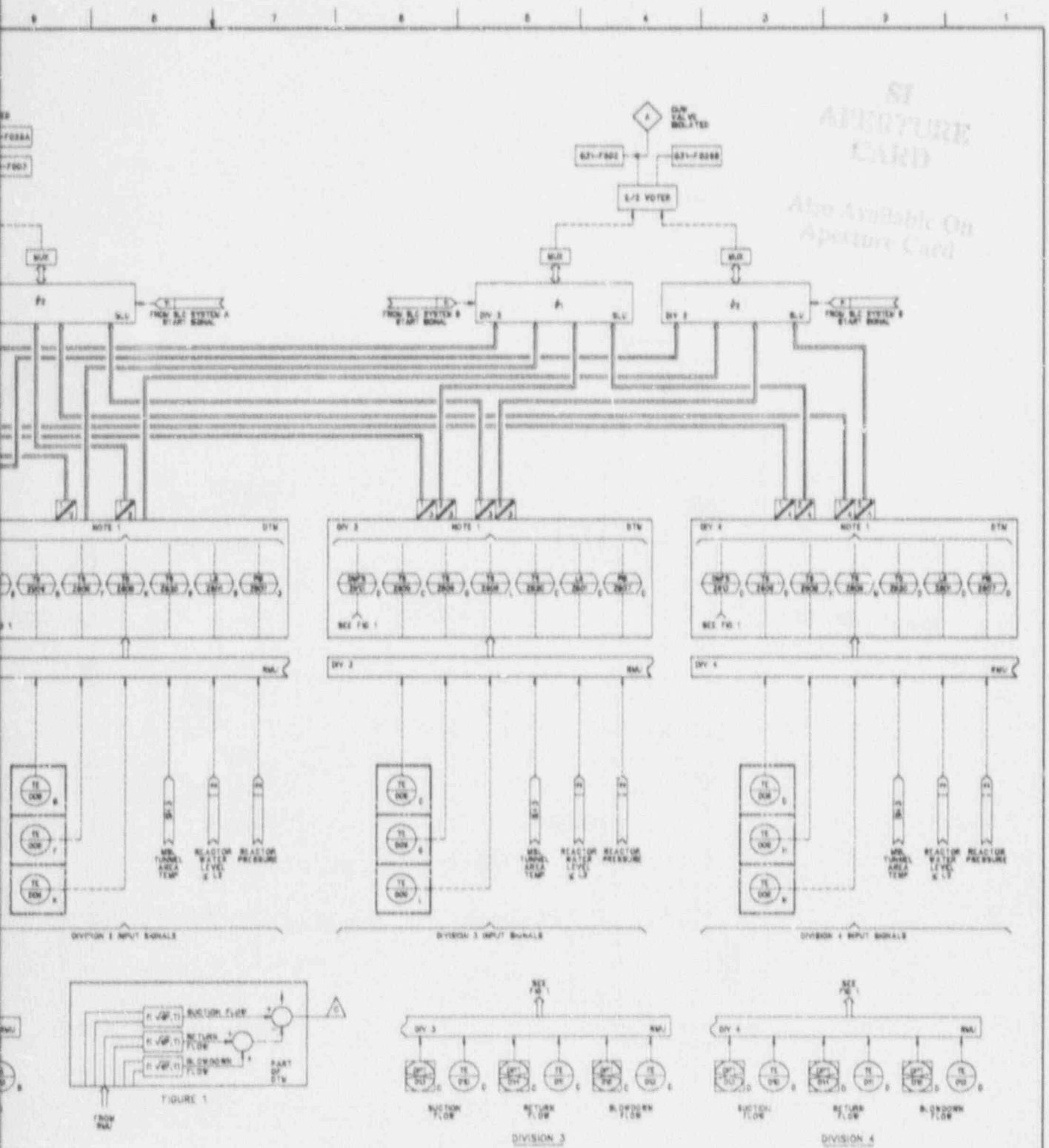


Figure 5.2-8 LEAK DET



B LEAK DETECTION AND ISOLATION SYSTEM IED, Sheet 6 of 10


2/3 VOTER
DIV 1
NOTE 1
DIVISION 1 INPUT SIGNALS
CUW REGEN HX
CUW NON REGEN HX
CUW VALVE ROOM
WR TUNNEL AREA TEMP
REACTOR WATER LEVEL (E.L.)
REACTOR PRESSURE
SUCTION FLOW
RETURN FLOW
BLOWDOWN FLOW
DIVISION 1
DIVISION 3
CUW DIFFERENTIAL FLOW



LEAK DETECTION & ISOLATION FOR REACTOR WATER CLEAN-UP SYSTEM.
SEE NOTES 3 & 9

NOTE: REFER TO SHEET 10 FOR SWITCH CONTROLS AND BYPASS SIGNALS.

Figure 5.2-8 LEAK DETECTION AND ISOLATION SYSTEM IED, Sheet 7 of 10

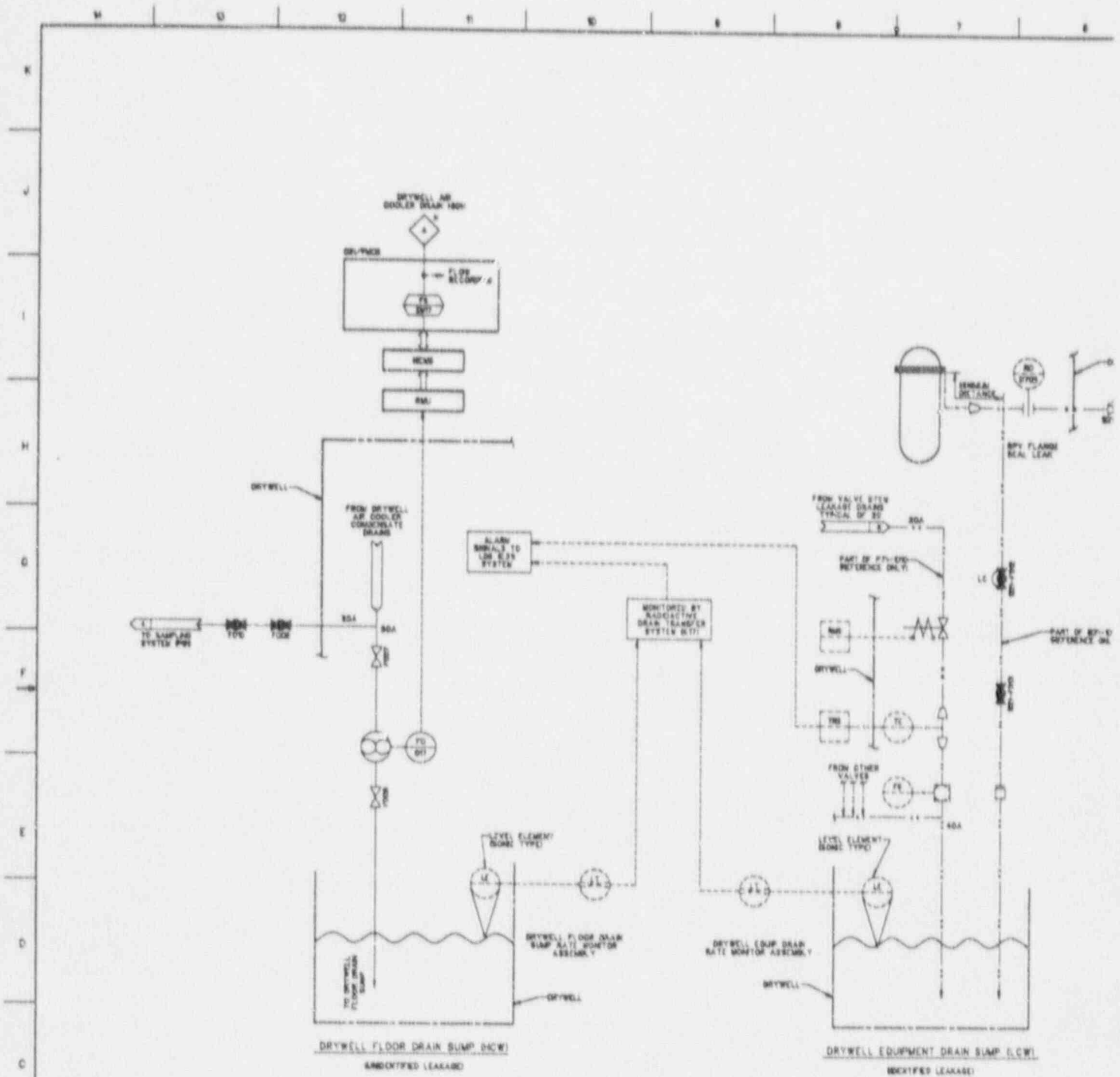
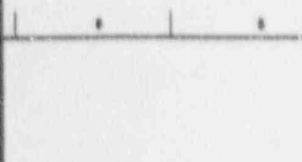
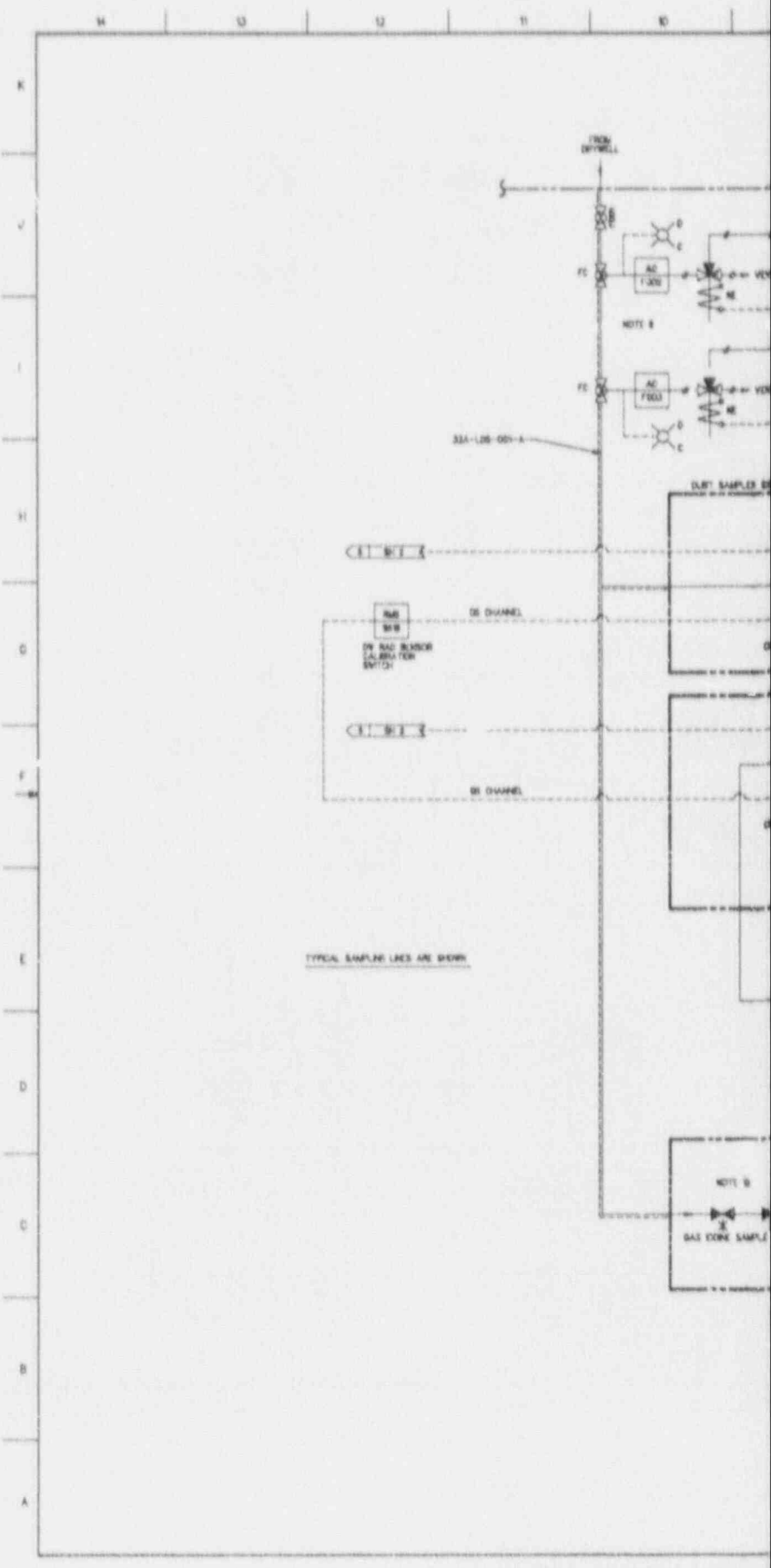


Figure 5.2-8 LEAK D



8 LEAK DETECTION AND ISOLATION SYSTEM IED, Sheet 8 of 10


FROM DRYWELL
AC F100
NOTE 8
AC F003
33A-L26-001-A
DW RAD MONITOR CALIBRATION SWITCH
DS CHANNEL
DS CHANNEL
TYPICAL SAMPLING LINES ARE SHOWN
NOTE 9

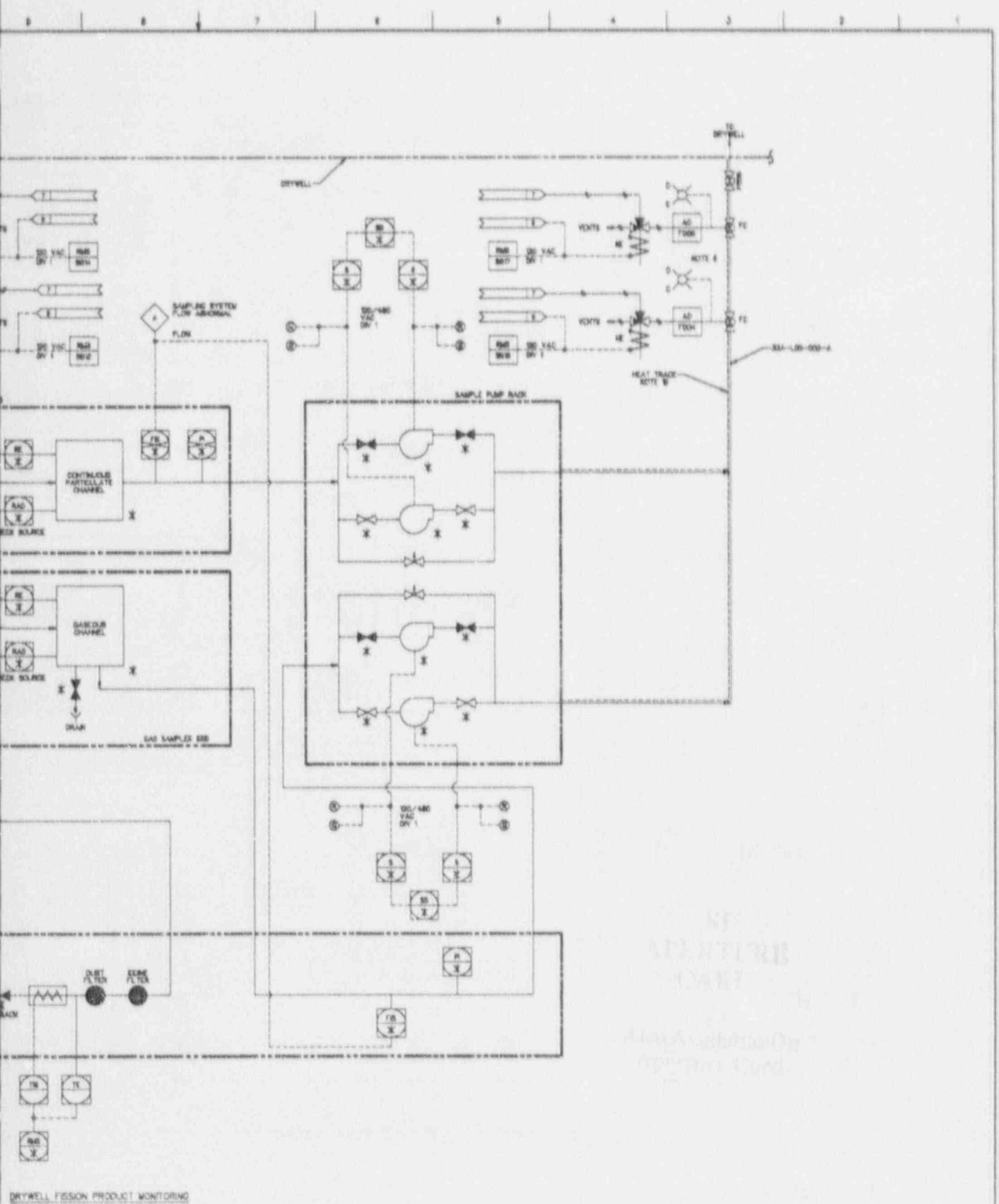
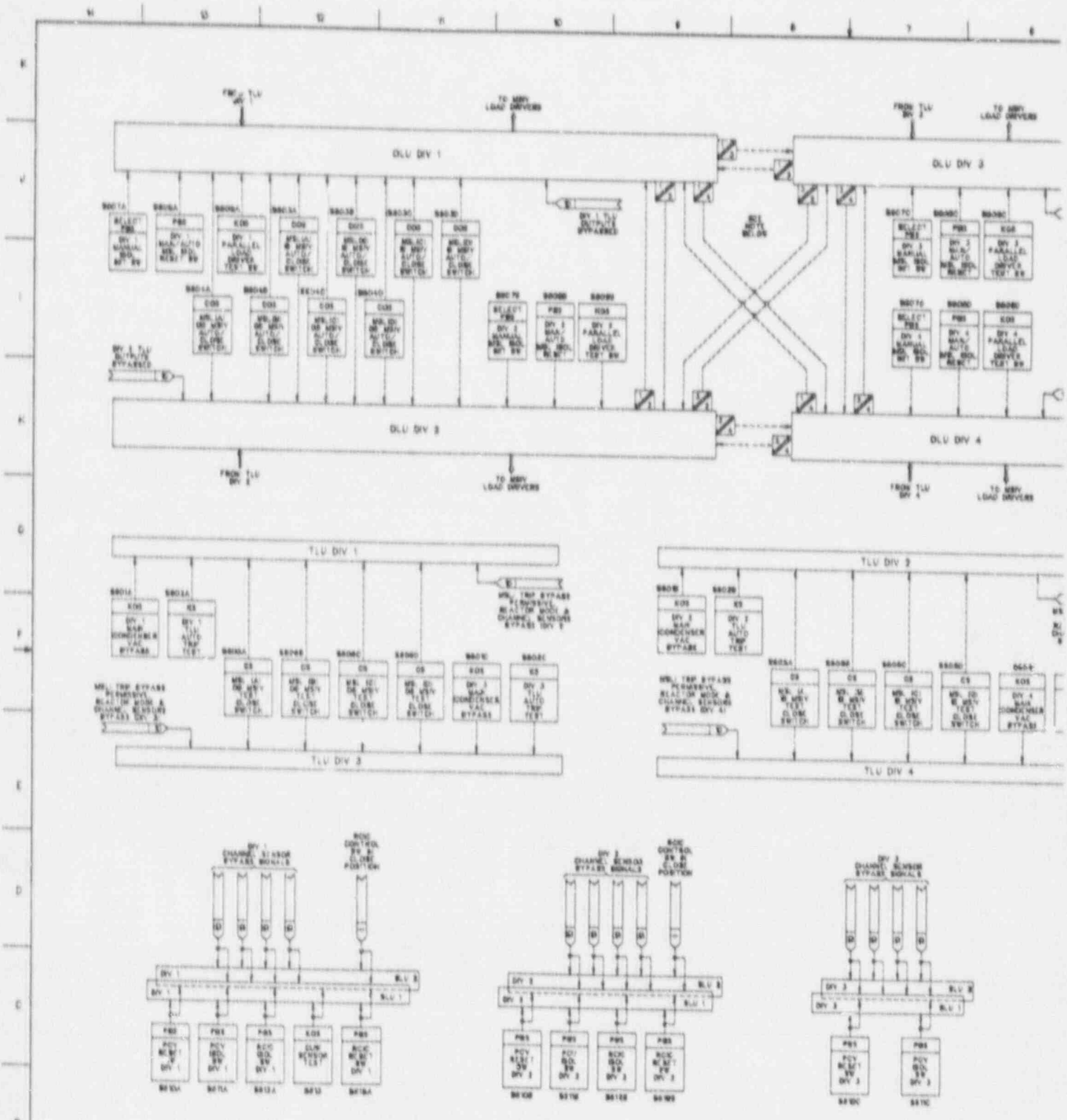


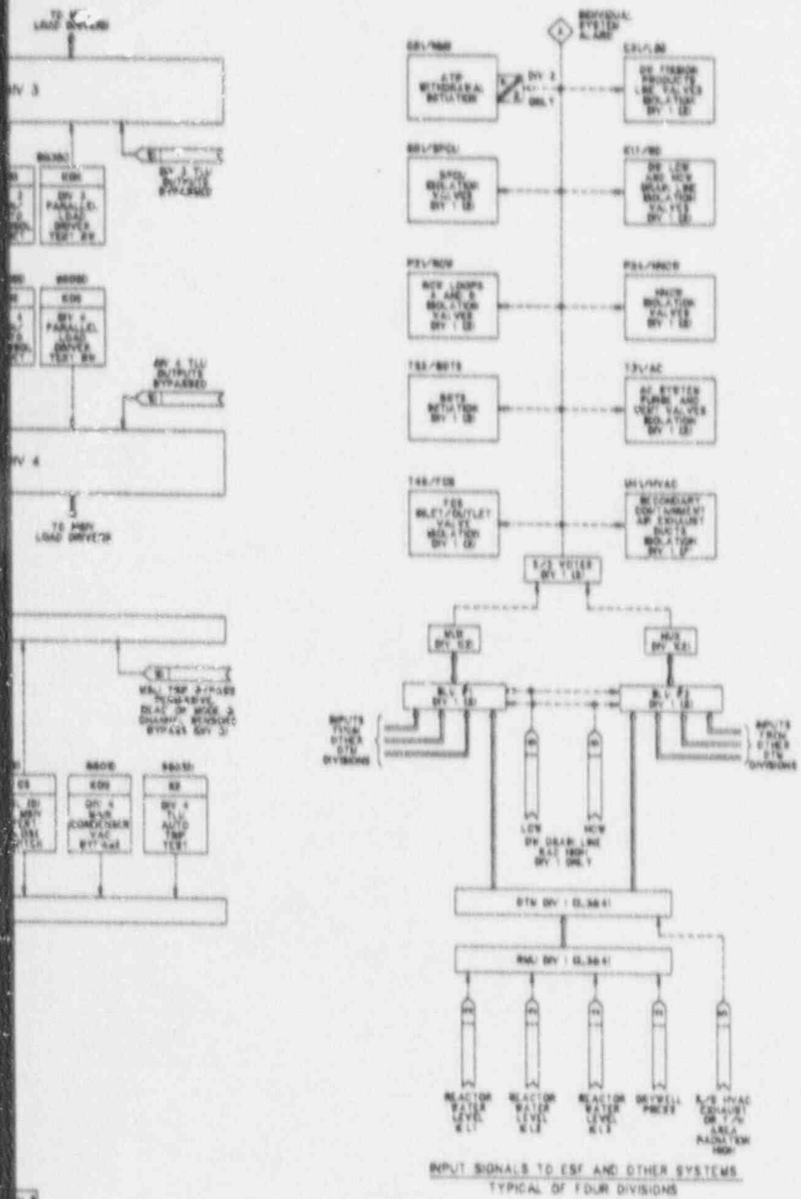
Figure 5.2-8 LEAK DETECTION AND ISOLATION SYSTEM IED, Sheet 9 of 10



