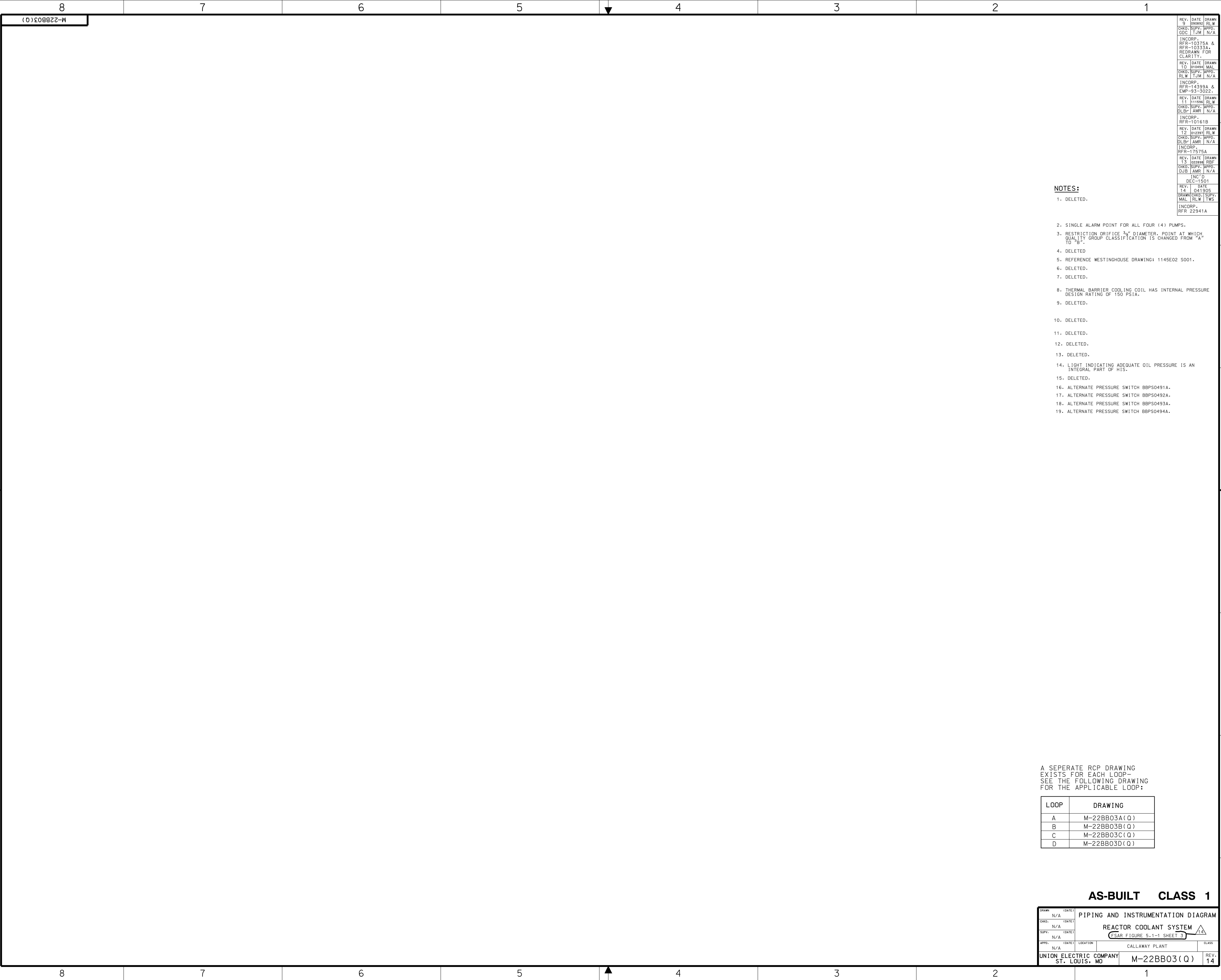


NOTES:  
SEE M-22BB01(Q) FOR NOTES.

AS-BUILT CLASS 1

DRAWING INFORMATION				PROJECT INFORMATION			
DRAWN	N/A	DATE		PROJECT	CALLAWAY PLANT	CLASS	
CHKD.	N/A	DATE		DESCRIPTION	REACTOR COOLANT SYSTEM		
SUPV.	N/A	DATE		FIGURE	FSAR FIGURE 5.1-1 SHEET 2		
APPD.	N/A	DATE		LOCATION	CALLAWAY PLANT		
UNION ELECTRIC COMPANY				M-22BB02 (Q)			
ST. LOUIS, MO				REV. 33			



REV.	DATE	DRAWN
9	090892	RLW
CHKD.	SUPV.	APPR.
GDC	TJM	N/A
INCORP.		
RFR-103375A & RFR-103333A.		
REDRAWN FOR CLARITY.		
REV.	DATE	DRAWN
10	010494	MAL
CHKD.	SUPV.	APPR.
RLW	TJM	N/A
INCORP.		
RFR-14339A & EMP-93-3022.		
REV.	DATE	DRAWN
11	111596	RLW
CHKD.	SUPV.	APPR.
DLB	AMR	N/A
INCORP.		
RFR-10161B		
REV.	DATE	DRAWN
12	012393	RLW
CHKD.	SUPV.	APPR.
DLB	AMR	N/A
INCORP.		
RFR-17575A		
REV.	DATE	DRAWN
13	022898	RBF
CHKD.	SUPV.	APPR.
DJB	AMS	N/A
INC'D		
DEC-1501		
REV.	DATE	
14	041905	
DRAWN	CHKD.	SUPV.
MAL	RLW	TWS
INCORP.		
RFR 22941A		

NOTES:

- DELETED.
- SINGLE ALARM POINT FOR ALL FOUR (4) PUMPS.
- RESTRICTION ORIFICE  $\frac{3}{8}$ " DIAMETER. POINT AT WHICH QUALITY GROUP CLASSIFICATION IS CHANGED FROM "A" TO "B".
- DELETED
- REFERENCE WESTINGHOUSE DRAWING: 1145E02 S001.
- DELETED.
- DELETED.
- THERMAL BARRIER COOLING COIL HAS INTERNAL PRESSURE DESIGN RATING OF 150 PSIA.
- DELETED.
- DELETED.
- DELETED.
- DELETED.
- DELETED.
- LIGHT INDICATING ADEQUATE OIL PRESSURE IS AN INTEGRAL PART OF HIS.
- DELETED.
- ALTERNATE PRESSURE SWITCH BBPS0491A.
- ALTERNATE PRESSURE SWITCH BBPS0492A.
- ALTERNATE PRESSURE SWITCH BBPS0493A.
- ALTERNATE PRESSURE SWITCH BBPS0494A.

A SEPERATE RCP DRAWING  
EXISTS FOR EACH LOOP-  
SEE THE FOLLOWING DRAWING  
FOR THE APPLICABLE LOOP:

LOOP	DRAWING
A	M-22BB03A(Q)
B	M-22BB03B(Q)
C	M-22BB03C(Q)
D	M-22BB03D(Q)

AS-BUILT CLASS 1

DRAWN	(DATE)	PIPING AND INSTRUMENTATION DIAGRAM		
N/A				
CHKD.	(DATE)	REACTOR COOLANT SYSTEM		
N/A		CSAR FIGURE 5.1-1 SHEET 3		
SUPV.	(DATE)			
N/A				
APPR.	(DATE)	LOCATION	CALLAWAY PLANT	CLASS
N/A				
UNION ELECTRIC COMPANY ST. LOUIS, MO		M-22BB03(Q)		REV. 14

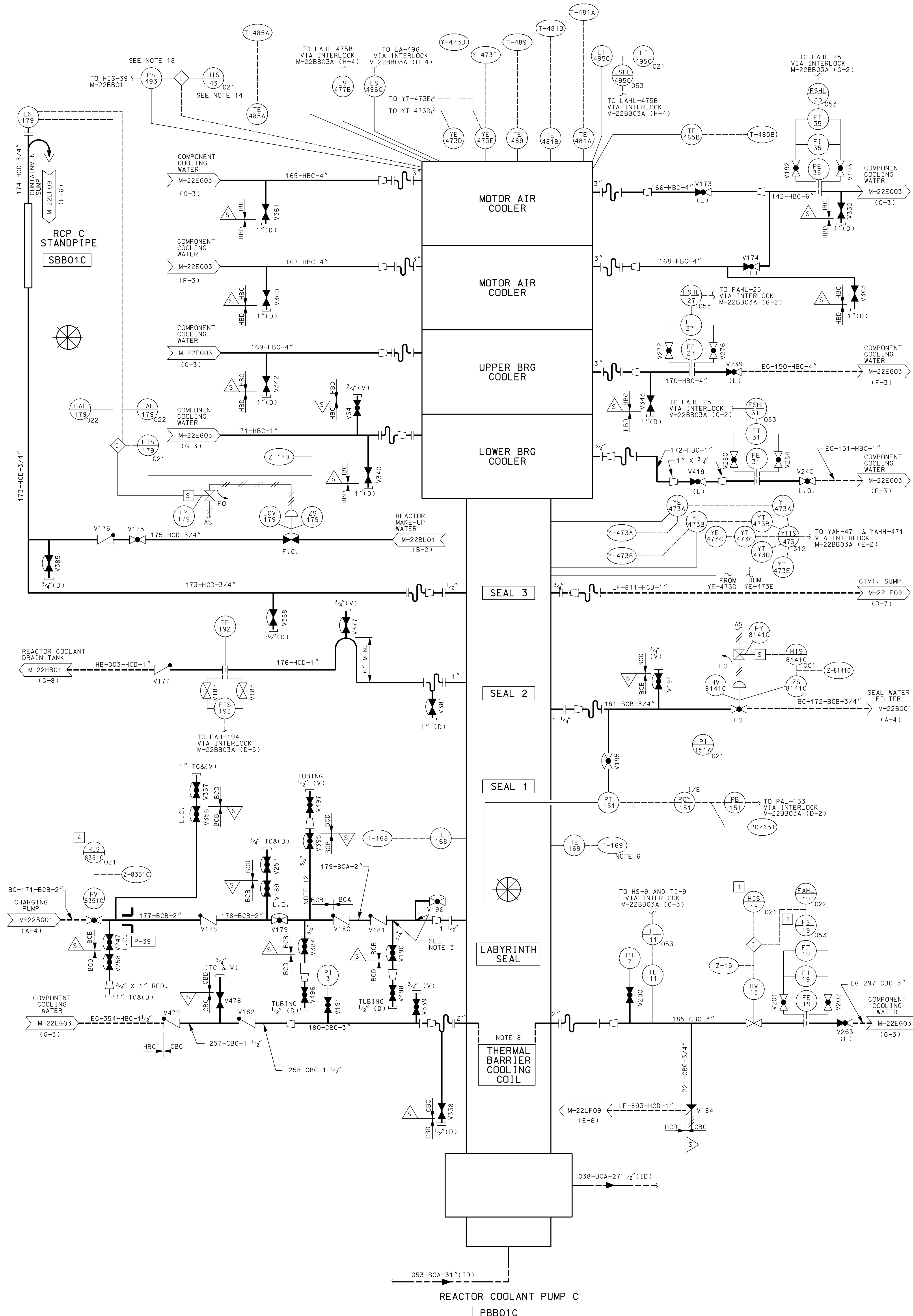




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REV. DATE DRAWMN
0 01239R RLW
CHKD SUPP. APPD.
JHK AMR N/A
INCRPATES
RFR=17575A
REV. DATE DRAWMN
3 03319R DLB
CHKD SUPP. APPD.
JHK AMR N/A
INCRP
DEC-1402
REV. DATE DRAWMN
3 04193R DUB
CHKD SUPP. APPD.
JHK AMR N/A
INCRPATES
CMP 95=1028A
REV. DATE DRAWMN
4 06359R RAM
CHKD SUPP. APPD.
JHK AMR N/A
INCRPATES
RFR=18322A
REV. DATE DRAWMN
7 02019R DUB
CHKD SUPP. APPD.
JHK AMR N/A
INCRPATES
RFR=19267A
REV. DATE DRAWMN
7 11039R RLW
CHKD SUPP. APPD.
JHK AMR N/A
INCRPATES
MP 97=100B
REV. DATE DRAWMN
8 04310R EWM
CHKD SUPP. APPD.
JHK AMR N/A
INCRPATES
FCN=02
REV. DATE DRAWMN
CHKD SUPP. APPD.
JHK AMR N/A
INCRPATES
MP 22341A
REV. DATE DRAWMN
10 103710
CHKD SUPP. APPD.
JHK AMR N/A
INCRPATES
RFR=20106760
REV. DATE DRAWMN
11 071416
CHKD SUPP. APPD.
JHK AMR N/A
INCRPATES
RFR=20160305A

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SEE M-22BB03 FOR NOTES.  
DO NOT ADD NOTES TO THIS DRAWING.

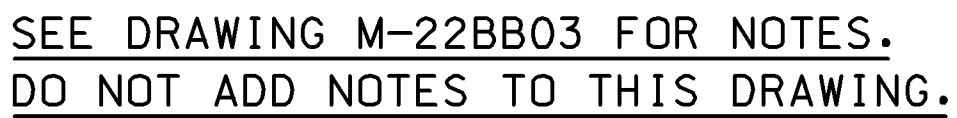
AS-BUILT CLASS 1

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CHKD	N/A	(DATE)	
SUPV	N/A	(DATE)	
APPR	N/A	(DATE)	
LOCATION	CALLAWAY PLANT		
CLASS			
UNION ELECTRIC COMPANY	M-22BB03C(Q)	REV.	7
ST. LOUIS, MO			

REV.	DATE	DRWN	012391	RLW
CHD.	SUPV.	PPRO.	DLB	AMR
PER	FR	RFR	17575A	
INITIAL	ISSUE			
REV.	DATE	DRWN	033191	DLB
CHD.	SUPV.	PPRO.	RLW	AMR
PER	FR	RFR	17575A	
INCORP	DEC-1402			
REV.	DATE	DRWN	040898	MAL
CHD.	SUPV.	PPRO.	EWM	JHK
PER	FR	RFR	1501	
INCORP	DEC-1501			
REV.	DATE	DRWN	062598	RAM
CHD.	SUPV.	PPRO.	JHK	AMR
PER	FR	RFR	18922A	
INCORP	DEC-18922A			
REV.	DATE	DRWN	020199	DJB
CHD.	SUPV.	PPRO.	RAM	AMR
PER	FR	RFR	19267A	
INCORP	DEC-19267A			
REV.	DATE	DRWN	100899	RLW
CHD.	SUPV.	PPRO.	DJB	AMR
PER	FR	RFR	1008A	
INCORP	DEC-1008A			
REV.	DATE	DRWN	120503	TWS
CHD.	SUPV.	PPRO.	RLW	MAL
PER	FR	RFR	200307724	
INCORP	DEC-200307724			
REV.	DATE	DRWN	110904	TWS
CHD.	SUPV.	PPRO.	RLW	MAL
PER	FR	RFR	22341A	
INCORP	DEC-22341A			

