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July 8, 1985
RBG- 21442
File No. G9.5

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Denton:

River Bend Station-Unit 1
Docket No. 50-458

Enclosed for your review are revisions to the River Bend Station Final Safety Analysis Report (FSAR) Section 3.6A and Appendix 3C. These revisions have resulted from completion of equipment installation, final walk-downs of equipment location, and verification of the final stress calculations. This information is provided to supplement GSU's previous submittals on SER Open Item No. 3. No impact is expected on the Safety Evaluation Report or on the proposed Technical Specifications. These revisions will be included in a future FSAR amendment.

Sincerely,

J. E. Booker

J. E. Booker
Manager-Engineering,
Nuclear Fuels & Licensing
River Bend Nuclear Group

JEL/ERG/kt

Enclosures

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TABLE 3.6A-4a

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASS 1 PIPING

MAIN STEAM VENT LINE SYSTEM

Break Point	Location			Maximum Stress Range(1)			Cumulative Usage Factor(1)	Pipe Break	Description of Break Points	Break Type		
	Elevation (ft-in)	Azimuth (deg)	r (ft-in)	Eg. 10 (psi)	Eg. 12 (psi)	Eg. 13 (psi)		Stress Limit 2.4 S (psi) m				
1	173-0	5/16	90	1-3	5/16	-	-	-	TP	CB		
3A	172-9		90	6-10		84,516	12,338	46,059	0.0943	40,512	IP	CB
5A	159-11		90	13-3		93,808	733	47,866	0.1358	43,363	IP	CB
8	156-8		90	14-5	5/8	44,009	32,472	29,132	0.1266	43,363	IP	CB
9	156-8		90	14-10	3/8	47,532	37,854	25,588	0.1698	43,363	IP	CB
9A	156-5		90	15-1	1/2	43,252	35,546	23,001	0.1294	43,363	IP	CB
10A	156-2		90	15-3	7/8	32,945	24,410	24,223	0.5041	43,363	IP	CB
19	150-8	7/8	106	19-3		50,433	38,826	20,422	0.1841	43,363	IP	CB
20	150-6	1/2	105	19-6		51,510	38,339	20,167	0.1747	43,363	IP	CB
33	148-6	1/2	76	16-6	3/4	-	-	-	-	-	TP	CB
34	156-8		90	14-8		44,009	32,472	29,132	0.1266	43,363	IP	CB
47	148-6		131.5	12-2	1/4	-	-	-	-	-	TP	CB

Key: IP = Intermediate point
 TP = Terminal point
 CB = Circumferential break
 LB = Longitudinal break

⁽¹⁾Stresses were calculated in accordance with equations 10, 12, and 13 of ASME Section III, paragraphs NB-3653.1(a), NB-3653.6(a), and NB-3653.6(b), respectively. Cumulative usage factors were calculated in accordance with ASME Section III, subarticle NB-3610.

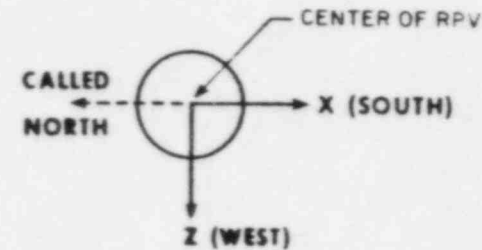
NOTES: See Fig. 3.6A-14a for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-14a. The reference coordinate system is shown in Table 3.6A-1.

TABLE 3.6A-5

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASSES 2 AND 3 PIPING
MAIN STEAM SYSTEM - OUTSIDE CONTAINMENT - LOOP A

Break Point	Location			Stress ⁽¹⁾		Total Additive Stress (psi)	Pipe Break Stress Limit 0.8 (1.2 S _h + S _A) (psi)	Description of Break Points	Break Type	
	El (ft-in)	I (ft-in)	Z (ft-in)	Eg. 9 (psi)	Eg. 10 (psi)					
121A	128-3 1/4	107-9 1/2	3-6	-	-	-	-	TP	CB	15
140A	127-6 1/16	138-5	40-6	8,539	7,252	15,791	32,400	IP (Elbow)	CB	16
168A	114-0	147-11	3-3	-	-	-	-	TP	CB	21
402A	127-11 11/16	119-5	25-11 1/2	10,839	6,456	17,295	32,400	IP (Valve)	CB	16
									CB	21



KEY: IP = Intermediate point
TP = Terminal point
CB = Circumferential break
LB = Longitudinal break

⁽¹⁾Stresses were calculated in accordance with Equations 9 and 10 of ASME Section III, paragraph WC-3652.

NOTES: See Fig. 3.6A-15 for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-15.

TABLE 3.6A-6

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASSES 2 AND 3 PIPING
MAIN STEAM SYSTEM - OUTSIDE CONTAINMENT - LOOP B

Break Point	Location			Stress ⁽¹⁾		Total Additive Stress	Pipe Break Stress Limit 0.8(1.2 S _h + S _A)	Description of Break Points	Break Type	
	El (ft-in)	X (ft-in)	Z (ft-in)	Eq. 9 (psi)	Eq. 10 (psi)					
348B	128-3 1/4	107-9 1/2	-(10-6)	-	-	-	-	TP	CB	15
425B	114-7	122-5	-(43-6)	10,978	9,600	20,578	32,400	IP (Elbow)	CB	16 21
466B	114-0	147-11	-(9-9)	-	-	-	-	TP	CB	11 16 21
503B	114-10 1/4	119-5	-(35-7 1/2)	12,790	9,154	21,944	32,400	IP (Valve)	CB	

KEY: IP = Intermediate point
TP = Terminal point
CB = Circumferential break
LB = Longitudinal break

⁽¹⁾Stresses were calculated in accordance with Equations 9 and 10 of ASME Section III, paragraph NC-3652.

NOTES: See Fig. 3.6A-16 for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-16. The reference coordinate system is shown in Table 3.6A-5.

TABLE 3.6A-7

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASSES 2 AND 3 PIPING

MAIN STEAM SYSTEM - OUTSIDE CONTAINMENT - LOOP C

Break Point	Elevation (ft-in)	Location		Stress ⁽¹⁾		Total Additive Stress (psi)	Pipe Break Stress Limit 0.8(1.2 S _h + S _A) (psi)	Description of Break Points	Break Type	
		X (ft-in)	Z (ft-in)	Eg. 9 (psi)	Eg. 10 (psi)					
349C	128-3 1/4	107-9 1/2	10-6	-	-	-	-	TP	CP	15
425C	114-7	122-5	43-6	9,853	9,390	19,243	32,400	IP (valve)	CB	16
466C	114-0	147-11	9-9	-	-	-	-	TP	CB	21
503C	114-10 1/4	119-5	34-11 1/2	12,080	9,346	21,426	32,400	IP (elbow)	CB	11 16 21

KEY: IP = Intermediate point
 TP = Terminal point
 CB = Circumferential break
 LB = Longitudinal break

⁽¹⁾Stresses were calculated in accordance with Equations 9 and 10 of ASME Section III, paragraph WC-3652.