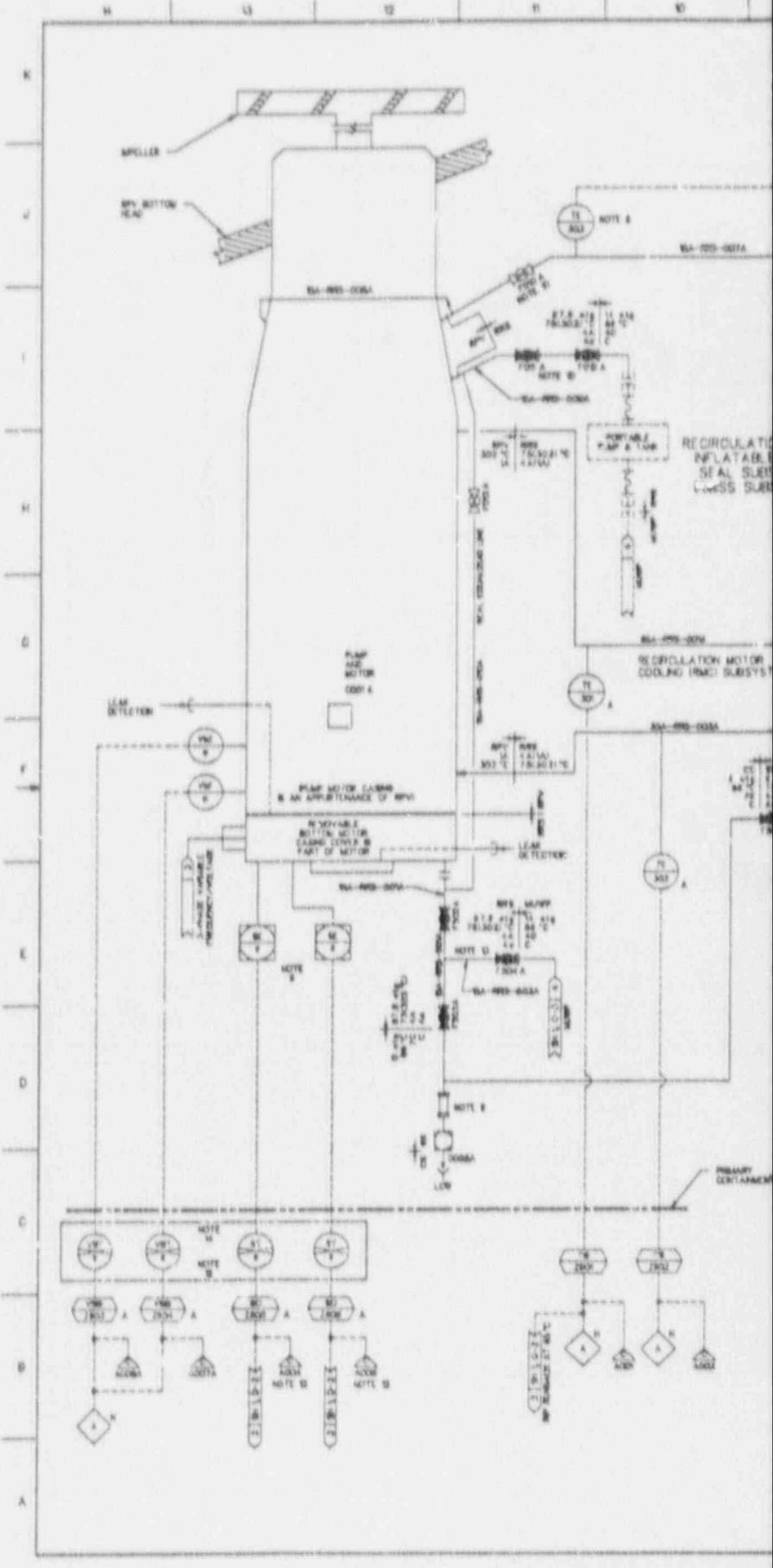
LEAK DETECTION SYSTEM SWITCHES AND OTHER INTERFACING SIGNALS

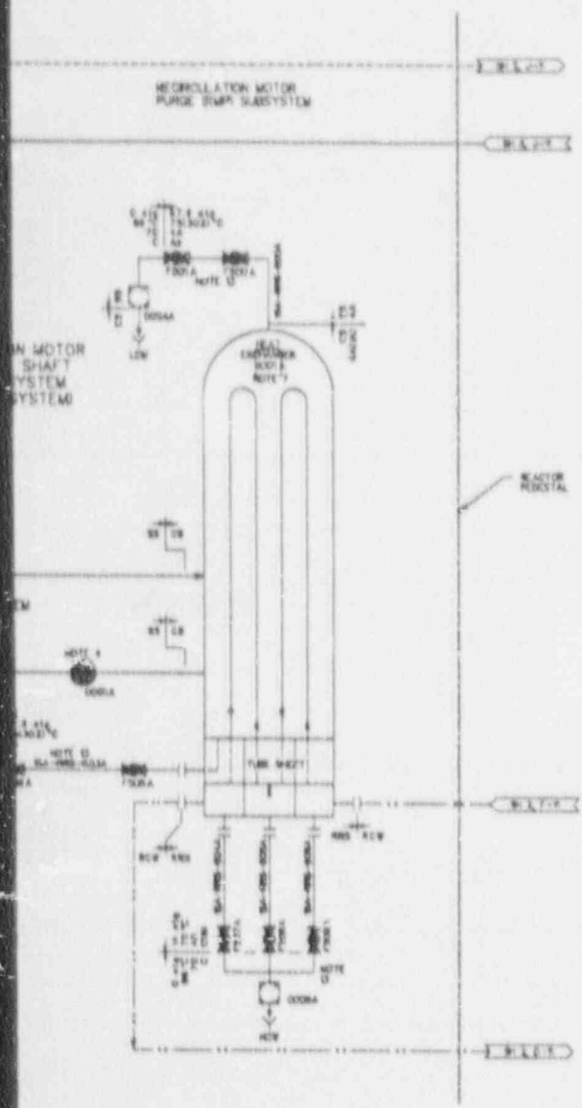
NOTE: THE INTERCONNECTING SIGNAL LINES BETWEEN DLU'S BETWEEN TLU'S AND BETWEEN DLU'S & TLU'S MUST BE ROUTED THROUGH THE MSIV'S TO FULLY CLOSE BEFORE THEY CAN BE ORDERED BY THE OPERATOR.

Figure 5.2-8 LEAK DET



LEAK DETECTION AND ISOLATION SYSTEM IED, Sheet 10 of 10


IMPELLER
RPV BOTTOM HEAD
LEAK DETECTION
PUMP MOTOR CASING IS AN APPURTENANCE OF RPV
REMOVABLE BOTTOM MOTOR CASING (STATOR IS PART OF MOTOR)
PRIMARY CONTAINMENT
RECIRCULATION MOTOR COOLING (RMC) SUBSYSTEM
NOTE 9
NOTE 12
NOTE 13
NOTE 14
LOW



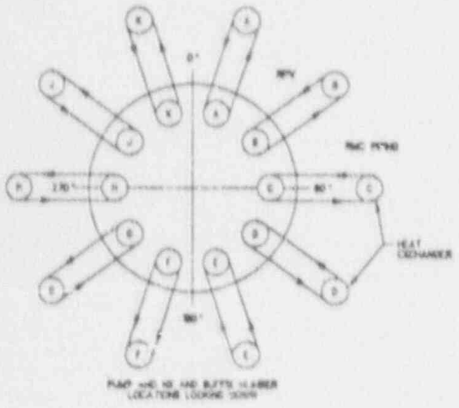


TABLE 3 PIPING SPECIFICATIONS

PIPE NO.	SCHEDULE	MATERIAL	FLUID
0016-K	80	SS	W
003A-K	80	SS	W
063A-K	80	SS	W
004	80	SS	W
008A-K	80	SS	W
008A	80	SS	W
007L	40	SS	W
008A--	--	SS	W
008A-K	80	SS	W
010A-K	80	SS	W
011	80	CS	W
800A-K	80	SS	W
801A-K	80	SS	W
802A-K	80	SS	W
803A-K	80	SS	W
804A-K	80	CS	W
805A-K	80	CS	W
806A-K	80	CS	W

NOTES:

1. HIGH POINT VENT SHOULD BE PROVIDED FOR PURGE SUBSYSTEM IF INTERMEDIATE HIGH POINTS EXIST.
2. CONTAINMENT ISOLATION VALVES SHALL BE LOCATED AS CLOSE AS POSSIBLE TO THE DRYWELL PENETRATION AND IN A HORIZONTAL POSITION.
3. ALL EQUIPMENT AND INSTRUMENTS SHALL BE PURGED BY N2 UNLESS OTHERWISE SPECIFIED.
4. SEPARATOR OR FILTER INTERNALS FOR INITIAL SYSTEM FLUSHING TO BE INSTALLED WHEN NEEDED, FLUSHED & WELDED PERMANENTLY IN LINE.
5. ORIFICE ELEMENTS ACCURACY SHALL CONFORM TO REFERENCE DOCUMENT 5 REQUIREMENTS.
6. DOES ANY OF CHILLED F. THE LOOP FLOW REGULATOR IS CAPABLE OF THE COMPLETE DIFFERENTIAL PRESSURE RANGE.
7. RECIRCULATION MOTOR HEAT EXCHANGER BODY SUPPLIED WITH EACH LOOP PUMP.
8. TE 302 LOCATED AS CLOSE AS POSSIBLE TO MOTOR CASING. TE 302 INSTALLED ON 1" R WHICHEVER AND LONGEST PURGE LINES ONLY (TWO TOTAL).
9. REMOVABLE SPOOL PIECE FOR DRAIN WATER SAMPLING.
10. LOCATE VALVES AS CLOSE TO MOTOR CASING AS POSSIBLE BUT BELOW NPV BOTTOM HEAD INSULATION.
11. RCW SYSTEM SHOWN IN PHANTOM BUT THIS RCW PIPE CONFIGURATION AND COMPONENTS ARE INCLUDED IN RHR B&PD SYSTEM.
12. THE RP SPEED AND VIBRATION ANALOG SIGNALS SHALL BE INPUT TO THE PLANT PROCESS COMPUTER AND PERMANENT CONNECTIONS FOR SPECIAL RP MOTOR ANALYTICAL AND RECORDING EQUIPMENT.
13. VENT AND DRAIN VALVES SHOULD BE CENTRALLY LOCATED FOR EACH PUMP AND HX.
14. LOCAL PANEL CONTAINING 3D VIBRATION AND 3D SPEED TRANSMITTERS, ALL SUPPLIED BY PUMP SUPPLIER.
15. ALL RPV PIPING IS SEISMIC CLASS 1a EXCEPT RP 1B TUBE SIDE DRAIN PIPES.
16. PIPING DESIGN SPECIFICATION ARE AS FOLLOWS:
    A. MAXIMUM OPERATING PRESSURE - SEE SPECIFIC BOUNDARIES
    B. MAXIMUM OPERATING TEMPERATURE - SEE SPECIFIC BOUNDARIES
    C. MATERIAL - SEE TABLE 3
    D. PIPING THICKNESS - SEE TABLE 3
    E. DESIGN CLASS - SEE SPECIFIC BOUNDARIES
    F. QC CLASS - SEE SPECIFIC BOUNDARIES
    G. SEISMIC CLASS - SEE SPECIFIC BOUNDARIES
    H. FLUID - SEE TABLE 3

REFERENCE DOCUMENTS UNDER THE FOLLOWING IDENTIFIER ARE TO BE USED IN CONJUNCTION WITH THIS DRAWING.

	MFL NO.
1. CONTROL ROD DRIVE SYS P&ID	010-1410
2. REACTOR BUILDING COOLING WATER SYS P&ID	P21-1154
3. RECIRC FLOW CONTROL SYS ED	DB1-1040
4. MAKE-UP WATER PURIFIED SYS P&ID	P31-1010
5. RECIRC FLOW CONTROL SYSTEM DESIGN SPEC	DB1-4010

SUPPORTING DOCUMENTS

	MFL NO.
1. PIPING AND INSTRUMENT SYMBOLS	A1D-3030
2. REAC RECIRC SYS DESIGN SPEC	B21-4010
3. PRESSURE INTEGRITY OF NUCLEAR COMPONENTS	A1D-3010
4. ABWR DOCUMENT STANDARDS	A1D-3000

TABLE 1

MCR ANNUNCIATOR - ALARMS		
FUNCTION	PRIMARY SENSOR	SET POINT
RHR PRIMARY SDC INLET WATER TEMP HIGH	TE301	65 °F
RHR PRIMARY SDC OUTLET WATER TEMP HIGH	TE302	65 °F
RP VIBRATION HIGH	VIB	1 MIL/SEC
RP VIBRATION HIGH	VIB	1 MIL/SEC
RP SEAL PURGE FLOW/ PRESSURE HIGH/LOW	FE007	1.5 GPM/PSIG
RHR SDC COOL WATER OUTLET FLOW HIGH/LOW	SEE P31	SEE P31
RHR SDC COOL WATER HEAT EXCHANGER INLET/OUTLET HIGH TEMP	SEE P31	SEE P31

MFL NO. A31-1010

Figure 5.4-4 REACTOR RECIRCULATION SYSTEM P&ID, Sheet 1 of 2

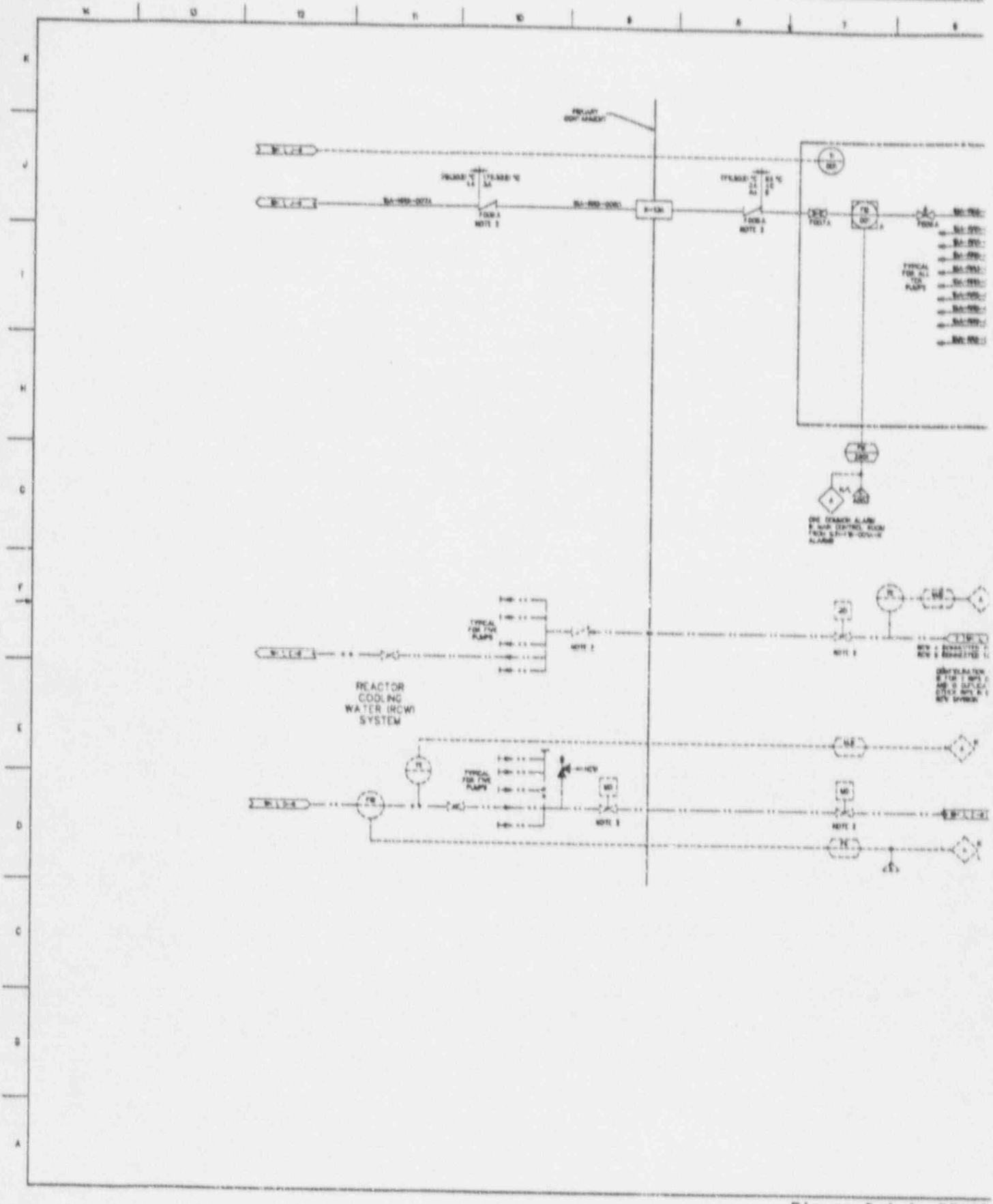


Figure 5.4-4 REACT

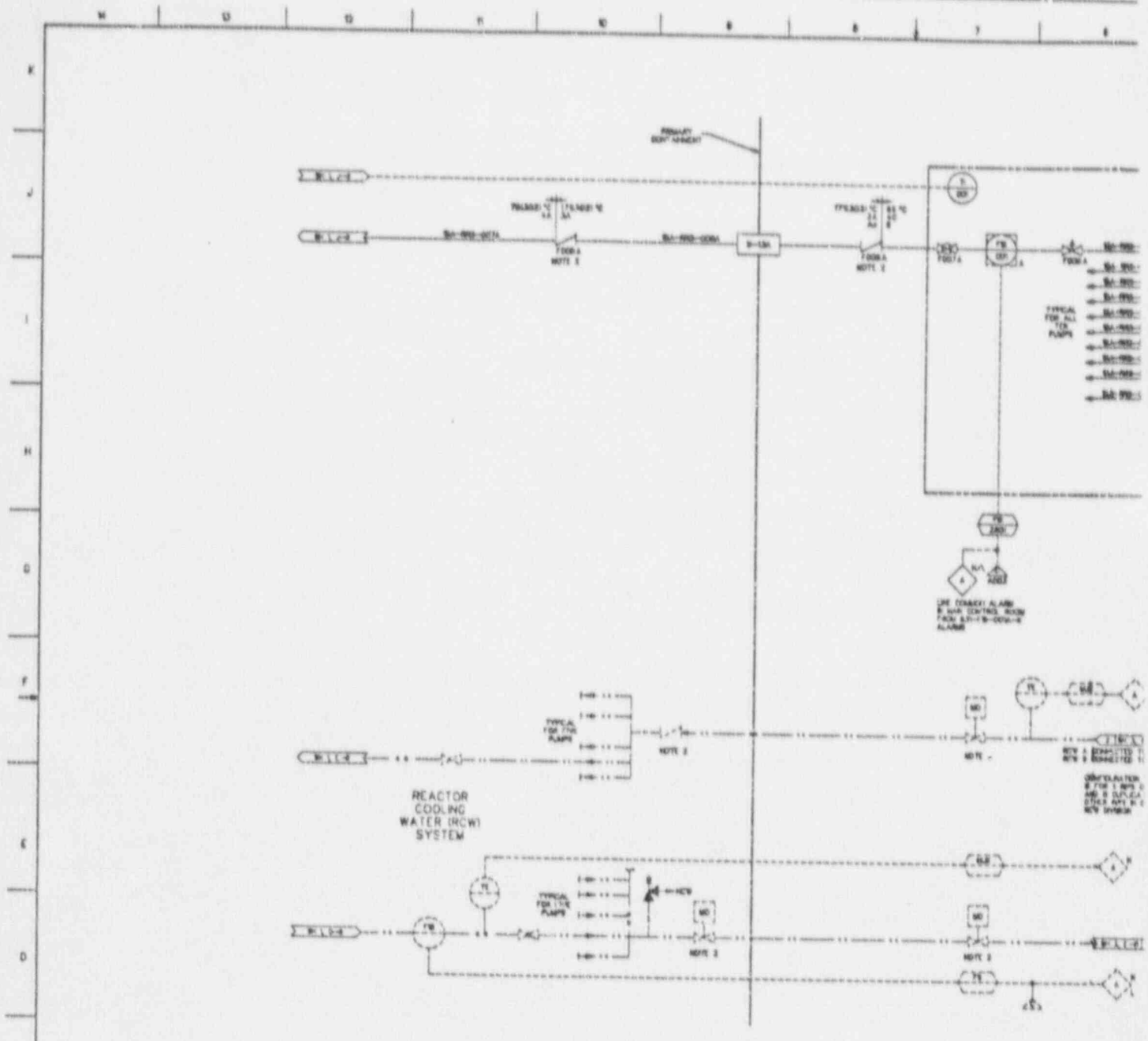
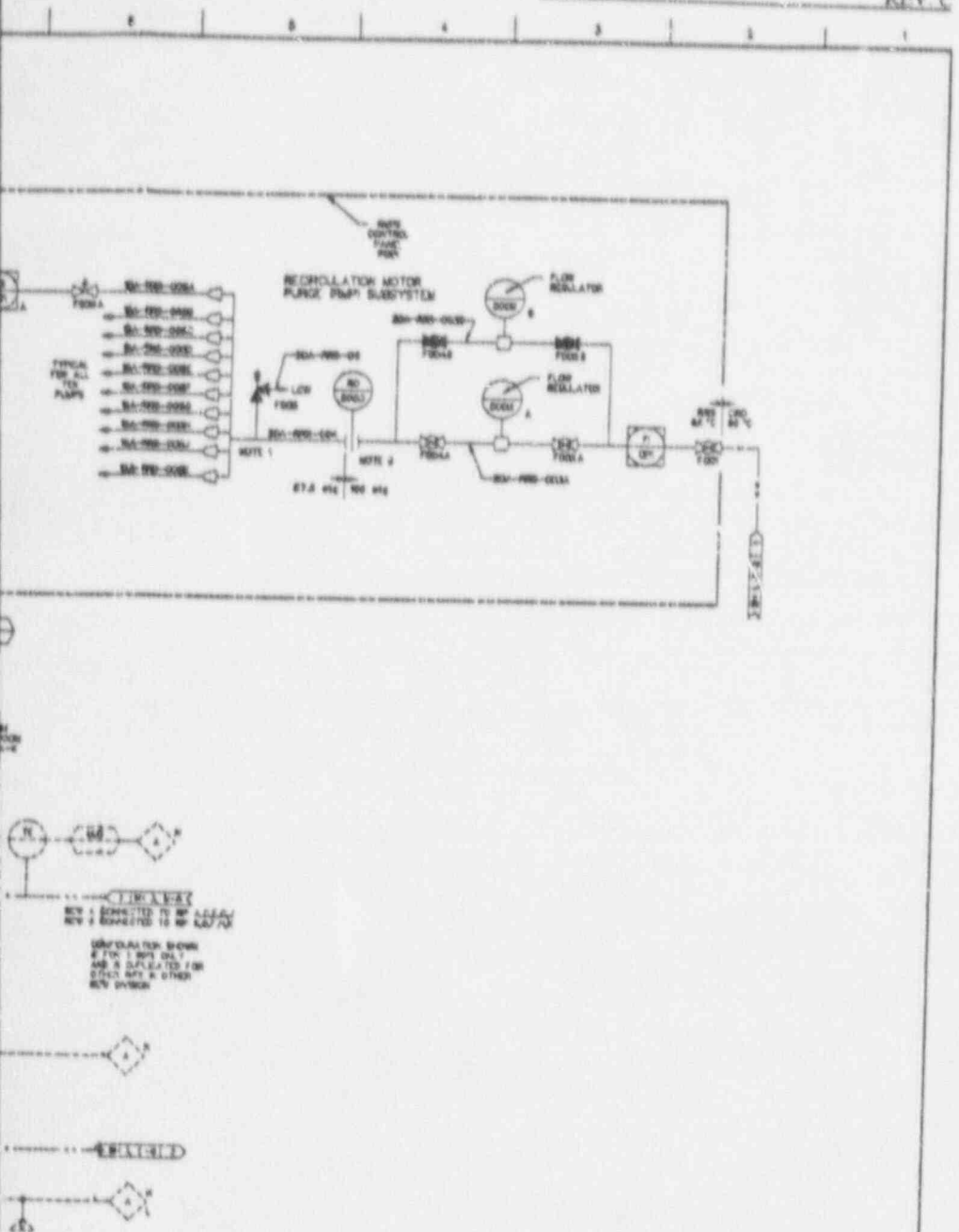
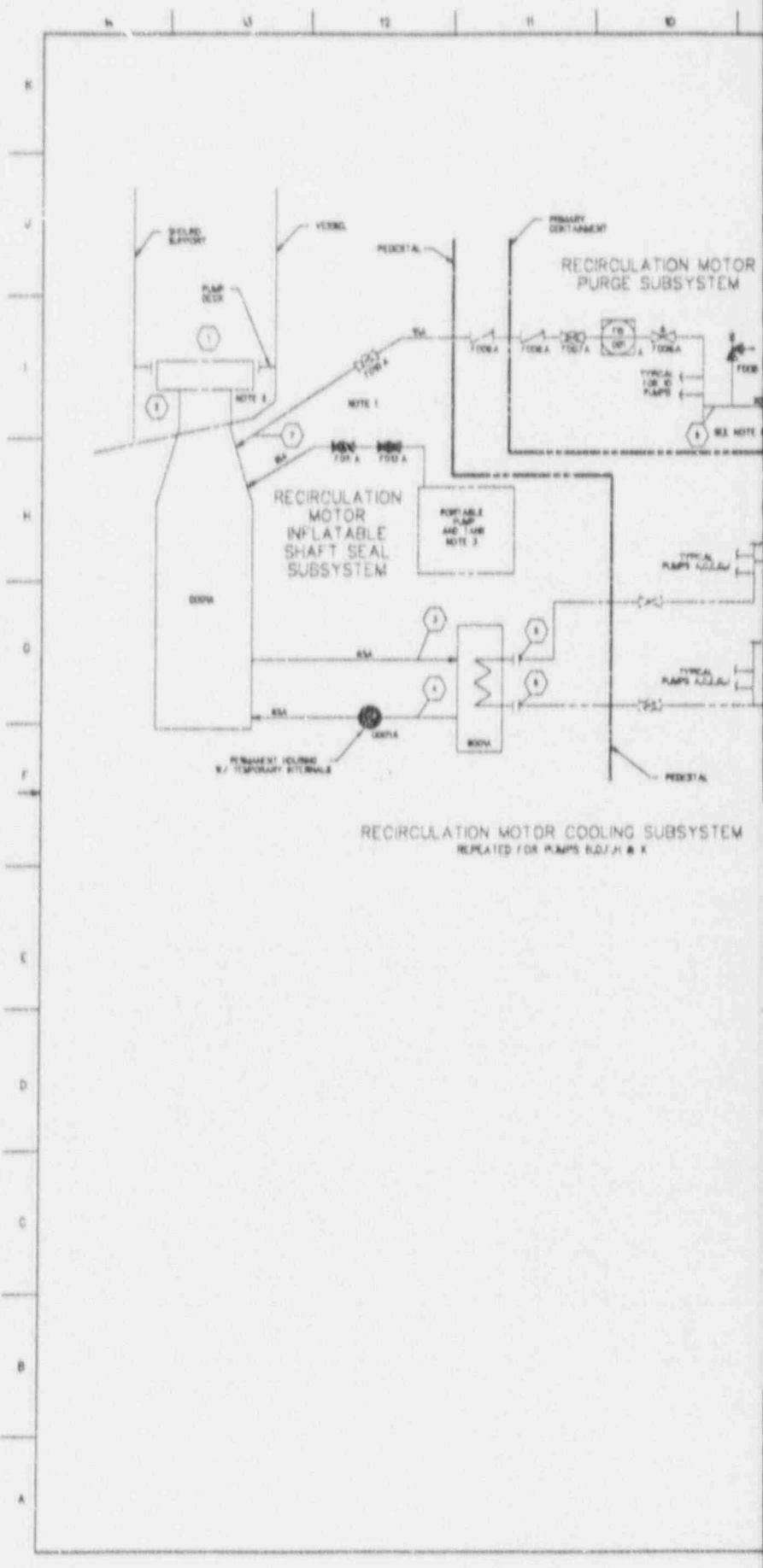