REACTOR COOLANT SYSTEM  
FSAR FIGURE 5.1-1 SHEET 3C





DRAWN	(DATE)						
N/A		PIPING AND INSTRUMENTATION DIAGRAM					
CWGD.	(DATE)						
N/A		REACTOR COOLANT SYSTEM					
SUPV.	(DATE)						
N/A		FSAR FIGURE 5.1-1 SHEET 3D					
APPD.	(DATE)	LOCATION					CLASS
N/A			CALLAWAY PLANT				
UNION ELECTRIC COMPANY ST. LOUIS, MO.			M-22BB03D(Q)				REV. 8

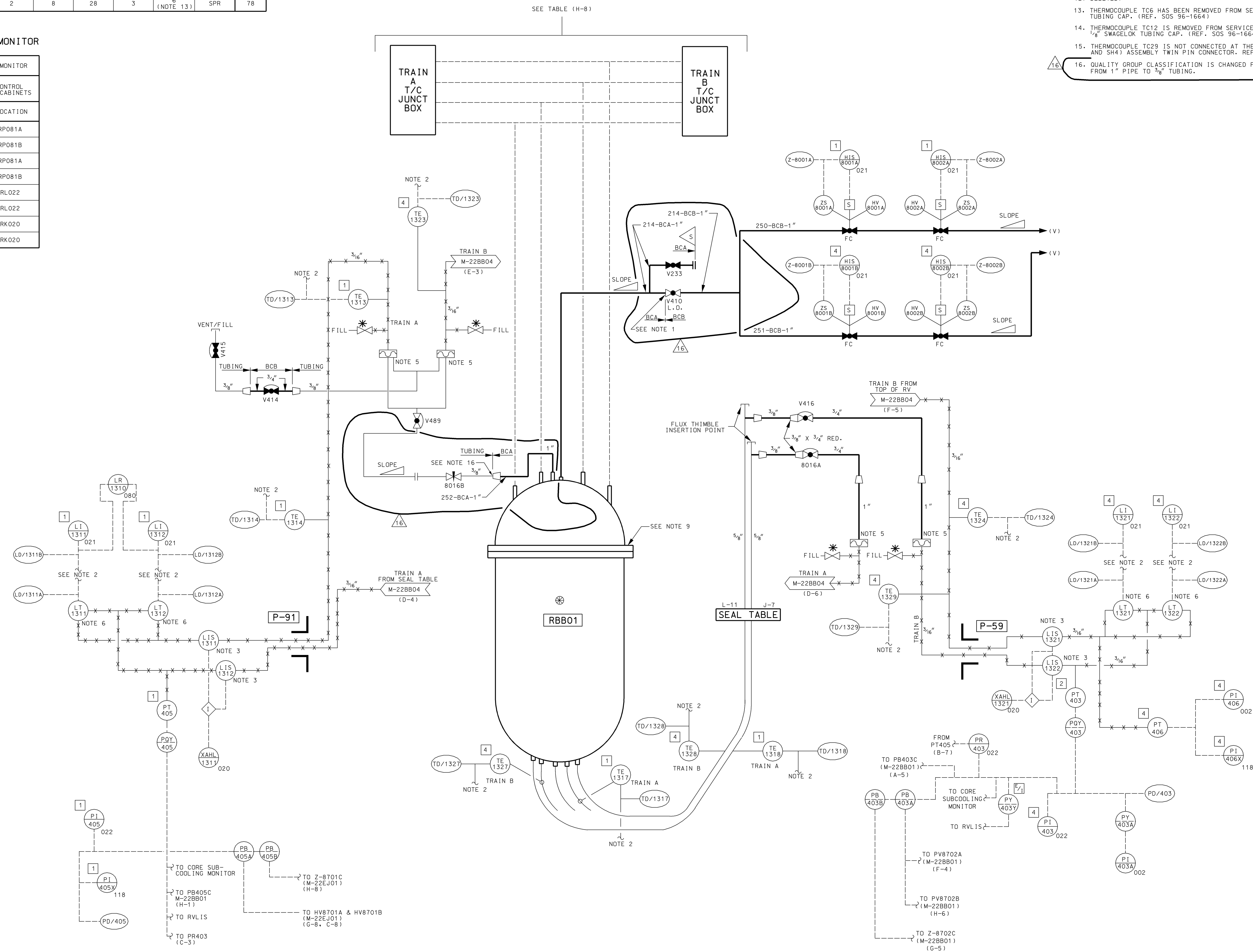
CLASS 1  
N DIAGRAM  
ITEM  
30  
CLASS  
(Q) REV.  
8

## RV CORE SUBCOOLING MONITOR

TRAIN	SEP. GRP.	T/C JUNCT. RDW. NO.	T/C NUMBER							PENE- TRATION NO.
A	1	BB04A	38	30	33	5	45	41 (NOTE 10)	SPR	75
			48	20	44	47	49	43	SPR	76
			42	39	15	35	13	46	7	77
			31	27	32	29 (NOTE 5)	4	1	SPR	78
B	4	BB04B	37	9	17	12 (NOTE 14)	36	11	SPR	75
			24	23	19	50	25	22	18	76
			40 (NOTE 11)	16 (NOTE 11)	14	34	10	21	SPR	77
			26	2	8	28	3	6 (NOTE 13)	SPR	78

RV CORE SUBCOOLING MONITOR  
(NOTE 8)

THERMOCOUPLE/CORE COOLING MONITOR	
DISPLAY INSTRUMENTS FOR CONTROL BOARD SECTION AND/OR OTHER CABINETS	
INSTRUMENT TAG NO.	LOCATION
UU-1390A	RP081A
UU-1390B	RP081B
TR-1390A	RP081A
TR-1390B	RP081B
TI-1390A	RL022
TI-1390B	RL022
TAL-1390A	RK020
TALL-1390B	RK020



- # NOTES
1. REFER TO NOTE 1 ON M-228B01(0).
  2. SEE WESTINGHOUSE PROCESS BLOCK DIAGRAMS-W DWG. NO. 2326D90 (4 SHEETS), AND WESTINGHOUSE INSTALLATION SCHEMATIC.
  3. L15-1311, 1312, 1321, AND 1322 ARE HYDRAULIC ISOLATORS WITH A MALFUNCTION INDICATION.
  4. DELETED.
  5. HYDRAULIC SENSORS.
  6. LEVEL TRANSMITTER TWIN CONNECTION ABOVE HYDRAULIC ISOLATOR AND NEAR CONTAINMENT PENETRATION.
  7. DELETED.
  8. FOR THERMOCOUPLE/CORE COOLING MONITOR SEE WESTINGHOUSE DRAWING 2332D78, (5 SHEETS).
  9. ONLY 63 OF THE 54 STUDS ARE REQUIRED TO BE TENSIONED TO ENSURE O-RING SEATING AND COMPLIANCE WITH THE ASME CODE STRESS CONCENTRATION FACTORS.
  10. BBTC0041 HAS BEEN ABANDONED IN PLACE.
  11. THERMOCOUPLES TC16 AND TC40 HAVE BEEN REMOVED FROM SERVICE AND CAPPED WITH A 1/8" SWAGelok TUBING CAP (REF. CMP 92-1028).
  12. DELETED.
  13. THERMOCOUPLE TC6 HAS BEEN REMOVED FROM SERVICE AND CAPPED WITH A 1/8" SWAGelok TUBING CAP. (REF. SDS 96-1664)
  14. THERMOCOUPLE TC12 IS REMOVED FROM SERVICE AND CAPPED WITH A 1/8" SWAGelok TUBING CAP. (REF. SDS 96-1664 AND RFR-174738)
  15. THERMOCOUPLE TC29 IS NOT CONNECTED AT THE TRANSITION CABLE (1BBS33AX - P4, NA4, AND SH4) ASSEMBLY TWIN PIN CONNECTOR. REF. SDS 99-2142 AND RFR-174738.
  16. QUALITY GROUP CLASSIFICATION IS CHANGED FROM "A" TO "B" AT THE 3/8" ADAPTOR FROM 1" PIPE TO 3/8" TUBING.

AS-BUILT CLASS 1

DRAWN	(DATE)						
N/A							
CHECKED	(DATE)	PIPING & INSTRUMENTATION DIAGRAM					
N/A		REACTOR COOLANT SYSTEM					
SUPV.	(DATE)	FSAR FIGURE 5.1-1 SHEET 4					
N/A		CALLAWAY ENERGY CENTER					
APPROD.	(DATE)	LOCATION				CLASS	
N/A							
UNION ELECTRIC COMPANY ST. LOUIS, MO							M-22BB04(Q) REV. 16



## NOTES TO FIGURE 5.1-2

## Mode A Steady State Full Power Operation

<u>Location</u>	<u>Fluid</u>	<u>Pressure</u>	<u>Temperature</u>	<u>Flow</u>		<u>Volume</u>
		<u>(psig)</u>	<u>(°F)</u>	<u>gpm</u> <sup>(1)</sup>	<u>lb/hr</u> <sup>(2)</sup>	
1	Reactor coolant	2,235.0	618.8	108,781	36.2040	-
2	Reactor coolant	2,233.7	618.8	108,781	36.2040	-
3	Reactor coolant	2,189.7	557.7	97,452	36.2040	-
4	Reactor coolant	2,186.1	557.7	97,453	36.2040	-
5	Reactor coolant	2,282.3	558.0	97,368	36.2065	-
6	Reactor coolant	2,281.0	558.0	97,361	36.2040	-
10-15	Reactor coolant	See Loop #1 Specifications				-
19-24	Reactor coolant	See Loop #1 Specifications				-
28-33	Reactor coolant	See Loop #1 Specifications				-
37	Reactor coolant	2,282.3	558.0	1.0	0.00037	-
38	Reactor coolant	2,282.3	558.0	1.0	0.00037	-
39	Reactor coolant	2,282.3	558.0	2.0	0.00074	-

CALLAWAY - SP

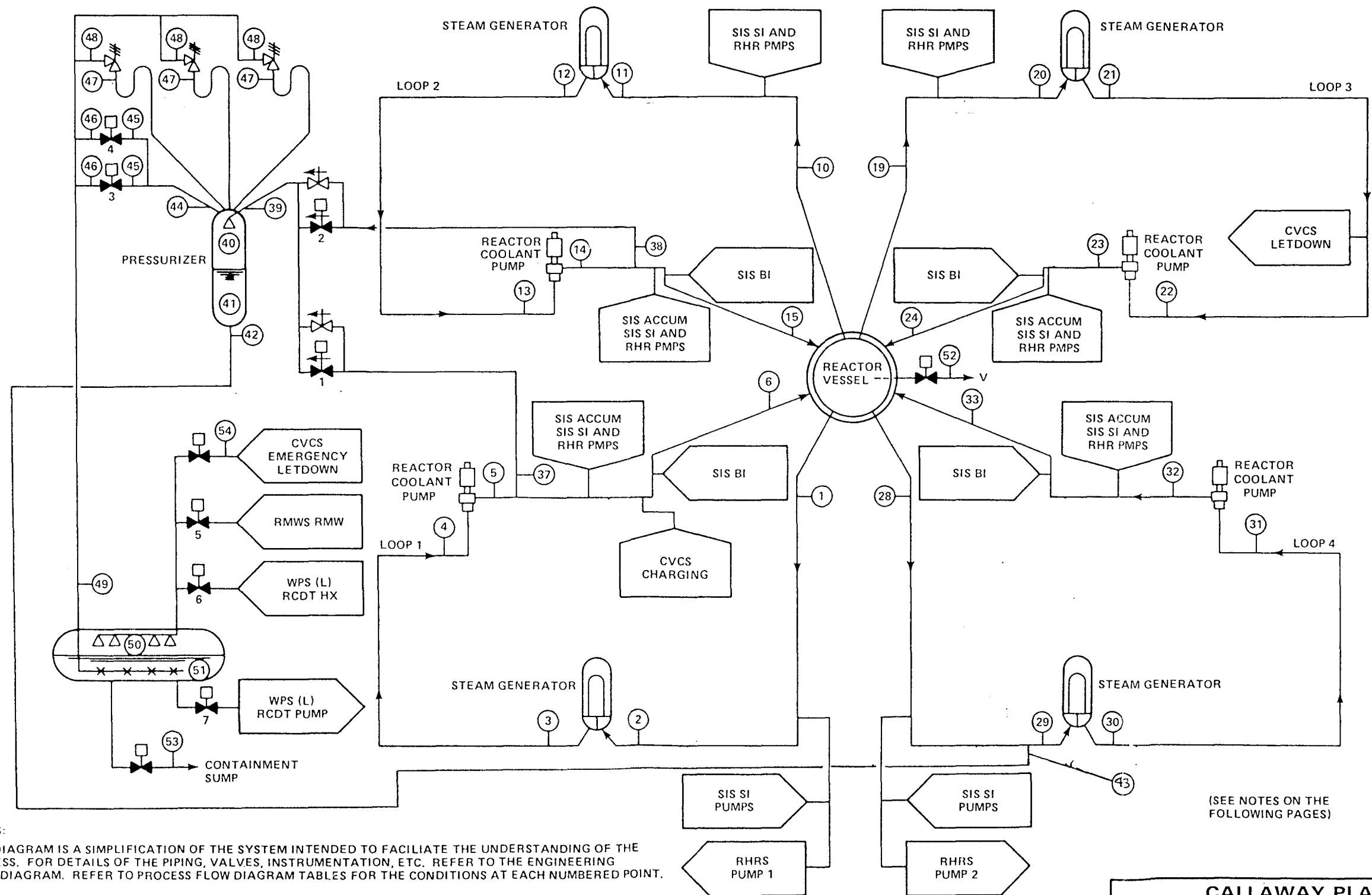
NOTES TO FIGURE 5.1-2 (Sheet 2)

<u>Location</u>	<u>Fluid</u>	<u>Pressure</u>	<u>Temperature</u>	<u>Flow</u>		<u>Volume</u>
		<u>(psig)</u>	<u>(°F)</u>	<u>gpm</u> <sup>(1)</sup>	<u>lb/hr</u> <sup>(2)</sup>	
40	Steam	2,235.0	652.7	-	-	720
41	Reactor coolant	2,235.0	652.7	-	-	1,080
42	Reactor coolant	2,235.0	652.7	2.5	0.0007	-
43	Reactor coolant	2,235.0	652.7	2.5	0.0007	-
44	Steam	2,235.0	652.7	0	0	-
45	Reactor coolant	2,235.0	≤300	0	0	Minimize
46	N <sub>2</sub>	3.0	120	0	0	-
47	Reactor coolant	2,235.0	≤300	0	0	Minimize
48	N <sub>2</sub>	3.0	120	0	0	-
49	N <sub>2</sub>	3.0	120	0	0	-
50	N <sub>2</sub>	3.0	120	-	-	450
51	Pressurizer relief tank water	3.0	120	-	-	1,350
52	Steam/H <sub>2</sub>	2,235.0	559	0	0	-
53	Reactor coolant	3.0	120	0	0	-
54	Reactor coolant	50	170	0	0	-

(1) At the conditions specified.

(2) X 10<sup>6</sup>.