NOTES: See Fig. 3.6A-15 for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-15. The reference coordinate system is shown in Table 3.6A-5.

TABLE 3.6A-8

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASSES 2 AND 3 PIPING

MAIN STEAM SYSTEM - OUTSIDE CONTAINMENT - LOOP D

Break Point	Location			Stress ⁽¹⁾		Total Additive Stress --(psil)--	Pipe Break Stress Limit 0.8(1.25 S _h + S _A) --(psil)--	Description of Break Points	Break Type	
	El	I	Z	Pg. 9 (psil)	Pg. 10 (psil)					
	(ft-in)	(ft-in)	(ft-in)							
121D	128-3 1/4	107-9 1/2	-(3-6)	-	-	-	-	TP	CB	15
140D	127-6 1/16	138-5	-(40-6)	8,709	7,503	16,212	32,400	IP (Elbow)	CB	16
168D	113-11 1/4	147-5	-(3-3)	-	-	-	-	TP	CB	11
402D	127-11 11/16	119-5	-(25-11 1/2)	11,069	7,869	18,938	32,400	IP (Valve)	CB	16

KEY: IP = Intermediate point
 TP = Terminal point
 CB = Circumferential break
 LB = Longitudinal break

(1) Stresses were calculated in accordance with Equations 9 and 10 of ASME Section III, paragraph WC-3652.

NOTES: See Fig. 3.6A-16 for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-16. The reference coordinate system is shown in Table 3.6A-5.

TABLE 3.6A-9a

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASS 1 PIPING

FEEDWATER SYSTEM - INSIDE CONTAINMENT

Break Point	Location			Maximum Stress Range ⁽¹⁾			Cumulative Usage Factor ⁽¹⁾	Pipe Break Stress Limit 2.4 S _m (psil)	Description of Break Points	Break Type	17
	El (ft-in)	Az (deg)	r (ft-in)	Eq. 10 (psil)	Eq. 12 (psil)	Eq. 13 (psil)					
1W	142-3 1/2	135	12-0 3/16	-	-	-	-	-	TP	CB	17
60AW	122-0	32.08	20-4 1/16	70,498	29,393	31,388	0.3479	47,472	IP	CB & LB	
60BW	122-0	27.75	19-6 7/16	70,498	29,393	31,388	0.3479	47,472	IP	CB & LB	17
60CW	122-0	25.44	21-0 1/2	70,498	29,393	31,388	0.3479	47,472	IP	CB & LB	
70W	123-9	24.59	17-9 11/16	70,339	43,990	22,566	0.3598	54,336	IP	CB & LB	21
100	142-3 1/2	45	12-0 3/16	-	-	-	-	-	TP	CB	
71W	122-0	26.5	18-3	76,470	46,162	22,499	0.5908	47,472	IP	CB & LB	17
130W	122-0	7.5	26-4 13/16	-	-	-	-	-	TP	CB	

⁽¹⁾Stresses were calculated in accordance with Equations 12 and 13 of ASME Section III, paragraphs NB-3652.6(a) and NB-3653.6(b), respectively. Cumulative usage factors were calculated in accordance with ASME Section III, subarticle NB-3650.

Key: IP = Intermediate point
 TP = Terminal point
 CB = Circumferential break
 LB = Longitudinal break

NOTES: See Fig. 3.6A-17 for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-17. The reference coordinate system is shown in Table 3.6A-1.

TABLE 3.6A-9b

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASS 1 PIPING
FEED WATER SYSTEM - INSIDE CONTAINMENT

Break Point	Location			Maximum Stress Range			Usage Factor ⁽¹⁾	Cumulative Stress Limit 2.4S _m (psil)	Pipe Break Description of Break Points	Break Type
	Elevation	Azimuth	r	Eg. 10	Eg. 12	Eg. 13				
	(ft-in)	(deg)	(ft-in)	(psil)	(psil)	(psil)				
1E	142-3 1/2	225	12-0 3/16	-	-	-	-	-	TP	CB
60AE	122-0	327.91	20-4 1/16	68,109	27,758	30,048	0.302	47,472	IP	CB & LB
60BE	122-0	332.25	19-6 7/16	68,109	27,758	30,048	0.302	47,472	IP	CB & LB
60CE	122-0	334.56	21-0 1/2	68,109	27,758	30,048	0.302	47,472	IP	CB & LB
70E	123-9	335.41	17-9 11/16	69,393	43,468	21,930	0.3371	54,336	IP	CB & LB
100	142-3 1/2	315	12-0 3/16	-	-	-	-	-	TP	CB
130E	122-0	352.5	26-4 13/16	-	-	-	-	-	TP	CP
71E	122-0	334.4	18-3	75,756	45,516	22,120	0.5376	47,472	IP	CB & LB

⁽¹⁾Stresses were calculated in accordance with equations 12 and 13 of ASME Section III, paragraphs NB-3653.6(a) and NB-3653.6(b), respectively. Cumulative usage factors were calculated in accordance with ASME Section III, subarticle NB-3650.

Key: IP = Intermediate point
TP = Terminal point
CB = Circumferential break
LB = Longitudinal break

NOTES: See Fig. 3.6A-17 for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-17. The reference coordinate system is shown in Table 3.6A-1. |11

TABLE 3.6A-10a

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASSES 2 AND 3 PIPING
 FEEDWATER SYSTEM - OUTSIDE CONTAINMENT (FWS-020-62-2, FWS-020-32-4)

Break Point	Location			Stress ⁽¹⁾		Total Additive Stress ⁽¹⁾ (psi)	Pipe Break Stress Limit 0.8(1.2S _H + S _A) (psi)	Description of Break Points	Break Type
	E1 (ft-in)	1 (ft-in)	2 (ft-in)	Eq. 9 (psi)	Eq. 10 (psi)				
1	121-8 1/16	107-9 1/2	3-6	-	-	-	-	TP	CB
3	119-0 5/8	119-5	3-6	10,361	16,366	26,727	32,400	IP	CB
6	108-8	119-5	35-8	8,697	11,142	19,839	32,400	IP	CB
7	108-3 43/64	149-5	38-2	-	-	-	-	IP	CB

Key: IP = Intermediate point
 TP = Terminal point
 CB = Circumferential break

⁽¹⁾Stresses were calculated in accordance with Equations 9 and 10 of ASME Section III, paragraph NC-3652.