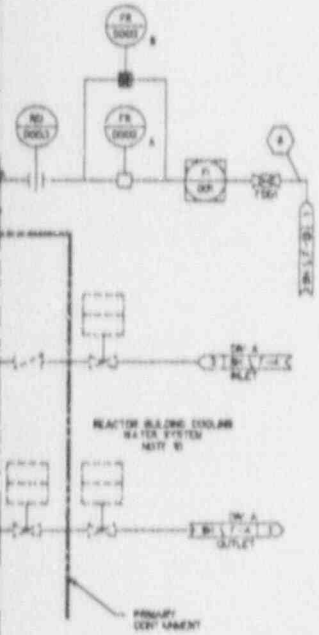
Figure 5.4-4 REACT



4-4 REACTOR RECIRCULATION SYSTEM P&ID, Sheet 2 of 2

9201100339 -23


RECIRCULATION MOTOR
PURGE SUBSYSTEM
RECIRCULATION
MOTOR
INFLATABLE
SHAFT SEAL
SUBSYSTEM
RECIRCULATION MOTOR COOLING SUBSYSTEM



MODE "A" REACTOR NORMAL OPERATION (5) PUMPS OPERATING
ALL PUMPS ARE AT SAME SPEED
CORE FLOW = 77% — RATED (100%)
PUMP SPEED = 100% OF RATED (NOTE 6)

SEE NOTE 5

POSITION		1	2	3	4	5	6	7	8
FLOW	m^3/HR	7700	7700	0	0	50 MAX	50 MAX	15/77 NOTES 5&11	130/170 NOTES 5&11
TEMP	°C	278	278	50	30	50		35/70	45/90
PRESS	kg/cm^2 g	73.8	76.3	75.0	77.8	ΔP = 10 MAX			100
AVAILABLE NPSH	M	10							

MODE "AS" REACTOR NORMAL OPERATION (4) PUMPS OPERATING
ALL PUMPS ARE AT SAME SPEED
CORE FLOW = 100% — RATED DESIGN
PUMP SPEED = 80% OF RATED (NOTE 6)

SEE NOTE 5

POSITION		1	2	3	4	5	6	7	8
FLOW	m^3/HR	6900	6900	7	7	50 MAX	50 MAX	15/77 NOTES 5&11	130/170 NOTES 5&11
TEMP	°C	278	278	40	30	50		35/70	45/90
PRESS	kg/cm^2 g	73.8	76.3	77.4	77.2	ΔP = 10 MAX			100
AVAILABLE NPSH	M	10+							

MODE "B" REACTOR NORMAL OPERATION (5 PUMPS OPERATING)
ONE PUMP OUT OF SERVICE
CORE FLOW = 100% — RUNNING PUMP DATA)
PUMP SPEED = 100% OF RATED (NOTE 6)

SEE NOTE 5

POSITION		1	2	3	4	5	6	7	8
FLOW	m^3/HR	6300	6300	0	0	50 MAX	50 CLOSE	15/77 NOTES 5&11	130/170 NOTES 5&11
TEMP	°C	278	278	64	30	55		35/70	45/90
PRESS	kg/cm^2 g	73.8	76.3	77.4	77.2	ΔP = 10 MAX			100
AVAILABLE NPSH	M	10+							

MODE "BS" REACTOR NORMAL OPERATION — 4 PUMPS OPERATING
DATA SHOWN FOR THE PUMP OUT OF SERVICE
CORE FLOW = 100%
PUMP SPEED = 100% OF RATED

SEE NOTE 5

POSITION		1	2	3	4	5	6	7	8
FLOW	m^3/HR	-4370 NOTE 7	-4370 NOTE 7	NAT. CIRC.		50 MAX	50 MAX	15/77 NOTES 5&11	130/170 NOTES 5&11
TEMP	°C	278	278			50		35/70	45/90
PRESS	kg/cm^2 g	73.8	76.8	77.4	77.2	ΔP = 10 MAX			100
AVAILABLE NPSH	M	10+							

MODE "C" REACTOR HOT STANDBY — (5) PUMPS OPERATING
ALL PUMPS ARE AT SAME SPEED
CORE FLOW = 33.2%
PUMP SPEED = 43% RPM

SEE NOTE 5

POSITION		1	2	3	4	5	6	7	8
FLOW	m^3/HR	2760	2760	2	2	50 MAX	50 MAX	15/77 NOTES 5&11	130/170 NOTES 5&11
TEMP	°C	260	260	30	30	50		35/70	45/90
PRESS	kg/cm^2 g	80.3	80.8	79.3	79.0	ΔP = 10 MAX			100
AVAILABLE NPSH	M	10							

MODE "D" REACTOR COLD STARTUP — (5) PUMPS OPERATING
ALL PUMPS ARE AT SAME SPEED
CORE FLOW = 33.2%
PUMP SPEED = 43% RPM

SEE NOTE 5

POSITION		1	2	3	4	5	6	7	8
FLOW	m^3/HR	2330	2330	2	2	50 MAX	50 MAX	15/77 NOTES 5&11	130/170 NOTES 5&11
TEMP	°C	100	100	30	30	50		35/70	45/90
PRESS	kg/cm^2 g	1.0	1.2	1.0	1.2	ΔP = 1.1 MAX			100
AVAILABLE NPSH	M	10							

NOTES:
1. ALL VALVES SHOWN IN THEIR NORMAL PLANT OPERATING POSITION AND ARE IN THE SAME POSITION FOR ALL OPERATING MODES.
2. THE PURGE FLOW (PATH 7 FLOW) IS TO THE REACTOR AT 8.
3. THE RECIRCULATING MOTOR APPLICABLE SHAFT SEAL SUBSYSTEM IS USED ONLY DURING SHUTDOWN.
4. XX/YY MEANS MIN/MAX CONDITIONS.
5. VALUES GIVEN FOR POSITION 1-7 ARE FOR EACH LINE OF THE PUMPS OPERATING IN THE DESIRED MODE CONDITION (8 OR 10 PUMPS OPERATION).
6. PUMP RATED SPEED ASSUMED AT 1800 RPM.
7. THIS VALUE IS MAXIMUM REVERSE FLOW.
8. TDH VALUES INCLUDE 3 PERCENT MARGIN.
9. POSITION "9" CREATES EXCLUSIVELY FOR DEFINED DESIGN PRESSURE/TEMPERATURE CONDITIONS (NOT PROCESS CONDITIONS).
10. NOT USED FOR ABWR (LOOP A,B/A,C IS SIMILAR TO ABWR A,C/B,D).
11. POSITIONS 7 & 8 FLOW IS GRAMS/SECOND FOR ALL MODES.

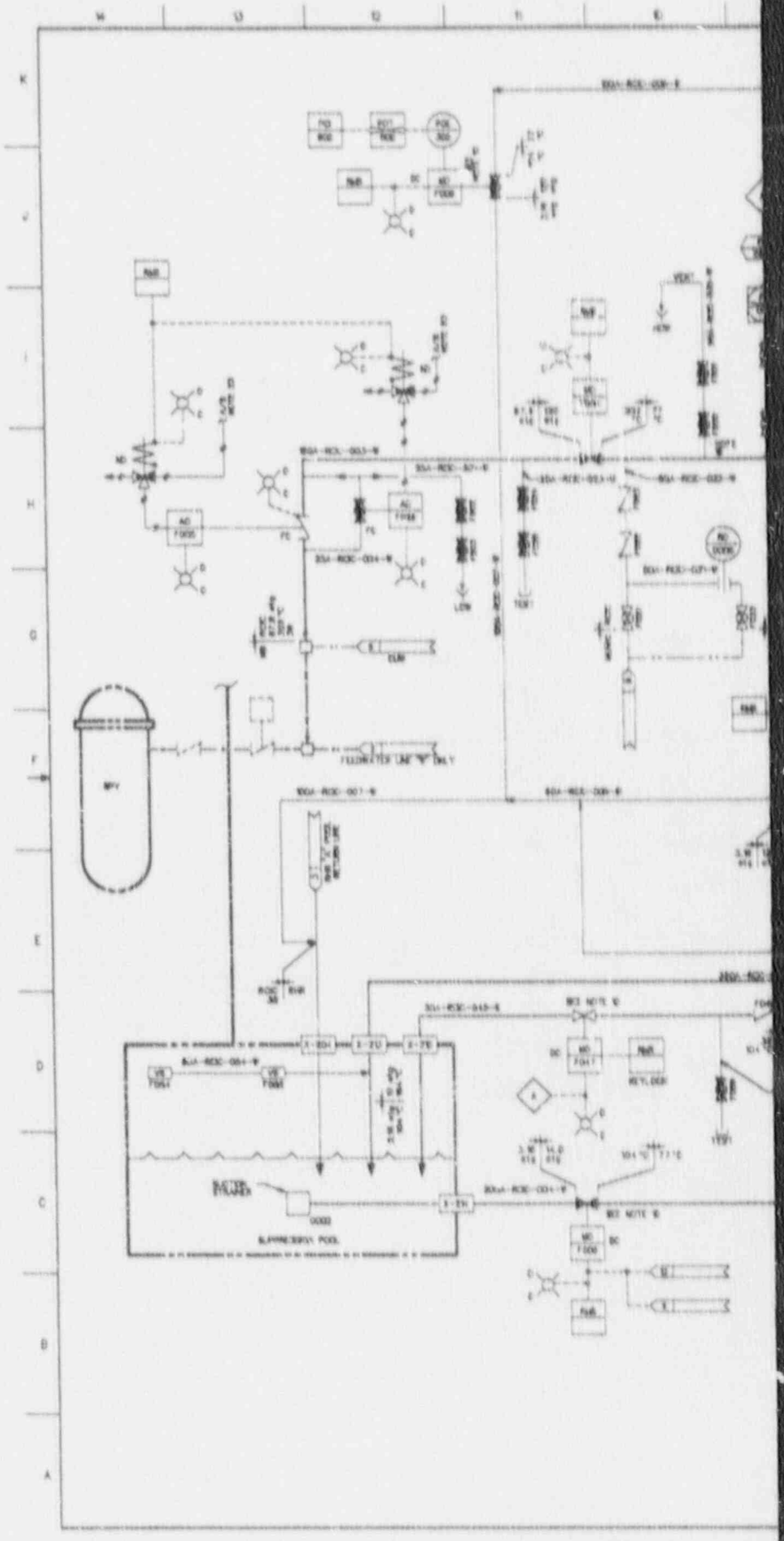
REFERENCE DOCUMENTS UNDER THE FOLLOWING IDENTIFIER ARE TO BE USED IN CONJUNCTION WITH THIS DRAWING.

	MFL NO.
1. CONTROL ROD DRIVE SYS PFD	03-1000
2. REAC BUILDING COOLING WATER SYSTEM PFD	33-1000

SUPPORTING DOCUMENTS

	MFL NO.
1. PIPING AND INSTRUMENT SYMBOLS	A31-3000
2. STEADY STATE PERFORMANCE REQUIREMENTS	A71-1000
3. REAC RECIRC SYS P&ID	B21-1010
4. REAC RECIRC SYS DESIGN SPEC	B21-4010
5. ABWR DOCUMENT STANDARD	A31-3000

Figure 5.4-5 REACTOR RECIRCULATION SYSTEM PFD



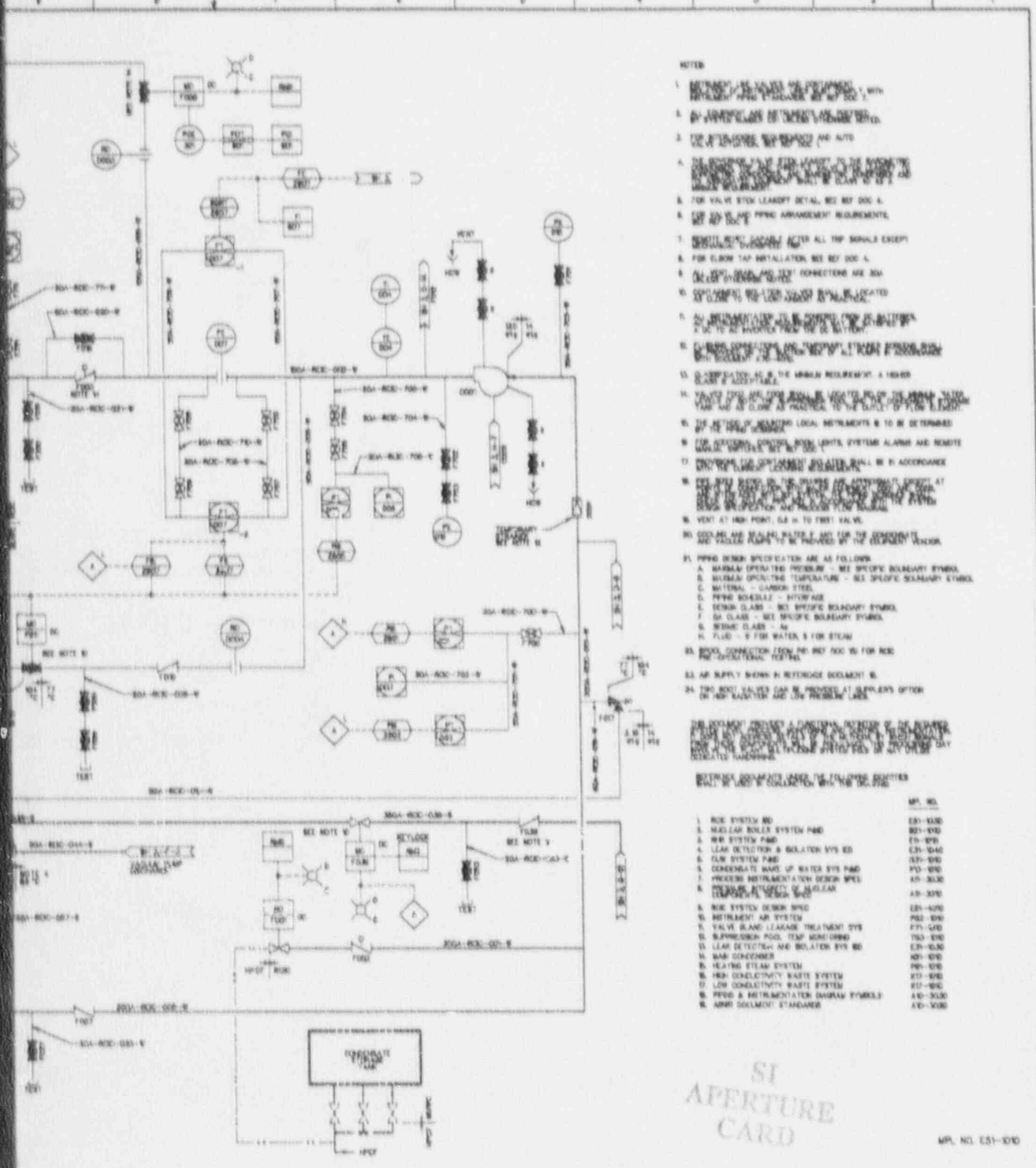


Figure 5.4-8 REACTOR CORE ISOLATION COOLING SYSTEM P&ID, Sheet 1 of 3

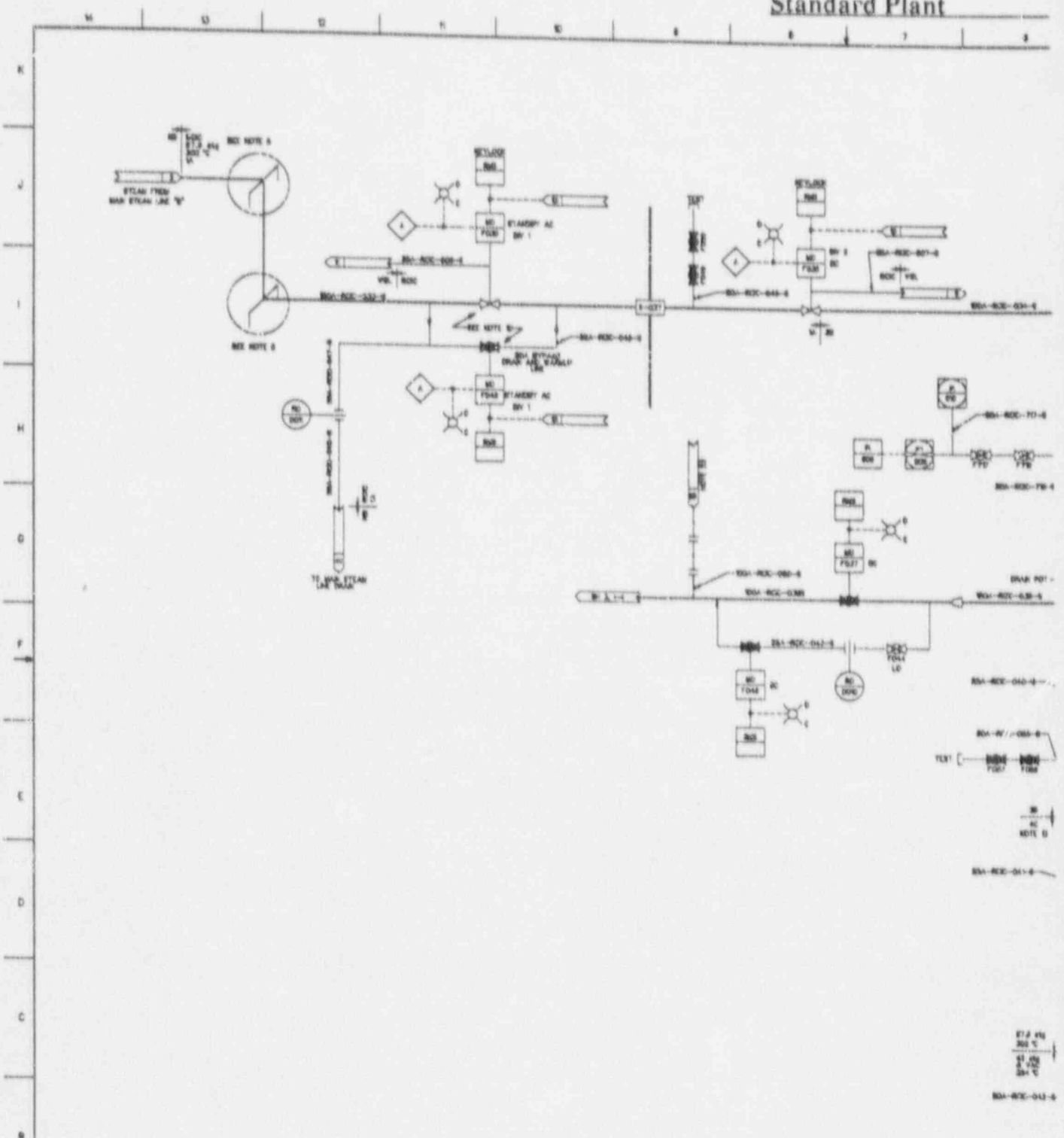
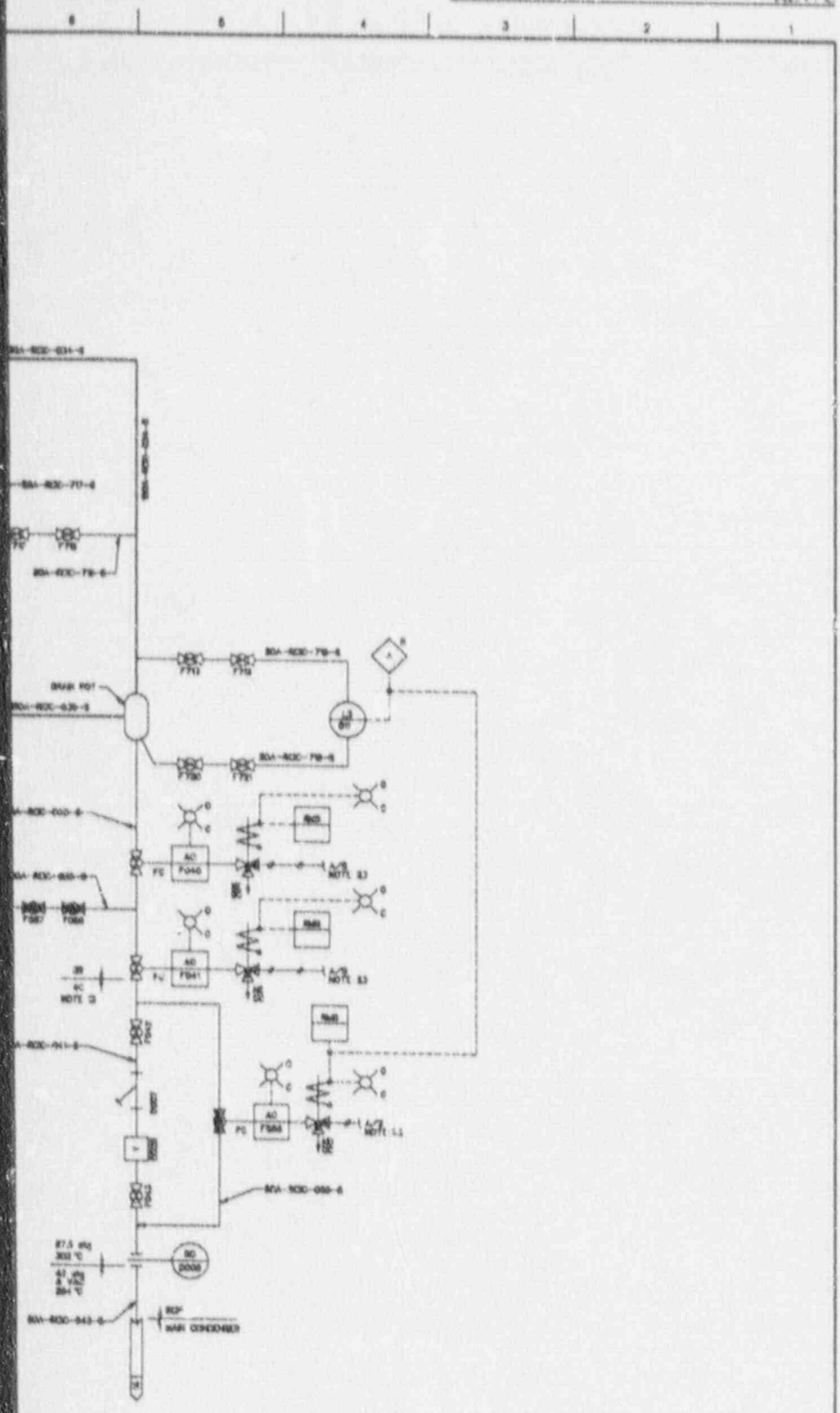
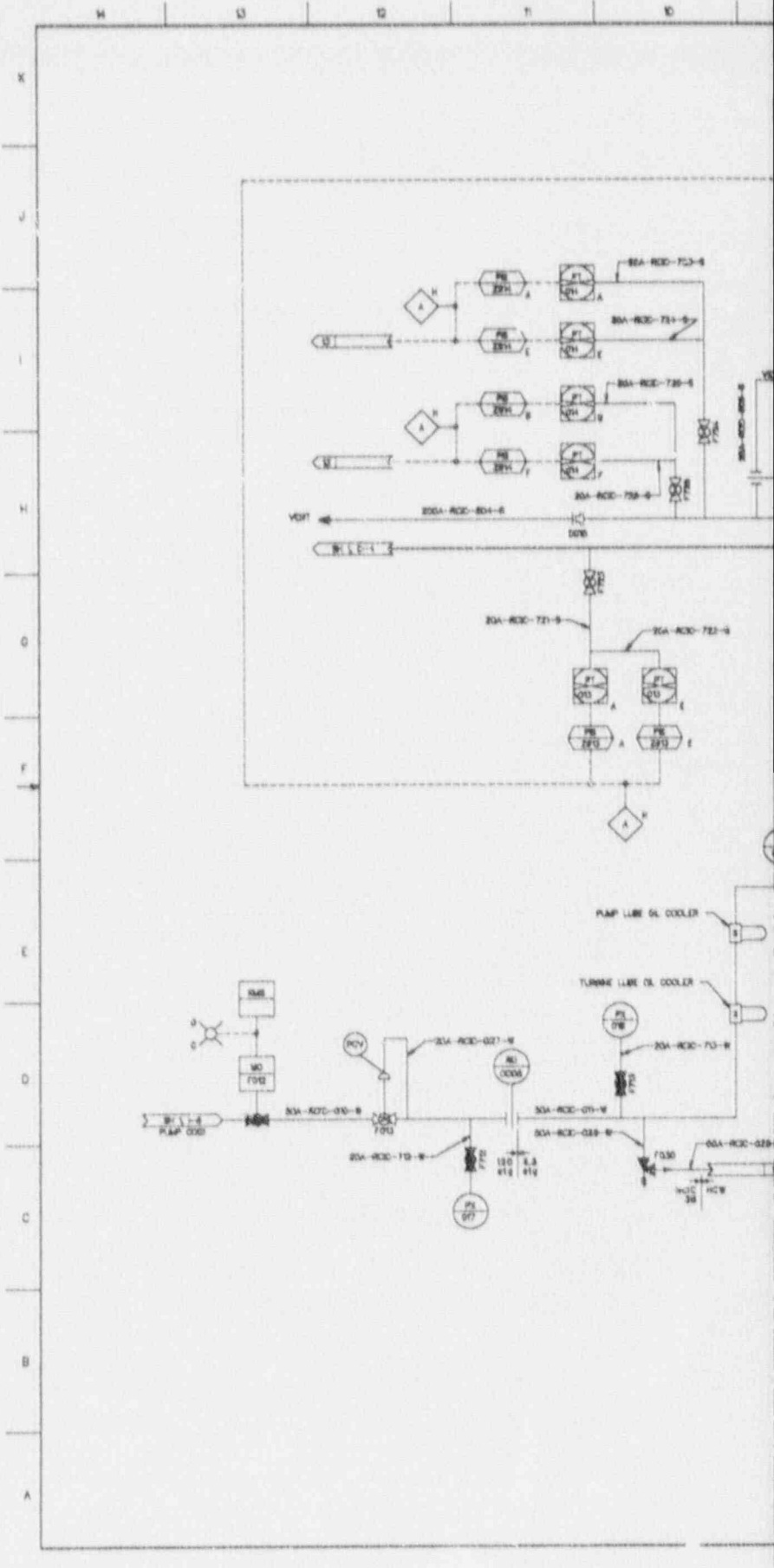