## NOTES:

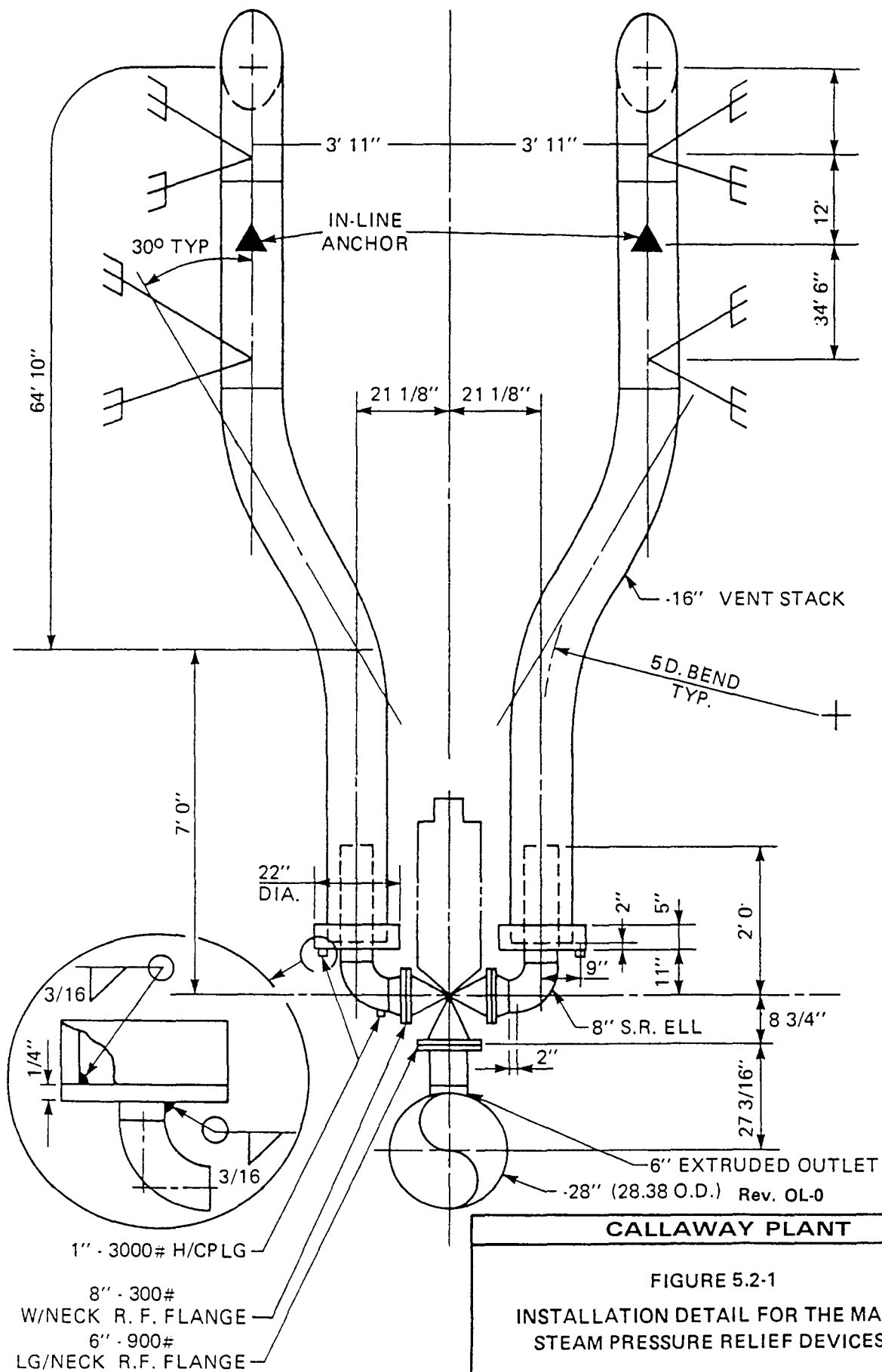
THIS DIAGRAM IS A SIMPLIFICATION OF THE SYSTEM INTENDED TO FACILITATE THE UNDERSTANDING OF THE PROCESS. FOR DETAILS OF THE PIPING, VALVES, INSTRUMENTATION, ETC. REFER TO THE ENGINEERING FLOW DIAGRAM. REFER TO PROCESS FLOW DIAGRAM TABLES FOR THE CONDITIONS AT EACH NUMBERED POINT.

(SEE NOTES ON THE FOLLOWING PAGES)