NOTES: See Fig. 3.6A-18 for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-18. The reference coordinate system is shown in Table 3.6A-5.

TABLE 3.6A-10b

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASSES 2 AND 3 PIPING
 FEEDWATER SYSTEM - OUTSIDE CONTAINMENT (FWS-020-63-2, FWS-020-31-4)

Break Point	Location			Stress ⁽¹⁾		Total Additive Stress ⁽¹⁾ (psil)	Pipe Break Stress Limit 0.8 (1.2 S _H + S _A) (psil)	Description of Break Points	Break Type			
	Elevation (ft-in)	X (ft-in)	Z (ft-in)	Eq. 9 (psil)	Eq. 10 (psil)							
11	121-8 1/16	107-9 1/2	-(3-6)	-	-	-	-	-	TP IP TP IP	CB	11	15
13	119-0 5/16	121-11	-(3-6)	10,389	16,595	26,904	32,400					
16	108-4	149-5	34-0	-	-	-	32,400					
31	108-8	121-11	31-6	8,371	10,624	18,995	32,400					

Key: IP = Intermediate point
 TP = Terminal point
 CB = Circumferential break
 LB = Longitudinal break

⁽¹⁾Stresses were calculated in accordance with Equations 9 and 10 of ASME Section III, paragraph WC-3652.

NOTES: See Fig. 3.6A-18 for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-18. The reference coordinate system is shown in Table 3.6A-5.

TABLE 3.6A-11a

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASS 1 PIPING

RCIC SYSTEM - INSIDE CONTAINMENT

Break Point	Location			Maximum Stress Range ⁽¹⁾			Cumulative Usage Factor ⁽¹⁾	Pipe Break Stress Limit 2.0 S _m (psil)	Description of Break Points	Break Type ²	
	E1 (ft-in)	Az (deg)	r (ft-in)	Eq. 10 (psil)	Eq. 12 (psil)	Eq. 13 (psil)					
1	146-3 3/4	67.5	16-6 3/8	-	-	-	-	-	TP	CP	15
2	146-1 1/8	3.5	16-6 3/8	49,639	2,874	34,149	0.0808	41,520	TP	CB	17
3	145-1 1/8	0	16-6 3/8	49,974	3,893	35,748	0.0837	41,520	IP	CB	21
12	122-6 3/4	24	26-10	-	-	-	-	-	TP	CB	17

Key: IP = Intermediate point
 TP = Terminal point
 CB = Circumferential break
 LB = Longitudinal break

⁽¹⁾Stresses were calculated in accordance with equations 10, 12, and 13 of ASME Section III, paragraphs NB-3653.1(a), NB-3653.6(a), and NB-3653.6(b), respectively. Cumulative usage factors were calculated in accordance with ASME Section III, subarticle NB-3650.

NOTES: See Fig. 3.6A-12 for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-12. The reference coordinate system is shown in Table 3.6A-1.

TABLE 3.6A-12

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASSES 2 AND 3 PIPING
REACTOR CORE ISOLATION COOLING AND RRB SYSTEMS - OUTSIDE CONFINEMENT

Break Point	Elevation ft-inl	Location		Stress ⁽¹⁾		Total Additive Stress (psi)	Pipe Break Stress Limit 0.8(1.2 S _h + S _A) (psi)	Description of Break Points	Break Types	
		I (ft-inl)	Z (ft-inl)	Eq. 9 (psi)	Eq. 10 (psi)					
1	121-8 1/16	107-9 1/2	10-6	-	-	-	-	TD	CB	
17	117-0 5/8	110-3 1/2	10-6	8,621	18,439	27,059	32,400	TD	CB	21
32	86-0 1/8	87-2 3/8	12-8	3,540	5,747	9,287	32,400	IP	CB	
33	85-9	86-11 3/8	12-8	3,564	5,715	9,279	32,400	TD	CB	
39	73-9 1/4	89-4 1/2	12-8	-	-	-	-	TP	CB	
57	116-1 3/8	110-3 1/2	22-11	-	-	-	32,400	TD	CB	
21	116-5 5/8	110-3 1/2	11-6	9,655	23,814	33,469	32,400	IP	CB, LB	21
60	116-5 5/8	110-3 1/2	22-11	-	-	-	-	TP	CB	
57A	115-11 15/16	110-3 1/2	20-10	-	-	-	-	TP	CB	
39A	88-0 1/4	95-2 1/2	11-7	-	-	-	-	TD	CB	21

KEY: IP = Intermediate point
 TD = Terminal point
 CB = Circumferential break
 LB = Longitudinal break

⁽¹⁾Stresses were calculated in accordance with Equations 9 and 10 of ASME Section III, paragraph WC-3652.

NOTES: See Fig. 3.6-19 for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-19. The reference coordinate system is shown in Table 3.6A-5.

TABLE 3.6A-14

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASS 1 PIPING
LOW-PRESSURE CORE SPRAY SYSTEM

Break Point	Location			Maximum Stress Range ⁽¹⁾			Cumulative Usage Factor	Pipe Break Stress Limit 2.4 S _m (psi)	Description of Break Points	Break Type	
	El (ft-in)	Az (deg)	r (ft-in)	Eq. 10 (psi)	Eq. 12 (psi)	Eq. 13 (psi)					
1	140-9	90	11-7 15/16	-	-	-	-	-	TP	CB	15
4	140-9	90	19-3	42,084	6,056	19,657	0.034	44,284	IP	CB	17 21
5	140-9	90	20-10	-	-	-	-	-	TP	CB	
6	140-9	90	15-7 1/2	59,668	14,668	35,019	0.0946	44,284	IP	CB	21

Key: IP = Intermediate point
TP = Terminal point
CB = Circumferential break
LB = Longitudinal break

⁽¹⁾Stresses were calculated in accordance with Equations 10, 12, and 13 of ASME Section III, paragraphs NB-3653.1(a), NB-3653.6(a), and NB-3653.6(b), respectively. Cumulative usage factors were calculated in accordance with ASME Section III, subarticle NB-3650.

NOTES: See Fig. 3.6A-22 for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-22. The reference coordinate system is shown in Table 3.6A-1.