Figure 5.4-8 REACTOR



REACTOR CORE ISOLATION COOLING SYSTEM P&ID, Sheet 2 of 3


PUMP LUBE OIL COOLER
TURBINE LUBE OIL COOLER
PUMP OUT

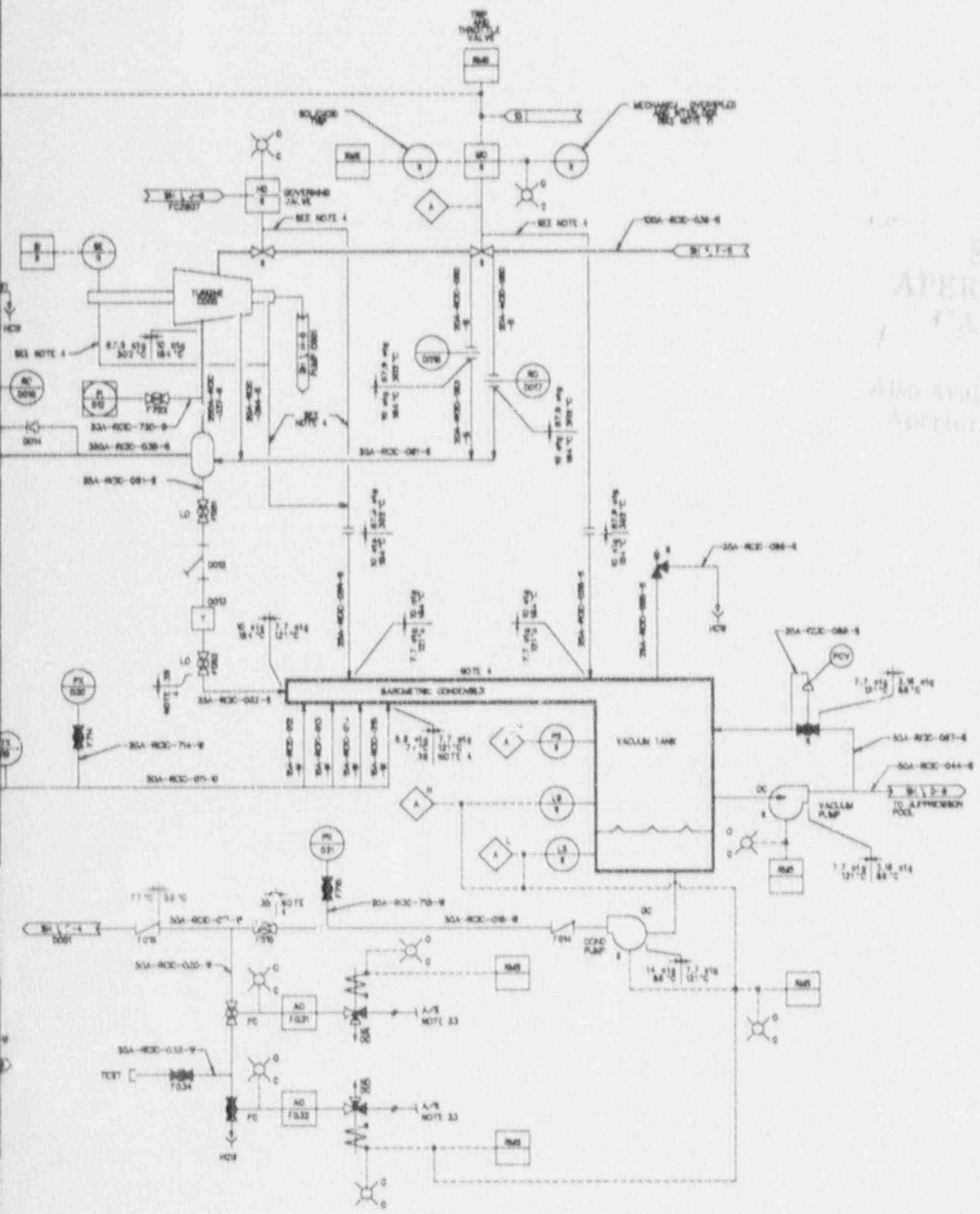
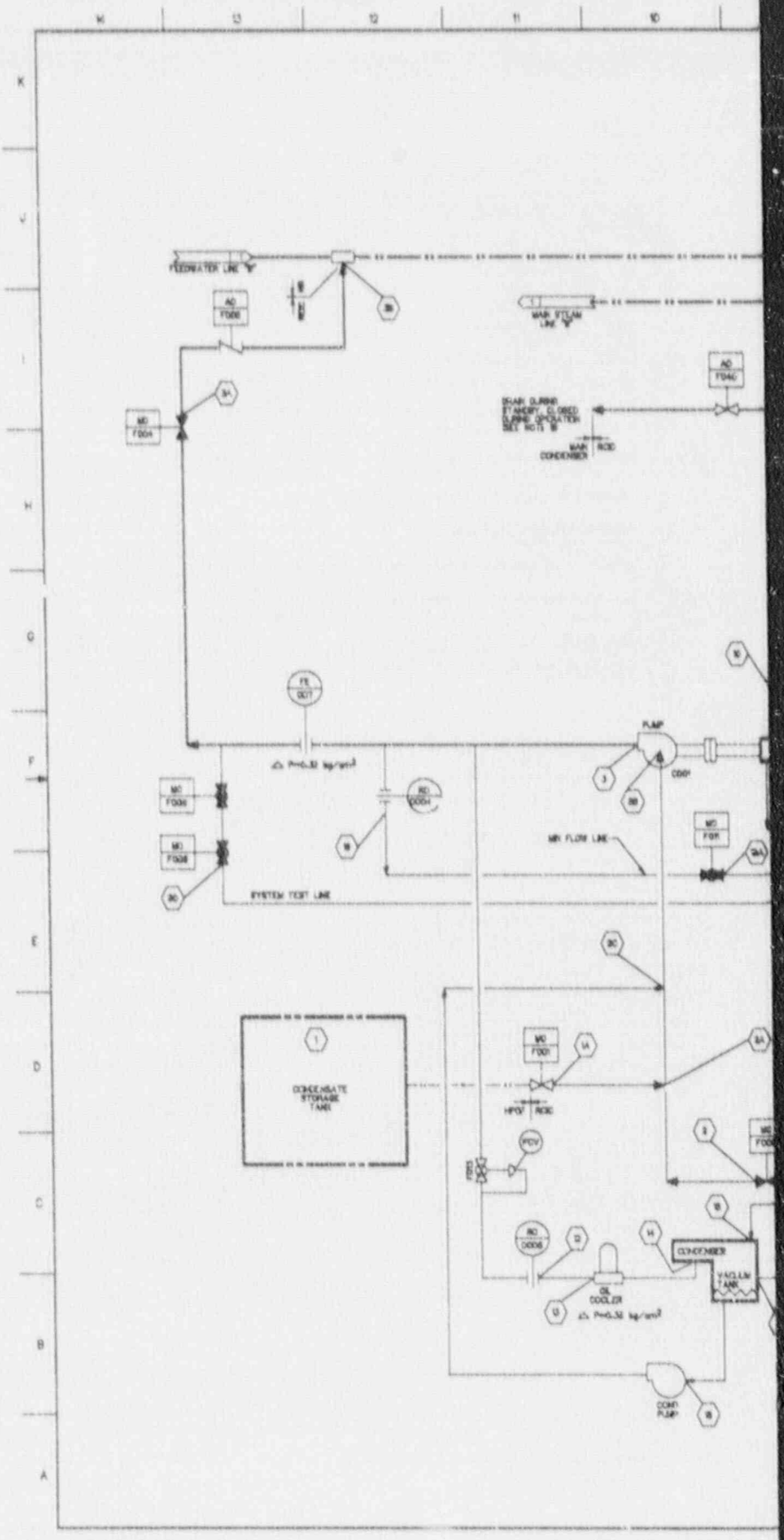
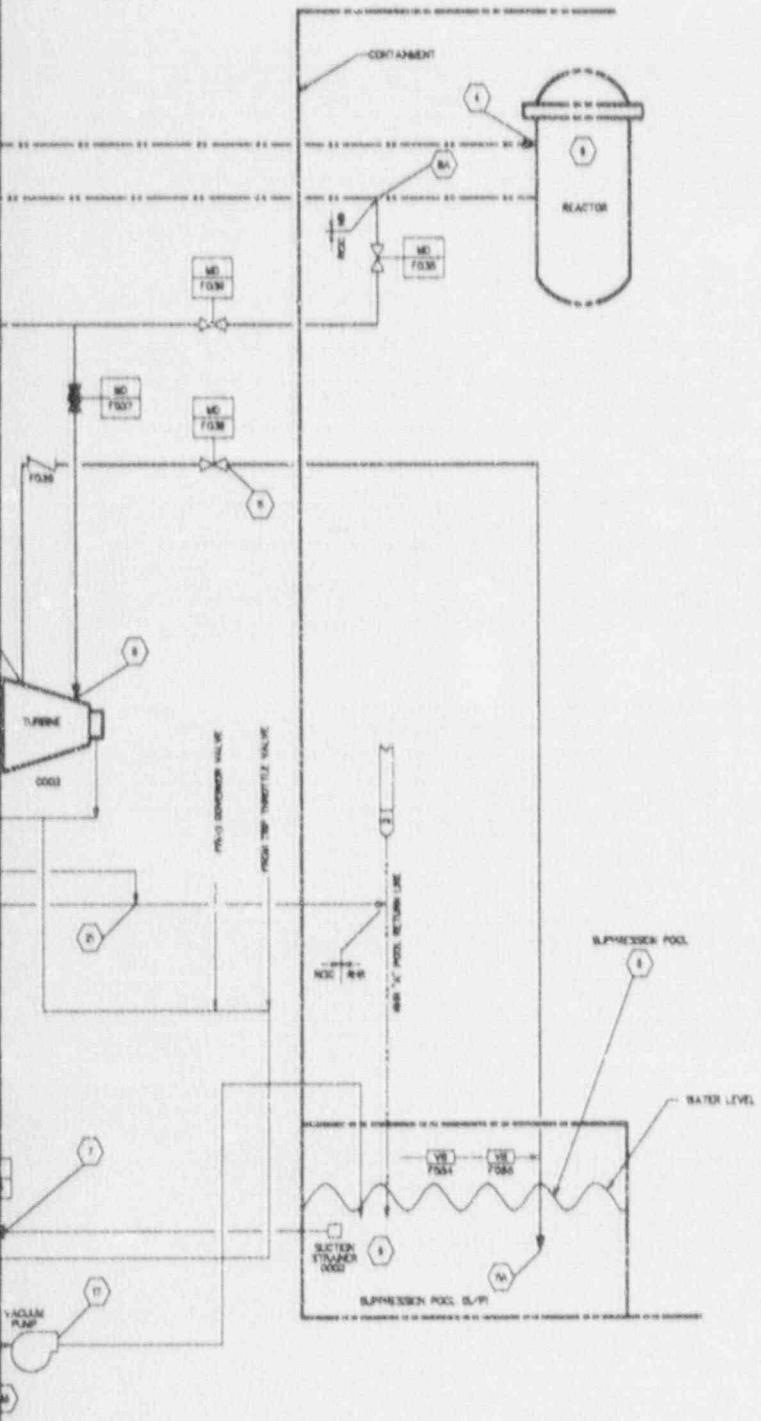


Figure 5.4-8 REACTOR CORE ISOLATION COOLING SYSTEM P&ID, Sheet 3 of 3


FEEDWATER LINE
MAIN STEAM LINE
DRAIN DURING STANDBY, CLOSED DURING OPERATION SEE NOTE 16
MAIN CONDENSER
PUMP
MR FLOW LINE
SYSTEM TEST LINE
CONDENSATE STORAGE TANK
HPCV
PCV
CONDENSER
OIL COOLER
COMP. PUMP



NOTES:

1. ATMOSPHERIC PRESSURE OF 10 kg/cm² abs WAS USED IN CALCULATIONS.
2. WATER FLOWS ARE SHOWN IN m³/hr, STEAM FLOW IN 1000 kg/hr.
3. THE UNRECOVERED FLOW ORIFICE PRESSURE DROP OF 3.2 kg/cm² (RCIC ORIFICE) IS A FIXED LOSS BETWEEN POSITIONS (3) AND (4).
4. THE LUBE OIL COOLER PRESSURE DROP OF 0.35 kg/cm² IS A FIX LOSS BETWEEN POSITIONS (12) AND (14).
5. THE CONTROLLING MODES FOR LINE SIZING AND ARRANGEMENT ARE:

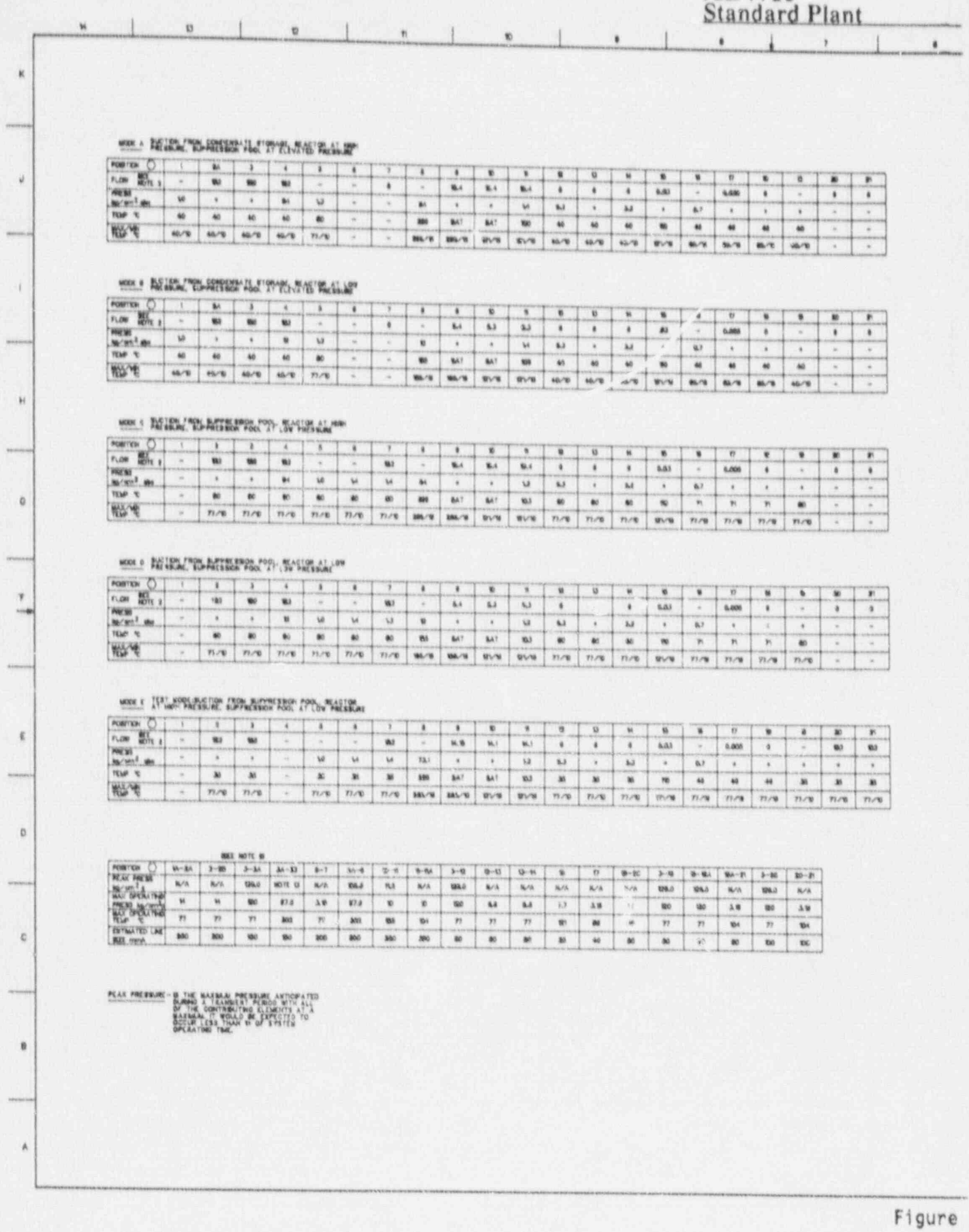
SUCTION FROM CONDENSATE STORAGE	MODE A & B
SUCTION FROM SUPPRESSION POOL	MODE C & D
PUMP DISCHARGE	MODE C & D
STEAM SUPPLY	MODE A & B
TURBINE EXHAUST	MODE A & C
TEST LINE	MODE E
COOLING SYSTEM	MODE A

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 30.1 m³/hr MINIMUM WITH TURBINE/PUMP AT MINIMUM SPEED (I.E. MODE A).
8. DURING SYSTEM STANDBY CONDITION (I.E. NOT OPERATING, AUTOMATICALLY) FLOW OCCURS THROUGH THE STEAM SUPPLY LINE DRAIN TRAP SYSTEM AT 70 kg/cm² abs AND 283°C.
9. THIS TABLE IS FOR REFERENCE ONLY. SEE M3C P&ID #001 001 FOR REQUIRED VALUES.
10. FLOW VALUES SHOWN IN MODES C & D ARE BASED UPON SUCTION PIPING DESIGN POINTING. THE MINIMUM REQUIRED NPSH TO CONTINUE TO BE PROVIDED TO THE RCIC PUMP WHEN THE SUPPRESSION POOL SUCTION STRAINER IS 80 PERCENT PLUGGED.
11. STEAM FLOWS FOR TEST MODE AT POSITION (1) (5) (7) AND (16) ARE BASED UPON A PUMP TDH OF 750 m.
12. DURING RCIC SYSTEM OPERATION A FLOW OF 0.06 m³/hr DISCHARGES THROUGH THE TURBINE EXHAUST LINE DRAIN POT SYSTEM AT 10 kg/cm² abs AND 138°C.
13. SEE INST DOC 1 FOR PEAK PRESSURE.

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

	NPS. NO.
1. NUCLEAR BOILER SYSTEM PFD	B21-1060
2. RESIDUAL HEAT REMOVAL SYSTEM PFD	E11-1280
3. HIGH PRESSURE CORE FLOODER SYS PFD	E22-1040
4. RCIC SYSTEM P&ID	E51-1010
5. PIPING AND INSTRUMENTATION DIAGRAM SYMBOLS	A10-3030
6. ABWR DOCUMENT STANDARDS	A10-3030

Figure 5.4-9 RCIC SYSTEM PFD, Sheet 1 of 2



Figure

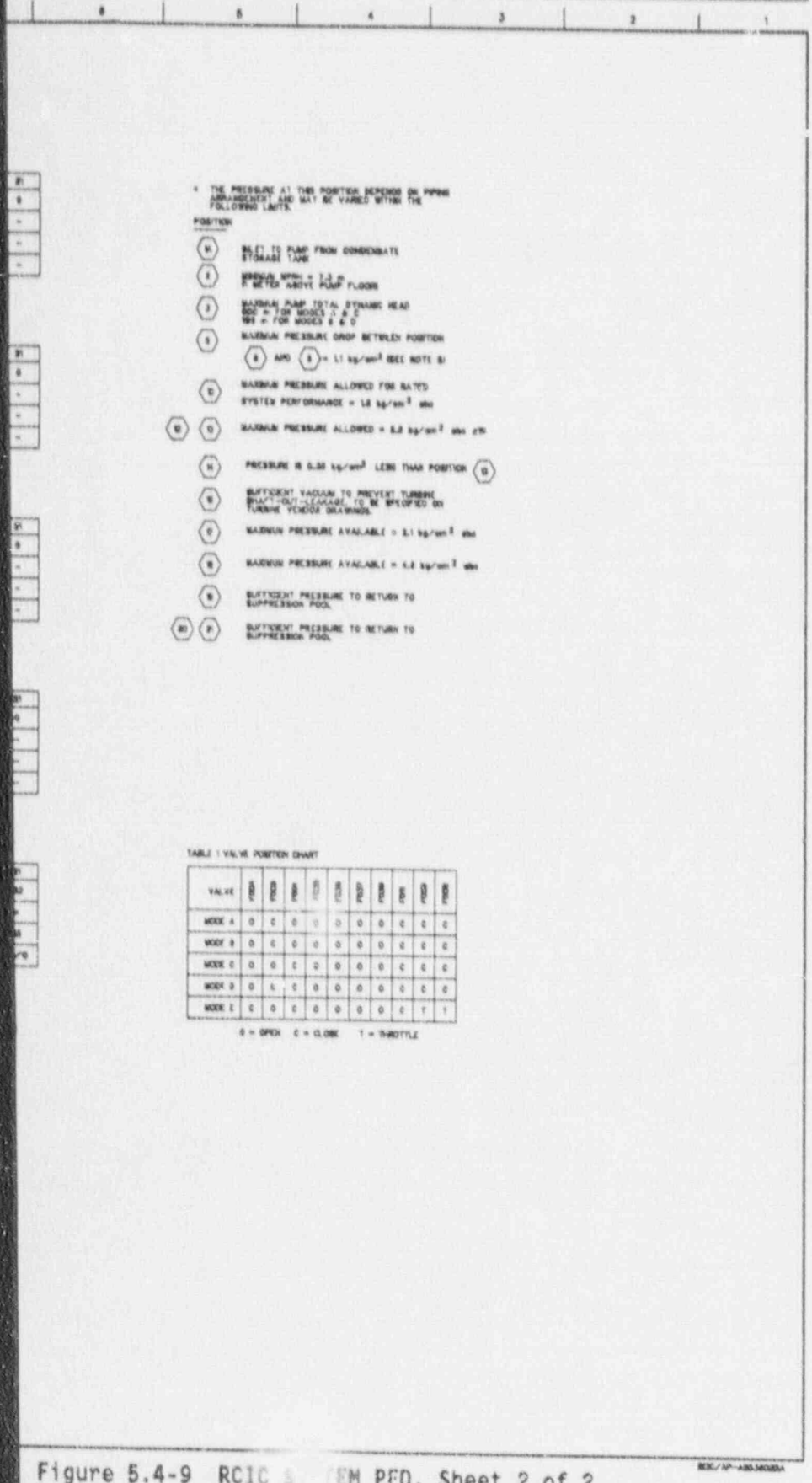


TABLE 1 VALVE POSITION CHART

VALVE	F004	F006	F009	F011	F015	F031	F039	F045	F059	F065
MODE A	O	C	O	O	O	O	O	C	C	C
MODE B	O	C	O	O	O	O	O	C	C	C
MODE C	O	C	C	O	O	O	O	C	C	C
MODE D	O	T	C	O	O	O	O	C	C	O
MODE E	C	O	C	O	O	O	O	C	T	T

O = OPEN C = CLOSE T = THROTTLE

Figure 5.4-9 RCIC SYSTEM PFD, Sheet 2 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 A51-3030.
3. VALVE F008 IS REQUIRED IF THERE IS POTENTIAL FOR OVERPRESSURE.
4. FOR ADDITIONAL CONTROL ROOM LIGHTS, SYSTEM ALARMS AND REMOTE MANUAL SWITCHES, SEE THE MMR SEC E71-1(M).
5. PROVISIONS FOR CONTAINMENT ISOLATION SHALL BE IN ACCORDANCE WITH CURRENT LICENSING REQUIREMENTS.
6. VALVE F009 SHALL BE LOCATED AT AN ELEVATION LOWER THAN THE SUPPRESSION POOL MINIMUM WATER LEVEL.
7. PUMP D001 COOLING WATER, IF REQUIRED, IS SPECIFIED IN P21-1(M).
8. VALVES F001, F004 & F011 SHALL BE LOCATED AS CLOSE AS POSSIBLE TO THE CONTAINMENT PENETRATION.
9. ALL MOTOR OPERATED VALVES ARE AC OPERATED UNLESS OTHERWISE NOTED.
10. EQUIPMENT IN SUBSYSTEMS A, B AND C SHALL HAVE THE SUFFIX LETTER A, B AND C RESPECTIVELY AFTER THE EQUIPMENT NUMBER.
11. FLUSHING CONNECTIONS AND TEMPORARY STRAINER SCREENS ON THE SUCTION SIDE OF ALL PUMPS SHALL BE PROVIDED IN ACCORDANCE WITH A70-4(N).
12. ALL MOTOR OPERATED VALVES, AIR OPERATED VALVES AND ALL PUMPS SHALL HAVE A LOCAL PANEL REMOTE MANUAL SWITCH AND STATUS LIGHT THAT WILL BE HARD WIRED. IN ADDITION, THERE WILL BE A REDUNDANT REMOTE MANUAL SWITCH AND STATUS LIGHT CONNECTED BY MEANS OF MULTIPLEXING AND LOCATED IN THE MAIN CONTROL ROOM.
13. DRYWELL PIPING RUNS SHALL BE HORIZONTAL OR VERTICAL UPWARDS FROM THE DRYWELL WALL TO THE POINT OF ATTACHMENT WITH THE REACTOR VESSEL.
14. THIS HIGH POINT VENT SHALL BE LOCATED AT THE HIGHEST POINT IN THE PIPING OUTSIDE THE DRYWELL BETWEEN VALVES F011 AND F016.
15. SUBSYSTEM A RETURNS TO RPV THROUGH FEEDWATER LINE A.
16. DISCHARGE LINES FOR COOLING WATER TO BE ROUTED UPSTREAM OF SERVICE WATER RADIATION MONITORS.
17. VALVE F014 SHALL BE AS CLOSE AS POSSIBLE TO THE CONNECTIONS TO THE MAIN LINE.
18. 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.
19. CHECK VALVE F004 SHALL BE LOCATED AS CLOSE AS PRACTICAL TO THE REACTOR VESSEL NOZZLE.
20. VALVES F016, F017B AND F017C ARE IN ELECTRICAL DIVISIONS B, C AND A RESPECTIVELY. THE MANUAL CONTROL SWITCHES FOR VALVES F016, F017B AND F017C ARE IN ELECTRICAL DIVISIONS A, B AND C RESPECTIVELY.
21. 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 - MMR - Aa
    H. FLUID - WATER
    I. INTERFACE
23. AIR SUPPLY AND NITROGEN SUPPLY SHOWN IN SUPPLEMENTAL DOCUMENT 1B.
33. [illegible] TYPE AS SUPPLIED WITH PUMP D003.
34. FLANGE CONNECTION USED FOR OCCASIONAL SUPPRESSION POOL DRAINING.