REV OL-8  
11/95

## CALLAWAY PLANT

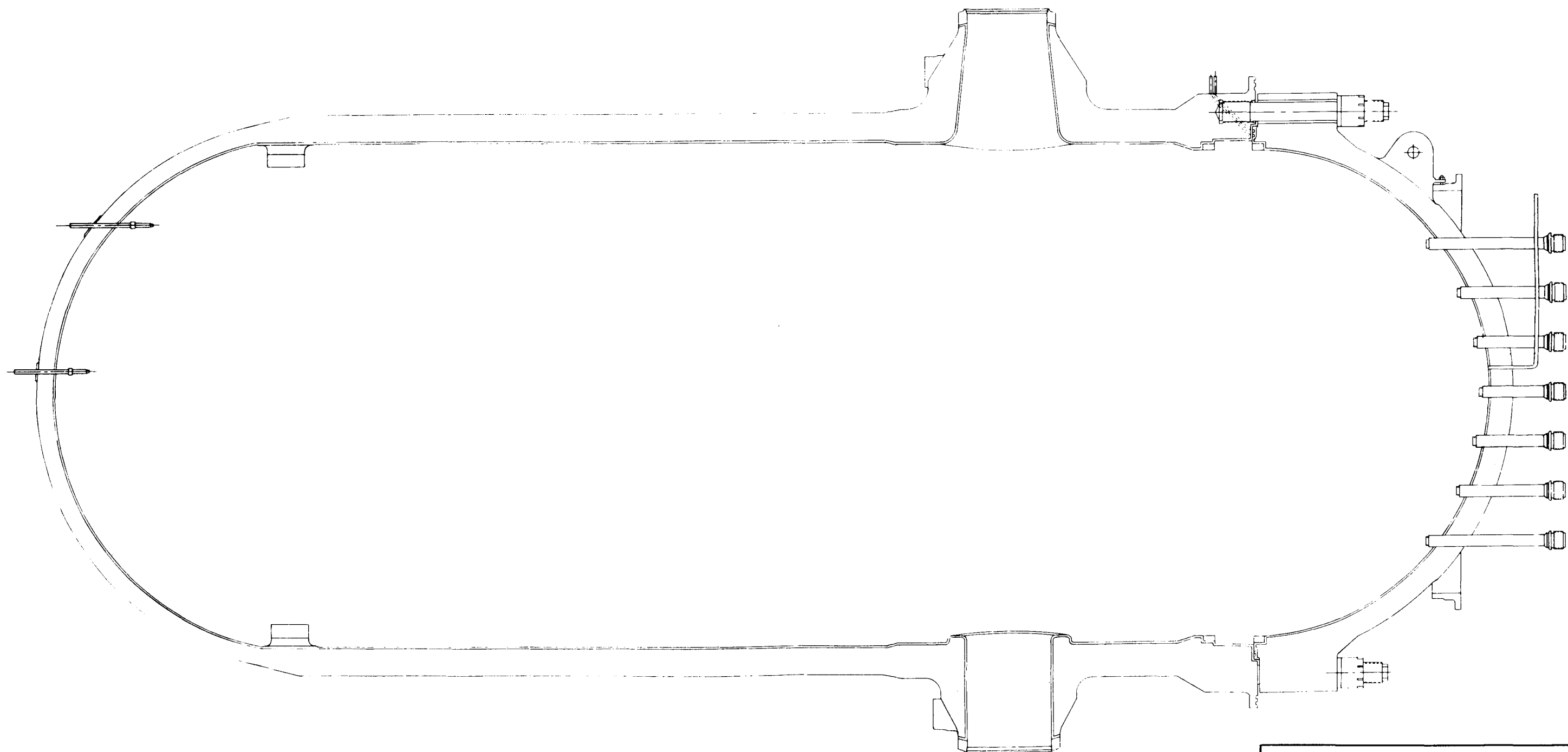
FIGURE 5.1-2  
REACTOR COOLANT SYSTEM  
PROCESS FLOW DIAGRAM



6/86

<b>CALLAWAY PLANT</b>
<b>FIGURE 5.2-1</b>
<b>INSTALLATION DETAIL FOR THE MAIN STEAM PRESSURE RELIEF DEVICES</b>



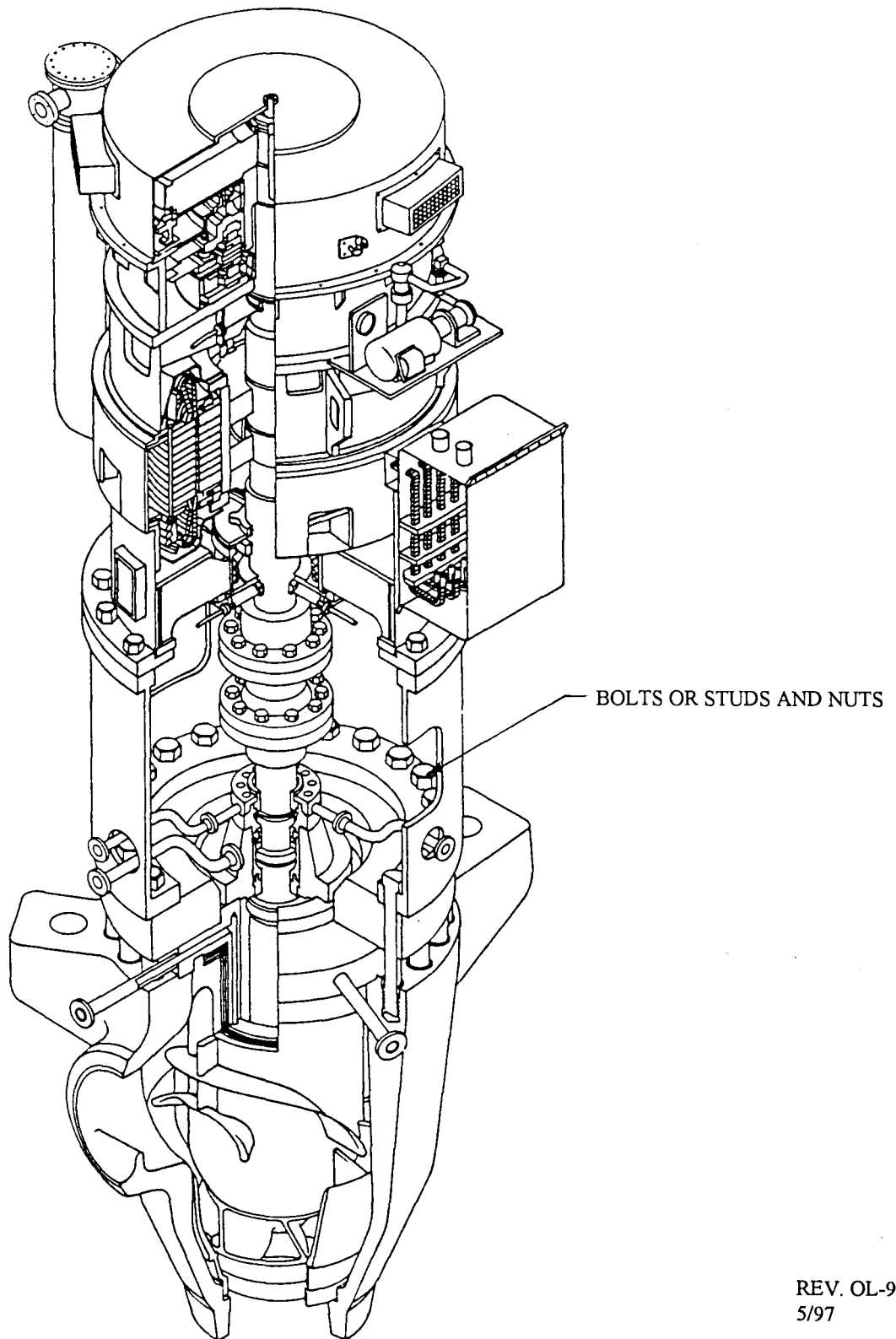


Rev. OL-0  
6/86

**CALLAWAY PLANT**

FIGURE 5.3-1  
REACTOR VESSEL



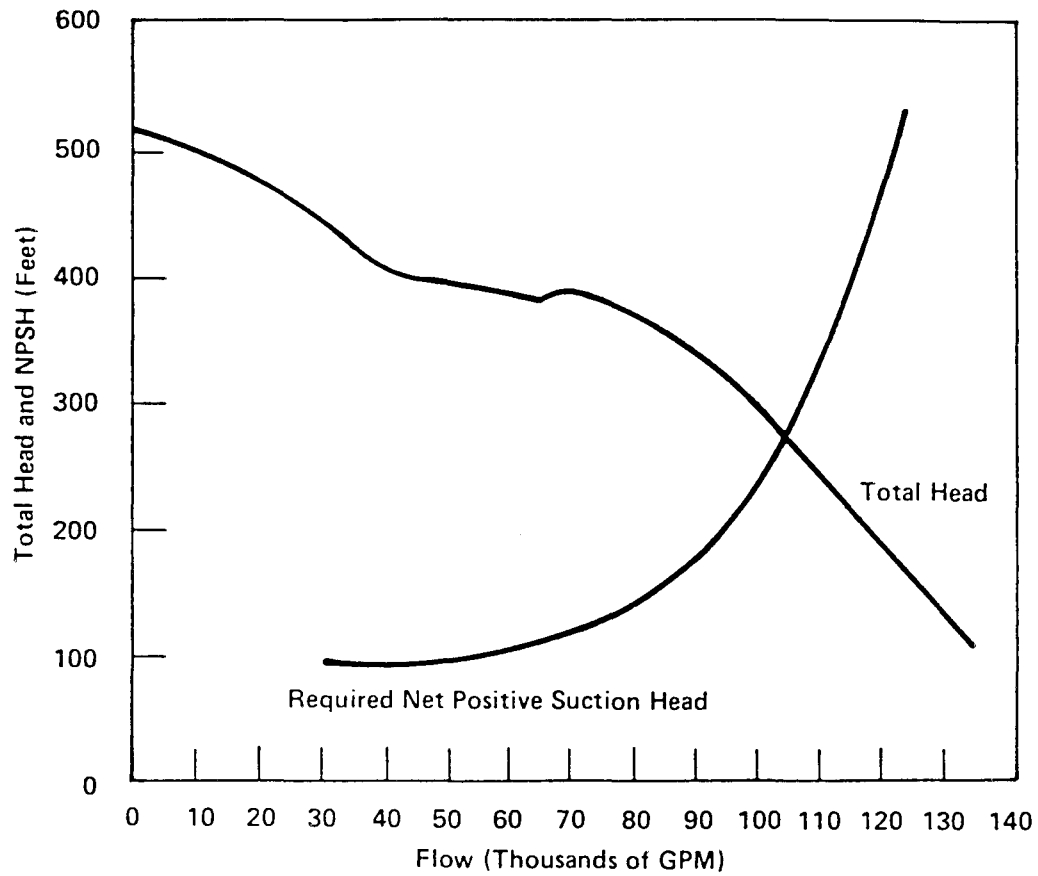


REV. OL-9  
5/97

**CALLAWAY PLANT**

FIGURE 5.4-1

REACTOR COOLANT CONTROLLED  
LEAKAGE PUMP

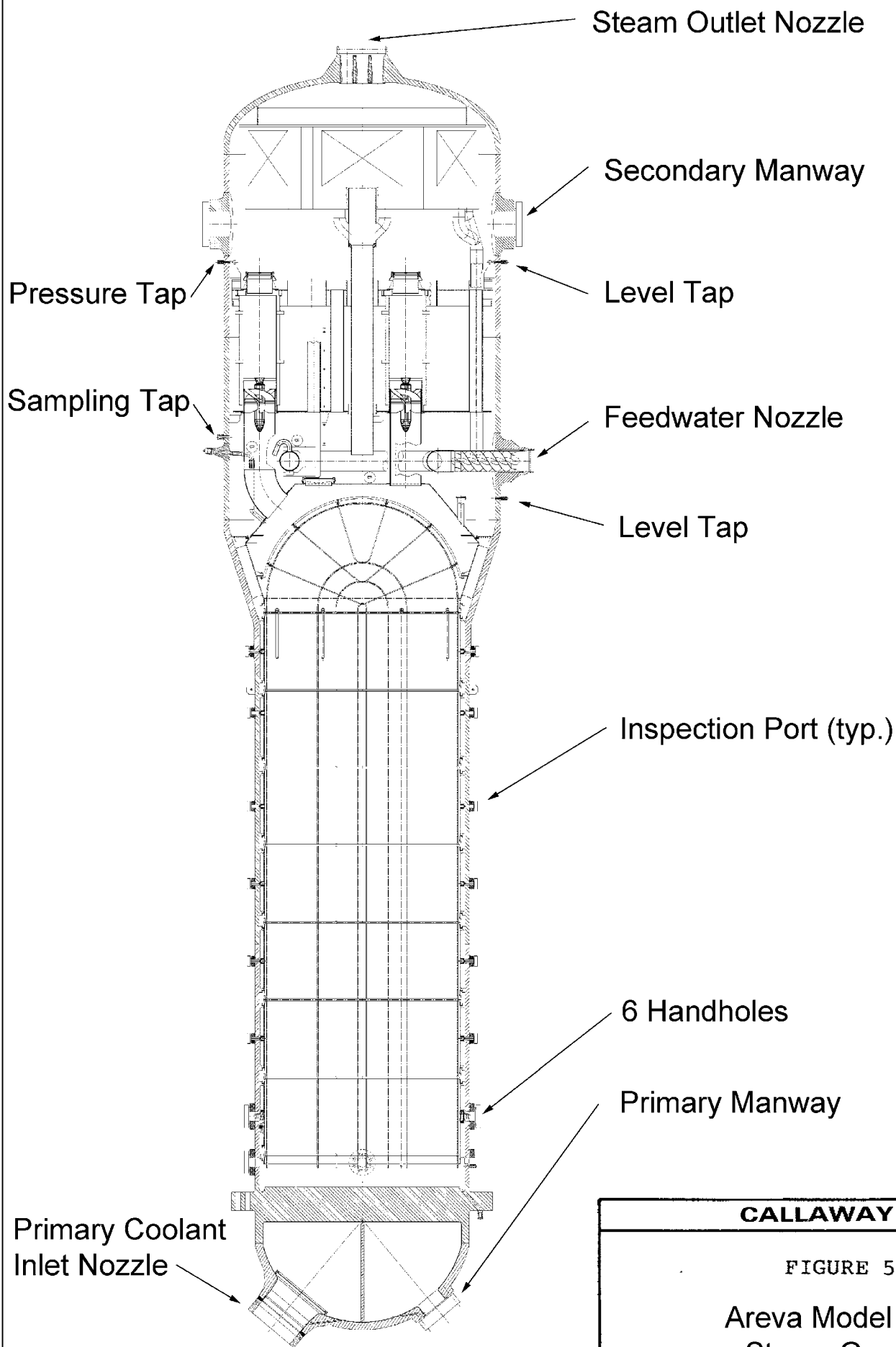


Rev. OL-0  
6/86

**CALLAWAY PLANT**

FIGURE 5.4-2

REACTOR COOLANT PUMP ESTIMATED  
PERFORMANCE CHARACTERISTIC



REV. OL-15  
5/06

**CALLAWAY PLANT**

FIGURE 5.4-3

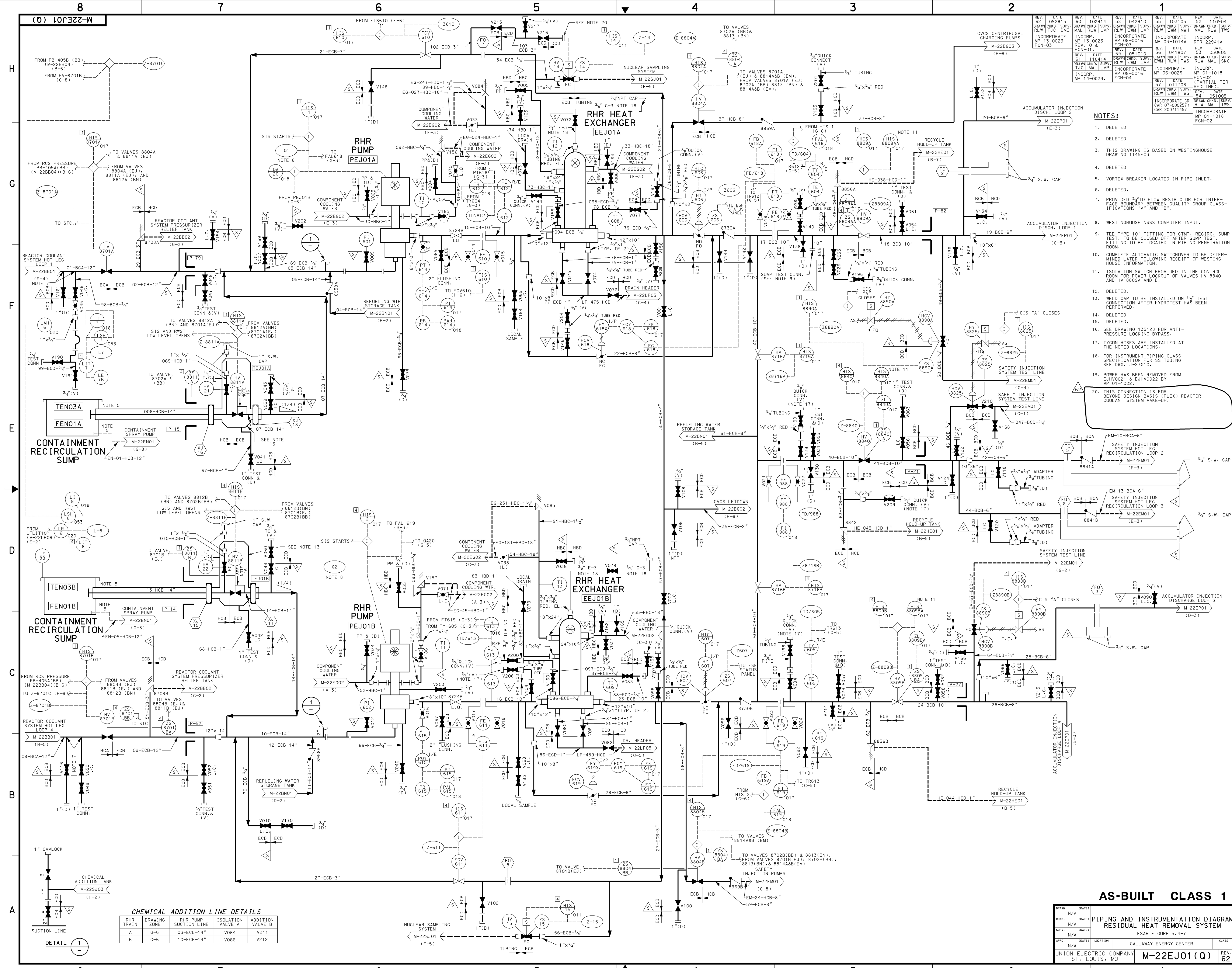
Areva Model 73/19T  
Steam Generator

**Figure 5.4-4 Deleted**



Figure 5.4-5 Deleted

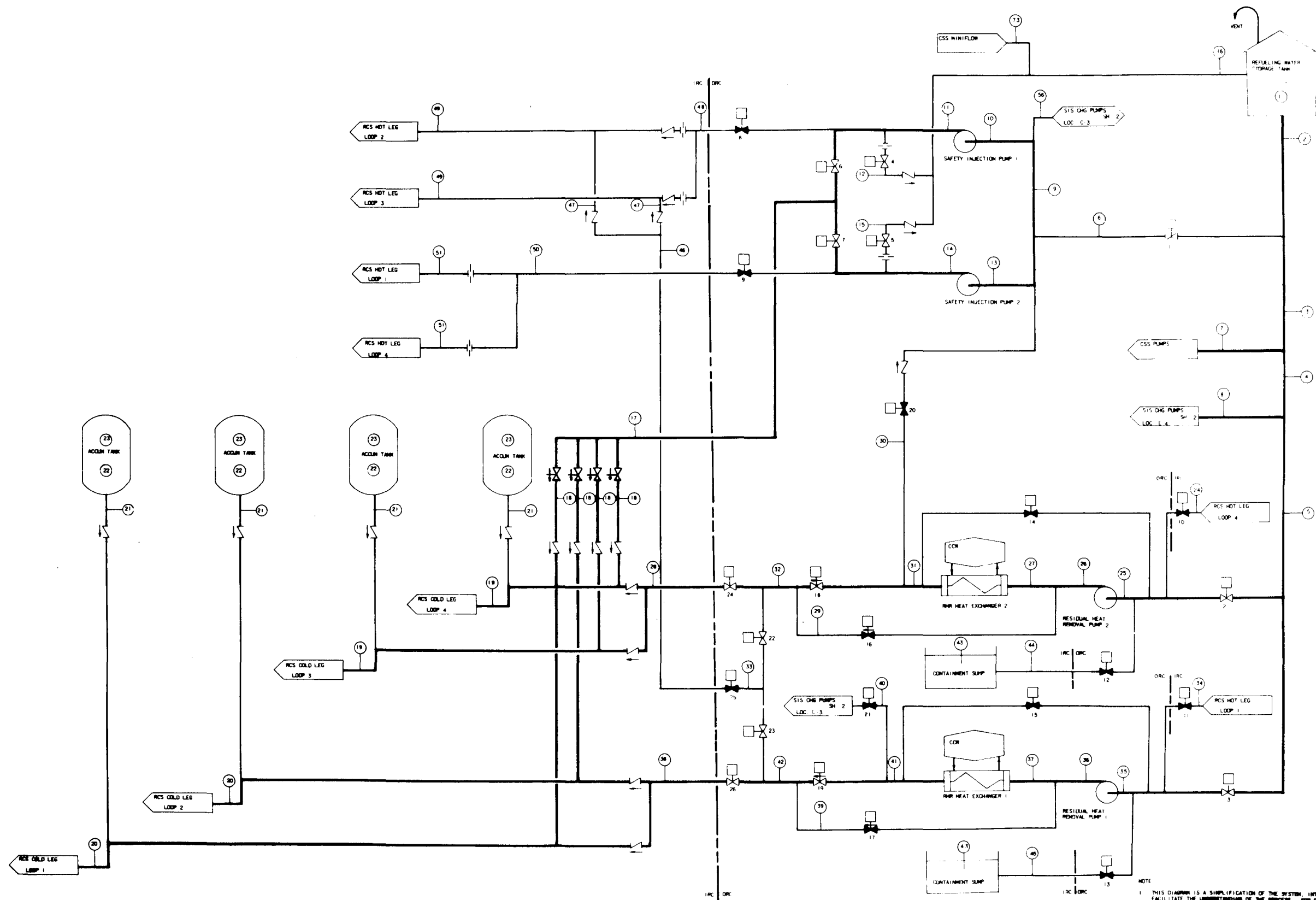
Figure 5.4-6 Deleted



- NOTES:**
1. DELETED
  2. DELETED
  3. THIS DRAWING IS BASED ON WESTINGHOUSE DRAWING 1145E03
  4. DELETED
  5. VORTEX BREAKER LOCATED IN PIPE INLET.
  6. DELETED
  7. PROVIDED 3/4" ID FLOW RESTRICTOR FOR INTER-FACE BOUNDARY BETWEEN QUALITY GROUP CLASSIFICATIONS "A" AND "B".
  8. WESTINGHOUSE NSSS COMPUTER INPUT.
  9. TEE-TYPE 10" FITTING FOR CMT. RECIRC. SUMP TEST; TO BE CLOSED OFF AFTER SUMP TEST; FITTING TO BE LOCATED IN PIPING PENETRATION ROOM.
  10. COMPLETE AUTOMATIC SWITCHOVER TO BE DETERMINED LATER FOLLOWING RECEIPT OF WESTINGHOUSE INFORMATION.
  11. ISOLATION SWITCH PROVIDED IN THE CONTROL ROOM FOR POWER LOCKOUT OF VALVES HV-8840 AND HV-8809A AND B.
  12. DELETED
  13. INCORPORATE 135128 FOR ANTI-PRESSURE LOOKING BYPASS.
  14. DELETED
  15. DELETED
  16. SEE DRAWING 135128 FOR ANTI-PRESSURE LOOKING BYPASS.
  17. TYGON HOSES ARE INSTALLED AT THE NOTED LOCATIONS.
  18. FOR INSTRUMENT PIPING CLASS SPECIFICATION FOR SS TUBING SEE DWG. J-271010.
  19. POWER HAS BEEN REMOVED FROM EHV0021 & EHV0022 BY MP 01-1002.
  20. THIS CONNECTION IS FOR BEYOND-DESIGN-BASIS (FLEX) REACTOR COOLANT SYSTEM MAKE-UP.

**AS-BUILT CLASS 1**

DATE	10/28/84	DATE	10/28/84	DATE	10/28/84	DATE	10/28/84	DATE	10/28/84
REV.	01	REV.	02	REV.	03	REV.	04	REV.	05
BY	WJ	BY	WJ	BY	WJ	BY	WJ	BY	WJ
CHKD.	N/A	CHKD.	N/A	CHKD.	N/A	CHKD.	N/A	CHKD.	N/A
APPD.	N/A	APPD.	N/A	APPD.	N/A	APPD.	N/A	APPD.	N/A
UNION ELECTRIC COMPANY	ST. LOUIS, MO	UNION ELECTRIC COMPANY	ST. LOUIS, MO	UNION ELECTRIC COMPANY	ST. LOUIS, MO	UNION ELECTRIC COMPANY	ST. LOUIS, MO	UNION ELECTRIC COMPANY	ST. LOUIS, MO
PROJECT	FSAR FIGURE 5.4-7	PROJECT	FSAR FIGURE 5.4-7	PROJECT	FSAR FIGURE 5.4-7	PROJECT	FSAR FIGURE 5.4-7	PROJECT	FSAR FIGURE 5.4-7
CLASS	CLASS 1	CLASS	CLASS 1	CLASS	CLASS 1	CLASS	CLASS 1	CLASS	CLASS 1
REVISION	M-22EJ01(Q)	REVISION	M-22EJ01(Q)	REVISION	M-22EJ01(Q)	REVISION	M-22EJ01(Q)	REVISION	M-22EJ01(Q)



NOTE  
THIS DIAGRAM IS A SIMPLIFICATION OF THE SYSTEM, INTENDED TO FACILITATE THE UNDERSTANDING OF THE PROCESS. FOR DETAILS OF THE PIPING, VALVES, INSTRUMENTATION, ETC. REFER TO THE ENGINEERING FLOW DIAGRAM. REFER TO PROCESS PLAN DIAGRAM TABLES FOR THE CONDITION AT EACH INSTRUMENT POINT.