TABLE 3.6A-15

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASS 1 PIPING

RESIDUAL HEAT REMOVAL SYSTEM - SHUTDOWN MODE

Break Point	Location			Maximum Stress Range ⁽¹⁾			Cumulative Usage Factor ⁽¹⁾	Pipe Break Stress Limit 2.0 S _m (psi)	Description of Break Points	Break Type
	El (ft-in)	Az (deg)	r (ft-in)	Eq. 10 (psi)	Eq. 12 (psi)	Eq. 13 (psi)				
1	91-6	0	18-2 1/2	-	-	-	-	-	TP	CB
2	93-9	0	20-5 1/2	42,506	19,861	27,435	0.0248	44,284	IP	CB
5	101-2	0	20-5 1/2	-	-	-	-	-	TP	CB
6	100-6	0	20-5 1/2	55,466	4,282	38,427	0.0994	44,284	IP	CB

Key: IP = Intermediate point
TP = Terminal point
CB = Circumferential break
LP = Longitudinal break

⁽¹⁾Stresses were calculated in accordance with equations 10, 12, and 13 of ASME Section III, paragraphs NB-3653.1(a), NB-3653.6(a), and NB-3653.6(b), respectively. Cumulative usage factors were calculated in accordance with ASME Section III, subarticle NB-3650.

NOTES: See Fig. 3.6A-24 for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-24. The reference coordinate system is shown in Table 3.6A-1.

TABLE 3.6A-16

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASS 1 PIPING

RESIDUAL HEAT REMOVAL SYSTEM - LPCI MODE

Break Point	Location			Maximum Stress Range ⁽¹⁾			Cumulative Usage Factor ⁽¹⁾	Pipe Break Stress Limit 2.4 S _m (psi)	Description of Break Points	Break Type
	Pl (ft-in)	Az (deg)	r (ft-in)	Eg. 10 (psi)	Eg. 12 (psi)	Eg. 13 (psi)				
1A	136-3 1/4	45	11-8 7/8	-	-	-	-	-	TP	CB
3A	136-3 1/4	45	19-11 1/2	52,039	6,118	26,153	0.014	44,284	IP	CB
4A	136-3 1/4	45	21-11 1/2	-	-	-	-	-	TP	CB
5A	136-3 1/4	45	20-8 1/2	75,147	5,962	41,803	0.0999	44,284	IP	CB
1B	136-3 1/4	225	11-8 7/8	-	-	-	-	-	TP	CB
3B	136-3 1/4	225	19-11 1/2	51,672	8,582	27,236	0.0038	44,284	IP	CB
4B	136-3 1/4	225	21-11 1/2	-	-	-	-	-	TP	CB
5B	136-3 1/4	225	21-0	71,159	7,489	42,101	0.071	44,284	IP	CB
1C	136-3 1/4	135	11-8 7/8	-	-	-	-	-	TP	CB
3C	136-3 1/4	135	19-11 1/2	51,691	7,131	28,343	0.0038	44,284	IP	CB
4C	136-3 1/4	135	21-11 1/2	-	-	-	-	-	TP	CB
5C	136-3 1/4	135	20-8 1/2	70,989	6,167	42,732	0.0682	44,284	IP	CB

Key: IP = Intermediate point
 TP = Terminal point
 CB = Circumferential break
 LB = Longitudinal break

⁽¹⁾Stresses were calculated in accordance with equations 10, 12, and 13 of ASME Section III, paragraphs NB-3653.1(a), NB-3653.6(a), and NB-3653.6(b), respectively. Cumulative usage factors were calculated in accordance with ASME Section III, subarticle NB-3650.

NOTES: See Fig. 3.6A-25 for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-25. The reference coordinate is shown in Table 3.6A-1.

TABLE 3.6A-17a

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASS 1 PIPING

MAIN STEAM DRAIN SYSTEM - INSIDE CONTAINMENT

Break Point	Location			Maximum Stress Range(1)			Cumulative Usage Factor(1)	Pipe Break Stress Limit 2.4 S _m (psil)	Description of Break Points	Break Type
	E1 (ft-in)	Az (deg)	r (ft-in)	Eq. 10 (psil)	Eq. 12 (psil)	Eq. 13 (psil)				
1	127-9 7/16	21.5	28-8	-	-	-	-	-	TP	CB
4	125-2 3/4	8	26-11	65,786	16,253	31,382	0.0851	43,360	IP	CB
5	125-6 3/4	7.5	26-11	65,786	16,253	31,382	0.0851	43,360	IP	CB
6	127-9 7/16	7.5	26-11	-	-	-	-	-	TP	CB
7	125-2 3/4	7	26-11	65,786	16,253	31,382	0.0851	43,360	IP	CB
8	125-1 5/8	353	26-11	77,929	24,534	39,737	0.274	43,360	IP	CB
9	125-5 5/8	352.5	26-11	77,929	24,534	39,737	0.274	43,360	IP	CB
10	127-9 7/16	352.5	26-11	-	-	-	-	-	TP	CB
11	125-1 5/8	352	26-11	77,929	24,534	39,737	0.274	43,360	IP	CB
18	127-9 7/16	338.5	28-8	-	-	-	-	-	TP	CB
26	115-7 1/8	346.5	28-3	-	-	-	-	-	TP	CB

17

21

Key: IP = Intermediate point
TP = Terminal point
CB = Circumferential break
LB = Longitudinal break

(1) Stresses were calculated in accordance with Equations 10, 12, and 13 of ASME Section III, paragraphs NB-3653.1(a), NB-3653.6(a), and NB-2653.6(b), respectively. Cumulative usage factors were calculated in accordance with ASME Section III, subarticle NB-3650.

NOTES: See Fig. 3.6A-33b for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-33b. The reference coordinate system is shown in Table 3.6A-1.

TABLE 3.6A-17b

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASSES 2 AND 3 PIPING
MAIN STEAM DRAIN SYSTEM - OUTSIDE CONTAINMENT (AUXILIARY BUILDING)