35. DRAIN AND VENT PIPING
    MAXIMUM OPERATING PR
    MAXIMUM OPERATING TE
36. UNIQUE PIPE NUMBERS
    LOOP RANGES OF NUMB
    TYPE OF PIPE AS FOLL
    PROCESS PIPING
    DRAIN AND VENT PIPING
    INSTRUMENT PIPING
37. THE VALVE TYPE FOR
    IN THE FINAL DESIGN.
38. THE RECURRING FUNCTI
    RECORDING DEVICE.
39. TWO INDEPENDENT VALVES OR
    OPTION OF HIGH RADIATION
    VENT LINES.

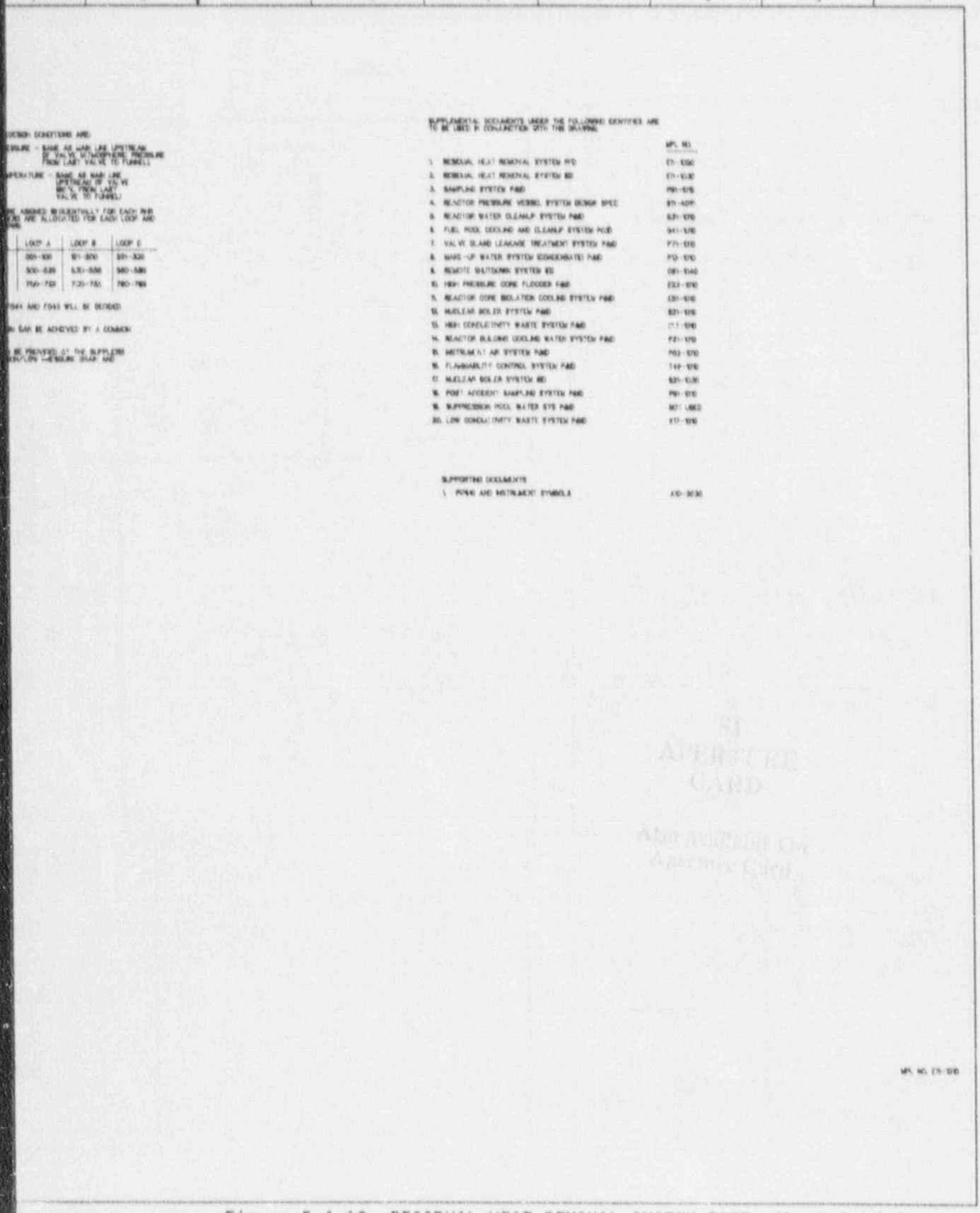


Figure 5.4-10 RESIDUAL HEAT REMOVAL SYSTEM P&ID, Sheet 1 of 7

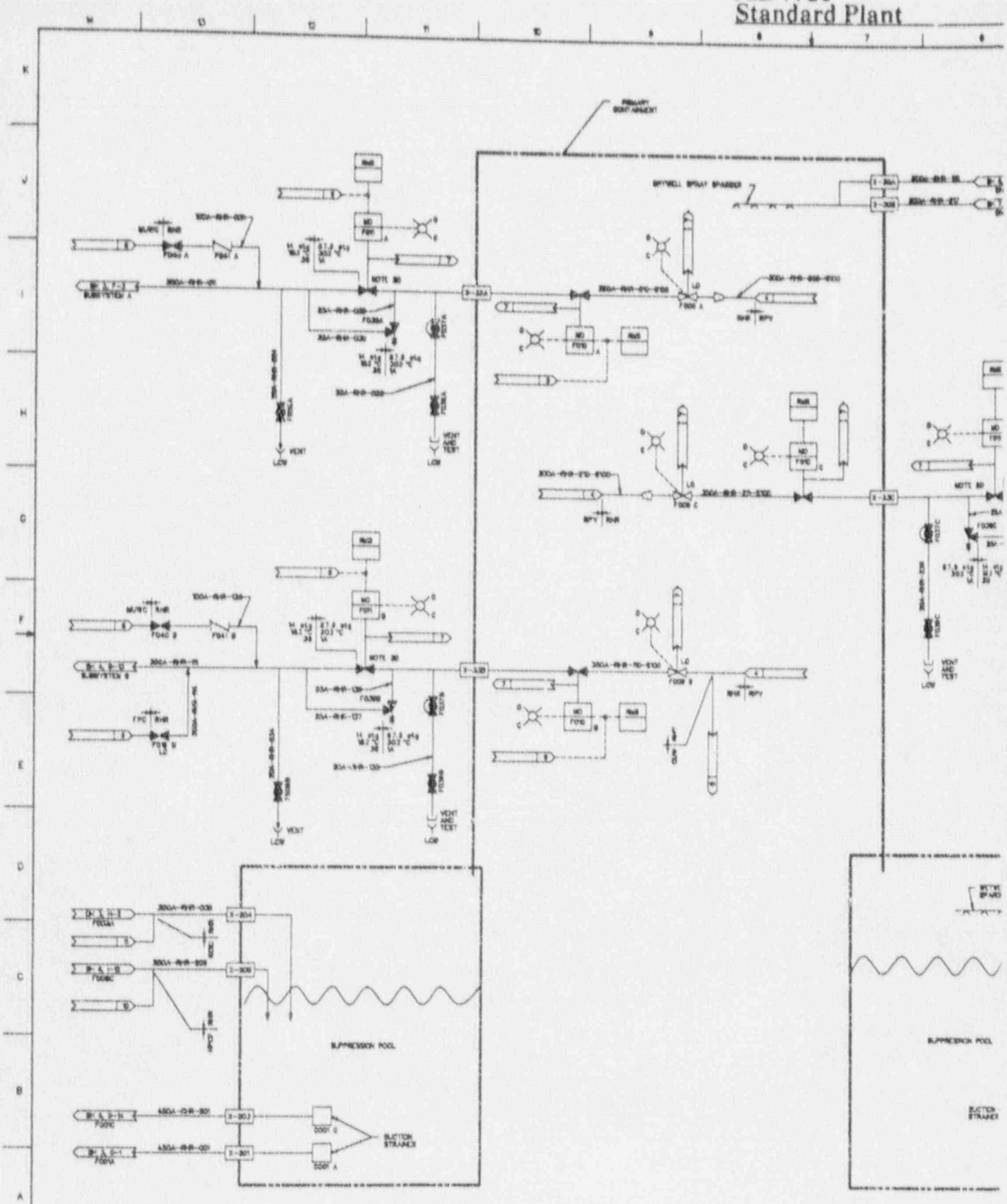
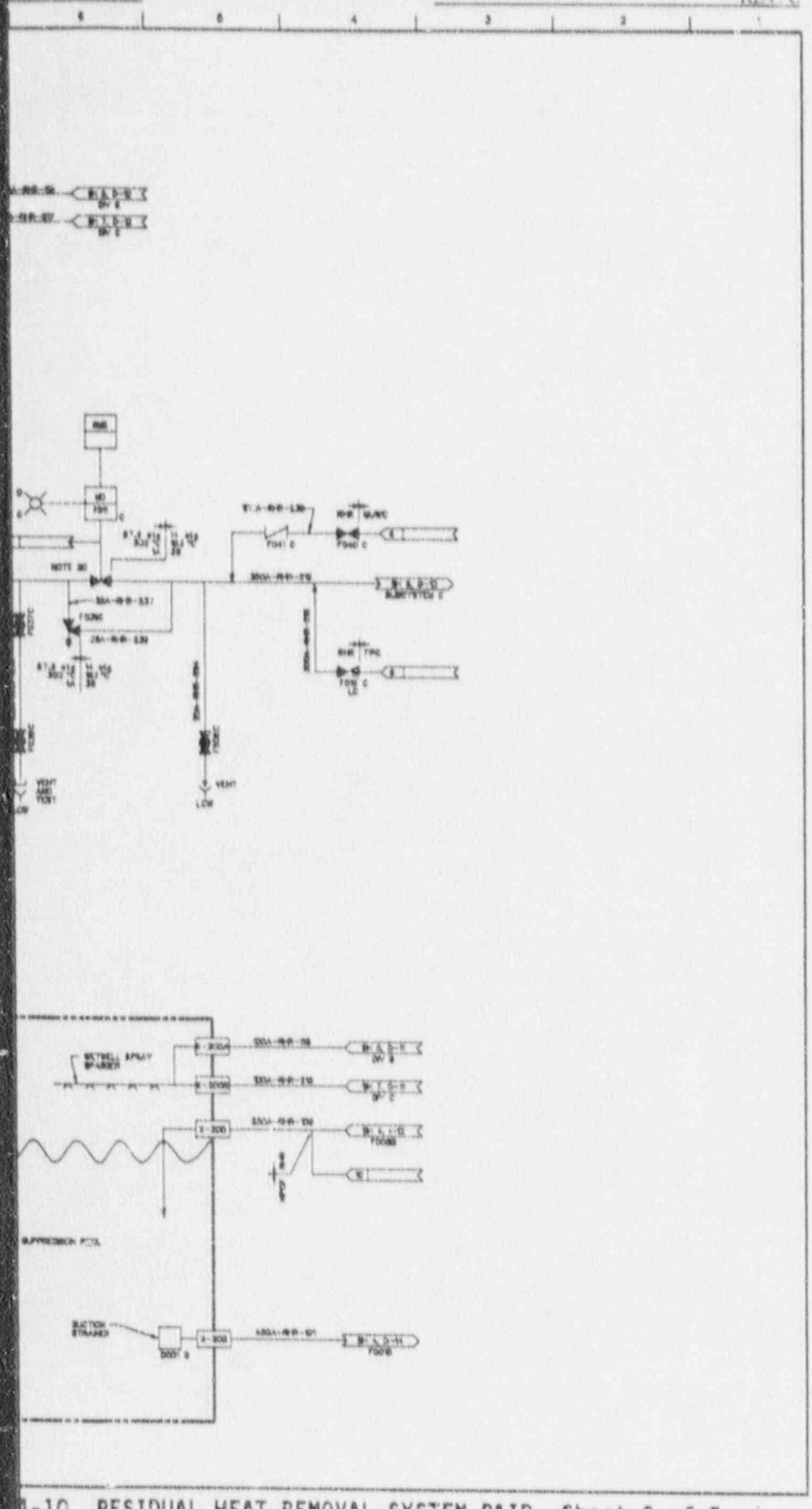
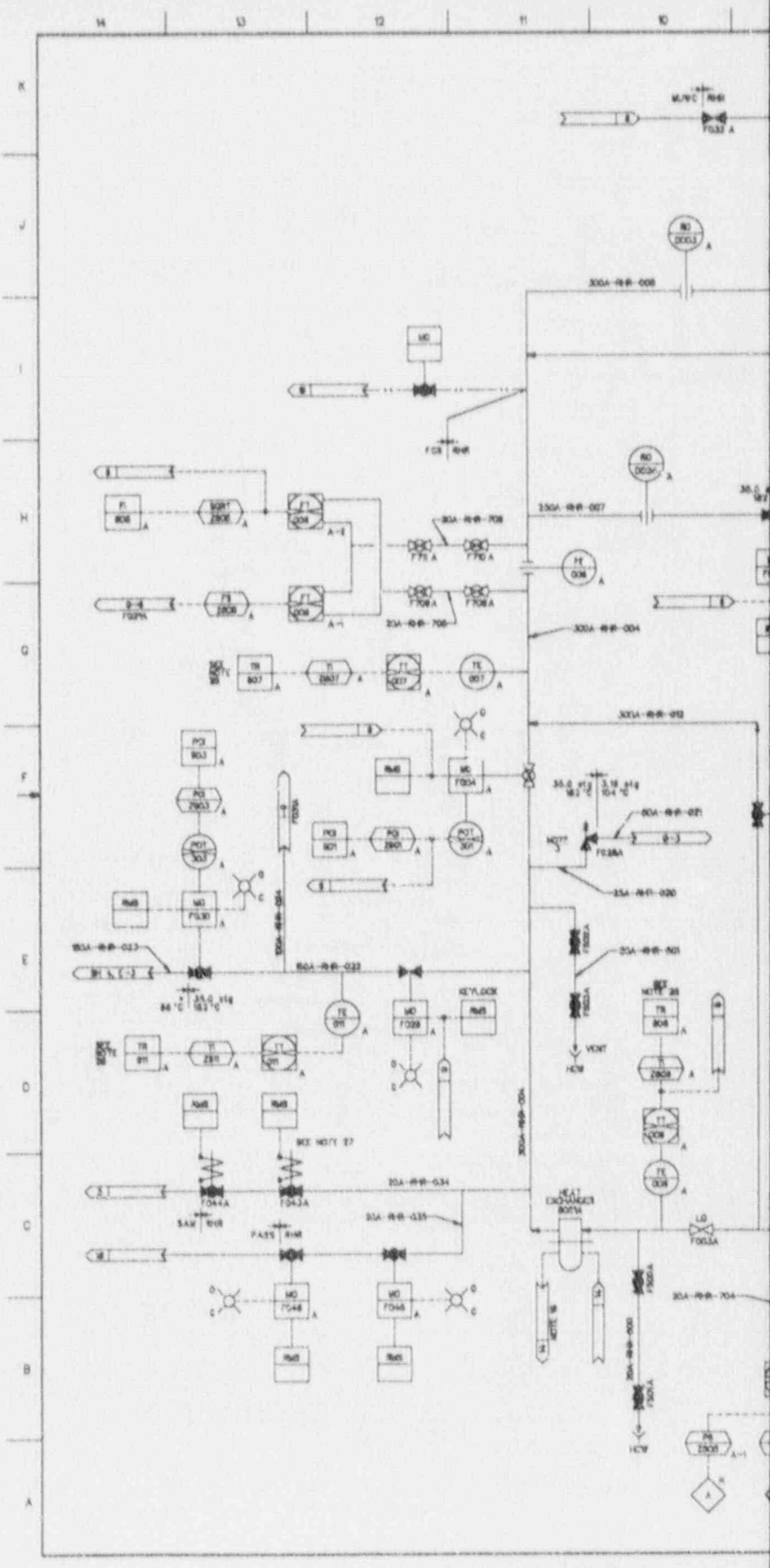