(SEE NOTES ON THE FOLLOWING PAGES)

**CALLAWAY PLANT**

FIGURE 5.4-8

RESIDUAL HEAT REMOVAL SYSTEM  
PROCESS FLOW DIAGRAM

## NOTES TO FIGURE 5.4-8

### MODES OF OPERATION

#### MODE A - INITIATION OF RHR OPERATION

When the reactor coolant temperature and pressure are reduced below approximately 350°F and 400 psig, approximately 4 hours after reactor shutdown, the second phase of plant cooldown starts with the RHRS being placed in operation. Before starting the pumps, the inlet isolation valves are opened, the heat exchanger flow control valves are set at minimum flow, and the outlet valves are verified open. The automatic miniflow valves are open and remain so until the pump flow exceeds approximately 1,650 gpm (at 300°F) at which time they close. Should the pump flow drop below approximately 816 gpm (at 300°F), the miniflow valves open automatically.

Startup of the RHRS includes a warmup period during which time reactor coolant flow through the heat exchangers is limited to minimize thermal shock on the RCS. The rate of heat removal from the reactor coolant is controlled manually by regulating the reactor coolant flow through the residual heat exchangers. The total flow is regulated automatically by control valves in the heat exchanger bypass line to maintain a constant total flow. The cooldown rate is limited to 100°F/hr, based on equipment stress limits and a 120°F maximum component cooling water temperature at the RHR heat exchanger inlet.

#### MODE B - END CONDITIONS OF A NORMAL COOLDOWN

This situation characterizes most of the RHRS operation. As the reactor coolant temperature decreases, the flow through the residual heat exchanger is increased until all of the flow is directed through the heat exchanger to obtain maximum cooling.

#### Note:

For the safeguards functions performed by the RHRS, refer to Section 6.3, ECCS.

**NOTES TO FIGURE 5.4-8 (Sheet 2)****VALVE ALIGNMENT CHART**

<u>Valve No.</u>	<u>Operational Mode</u>	
	<u>A</u>	<u>B</u>
2	C	C
3	C	C
10	O	O
11	O	O
12	C	C
13	C	C
14	C	C
15	C	C
16	P	C
17	P	C
18	P	O
19	P	O
20	C	C
21	C	C
22	O	O
23	O	O
24	O	O
26	O	O

O = Open

C = Closed

P = Partially Open

**NOTES TO FIGURE 5.4-8 (Sheet 3)**  
**MODE A - INITIATION OF RHR OPERATION**

<u>Location</u>	<u>Fluid</u>	Pressure	Temperature	Flow	
		<u>(psig)</u>	<u>(F)</u>	<u>(gpm)</u> <sup>(a)</sup>	<u>(lb/hr)</u>
24	Reactor coolant	400	350	3,800	$1.60 \times 10^6$
25	"	407	350	3,800	$1.60 \times 10^6$
26	"	542	350	3,800	$1.60 \times 10^6$
27	"	541	350	1,259	$0.56 \times 10^6$
31	"	539	140	1,259	$0.56 \times 10^6$
29	"	496	350	2,541	$1.13 \times 10^6$
32	"	496	280	3,800	$1.69 \times 10^6$
28	"	480	280	3,690	$1.64 \times 10^6$
19 Loop 4	"	404	280	1,992	$0.885 \times 10^6$
19 Loop 3	"	419	280	1,698	$0.755 \times 10^6$
34	"	400	350	3,800	$1.69 \times 10^6$
35	"	407	350	3,800	$1.69 \times 10^6$
36	"	542	350	3,800	$1.69 \times 10^6$
37	"	541	350	1,259	$0.56 \times 10^6$
41	"	539	140	1,259	$0.56 \times 10^6$
39	"	496	350	2,541	$1.13 \times 10^6$
42	"	496	280	3,800	$1.69 \times 10^6$
38	"	479	280	3,910	$1.74 \times 10^6$
20 Loop 1	"	404	280	1,955	$0.87 \times 10^6$
20 Loop 2	"	404	280	1,955	$0.87 \times 10^6$

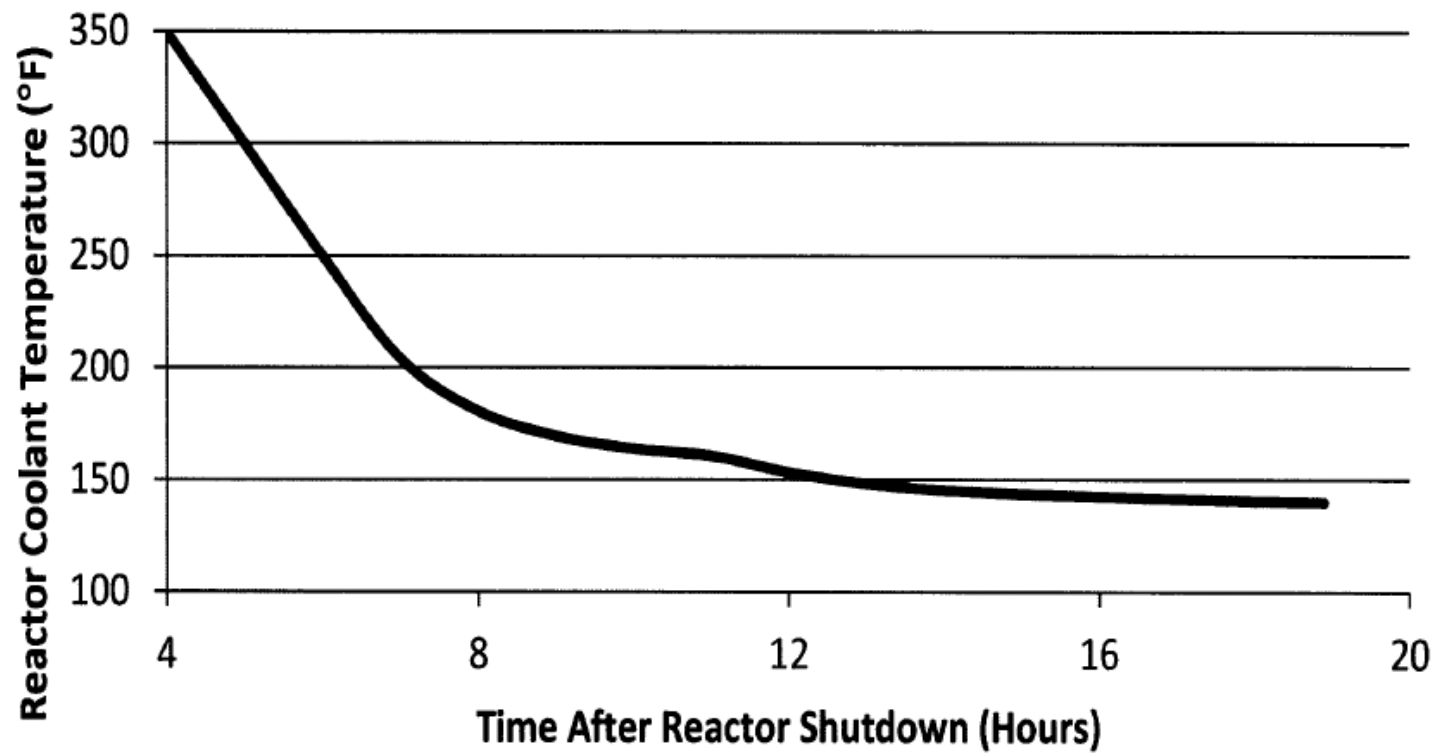
(a) At reference conditions 350°F and 400 psig



**NOTES TO FIGURE 5.4-8 (Sheet 4)****MODE B - END CONDITIONS OF A NORMAL COOLDOWN**

<u>Location</u>	<u>Fluid</u>	<u>Pressure</u> <u>(psig)</u>	<u>Temperature</u> <u>(F)</u>	<u>Flow</u> <u>(gpm) <sup>(a)</sup></u>	<u>(lb/hr)</u>
24	Reactor coolant	0	140	3,800	$1.87 \times 10^6$
25	"	7	140	3,800	$1.87 \times 10^6$
26	"	156	140	3,800	$1.87 \times 10^6$
27	"	149	140	3,800	$1.87 \times 10^6$
31	"	129	120	3,800	$1.87 \times 10^6$
29	"	93	120	0	0
32	"	93	120	3,800	$1.87 \times 10^6$
28	"	75	120	3,800	$1.87 \times 10^6$
19	"	2	120	1,900	$0.935 \times 10^6$
34	"	0	140	3,800	$1.87 \times 10^6$
35	"	7	140	3,800	$1.87 \times 10^6$
36	"	156	140	3,800	$1.87 \times 10^6$
37	"	149	140	3,800	$1.87 \times 10^6$
41	"	129	120	3,800	$1.87 \times 10^6$
39	"	93	120	0	0
42	"	93	120	3,800	$1.87 \times 10^6$
38	"	75	120	3,800	$1.87 \times 10^6$
20	"	2	120	1,900	$0.935 \times 10^6$

(a) At reference conditions 140°F and 0 psig.