Break Point	Elevation ft-in	Location		Stress(1)		Total Additive Stress (psi)	Pipe Break Stress Limit $0.8(1.2S_h + S_A)$ (psi)	Description of Break Points	Break Type
		X (ft-in)	Z (ft-in)	Eq. 9 (psi)	Eq. 10 (psi)				
1	115-0 7/16	107-9 1/2	-(4-3)	-	-	-	-	TP	CB
13	115-0 3/8	117-0	-(15-7 1/2)	-	-	-	-	TP	CB
20	111-8 11/16	136-9 1/2	-(9-7)	9,529	17,940	27,469	32,400	IP	CB
22	110-10 5/8	137-2	-(9-7)	9,910	18,352	28,262	32,400	IP	CB
27	114-10 1/4	117-0	-(13-3 1/2)	(2)	-	-	-	TP	CB
28	119-9	117-0	-(13-3 1/2)	(2)	-	-	-	IP	CB
29	120-0	117-0	-(13-0 1/2)	(2)	-	-	-	IP	CB
34	114-7 9/16	120-5	38-11 1/2	(2)	-	-	-	TP	CB
35	114-10 5/16	117-0	-(13-10 1/2)	(2)	-	-	-	TP	CB
43	127-9 1/2	118-5	30-2 1/2	(2)	-	-	-	TP	CB
44	114-10 3/8	117-0	-(14-5 1/2)	(2)	-	-	-	TP	CB
52	127-10 1/2	118-5	-(30-2 1/2)	(2)	-	-	-	TP	CB
53	114-10 7/16	117-0	-(15-0 1/2)	(2)	-	-	-	TP	CB
60	114-7 9/16	120-5	-(38-11 1/2)	(2)	-	-	-	TP	CB
69	114-7 9/16	121-0	-(38-11 1/2)	(2)	-	-	-	IP	CB
70	114-10 9/16	121-3	-(38-11 1/2)	(2)	-	-	-	IP	CB
71	118-1 9/16	116-2	-(38-11 1/2)	(2)	-	-	-	IP	CB
72	118-4 9/16	115-11	-(38-11 1/2)	(2)	-	-	-	IP	CB
73	127-10 1/2	117-10	-(30-2 1/2)	(2)	-	-	-	IP	CB
74	128-1 1/2	117-7	-(30-2 1/2)	(2)	-	-	-	IP	CB
75	133-0	117-7	-(30-2 1/2)	(2)	-	-	-	IP	CB
76	133-3	117-7	-(29-11 1/2)	(2)	-	-	-	IP	CB
77	117-11 1/2	117-0	-(14-8 1/2)	(2)	-	-	-	IP	CB
78	117-9 3/8	117-0	-(14-6 3/8)	(2)	-	-	-	IP	CB
79	127-9 3/4	116-3	30-2 1/2	(2)	-	-	-	IP	CB
80	128-0 3/4	116-0	30-2 1/2	(2)	-	-	-	IP	CB
81	117-7 9/16	118-8	38-11 1/2	(2)	-	-	-	IP	CB
82	117-7 9/16	118-5	38-8 1/2	(2)	-	-	-	IP	CB
83	118-10 1/8	116-5	14-8	(2)	-	-	-	IP	CB
84	119-1 1/8	116-5	14-5	(2)	-	-	-	IP	CB
85	126-4 7/8	116-5	6-11	(2)	-	-	-	IP	CB
86	126-7 7/8	116-2	6-11	(2)	-	-	-	IP	CB

21

21

16

TABLE 3.6A-17b (Cont)

Break Point	Elevation (ft-in)	Location		Stress ⁽¹⁾		Total Additive Stress (psi)	Pipe Break Stress Limit $0.8(1.2S_h + S_A)$ (psi)	Description of Break Points	Break Type	
		X (ft-in)	Z (ft-in)	Eq. 9 (psi)	Eq. 10 (psi)					
87	126-7 7/8	115-3 13/16	6-11	(2)						
88	126-7 7/8	115-0 13/16	6-8	(2)			-	IP	CB	
89	126-6	115-0 13/16	-(7-0 3/8)	(2)			-	IP	CB	16
90	126-6	115-3 13/16	-(7-3 3/8)	(2)			-	IP	CB	
94	110-1 15/16	152-0	-(14-8)	-	-	-	-	TP	CB	
97	114-10 3/16	117-0	-(12-6)	-	-	-	-	TP	CB	21

KEY: IP = Intermediate point
TP = Terminal point
CB = Circumferential break
LB = Longitudinal break

(1) Stresses were calculated in accordance with Equations 9 and 10 of ASME Section III, paragraph WC-3652.
(2) Pipe stresses are not required since pipe breaks are postulated at every fitting and attachment.

NOTES: See Fig. 3.6A-33c for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-33c. The reference coordinate system is shown in Table 3.6A-5.

TABLE 3.6A-18E (Cont)

Break Point	Elevation (ft-in)	Location		Stress		Total Additive Stress (psi)	Pipe Break Stress Limit 0.8 (1.2 S _n + S _A) (psi)	Description of Break Points	Break Types
		X (ft-in)	Z (ft-in)	Eq. 9 (psi)	Eq. 10 (psi)				
89	107-0	-(72-5)	2-8 3/4					IP	CP
90	107-0	-(72-7)	2-6 3/4					IP	CB
91	107-0	-(73-1)	2-6 3/4					IP	CB
92	107-2	-(73-3)	2-6 3/4					IP	CB
94	115-0	-(73-3)	2-6 3/4					IP	CB
95	115-10	-(73-3)	2-6 3/4					IP	CB
96	116-0	-(73-1)	2-6 3/4					TP	CB

Stresses are not required for control rod drive piping in the fuel building since pipe breaks are postulated at every fitting and attachment.

21

Key: IP = Intermediate point
 TP = Terminal point
 CB = Circumferential break
 LB = Longitudinal break

NOTES: See Fig. 3.6A-24c for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-24c. The reference coordinate system is shown in Table 3.6A-5.

TABLE 3.6A-19

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASS 1 PIPING

REACTOR WATER CLEANUP SYSTEM - INSIDE CONTAINMENT

Break Point	Location			Maximum Stress Range ⁽¹⁾			Cumulative Usage Factor ⁽¹⁾	Pipe Break Stress Limit 2.4 S _m (psi)	Description of Break Points	Break Type
	E1 (ft-in)	X (ft-in)	Z (ft-in)	Eq. 10 (psi)	Eq. 12 (psi)	Eq. 13 (psi)				
1	83-5	-(18-0 7/16)	-(8-10 1/8)	-	-	-	-	-	TP	CB
14	86-6	26-6 5/8	-(8-9)	59,136	36,011	37,433	0.1476	43,032	IP	CB, LB
16	86-6	26-4 5/8	-(9-3)	59,136	36,011	37,433	0.1476	43,032	IP	CB, LB
15	86-6	26-5 5/8	-(9-0)	59,136	36,011	37,433	0.1476	43,032	IP	CB, LB
31	83-5	18-4	9-0	-	-	-	-	-	TP	CB
41	89-8	28-1	-(2-0)	79,167	17,114	47,470	0.6797	49,224	IP	CB, LB
42	90-4	28-1	-(2-0)	79,167	17,114	47,470	0.6797	49,224	IP	CB, LB
51	104-0	31-2	4-3	-	-	-	-	-	TP	CB
60	82-6	22-3	2-0	-	-	-	-	-	TP	CB
9	82-11 1/4	-(18-1/2)	8-10	64,415	10,705	34,149	0.2435	40,608	IP	CB, LB
67B	81-8	18-11	-(2-0)	48,292	23,269	33,473	0.1461	43,032	IP	CB
67C	81-8	18-8	-(1-9)	45,213	19,648	33,192	0.138	43,032	IP	CB
26A	83-0	17-2	-(8-6)	68,978	16,100	34,948	0.2731	40,608	IP	CB, LB
60A	82-6	22-3	-(2-0)	66,955	10,137	40,097	0.365	43,032	IP	CB