Figure 5.4-10 RI



4-10 RESIDUAL HEAT REMOVAL SYSTEM P&ID, Sheet 2 of 7



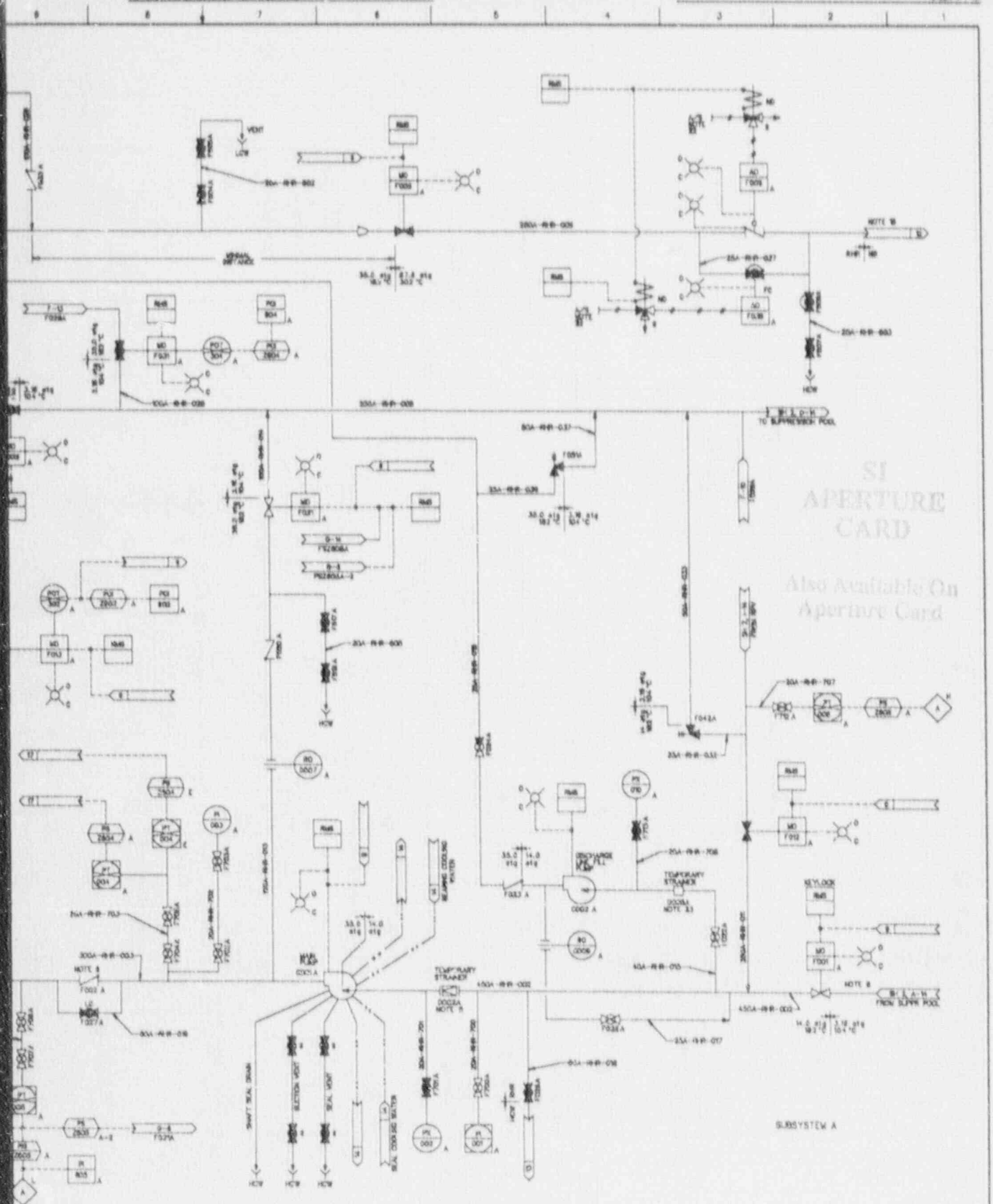


Figure 5.4-10 RESIDUAL HEAT REMOVAL SYSTEM P&ID, Sheet 3 of 7

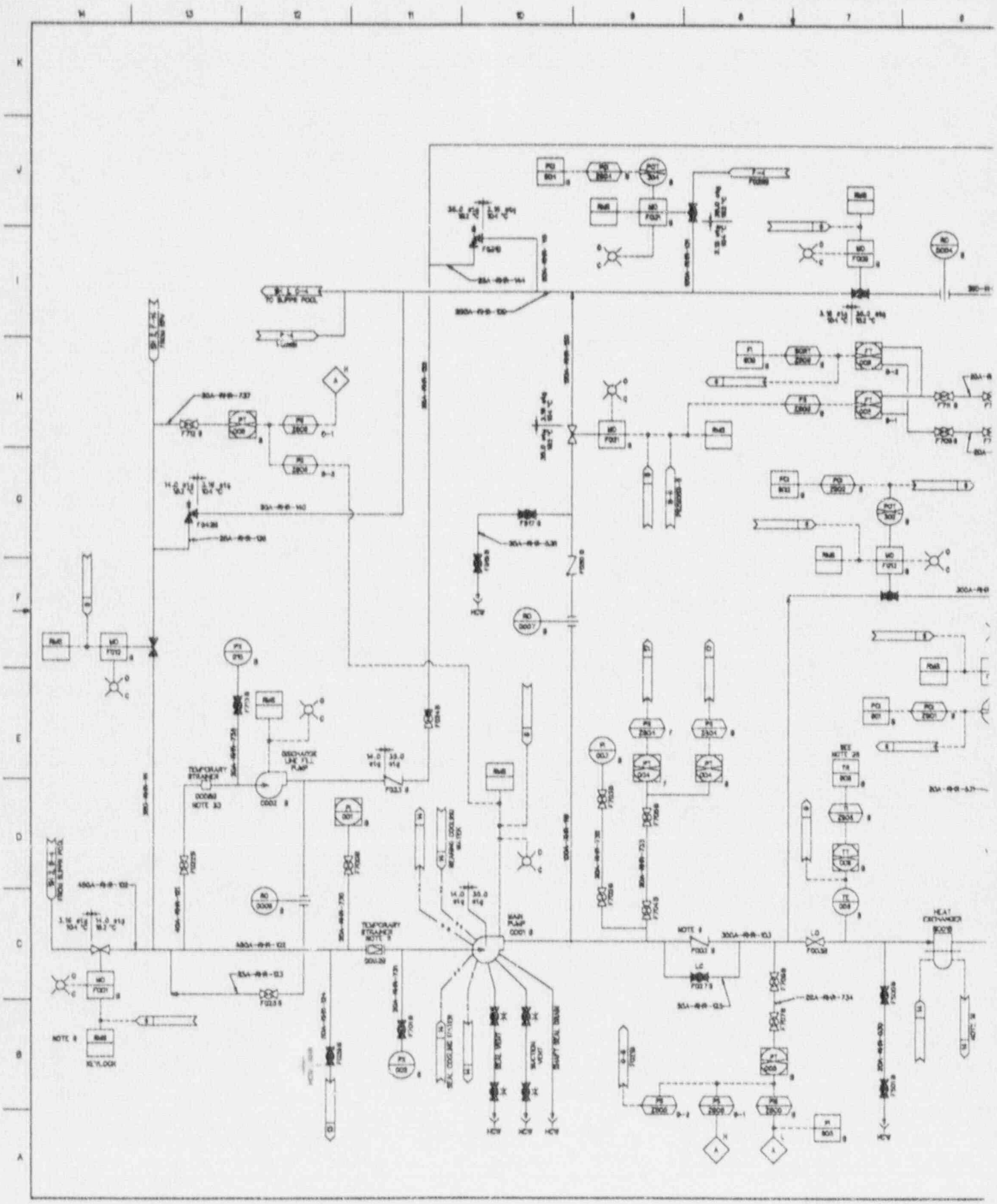
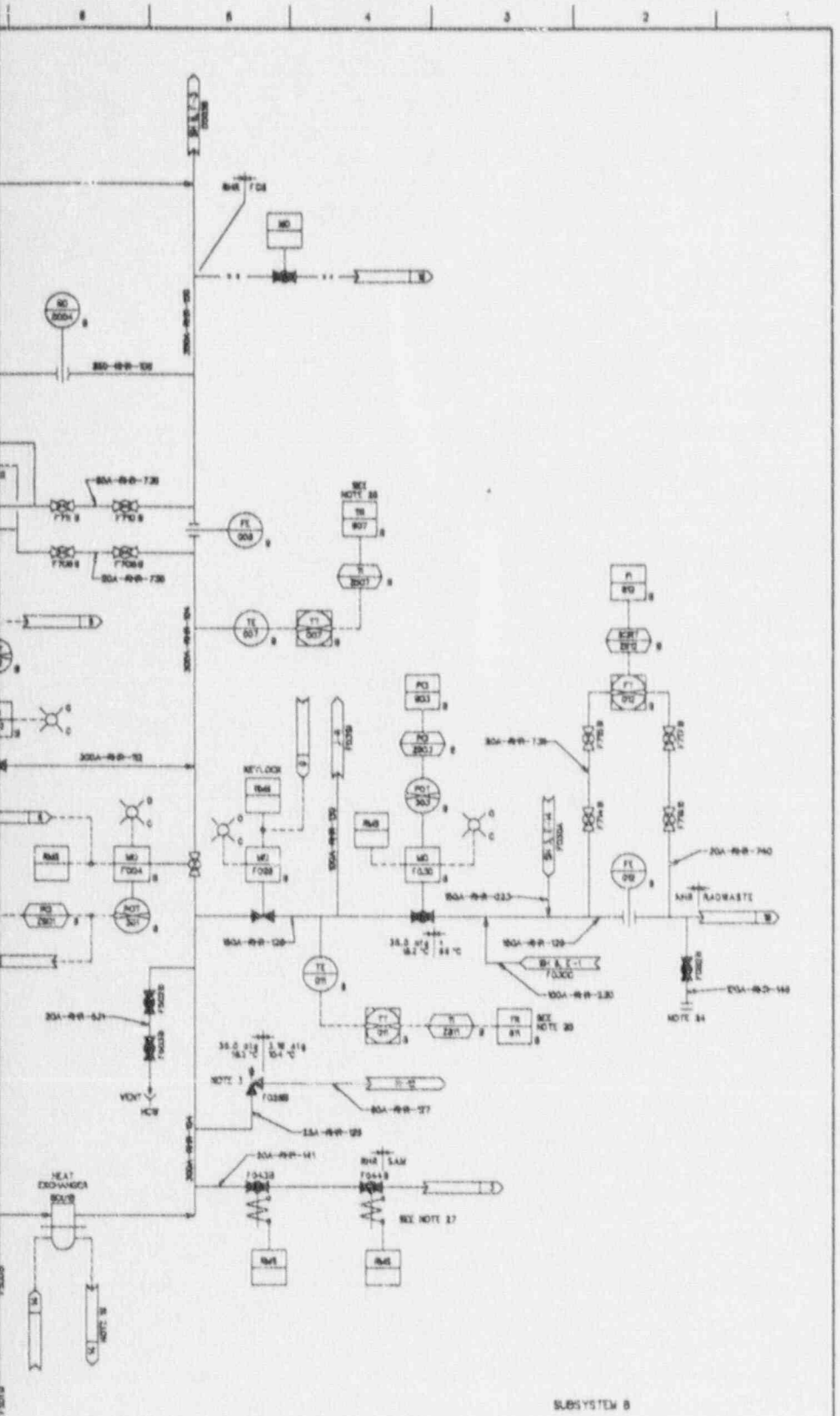
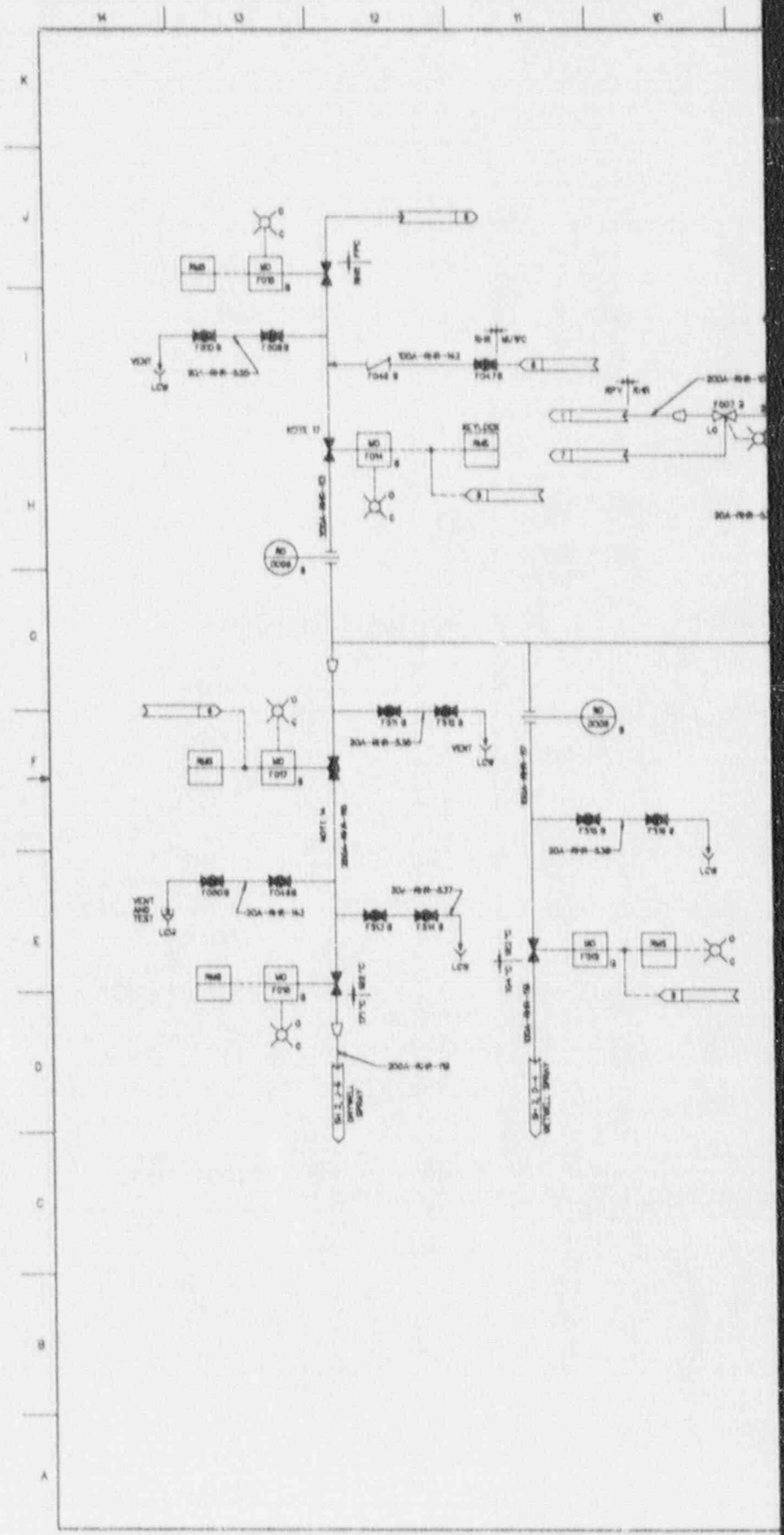


Figure 5.4-10 RE



4-10 RESIDUAL HEAT REMOVAL SYSTEM P&ID, Sheet 4 of 7



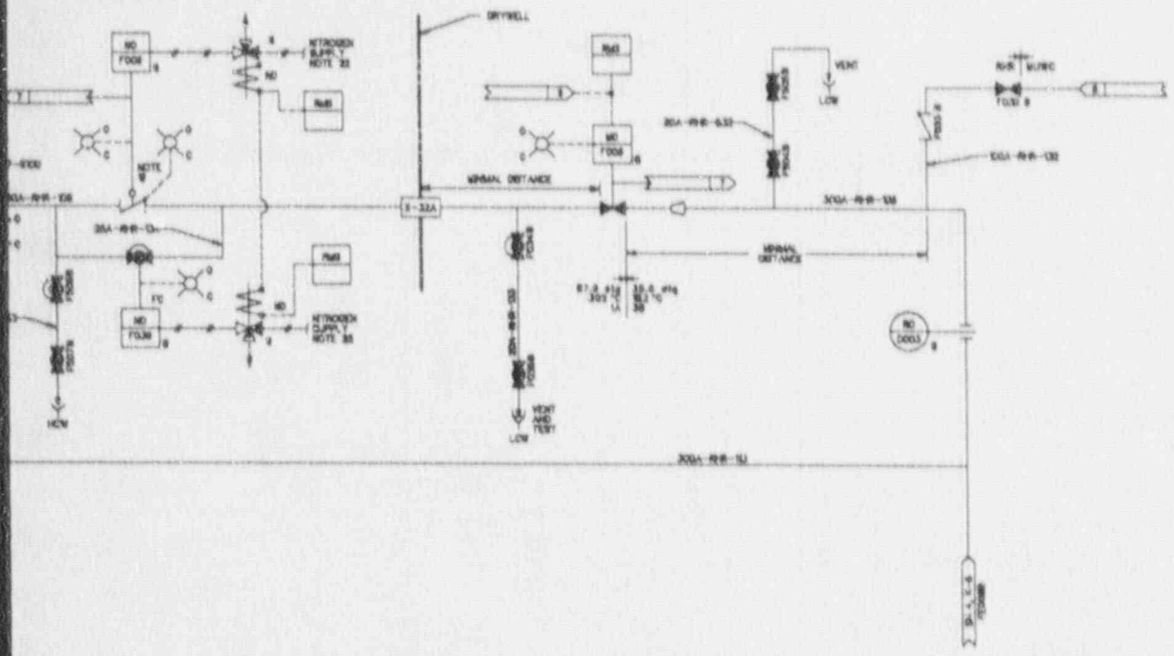


Figure 5.4-10 RESIDUAL HEAT REMOVAL SYSTEM P&ID, Sheet 5 of 7

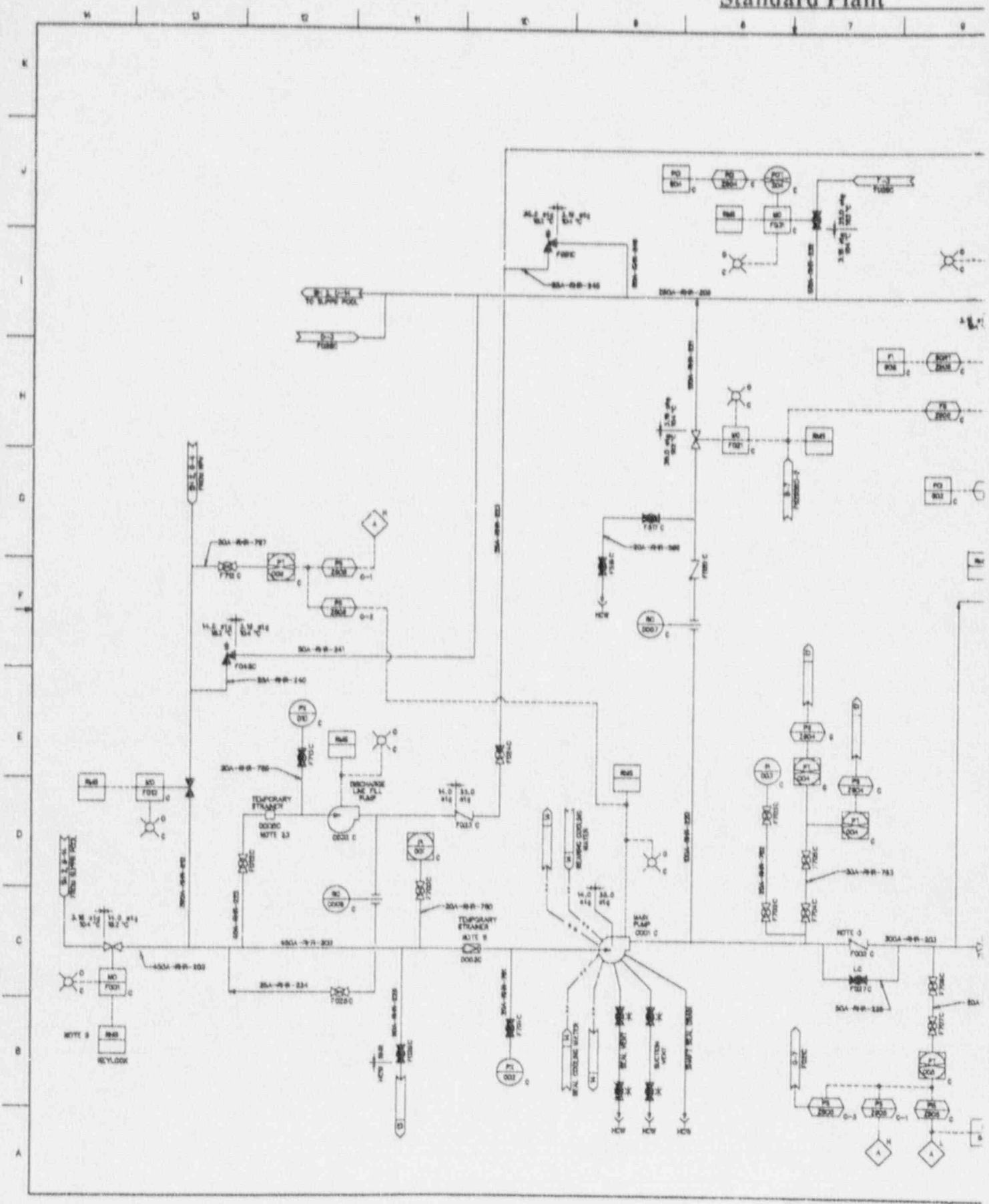
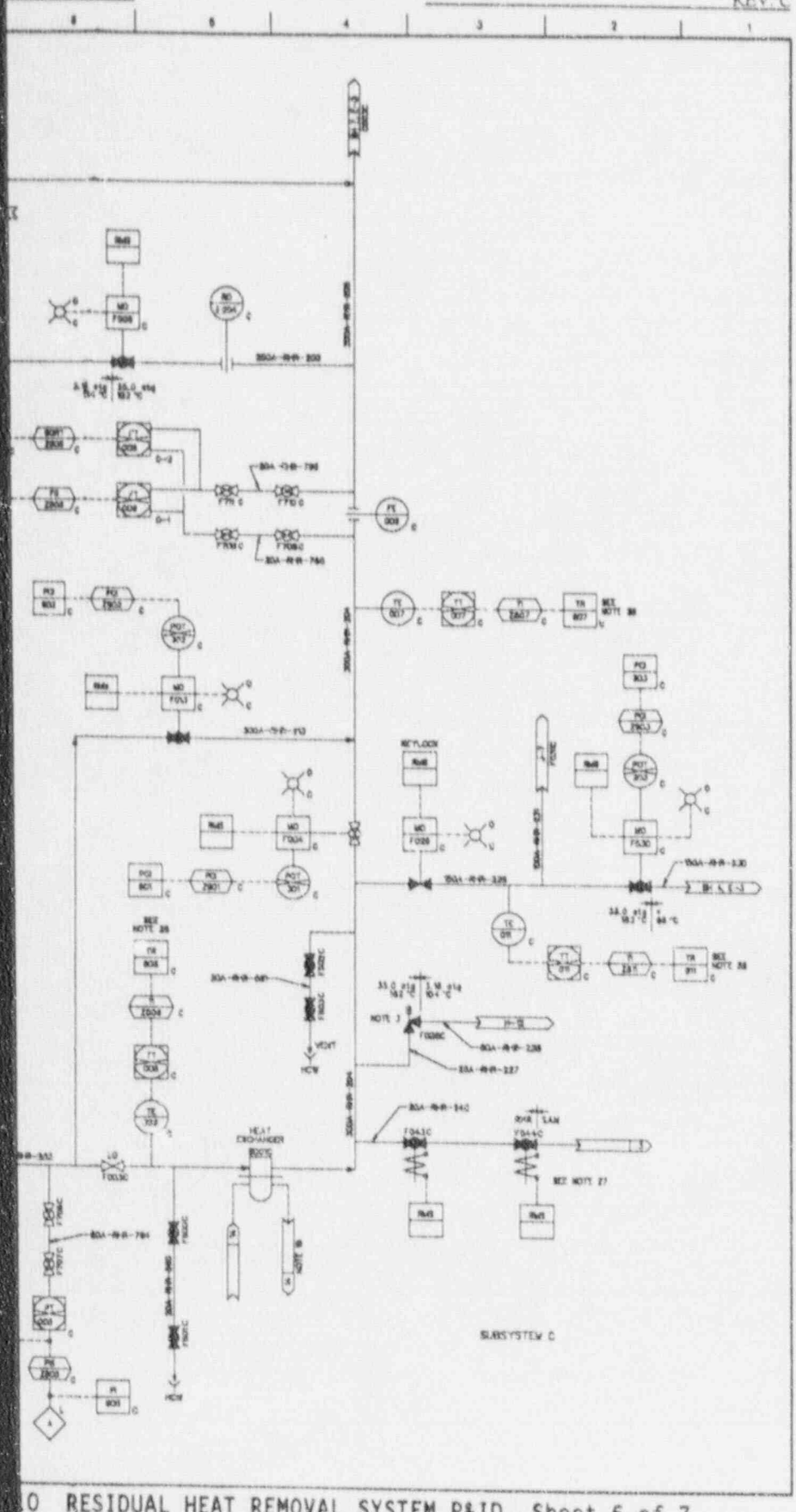
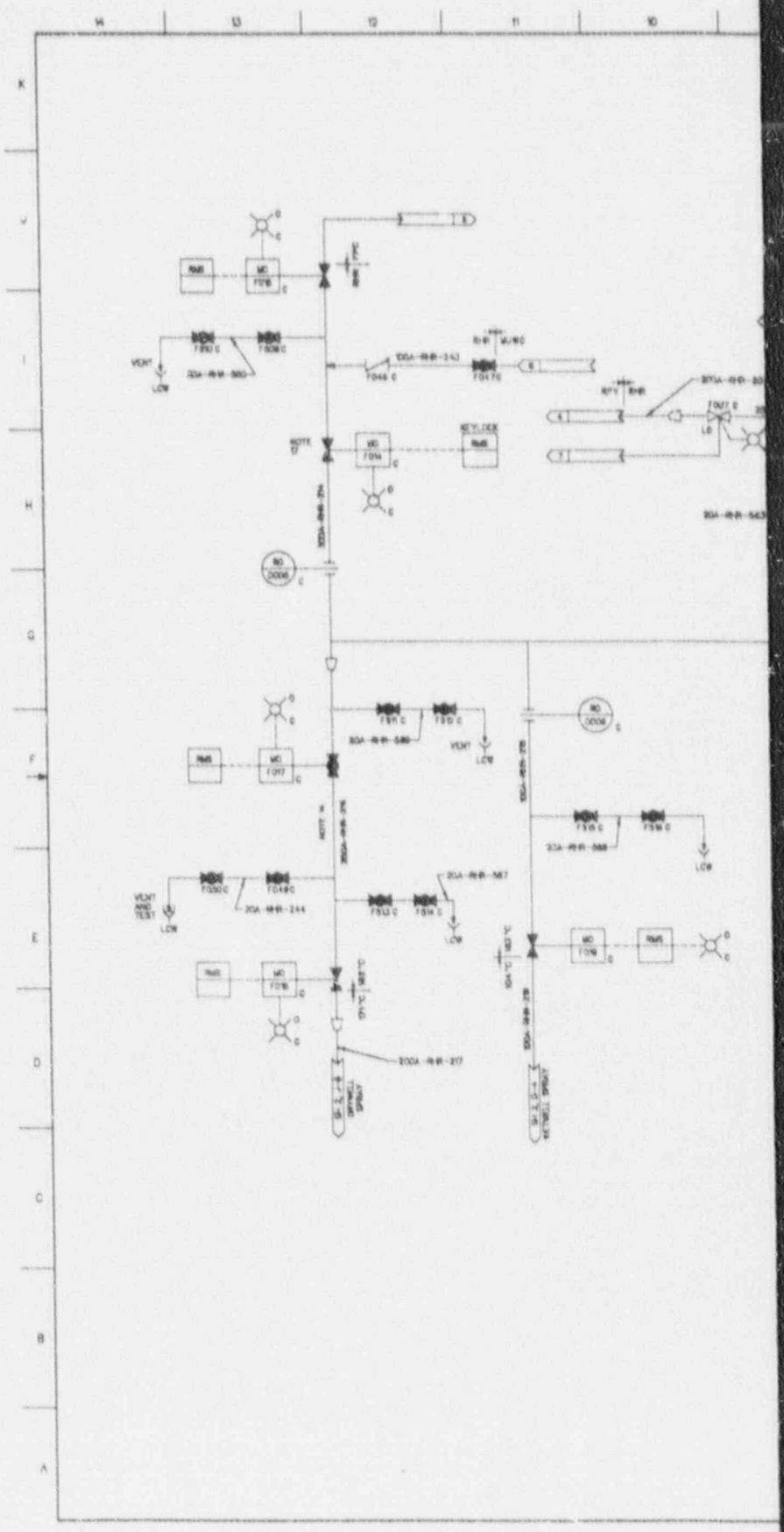