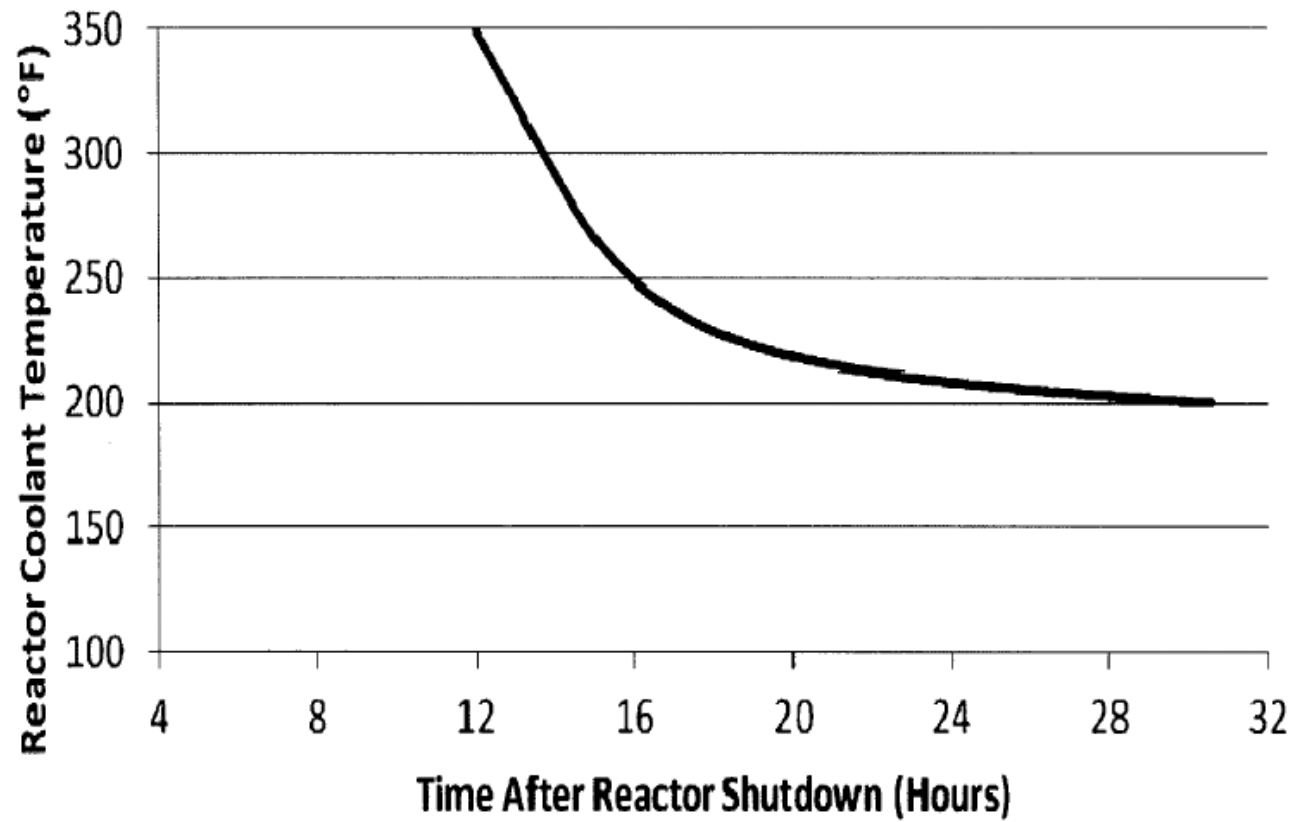


## CALLAWAY PLANT

FIGURE 5.4-9

NORMAL RESIDUAL HEAT  
REMOVAL COOLDOWN

REV. 16 9/14

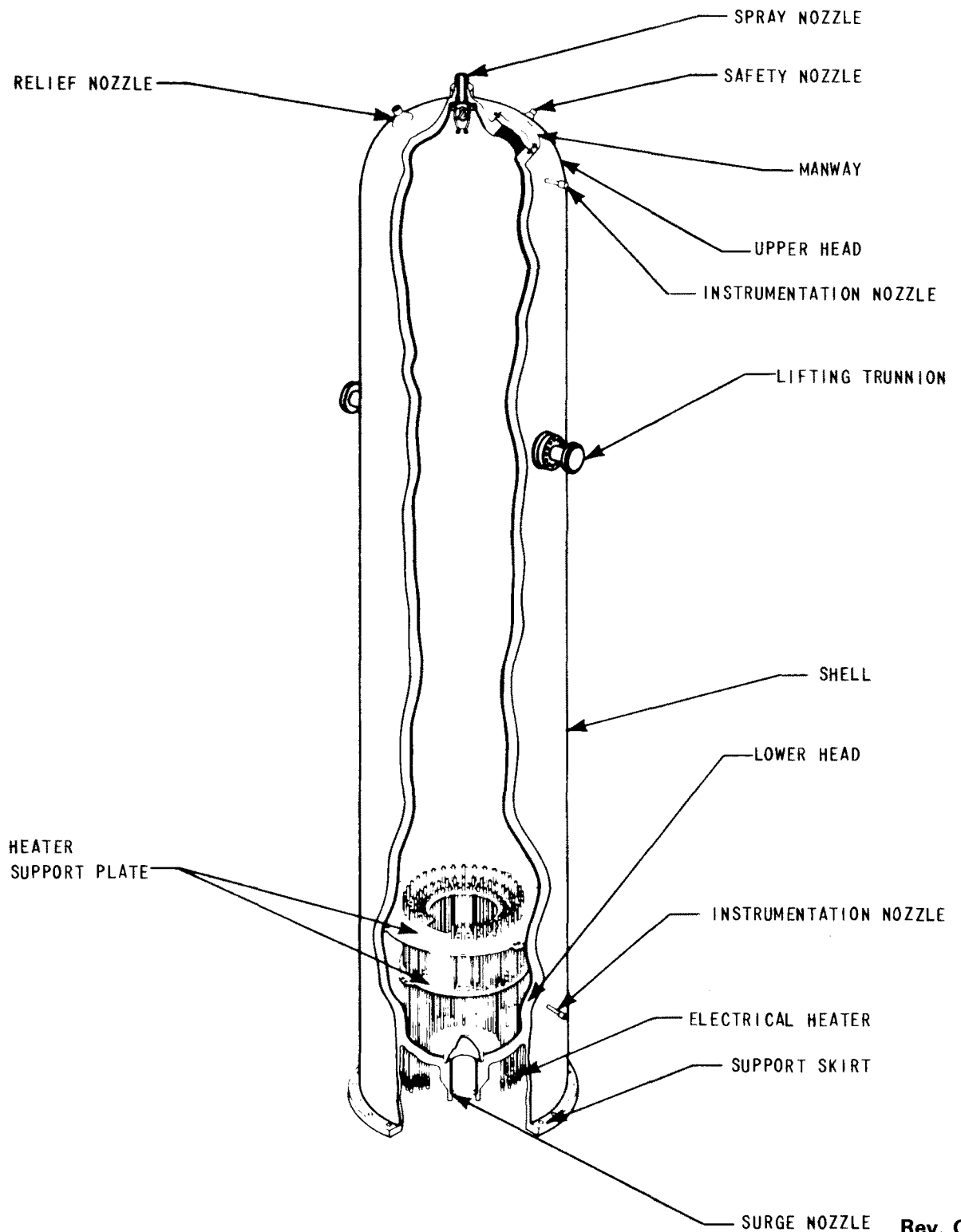


### **CALLAWAY PLANT**

**FIGURE 5.4-10**

**SINGLE RESIDUAL HEAT REMOVAL  
TRAIN COOLDOWN**

**REV. 16 9/14**

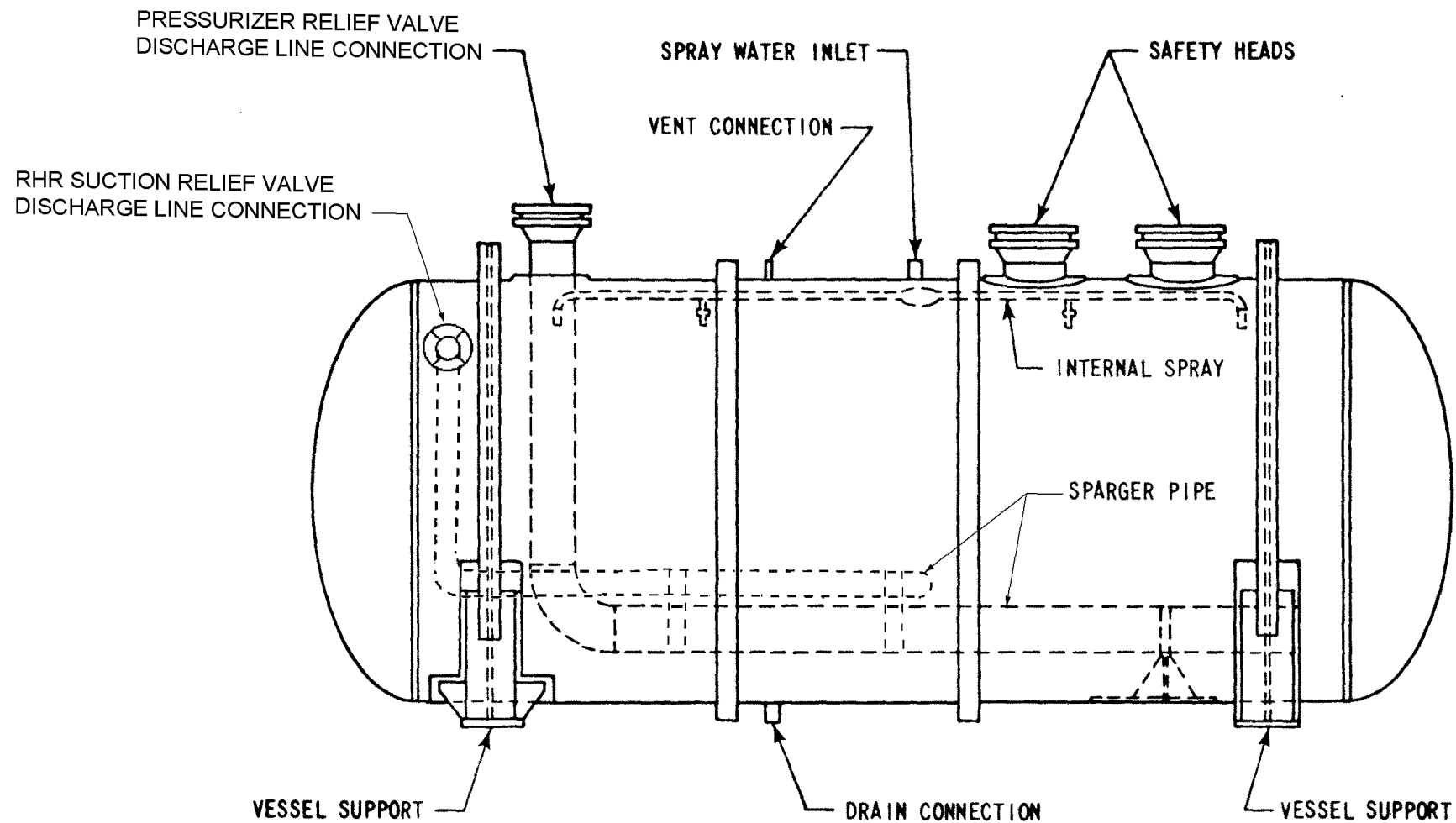


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# CALLAWAY PLANT

FIGURE 5.4-11

PRESSURIZER

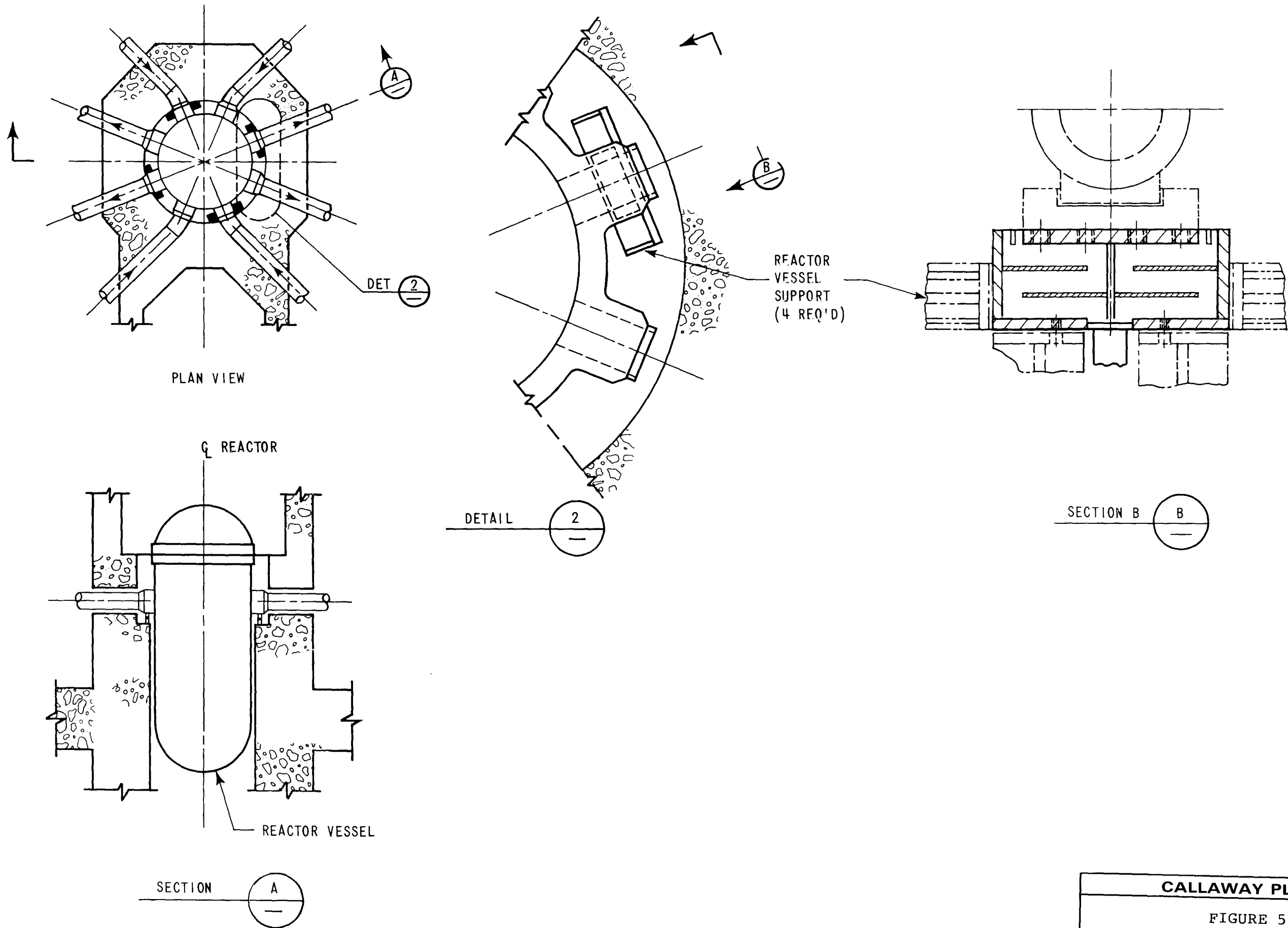


**CALLAWAY PLANT**

FIGURE 5.4-12

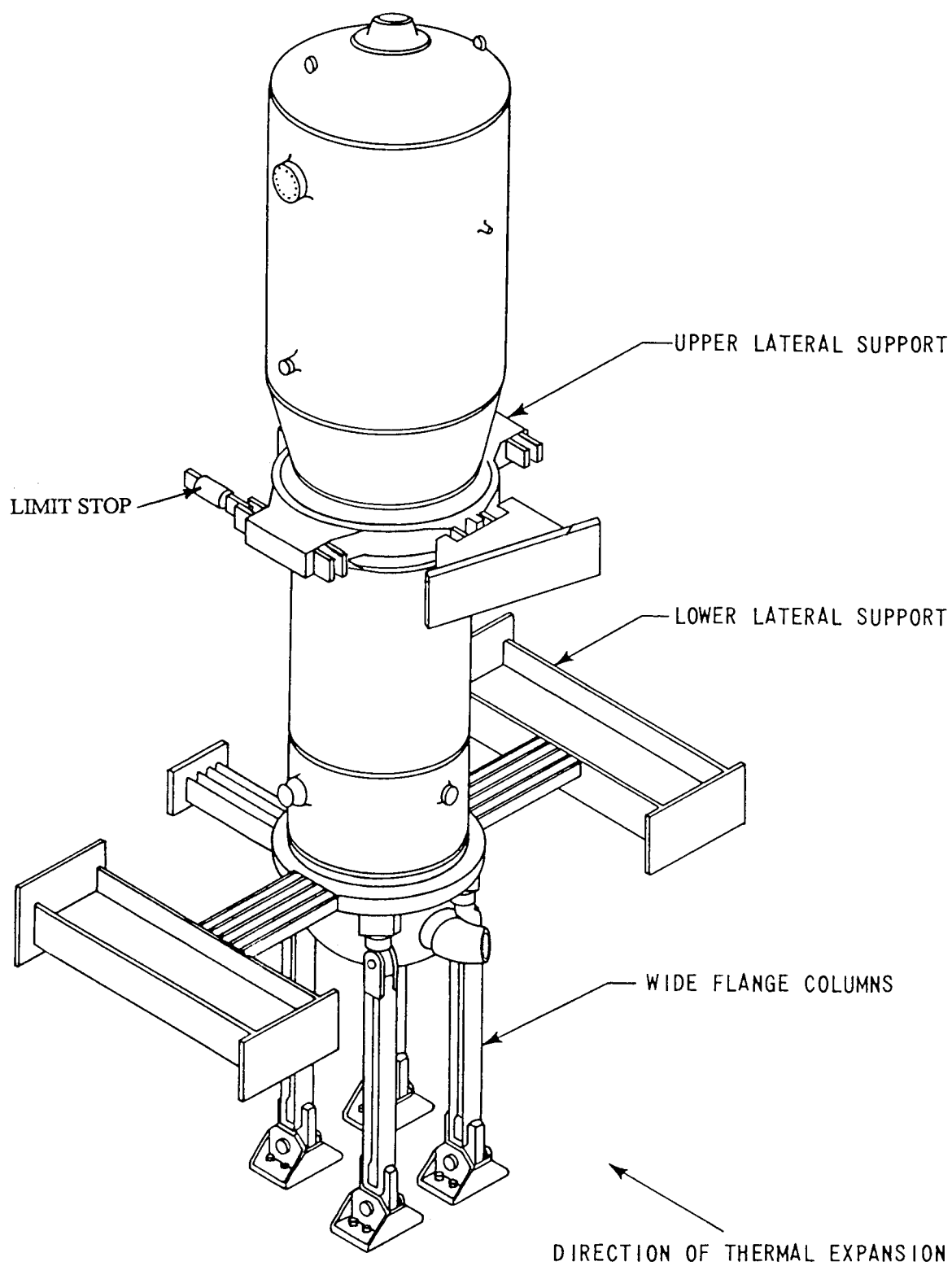
PRESSURIZER RELIEF TANK

REV. 1 3/09



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<b>CALLAWAY PLANT</b>
FIGURE 5.4-13
REACTOR VESSEL SUPPORTS