15

17

17

21

TABLE 3.6A-19 (Cont)

Break Point	Location			Maximum Stress Range(1)			Cumulative Usage Factor(1)	Pipe Break Stress Limit 2.4 S _m (psi)	Description of Break Points	Break Type
	E1 (ft-in)	I (ft-in)	Z (ft-in)	Eq. 10 (psi)	Eq. 12 (psi)	Eq. 13 (psi)				
59	90-0	28-1	-(2-0)	79,167	17,114	47,470	0.6797	49,224	IP	CB
68	82-6	20-7	-(2-0)	-	-	-	-	-	TP	CB
69	82-6	20-6	-(2-0)	-	-	-	-	-	TP	CB
85	100-0 13/16	7-6	-(3-0)	57,097	5,664	43,752	0.1127	43,032	IP	CB
87	100-4 13/16	7-6	-(2-6)	52,176	3,884	39,263	0.1527	43,032	IP	CB
95	100-4 13/16	7-0	3-11	-	-	-	-	-	TP	CB
93	102-0	-(0-9)	0-6	-	-	-	-	-	TP	CB
3A	82-6	17-0	12-0	-	-	-	-	-	TP	CB
29A	82-6	17-6	-(13-3)	-	-	-	-	-	TP	CB
67D	81-8	18-8	-(0-4)	-	-	-	-	-	TP	CB

Key: IP = Intermediate point
 TP = Terminal point
 CB = Circumferential break
 LB = Longitudinal break

NOTES: See Fig. 3.6A-23 for break locations.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-23. The reference coordinate system is shown in Table 3.6A-5.

TABLE 3.6A-19a

SUMMARY OF STRESSES IN HIGH ENERGY ASME CLASSES 2 AND 3 PIPING

Peactor Water Cleanup System - Inside Containment

Break Point	Elevation (ft-in)	Location		Stress ⁽¹⁾		Total Additive Stress (psi)	Pipe Break Stress Limit 0.8(1.2 S _h + S _A) (psi)	Description of Break Points	Break Types
		I (ft-in)	Z (ft-in)	Eq. 9 (psi)	Eq. 10 (psi)				
124	149-0	44-4 7/16	-(5-2 11/16)	-	-	-	-	TP	CB
125	149-0	44-4 7/16	-(6-1)	6,820	20,585	27,943	32,400	IP	CB
129	149-0	46-0 11/16	-(12-8)	13,662	16,710	30,372	32,400	IP	CB
140	159-8 15/16	51-2	-(6-9)	-	-	-	-	TP	CB
141	149-0	46-3 7/16	-(6-10)	-	-	-	-	TP	CB
142	149-0	47-5 7/16	-(6-10)	-	-	-	-	TP	CB
153	157-8 5/8	49-7 5/16	-(8-3)	-	-	-	-	TP	CB
154	149-0	49-5 5/16	-(8-5 7/8)	9,620	25,293	34,913	32,400	IP	CB, LB
155	149-0	49-5 5/16	-(7-0)	-	-	-	-	TP	CB
174A	154-6	41-9	-(8-9)	-	-	-	-	TP	CB
178	149-6	40-6	-(11-1 1/2)	14,050	4,085	18,136	32,400	IP	CB
180	149-0	40-6	-(8-6)	-	-	-	-	TP	CB
186A	153-7	40-6	-(15-9)	-	-	-	-	TP	CB
195	172-10 3/8	47-0 5/16	0-11	-	-	-	-	TP	CB
197	154-6	40-1 7/8	-(15-9)	11,328	19,376	30,704	32,400	IP	CB
200	149-0	37-6	-(15-9)	8,342	6,101	14,442	32,400	IP	CB
201A	148-6	30-1 5/8	-(26-6)	-	-	-	-	TP	CB
201F	148-6	15-7 7/16	-(36-4 5/8)	9,453	5,802	15,255	32,400	IP	CB
202A	151-6	17-5 7/16	-(36-4 5/8)	-	-	-	-	TP	CB
202C	125-3	7-11 1/8	-(40-2 9/16)	7,059	4,129	11,188	32,400	IP	CB
206A	158-0	-(1-6)	-(40-3)	-	-	-	-	TP	CB
217	171-6	-(8-8)	-(44-3)	17,569	12,120	29,689	32,400	IP	CB
220	171-0	-(7-5)	-(45-3)	-	-	-	-	TP	CB
232	171-6	-(8-4)	-(41-0)	-	-	-	-	TP	CB
245	176-8	-(8-1)	-(27-6)	-	-	-	-	TP	CB
246A	158-0	1-6	-(40-3)	-	-	-	-	TP	CB
201E	148-6	24-1	-(32-4)	11,059	2,429	13,488	32,400	IP	CB
227	172-6	-(11-6)	-(41-3)	8,791	15,702	24,493	32,400	IP	CB
184	149-0	40-6	-(15-3)	9,779	5,355	15,133	32,400	IP	CB

TABLE 3.6A-19a (Cont)