Figure 5.4-10 RESI



10 RESIDUAL HEAT REMOVAL SYSTEM P&ID, Sheet 6 of 7



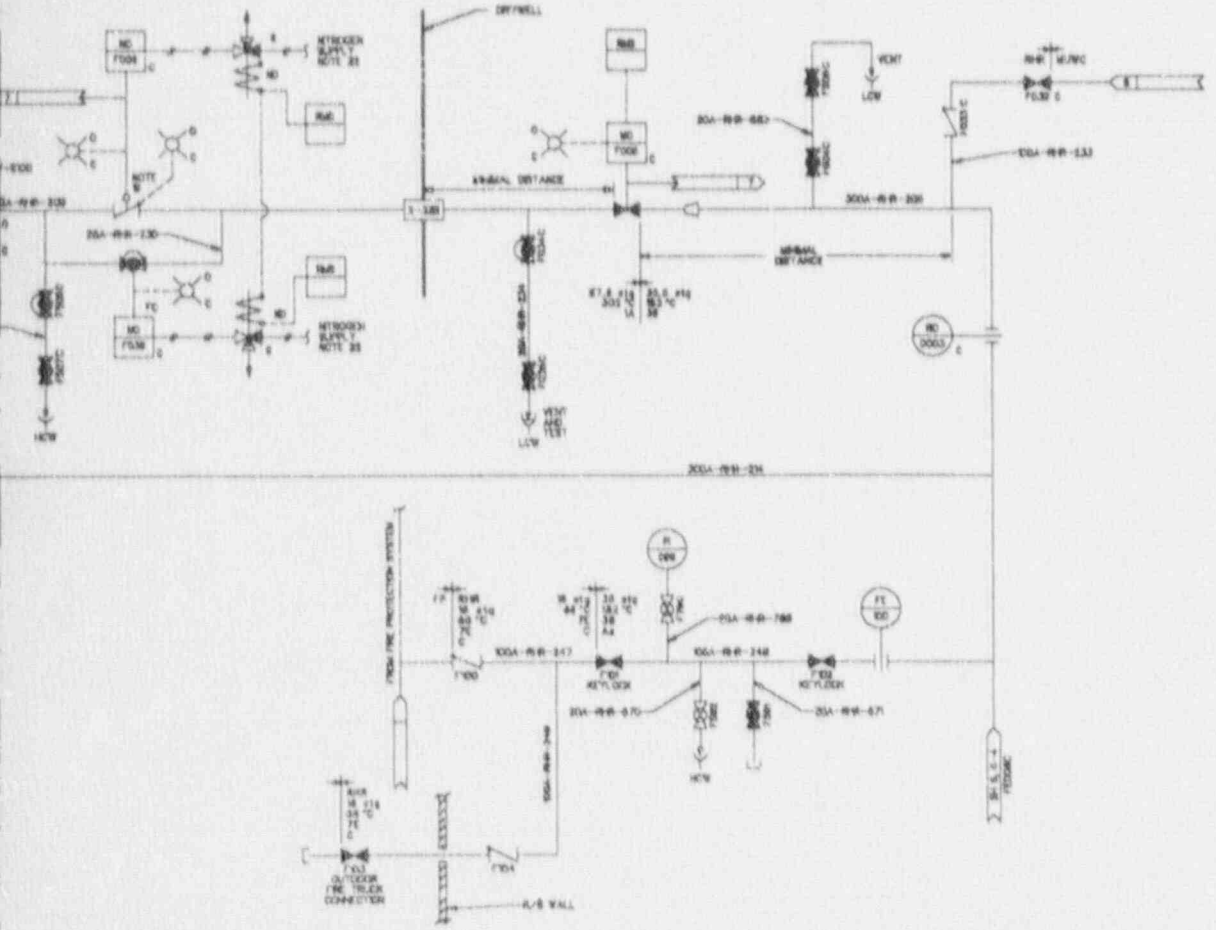
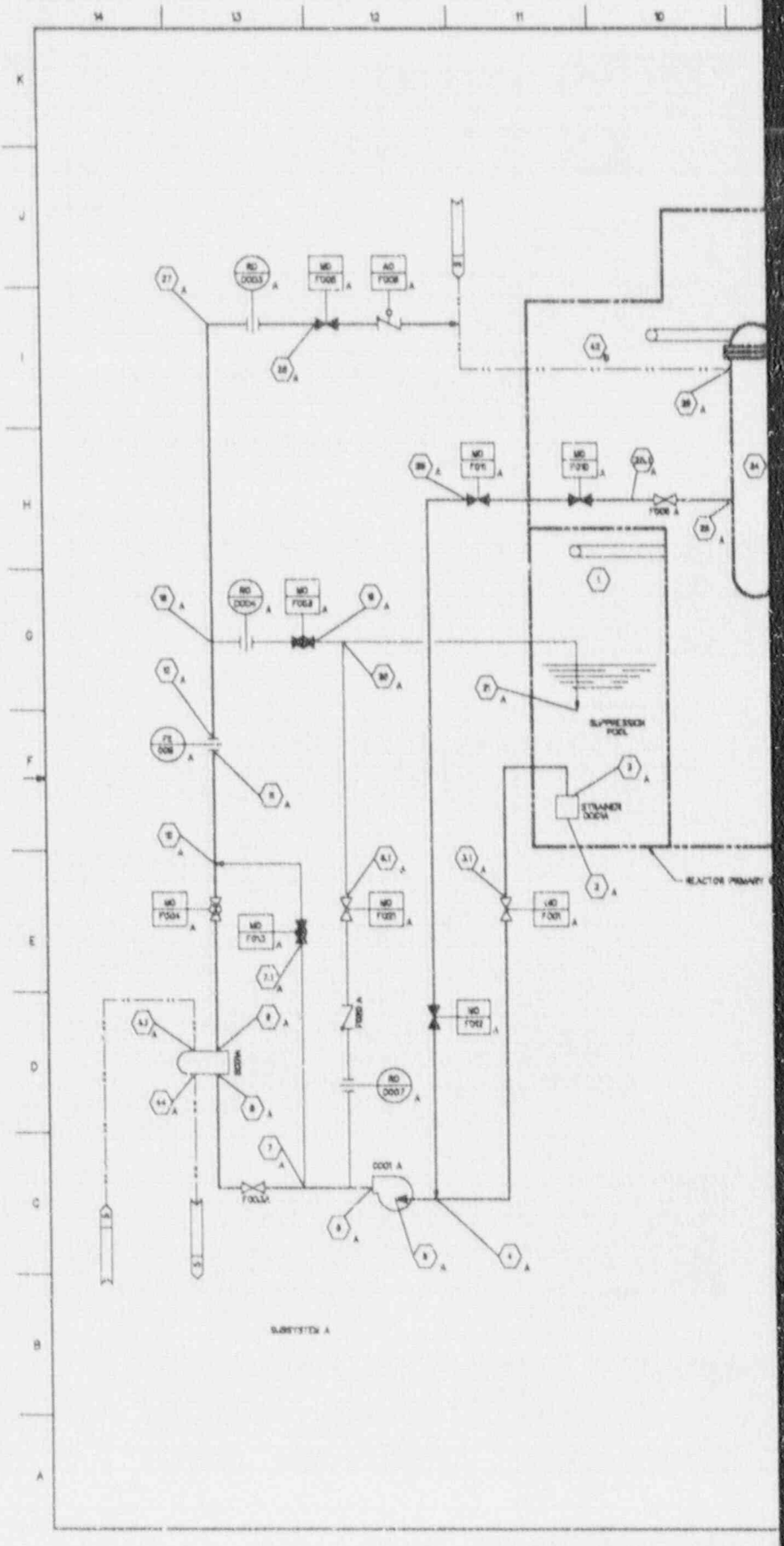
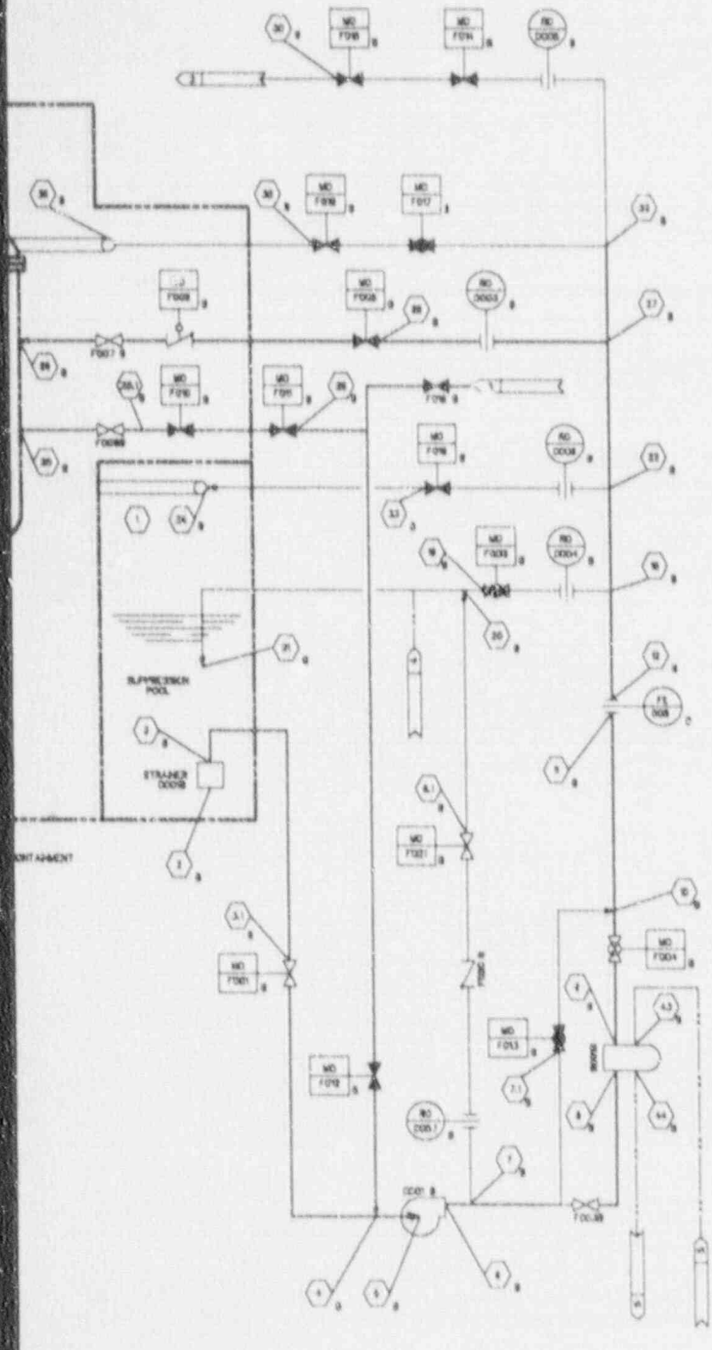


Figure 5.4-10 RESIDUAL HEAT REMOVAL SYSTEM P&ID, Sheet 7 of 7


SUPPRESSION POOL
REACTOR PRIMARY



NOTES:

1. SHOWN AS TYPICAL FOR ONE SUBSYSTEM. IF SUBSYSTEMS ARE NOT SYMMETRICALLY ARRANGED, VALUES FOR EACH SUBSYSTEM SHALL BE SUBMITTED.
2. PIPING BETWEEN POINTS WITH EMPTY DATA BLANKS SHALL BE SIZED BY OTHERS BASED ON SPECIFIED OPERATING CONDITIONS. EMPTY DATA BLANKS CAN BE FILLED IN BASED ON ACTUAL ARRANGEMENT OR EQUIVALENT HYDRAULIC DATA.

   ⊠ —— INDICATES THE DATA IS NOT SIGNIFICANT.

3. MODE 'B' IS THE LIMITING MODE FOR HEAT LOAD, HEAT CAPACITY RATED DW Δ =84.5 KCAL/°C-SEC.
4. X / Y —— INDICATES MAXIMUM (X) AND MINIMUM (Y) VALUES FOR THE MODE SPECIFIED.
5. DASHED LINES INDICATE FLOW DOES NOT PASS THROUGH THESE POINTS.
6. TYPICAL VALUES FOR MAXIMUM SUPPRESSION POOL TEMPERATURE SHOWN. FINAL TEMPERATURE DEPENDS ON INITIAL POOL WATER TEMPERATURE AND POOL WATER VOLUME.
7. THE NPSH AVAILABLE IN MODES A AND C-1 AT A REFERENCE LOCATION 1 METER ABOVE THE PUMP MOUNTING FLOOR MUST EQUAL OR EXCEED 5.4 METERS (ASSUMED SATURATION TEMPERATURES OF 104°C AND 96.6°C RESPECTIVELY). THE NPSH AVAILABLE AT THE PUMP SUCTION NOZZLE MUST EQUAL OR EXCEED THIS VALUE PLUS THE DIFFERENCE IN ELEVATION BETWEEN THE REFERENCE LOCATION AND THE CENTERLINE OF THE PUMP SUCTION NOZZLE.
8. TABLE 1 INDICATES VALVE POSITIONS DURING VARIOUS MODES OF OPERATION.
9. THIS TABLE IS FOR REFERENCE ONLY; SEE P&ID FOR REQUIRED VALUES.
10. THE WEIGHT OF WATER IN THE SHUTDOWN COOLING SUBSYSTEM PIPING, INCLUDING THE HEAT EXCHANGERS AND PUMPS SHALL NOT EXCEED THE VALUE SPECIFIED (41-4010) IN ORDER TO PREVENT DILUTION OF STANDBY LIQUID CONTROL NEUTRON ABSORBER BELOW MINIMUM REQUIREMENTS.
11. HEAT EXCHANGER HEAT REMOVAL AND SPRAY BASED UPON 884 m^3/hr TUBE SIDE FLOW.
12. SOK = 185 METERS REQUIRED MINIMUM AND 330 METERS MAXIMUM.
13. MAXIMUM TUBE SIDE FLOW RATE IS 1130 m^3/H WHICH IS MAXIMUM PUMP RUNOUT FLOW.
14. HX** EXCHANGER HEAT REMOVAL SHOWN FOR FULL FLOW AND MAXIMUM TEMPERATURE DIFFERENCE.
15. ONLY TWO SUBSYSTEMS ARE REQUIRED AT THIS STAGE OF SHUTDOWN.
16. LOCATIONS 16,20,31 ARE FL33-34 SHOW THE FLOW SPLIT BY LOOPS B AND C WHEN THE WETWELL SPRAY FUNCTION IS INITIATED.
17. ONLY ONE SUBSYSTEM IS REQUIRED FOR THIS MODE OF OPERATION, EITHER SUBSYSTEM B OR SUBSYSTEM C.

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

	MFL NO.
1. RESIDUAL HEAT REMOVAL SYSTEM P&ID	E11-1010
2. NUCLEAR BOILER SYSTEM PFD	B21-1030
3. FUEL POOL COOLING & CLEANUP SYS PFD	G41-1030
4. HIGH PRESSURE CORE FLOODER SYS PFD	E32-1030
5. REACTOR BUILDING COOLING WATER SYSTEM PFD	P31-1030
6. STANDBY LIQUID CONTROL SYSTEM DESIGN SPEC	C41-4010

SUPPORTING DOCUMENTS

	MFL NO.
1. PIPING AND INSTRUMENT DIAGRAM SYMBOLS	A10-5030

MFL NO. E11-1030

Figure 5.4-11 RHR SYSTEM PFD, Sheet 1 of 2

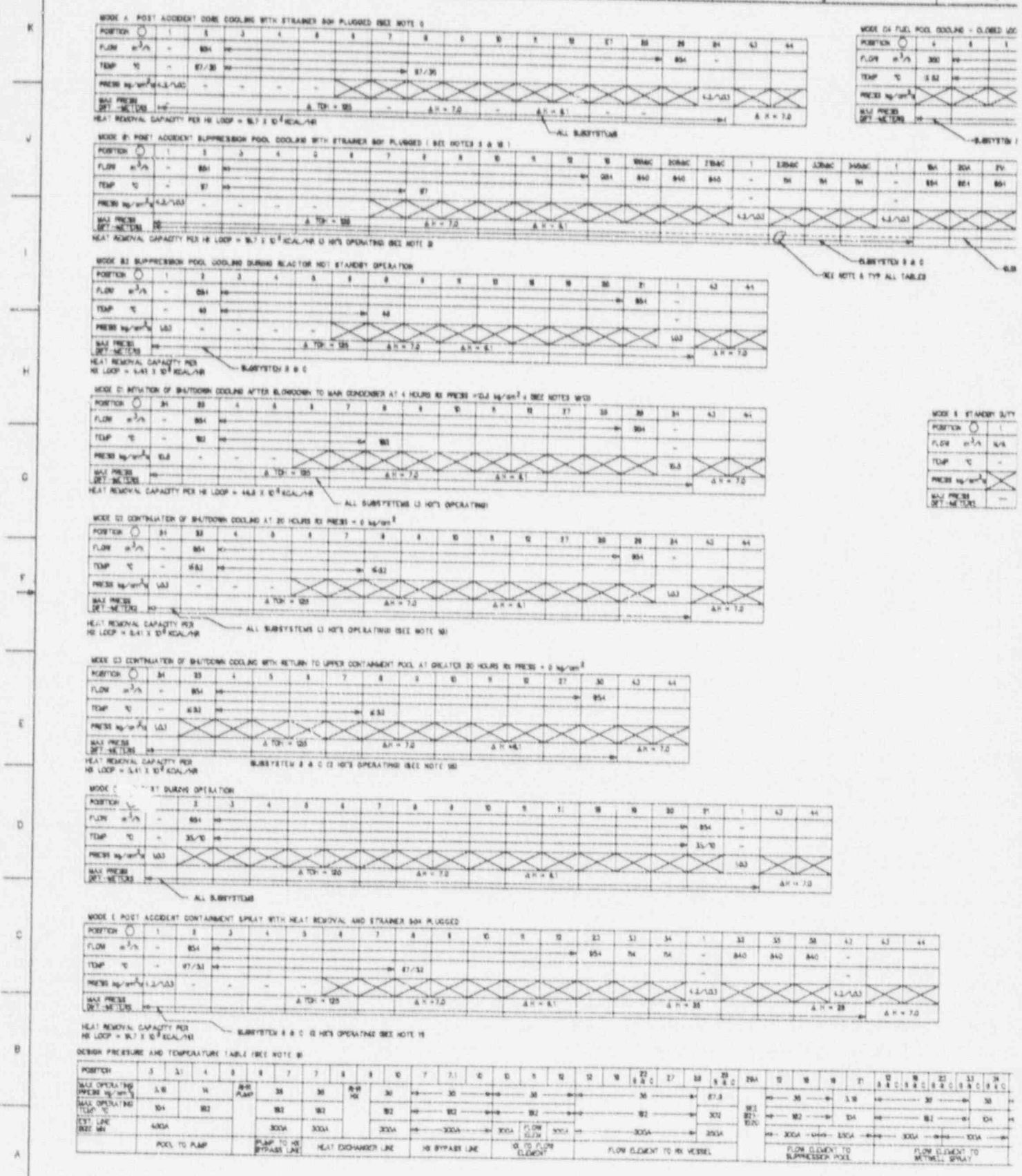
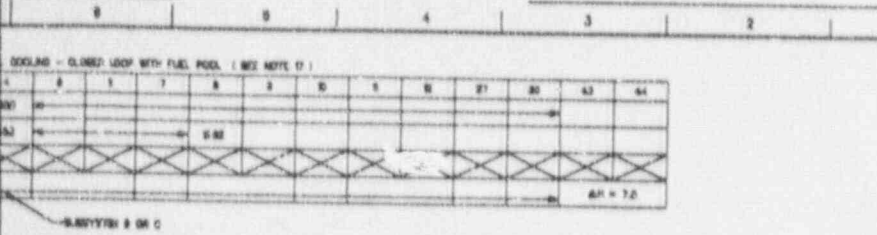
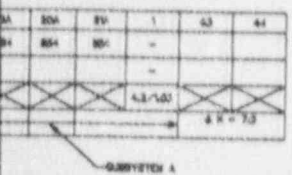


Figure 5.





MODES

A POST ACCIDENT CORE COOLING WITH STRAINER BOX PLUGGED.

B-1 POST ACCIDENT SUPPRESSION POOL COOLING WITH STRAINER BOX PLUGGED.

B-2 SUPPRESSION POOL COOLING DURING HOT STANDBY OPERATION.

C-1 INITIATION OF SHUTDOWN COOLING AFTER BLOWDOWN TO MAIN CONDENSER AT FOUR HOURS.

C-2 CONTINUATION OF SHUTDOWN COOLING AT 20 HOURS.

C-3 CONTINUATION OF SHUTDOWN COOLING WITH RETURN TO UPPER CONTAINMENT POOL AT GREATER THAN 20 HOURS.

C-4 FUEL POOL COOLING - CLOSED LOOP WITH FUEL POOL

D. RHR TEST DURING PLANT OPERATION.

E. POST ACCIDENT CONTAINMENT SPRAY WITH HEAT REJECTION AND BORON BOX PLUGGED.

F. MINIMUM FLOW BYPASS MODE.

S. SYSTEM ON STANDBY DUTY.

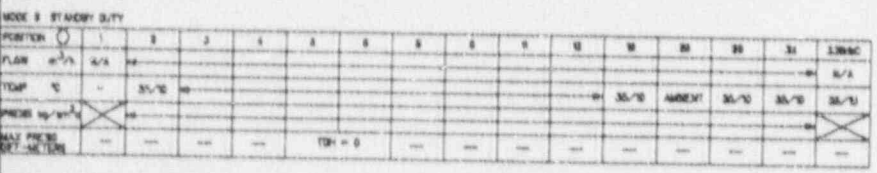


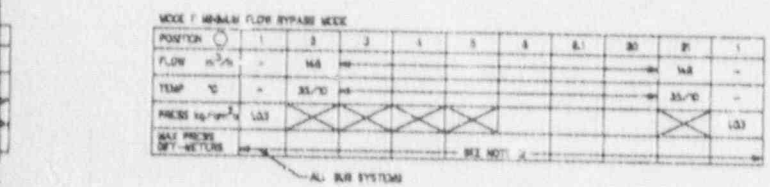
TABLE 1 VALVE POSITION CHART (SEE NOTE 8)

MODE	STRAINER
A	BOX P
B-1	BOX P
B-2	BOX P
C-1	CLEAR
C-2	CLEAR
C-3	CLEAR
C-4	CLEAR
D	CLEAR
E	BOX P
F - POOL	CLEAR
S	CLEAR

O = VALVE OPEN
T = VALVE THROTTLE
T-C = VALVE THROTTLED OR CLOSED
O-T = VALVE OPEN OR THROTTLED
P = STRAINER PLUGGED
BLANK SPACE INDICATE VALVE IS CLOSED

LEGEND

RX PRESS ------- REACTOR VESSEL PRESSURE
TDH ---------- TOTAL DYNAMIC HEAD
BOH ---------- SHUTOFF HEAD
ΔH ---------- HEAD LOSS



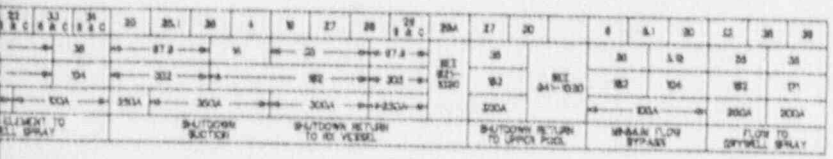
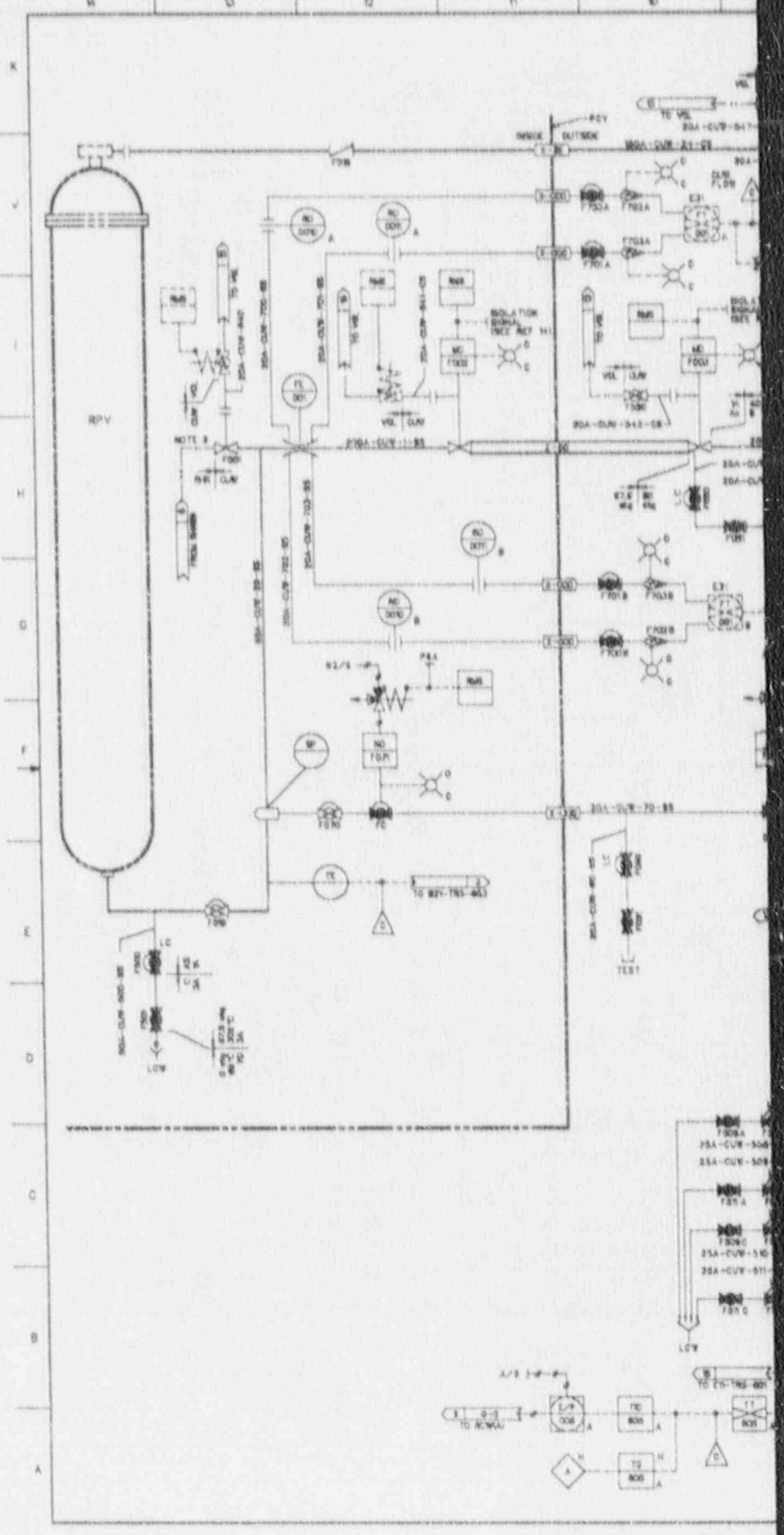