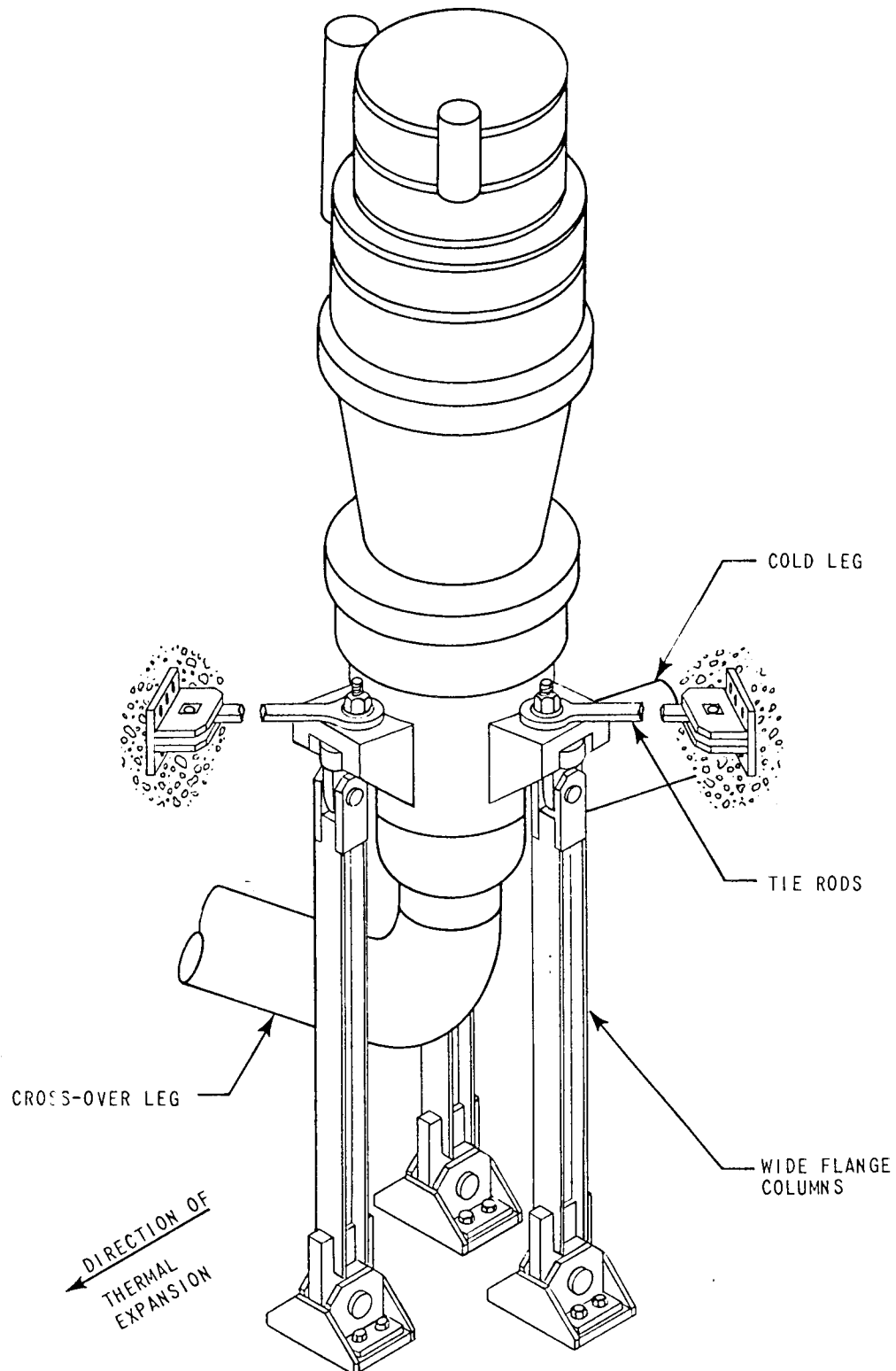


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5/06

**CALLAWAY PLANT**

FIGURE 5.4-14  
STEAM GENERATOR SUPPORTS



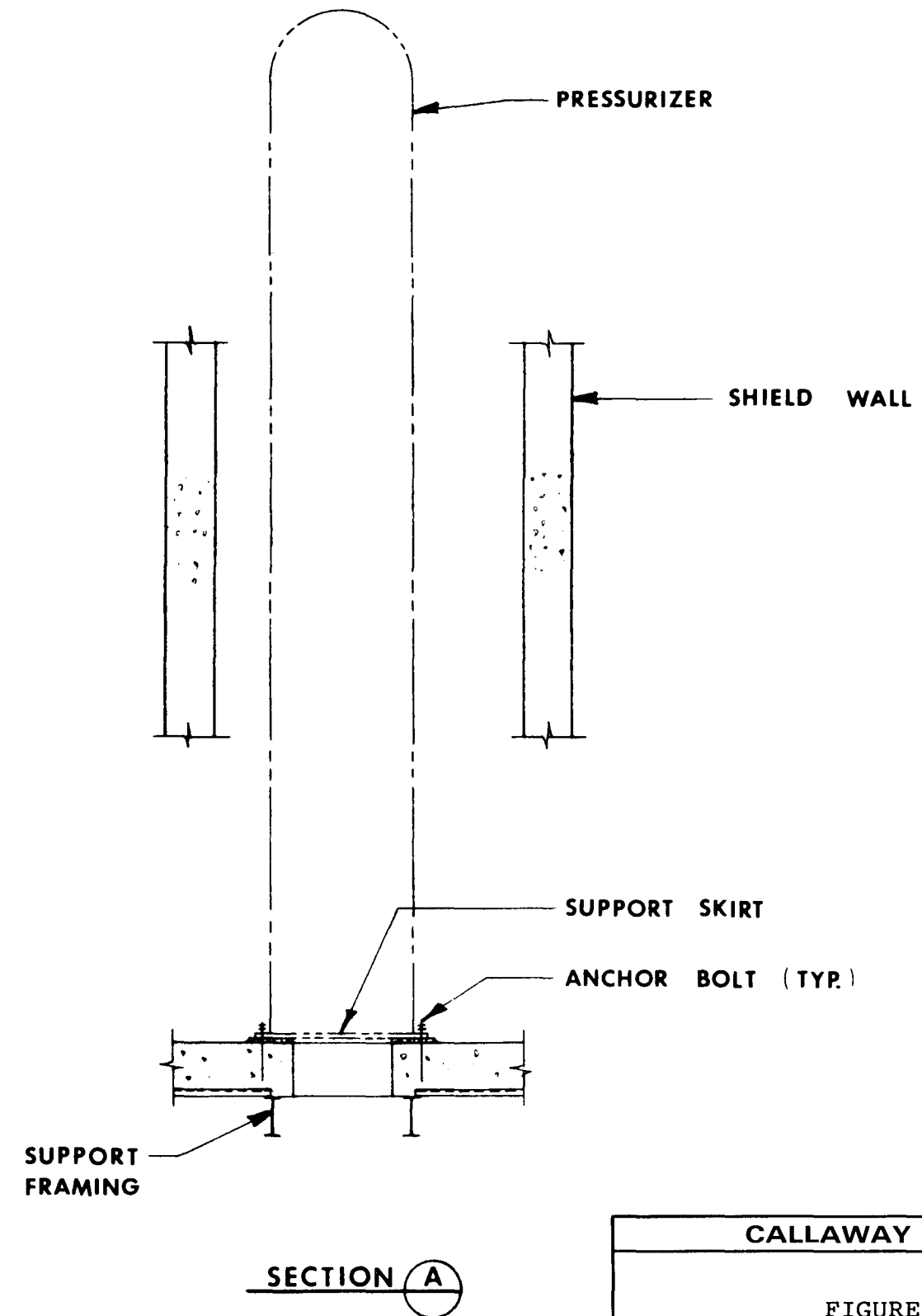
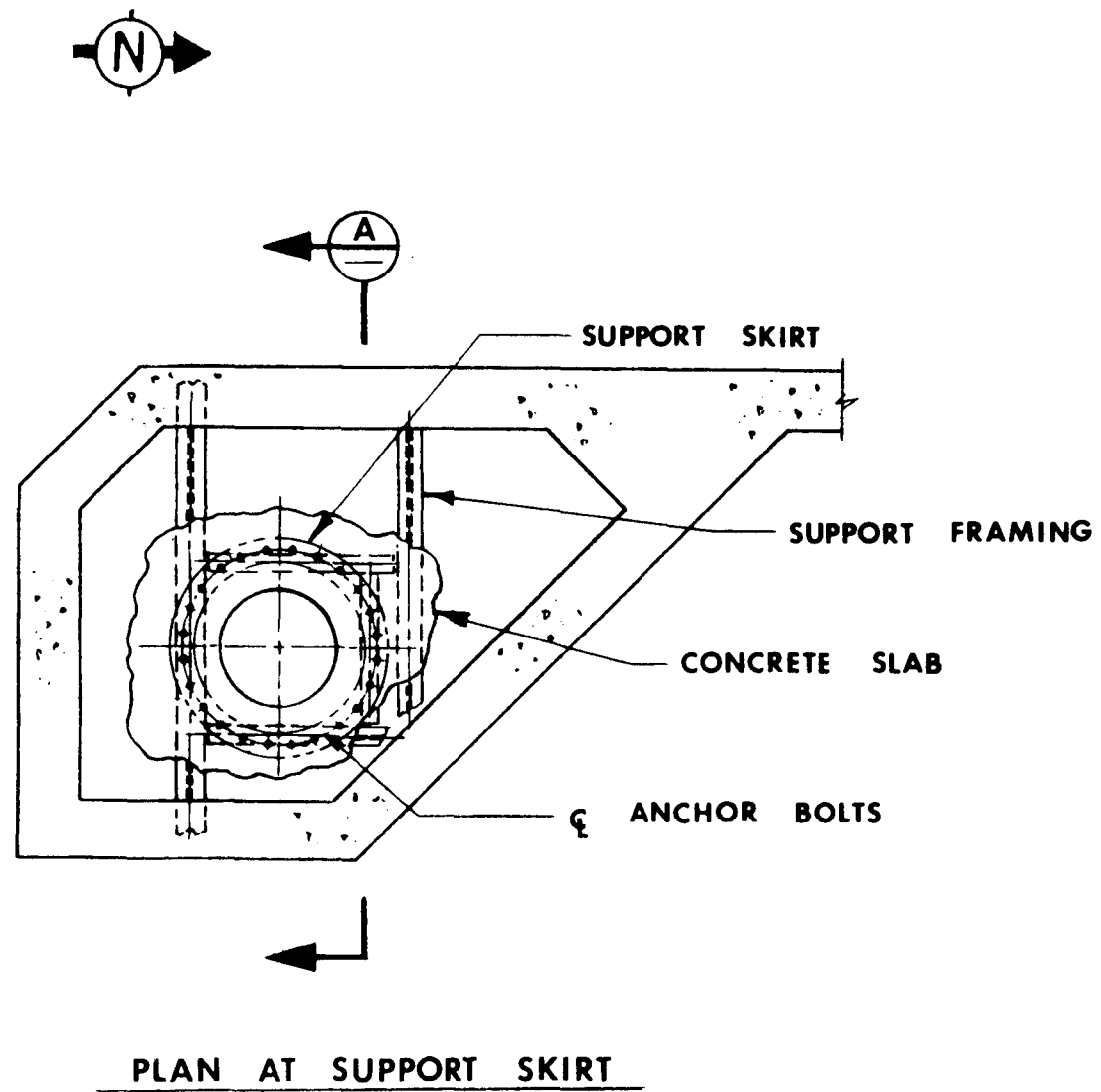


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**CALLAWAY PLANT**

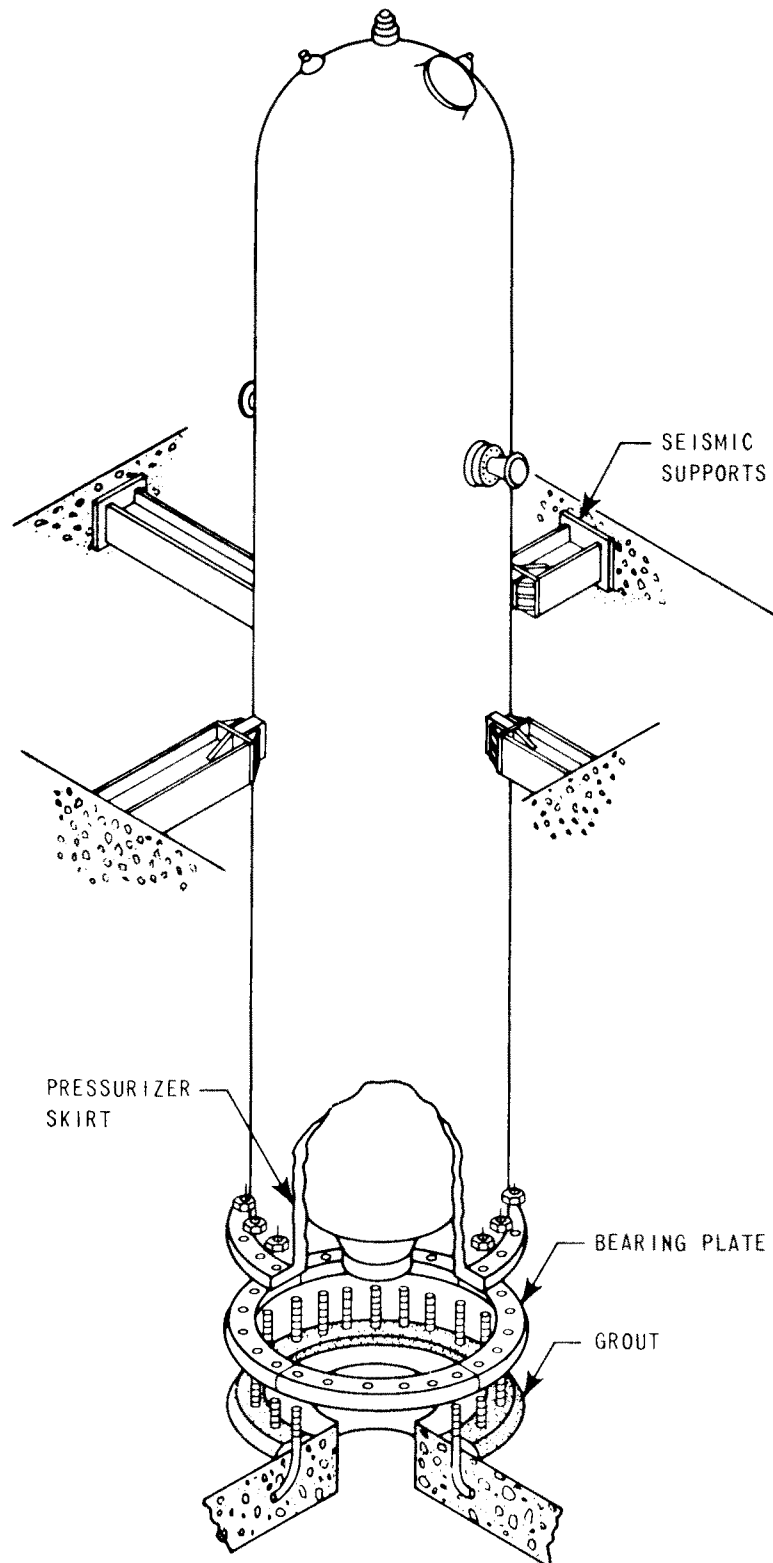
FIGURE 5.4-15

REACTOR COOLANT PUMP SUPPORT



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CALLAWAY PLANT
FIGURE 5.4-16
REACTOR BUILDING INTERNALS PRESSURIZER SUPPORTS