Break Point	Elevation (ft-in)	Location		Stress(1)		Total Additive Stress (psi)	Pipe Break Stress Limit 0.8(1.2 S _h + S _A) (psi)	Description of Break Points	Break Types
		X (ft-in)	Z (ft-in)	Eq. 9 (psi)	Eq. 10 (psi)				
257	171-6	9-0	-(44-3)	21,026	6,107	27,133	32,400	IP	CB
259	171-0	8-6	-(44-7 1/2)	13,095	3,158	16,253	32,400	IP	CB
260	171-0	6-9	-(45-3)	-	-	-	-	TP	CB
272	171-6	8-5	-(41-0)	-	-	-	-	TP	CB
285	176-6	8-0	-(27-7)	-	-	-	-	TP	CB
286	171-6	-(8-8)	-(41-3)	10,587	5,780	16,367	32,400	IP	CB
294	163-11	-(5-5)	-(41-0)	-	-	-	-	TP	CB
303	163-11	5-6	-(41-0)	-	-	-	-	TP	CB
306	153-10 3/16	51-0	9-3	-	-	-	-	TP	CB
318	150-1 1/8	43-2	-(17-2)	17,210	4,254	21,524	32,400	IP	CB
320	150-6	43-8	-(16-9)	14,137	3,757	17,894	32,400	IP	CB
323A	153-6	43-8	-(15-9)	-	-	-	-	TP	CB
324	149-3	43-3 7/8	-(17-2)	13,152	10,762	23,914	32,400	IP	CB
324A	149-3	30-1 5/8	-(26-6)	-	-	-	-	TP	CB
325A	149-3	24-2 1/4	-(32-1 7/8)	10,026	2,436	12,463	32,400	IP	CB
326A	150-11	18-4	-(35-10 1/4)	8,300	5,053	13,353	32,400	IP	CB
327A	151-6	18-3	-(35-10 1/4)	-	-	-	-	TP	CB
347	168-7	9-6	-(34-9)	-	-	-	-	TP	CB
358	170-5 13/16	11-4	28-3	-	-	-	-	TP	CB
360A	170-1 5/16	6-2 1/4	-(37-6)	-	-	-	-	TP	CB
362	166-0	6-2 1/4	-(37-9)	-	-	-	-	TP	CB
366	170-5 13/16	4-0	-(37-6)	-	-	-	-	TP	CB
379	168-7	-(9-6)	-(34-9)	-	-	-	-	TP	CB
390	170-5 13/16	-(11-4)	-(28-3)	-	-	-	-	TP	CB
395	170-5 13/16	-(4-5)	-(37-6)	-	-	-	-	TP	CB
396A	170-1 5/16	-(5-9 3/4)	-(37-6)	-	-	-	-	TP	CB
398	166-0	-(5-9 3/4)	-(37-9)	-	-	-	-	TP	CB
412	165-0	-(3-4)	-(34-9)	9,608	12,187	21,795	32,400	IP	CB
419	164-4	-(4-9)	-(34-1 1/2)	-	-	-	-	TP	CB
420	165-0	3-9	-(34-9)	9,294	11,714	21,007	32,400	IP	CB
426	164-4	4-9	-(34-1 1/2)	-	-	-	-	TP	CB
427	181-0	-(9-6)	-(26-3)	-	-	-	-	TP	CB
428	181-3 5/8	-(9-6)	-(24-4)	-	-	-	-	IP	CB
428A	181-1 5/8	-(9-6)	-(23-5)	-	-	-	-	IP	CB
429	181-3 5/8	-(9-6)	-(22-8)	-	-	-	-	IP	CB
430	181-3 5/8	-(9-9)	-(22-5) (2)	-	-	-	-	IP	CB
431	181-1 5/8	-(16-8)	-(22-5)	-	-	-	-	IP	CB
432	181-1 5/8	-(16-11)	-(22-8)	-	-	-	-	IP	CB
433	181-1 5/8	-(16-11)	-(34-6)	-	-	-	-	IP	CB
434	181-1 5/8	-(17-5)	-(34-9)	-	-	-	-	IP	CB

TABLE 3.6A-20

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASSES 2 AND 3 PIPING
 REACTOR WATER CLEANUP SYSTEM - OUTSIDE CONTAINMENT

Break Point	Elevation (ft-in)	Location		Stress(1)		Total Additive Stress (psi)	Pipe Break Stress Limit 0.8 (1.2 S _h S _A) (psi)	Description of Break Points	Break Types
		I (ft-in)	Z (ft-in)	Eq. 9 (psi)	Eq. 10 (psi)				
1	116-0	107-9 1/2	4-3	11,659	15,354	27,013	32,400	TP	CB
3	115-3	109-5	4-3	6,798	15,738	22,537	32,400	IP	CB
5	106-9	108-10 1/3	3-8 1/2	7,072	14,510	21,582	32,400	IP	CB
7A	106-9	95-9	0-0	-	-	-	-	TP	CB
20A	105-5	79-0	3-5 1/16	8,902	6,273	15,175	32,400	IP	CB
24	97-9	78-7 1/2	3-5	5,231	8,575	13,805	32,400	IP	CB
30	97-9	77-6	8-10	-	-	-	-	TP	CB
37	97-9	84-4 1/2	3-5	5,266	8,732	13,999	32,400	IP	CB
43	97-9	77-6	8-10	-	-	-	-	TP	CB
44	117-6	107-10	10-6	-	-	-	-	TP	CB
46	117-0	109-5	10-6	6,445	8,951	15,396	32,400	IP	CB
52A	106-9	92-4	11-3	-	-	-	-	TP	CB
57	106-9	81-5	11-11	10,205	15,173	25,378	32,400	IP	CB
58	106-9	80-11	4-11	9,477	13,384	22,861	32,400	IP	CB
72	98-10	77-11	9-2	-	-	-	-	TP	CB
87	98-10	86-1	9-3	-	-	-	-	TP	CB
90	117-9 1/2	107-11	0-0	-	-	-	-	TP	CB
90A	126-0 1/2	116-3	-(2-0)	15,902	17,222	20,761	32,400	IP	CB
98B	117-9 1/2	116-6 7/8	2-0	7,349	12,813	20,162	32,400	IP	CB
108	124-9	121-5 3/4	6-8 5/8	-	-	-	-	TP	CB
117	124-9	120-6 1/8	-(6-6 7/8)	-	-	-	-	TP	CB
50A	106-9	102-11	5-9	7,577	5,852	13,429	32,400	IP	CB

Key: IP = Intermediate point
 TP = Terminal point
 CB = Circumferential break
 LB = Longitudinal break

NOTES: See Fig. 3.6A-26 through 28 for break locations.

Stresses were calculated in accordance with Equations 9 and 10 of ASME Section III, paragraph NC-3652.

The data presented in this table were used in conjunction with Section 3.6.2A to determine the break locations shown in Fig. 3.6A-26 through 28. The reference coordinate system is shown in Table 3.6A-5.

TABLE 3.6A-25

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Main Steam (Inside Containment)

Piping Line Numbers: 1-MSS-024-Line A

Consequence of Piping Failure: Pipe Whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)						
1A	155-0 1/2	72	11-10 1/2	C	P				No whip
					H	1) Drywell wall 2) Fl El 141'-0" 3) SWP-010-170-3 4) SWP-010-155-3 5) Vent duct	PRP-811 -812 -813	PRR	16
10A	152-0 1/2	72	17-6	C	R	1) Top of drywell	PRR-811	PRR	16
					H	1) Fl El 125'-8 3/8" E 141'-0" 2) ICS-008-1-1 piping 3) CSL-010-43-1 piping 4) MSS-Loop C 5) MSS-002-2-1	PRR-813 -812 -814	PRR	16
38A	130-10 3/4	51	19-0	C	R&H	1) Containment penetration 1DRB*21A 2) Fl El 134'-10" 3) PHS-010-34-1 (LPCI-A)	PRR-813 -814 - -	1) PRR 2) NPS 3) SPI	15 16
38A-1	130-5 1/2	51	19-0	C	R&H	1) Containment penetration 1DRB*21A 2) Fl El 134'-10" 3) PHS-010-34-1 (LPCI-A)	PRR-813 -814	1) PRR 2) NPS 3) SPI	16 21
42A	130-10	34.5	19-6	C	R&H	1) Containment penetration 1DRB*21A 2) Fl El 134'-10"	PRR-813 -814	1) PRR 2) NPS	16