Figure 5.4-11 RHR SYSTEM PFD, Sheet 2 of 2


RPV
INSIDE
OUTSIDE
TO VSL
ISOLATION SIGNAL (NCE REF 141)
NOTE 8
TO RCW-TRS-603
TO RCW-TRS-601
TO RCW-AU
LCW
TES1

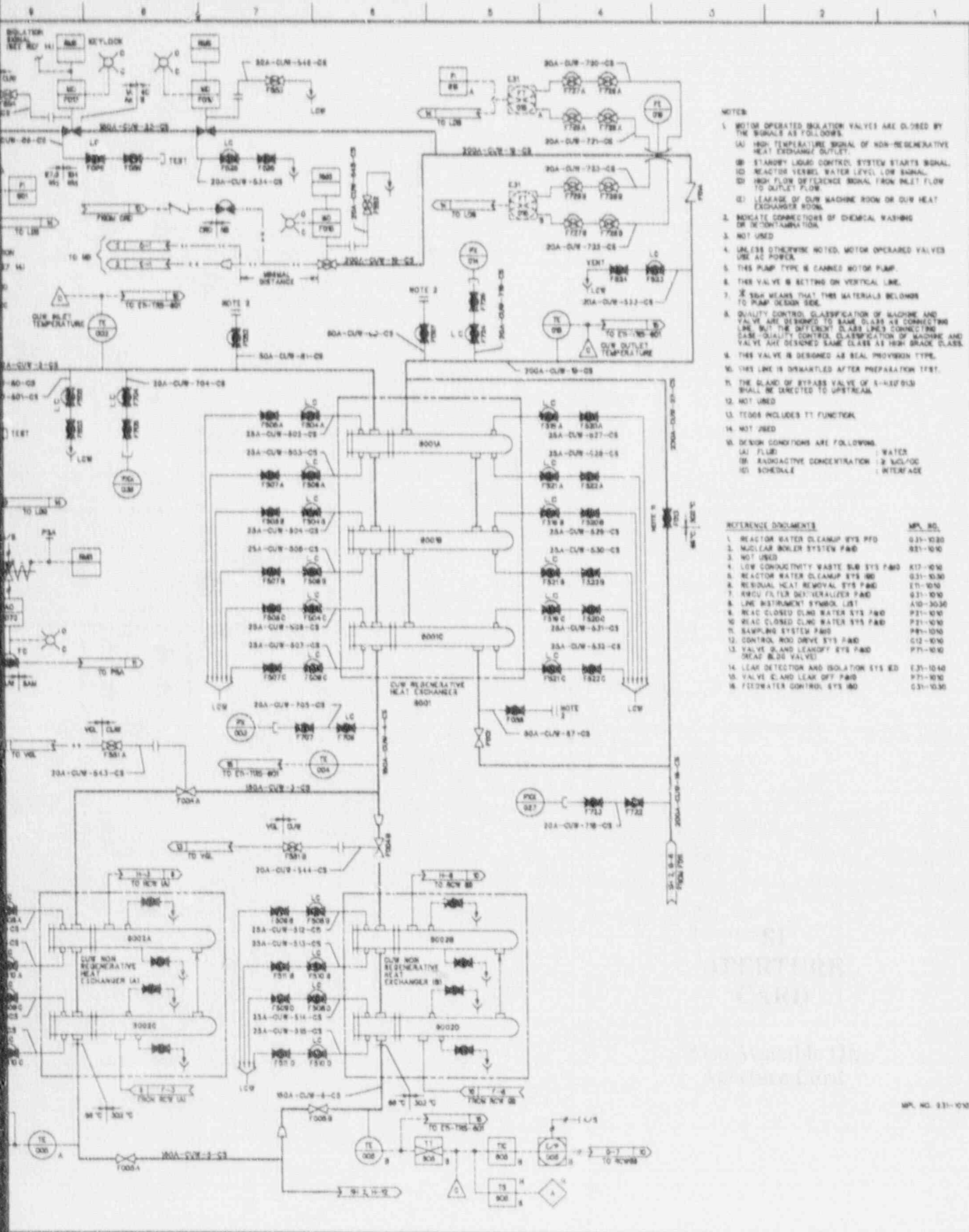


Figure 5.4-12 REACTOR WATER CLEANUP SYSTEM P&ID, Sheet 1 of 2

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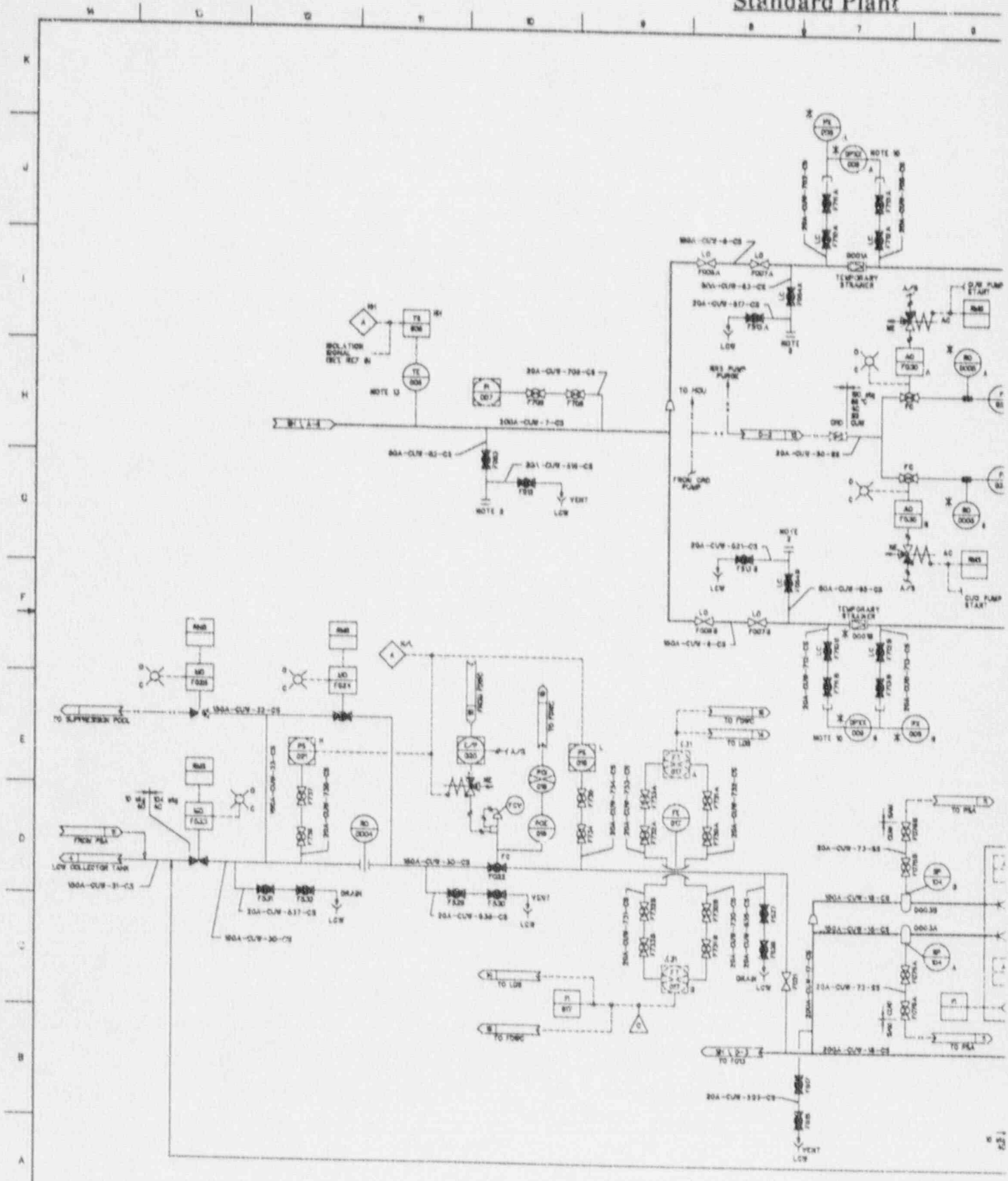
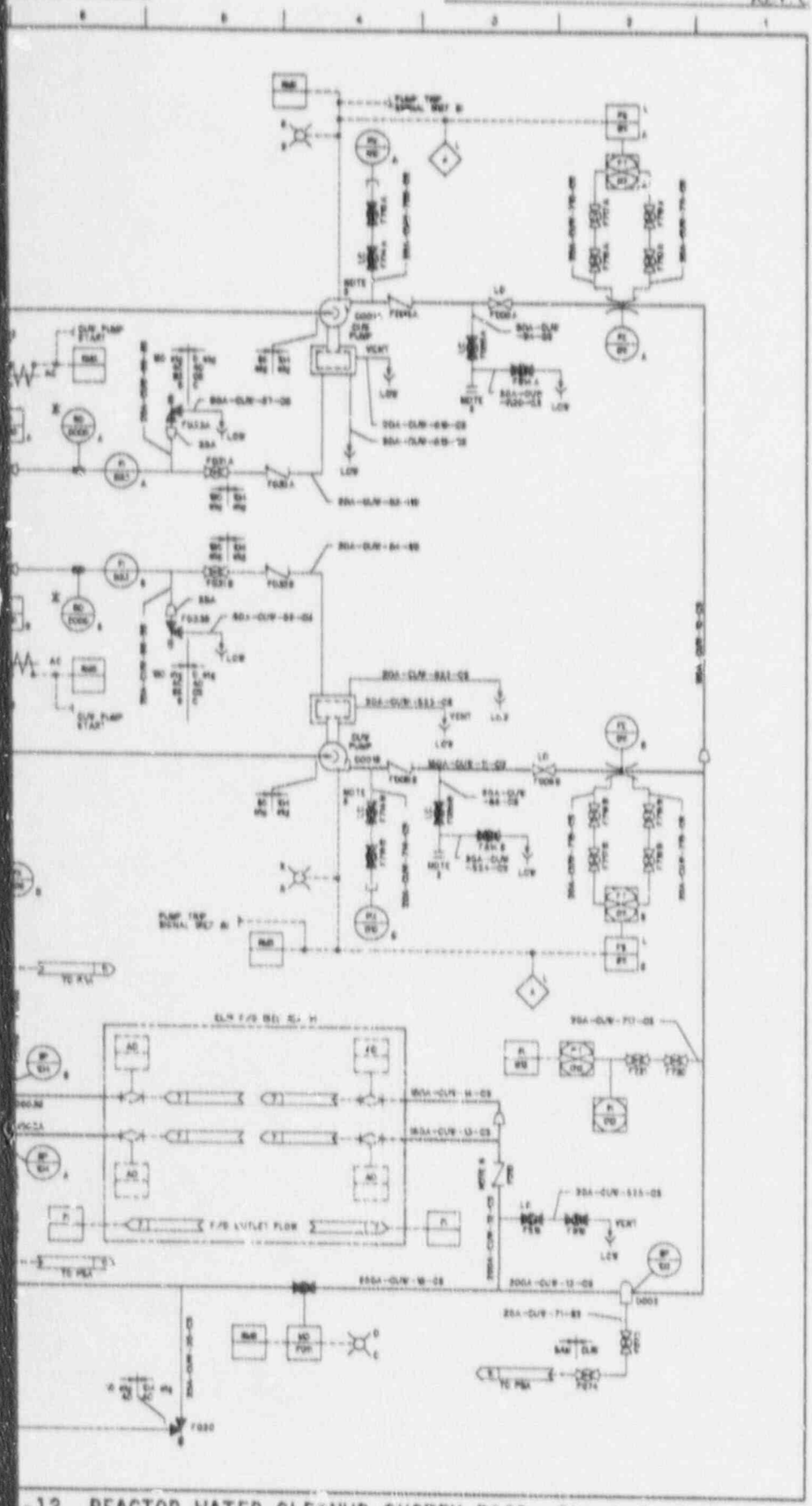
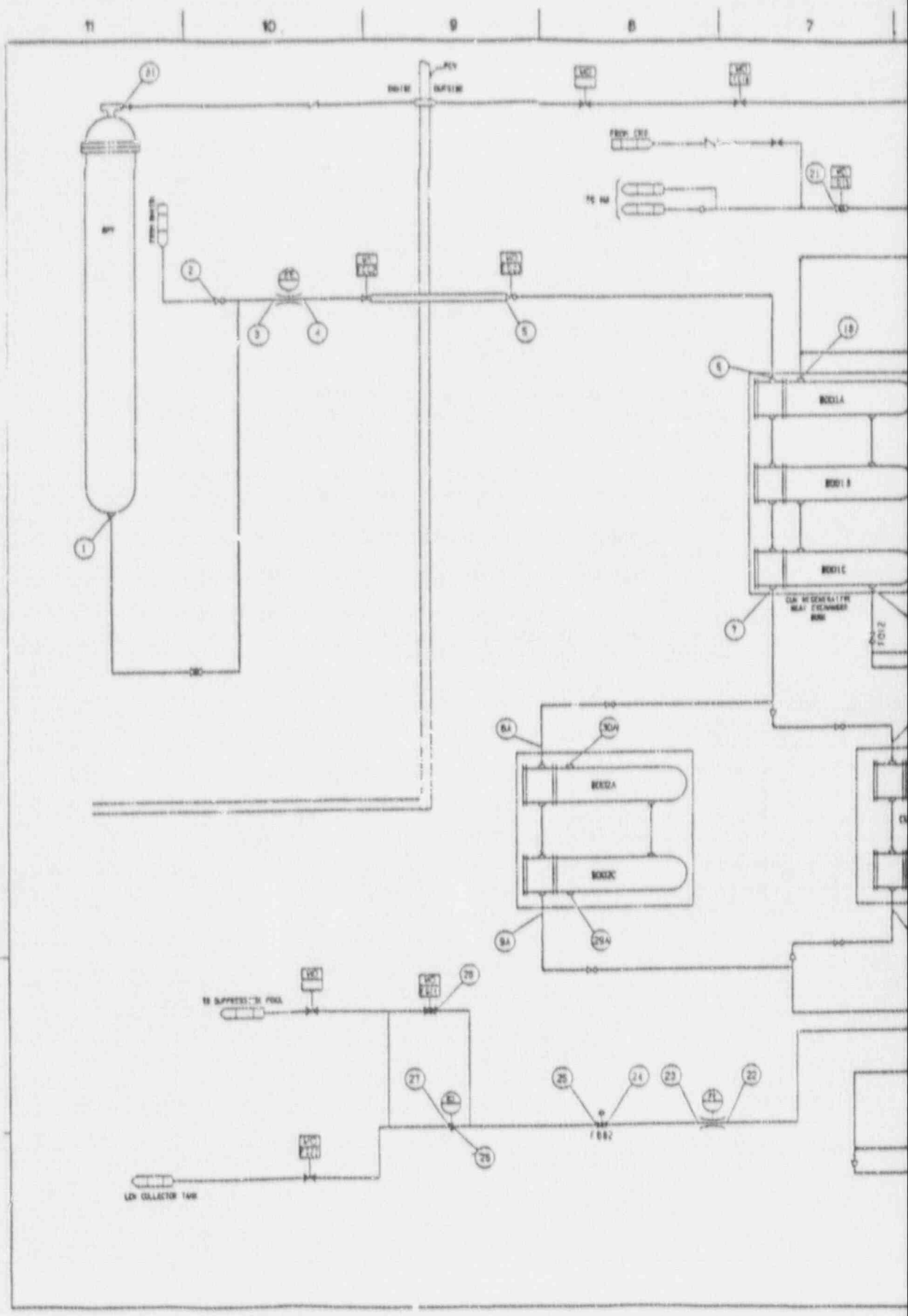


Figure 5.4-12 REA



-12 REACTOR WATER CLEANUP SYSTEM P&ID, Sheet 2 of 2


11
10
9
8
7
FROM CKD
TO SUPPRESS "B" FEED
LCH COLLECTOR TANK

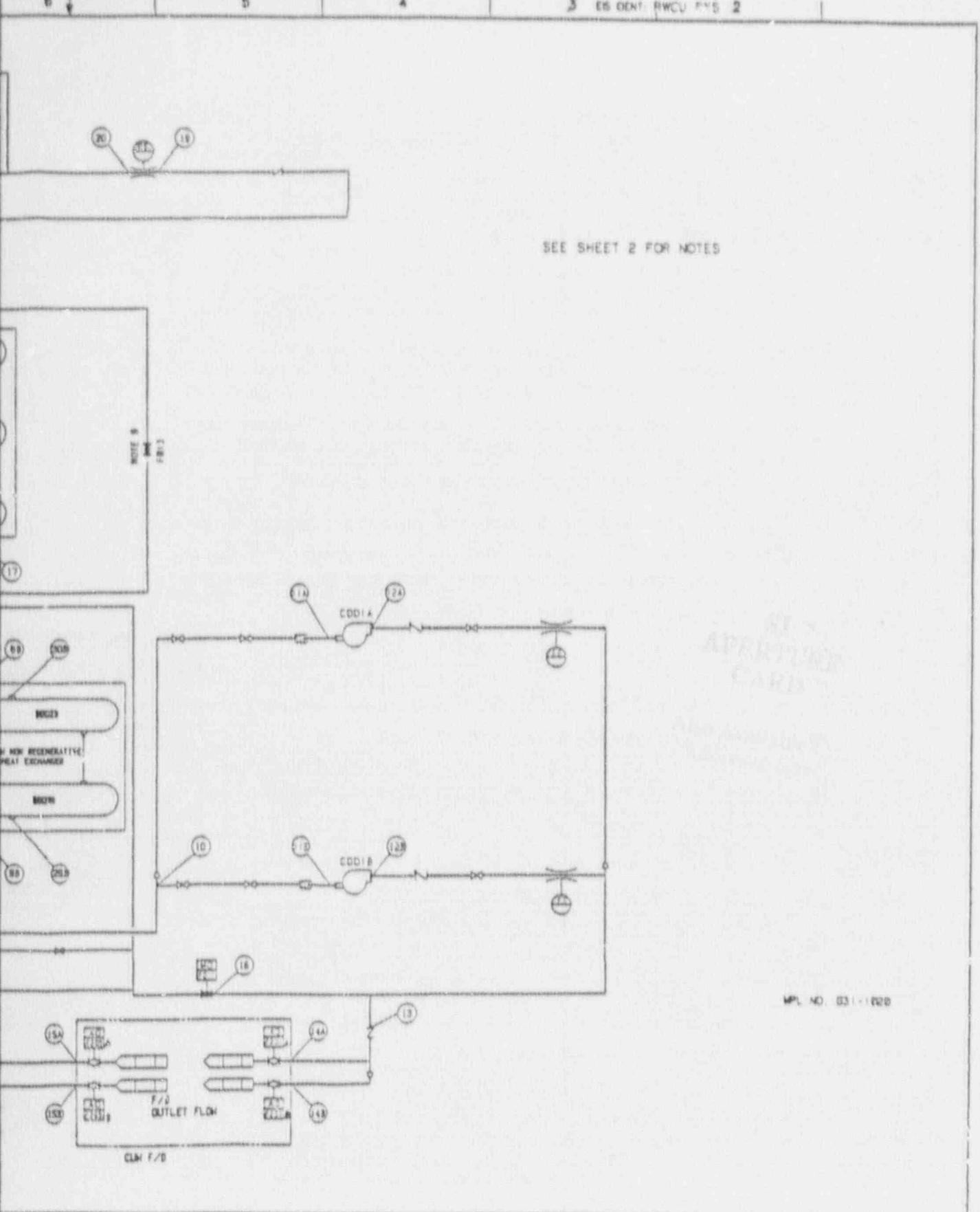
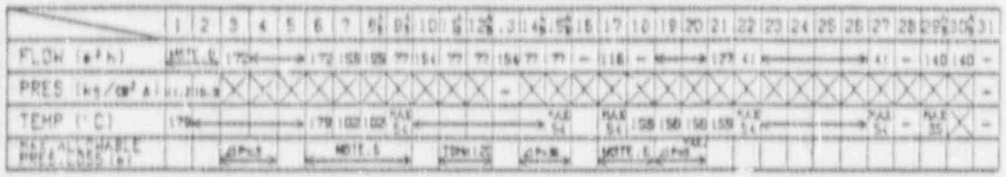


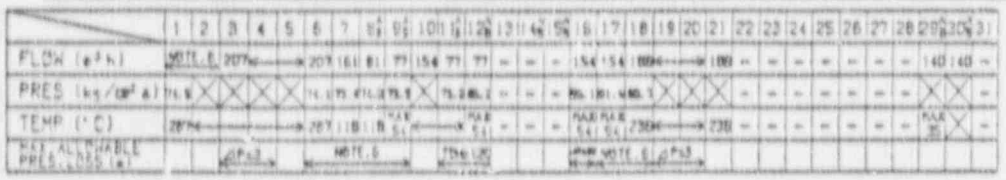
Figure 5.4-13 REACTOR WATER CLEANUP SYSTEM PFD, Sheet 1 of 2

MODE A NORMAL OPERATION (REACTOR PRES. 73.1kg/cm²a)

MODE B START-UP OPERATION (REACTOR PRES. 11.0kg/cm²a) NOTE5

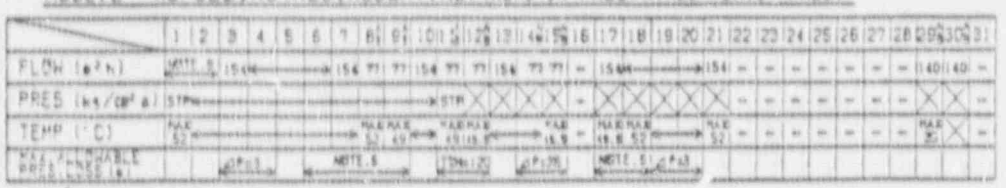


MODE C HOT STANDBY OPERATION(MAINCONDENSER AVAILABLE)(REACTOR PRES. 73.1kg/cm²a)

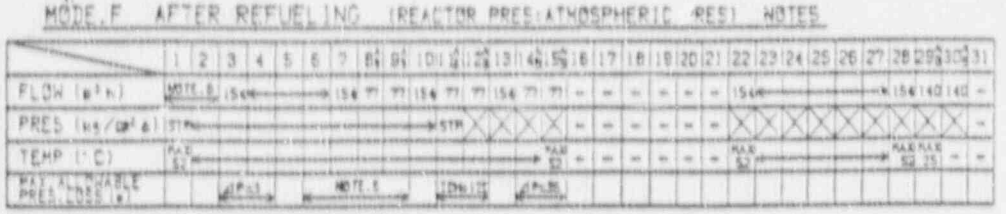


MODE D HOT STANDBY OPERATION(MAINCONDENSER ISOLATION)(REACTOR PRES. 77.6kg/cm²a)

MODE E REFUELING(RECIRCULATING)(REACTOR PRES:ATMOSPHERIC PRES)



MODE F AFTER REFUELING (REACTOR PRES:ATMOSPHERIC PRES) NOTE5



MODE G RPV SPRAY (REACTOR PRES. 10.5kg/cm²a) NOTE7

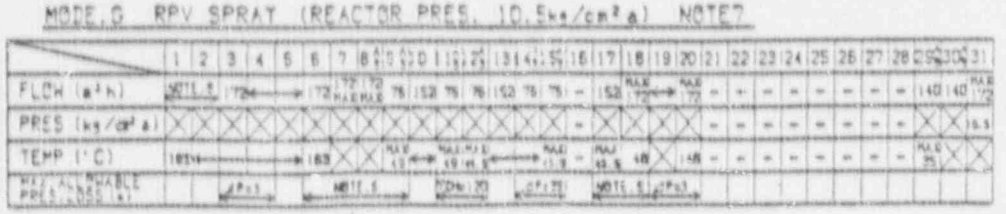


TABLE 1 VALVE OPENING/C

MODE \ V.V. NO.	F002	F003	F011
A	O	O	C
B	O	O	C
C	O	O	O
D	O	O	O
E	O	O	C
F	O	O	C
G	O	O	C

O : OPENING
C : CLOSING
T : THROTTL

GENERAL NOTES THE VALVE(FD04) AND

1. [redacted] SHOWS THE PART WHERE THE FLUID DOES NOT FLOW.
   [redacted] SHOWS THE VALVE WHICH IS NOT NEEDED IN BASIC PLANNING OF THIS SYSTEM.
2. CUW PUMP, CUW NON-REGENERATIVE HEAT EXCHANGER AND CUW REGENERATIVE HEAT EXCHANGER SHALL BE INSTALLED TO HAVE ADEQUATE STATIC PRESSURE. THE MOST SEVERE OPERATING MODE IS OFF GAS OPERATING MODE AT START-UP OPERATION WHEN REACTOR PRESSURE IS 0atg.
3. MODE A IS THE BASIC DESIGN CONDITION OF HEAT EXCHANGER(REGENERATIVE HEAT EXCHANGER AND NON-REGENERATIVE HEAT EXCHANGER).
4. DURING A STARTUP OPERATION F/D MAY BE BYPASSED WHEN F/D IS OUT OF SERVICE.
5. AT MODE B AND MODE F THE VALVE (FD22, FD23, FD24) SHALL BE OPEN AND THEN THE FLUID IS TRANSFERED TO THE LOW CONDUCTIVITY COLLECTOR TANK.
6. THE TOTAL PRESSURE LOSS OF REGENERATIVE HEAT EXCHANGE(SHELL SIDE AND TUBE SIDE) AND NON-REGENERATIVE HEAT EXCHANGER(TUBE SIDE) IS UNDER 2.1kg/cm².
7. ALL OF THE SYSTEM FLOW IS SPRAYED FROM RPV SPRAY HEADER AT THE RPV SPRAY MODE.
8. THE TOTAL FLOW RATE FROM RHR AND FROM RPV BOTTOM HEAD DRAIN LINE IS 152.5×10³kg/h.
9. THIS BYPASS LINE MAY BE APPLIED WITH FD13 OPENED AND FD12 CLOSED CONDITION SO THAT THE DECAY HEAT IS REMOVED BY NON REGENERATIVE HEAT EXCHANGER DURING REFUELING OUTAGE IF REQUIRED.

OPENING/CLOSING CONDITION

FD09	FD11	FD15	FD16	FD22	FD23	FD24	F201	F205
O	C	O	C	C	C	C	O	O
O	C	O	C	T	O	C	O	O
O	O	O	C	C	C	C	C	C
O	O	O	C	C	C	C	C	C
O	C	O	C	C	C	C	O	O
O	C	C	C	O	O	O	O	O
O	C	C	O	C	C	C	O	O

O : OPENING
C : CLOSING
T : THROTTLED

SI
APERTURE
CARD

Figure 5.4-13 REACTOR WATER CLEANUP SYSTEM PFD, Sheet 2 of 2

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