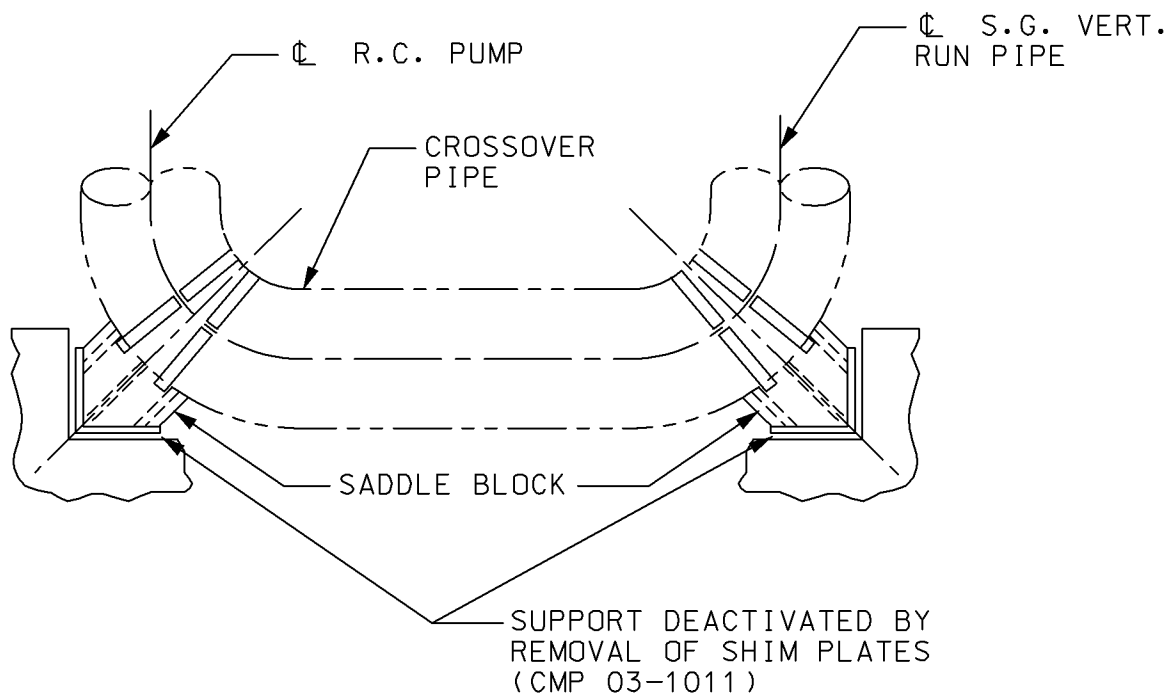


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**CALLAWAY PLANT**

FIGURE 5.4-17

PRESSURIZER SUPPORTS

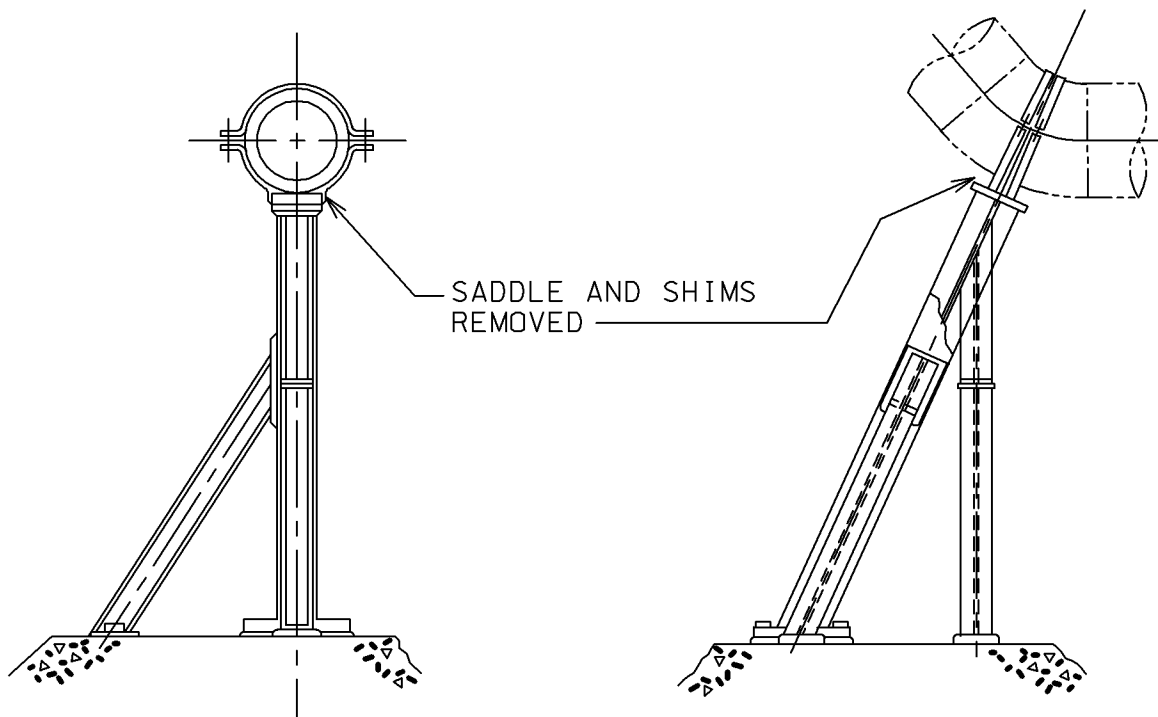


## CALLAWAY PLANT

FIGURE 5.4 - 18  
CROSSOVER LEG RESTRAINT

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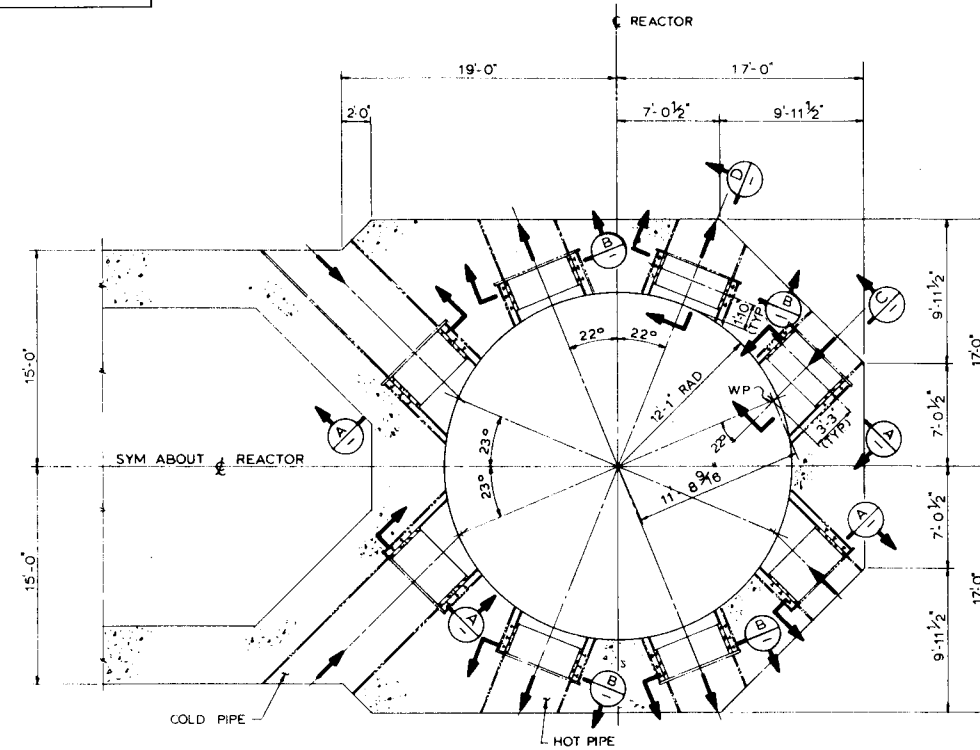
**Figure 5.4-19 Deleted**



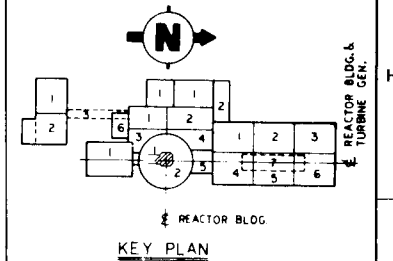
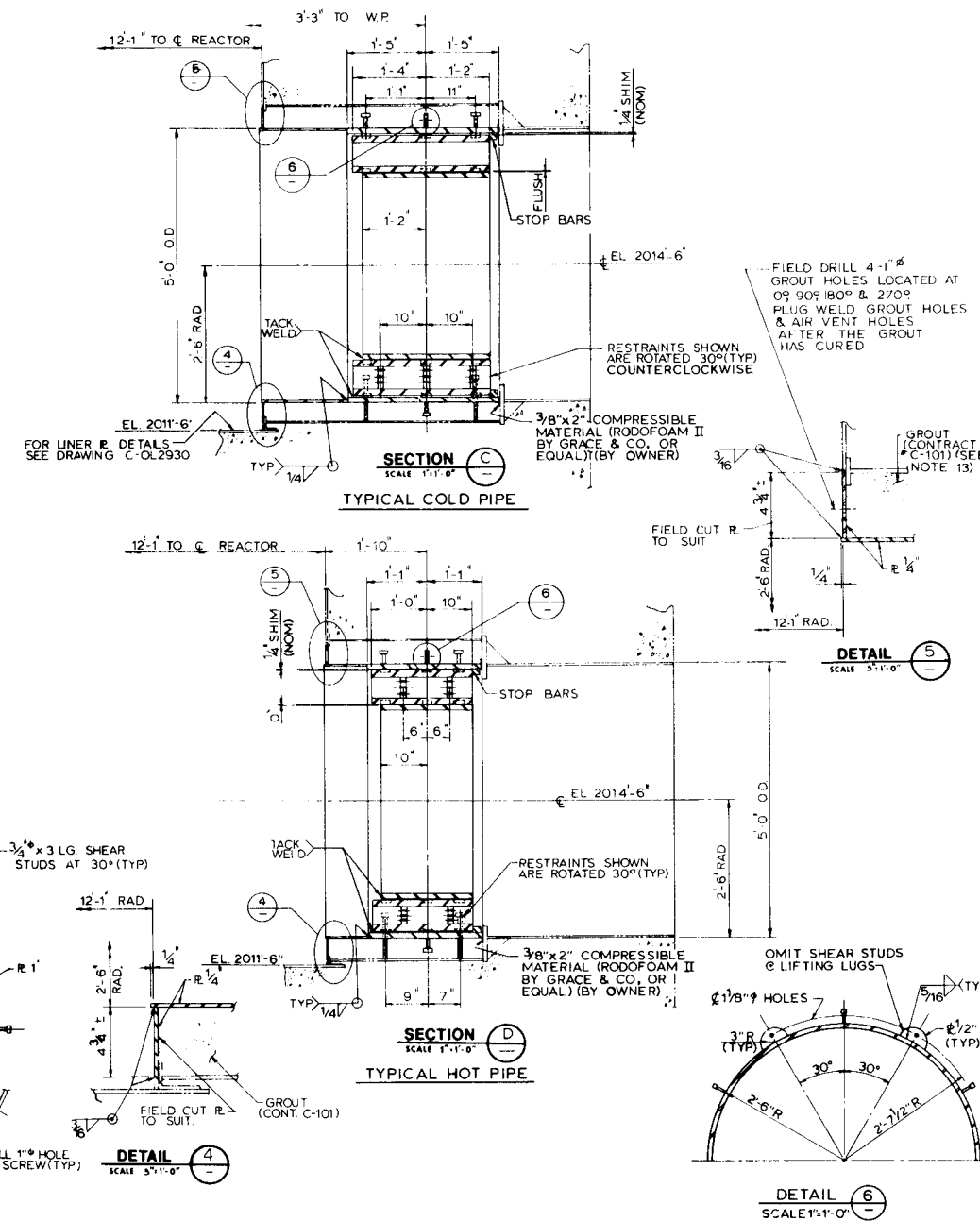
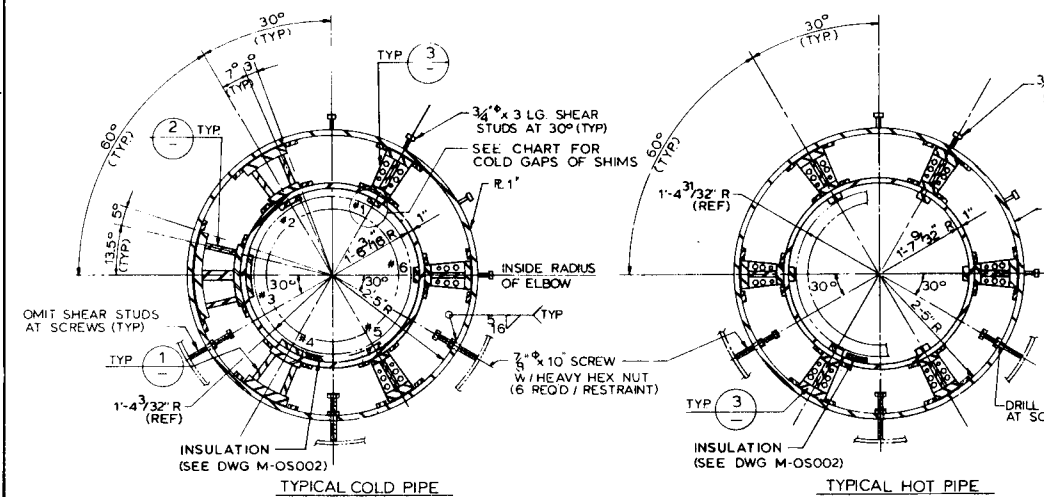
## CALLAWAY PLANT

FIGURE 5.4 - 20  
HOT LEG RESTRAINT

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PLAN AT EL 2014'-6"



## NOTES

1. ALL DIMENSIONS GIVEN ARE IN COLOR POSITION U.N.O.
2. MATERIAL FOR THE 1" THICK COLLAR RING SHALL BE ASTM A516 GR TO
3. THE 1" THICK COLLAR RING AND BUILT UP FILLER MEMBERS SHALL BE POST WELD HEAT TREATED
4. SURFACES WHICH RECEIVE SHIMS AND/OR BEARING SHALL BE MACHINED TO THE DESIGN CONTOUR
5. SHIM AREA AS INDICATED ON THE DRAWING SHALL BE PROVIDED WITH NOT LESS THAN 50% OF THE BEARING AREA
6. SHIM PLATES SHALL BE SHOP TACK WELDED TO THE BUILT UP FILLER MEMBER AFTER PROPERLY ALIGNED
7. THE RADIAL LOCATION OR INNER RADIUS AT ANY POINT OF THE 1" THICK COLLAR RING SHALL NOT VARY FROM THE DESIGN RADIUS BY MORE THAN 1/8"
8. RESTRAINT ASSEMBLIES SHALL BE SHOP PRE ASSEMBLED TO INSURE PROPER ALIGNMENT AND DELIVER TO SITE AS ONE UNIT FOR EACH BEARING
9. THE MAXIMUM ALLOWABLE GAP AT THE SHIM OR BEARING SURFACES SHALL BE 1/16" SHIMS MAY BE ADDED BETWEEN THE OUTSIDE FACE OF THE INNER RING AND THE INSIDE FACE OF THE SPOKE TO MEET THIS REQUIREMENT
10. THE FIELD MACHINED SHIMS SHALL ACCOUNT FOR THE AS BUILT DIMENSIONS OF THE RESTRAINT RING, THE INSIDE FACE OF THE INNER RING, AND THE OUTSIDE DIAMETER OF THE HOT AND COLD SPIRES AT EACH LOCATION
11. DELETED
12. THE OUTER RING SHALL BE PRESS ADGAGED TO THE COMPRESSIBLE MATERIAL AS MUCH AS POSSIBLE TO PREVENT LEAKAGE OF GROUT
13. DELETED
14. THE AS-BUILT COLD GAP AT SHIM#3 MUST BE:
  - A) SMALLER THAN (OR EQUAL TO) THE AS-BUILT COLD GAP AT SHIM #2
  - B) SMALLER THAN (OR EQUAL TO) THE AS-BUILT COLD GAP AT SHIM #4 PLUS 3/16"

## REFERENCE DRAWINGS

C-OL2930	REACTOR BUILDING LINER PLATE REACTOR CAVITY WALL
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## MATERIAL RESPONSIBILITY

1. STEEL TO BE FURNISHED UNDER SPEC  
10466-C202

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## CALLAWAY PLANT

**FIGURE 5.4-21**  
**HOT AND COLD LEG**  
**LATERAL RESTRAINTS**  
**(C-03BB53(Q)-4)**