TABLE 3.6A-25 (Cont)

Piping System: Main Steam (Inside Containment)
Piping Line Numbers: 1-MSS-024-Line A
Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)						
42A-1	130-4 3/4	34.5	19-6	C	B&H	1) Containment penetration 1DPB*Z1A 2) Fl El 134'-10"	PRR-813 -814	1) PRR	16
60A	129-0 7/8	8	25-0	C	B	1) BSW 2) PWS-012-37-1 piping	PRR-814 -812 -813	2) NRS PRR	15 16
					H	None			No whip 16
30A	129-4 3/4	62.5	17-9	C	B	1) Pl El 141'-0" 2) CSL-010-43-1 piping 3) MSS-Loop C	PRR-812 -811	PRR	21
					H	1) MSS-Loop C 2) PWS-012-37-1	PRR-814 -813 -815	PRR	16

TABLE 3.6A-25 (Cont)

Piping System: Main Steam (Inside Containment)
Piping Line Numbers: 1-MSS-024-Line B
Consequence of Piping Failure: Pipe Whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)						
1B	155-0 1/2	252	11-10 1/2	C	H	1) Drywell 2) P1 El 141'-0" 3) SWP-010-155-3 4) SWP-010-177-3 5) Vent duct 6) IDPS-UC1C	PRR-821	PRR	No whip
10B	152-0 1/2	252	17-5	C	F	1) EPV	PRR-821	PRR	16
					H	1) P1 El 141'-0" 2) PSW	PRR-822	PRR	
35B	129-6 1/8	264.5	23-8	C	F	1) PWS-012-36-1 2) Structural steel El 141'-0" 3) RBS-010-16-1	PRR-822 -821	PRR	16 15 16
					H	1) Drywell wall 2) SVV-010-6-3 3) SVV-010-7-3 4) SVV-010-8-3 5) Vent duct	PRR-824 -823 -825	PRR	16
37B	131-1 1/4	272	23-6	C	FEH	1) Containment penetration 1DRB*Z1B 2) CSH-010-41-1 3) ICC 502 RT4 ADS conduit	PRR-823 -825	1) PRR 2) SPI 3) RL	16 16 21
37B-1	130-8	272	23-6	C	FEH	1) Containment penetration 1DRB*Z1B 2) CSH-010-41-1 3) ICC 502 RT4 ADS conduit	PRR-823 -825	1) PRR 2) SPI 3) RL	16 21

TABLE 3.6A-25 (Cont)

Piping System: Main Steam (Inside Containment)
 Piping Line Numbers: 1-MSS-024-Line B
 Consequence of Piping Failure: Pipe Whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)						
38B	131-0 1/4	278	23-9	C	BEH	1) Containment penetration 1DRB*21B 2) CSH-010-41-1 3) ICC 502 RT4 ADS conduit	PRR-823 -825	1) PRR 2) SPI 3) EL	16 16 21
38B-1	130-7	278	23-9	C	BEH	1) Containment penetration 1DRB*21B 2) CSH-010-41-1 3) ICC 502 RT4 ADS conduit	PRR-823 -825	1) PRR 2) SPI 3) EL	16 16 21
39B	130-11 3/4	284	24-4	C	BEH	1) Containment penetration 1DRB*21B 2) CSH-010-41-1 3) ICC 502 RT4 ADS conduit	PRR-823 -825	1) PRR 2) SPI 3) EL	16 15 16 21
39B-1	130-6 1/2	284	24-4	C	BEH	1) Containment penetration 1DRB*21B 2) CSH-010-41-1 3) ICC 502 RT4 ADS conduit	PRR-823 -825	1) PRR 2) SPI 3) EL	16 16 21
47B	130-11 1/8	297	25-6	C	BEH	1) Containment penetration 1DRB*21B 2) CSH-010-41-1 3) ICC 502 RT4 ADS conduit	PRR-823 -825	1) PPP 2) SPI 3) EL	16 16 21

TABLE 3.6A-25 (Cont)

Piping System: Main Steam (Inside Containment)
 Piping Line Numbers: 1-MSS-024-Line B
 Consequence of Piping Failure: Pipe Whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)						
47B-1	130-5 7/8	297	25-6	C	PEH	1) Containment penetration 1DRB*Z1B 2) CSH-010-41-1 3) ICC 502 RT4 ADS conduit	PRR-823 -825	1) PRR 2) SPI 3) RL	16 16 21
48B	130-11	302	25-5	C	PEH	1) Containment penetration 1DRB*Z1B 2) CSH-010-41-1 3) ICC 502 RT4 ADS conduit	PRR-823 -825	1) PRR 2) SPI 3) RL	16 15 16 21
48E-1	130-5 3/4	302	25-5	C	PEH	1) Containment penetration 1DRB*Z1B 2) CSH-010-41-1 3) ICC 502 RT4 ADS conduit	PRR-823 -825	1) PRR 2) SPI 3) RL	16 16 21
70B	129-0 5/8	337	26-10 1/2	C	B H	1) BSW 2) MSS-Loop D 3) FWS-012-35-1	PRR-825 -824	PRR	16 No whip

TABLE 3.6A-25 (Cont)

Piping System: Main Steam (Inside Containment)
 Piping Line Numbers: 1-MSS-024-Line C
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)						
1C	155-0 1/2	108	11-10 1/2	C	B				No whip
					H	1) Drywell wall 2) P1 El 141'-0" 3) SWP-010-155-3 4) SWP-010-170-3 5) MSS-002-1-1 6) Vent duct 7) DRS-UC1C	PRR-801 -802	PRR	16
10C	152-0 1/2	108	17-5	C	P	1) RPV	PRP-801	PPR	16
					H	1) P1 El 141'-0" 2) PSW	PRR-802 -803	PPR PRR	21
35C	129-6 1/8	95.5	23-8	C	P	1) Structural steel El 141'-0" 2) FWS-012-38-1	PRR-802 -801	PPR	16 15
					H	1) Drywell wall 2) RRS-010-34-1 3) SVV-010-10-3	PRR-804 -803 -805	PPR	16
37C	131-1 1/4	88.1	23-6	C	R&H	1) Containment penetration 1DRB*21C 2) CSL-010-43-1	PRR-803 -805	1) PRR	16
37C-1	130-8	88.1	23-6	C	R&H	1) Containment penetration 1DRB*21C 2) CSL-010-43-1	PRR-803 -805	1) PRR	16
38C	131-0 1/4	82.1	23-9	C	R&H	1) Containment penetration 1DRB*21C 2) CSL-010-43-1	PRR-803 -805	1) PRR 2) RRS	16 16

TABLE 3.6A-25 (Cont)

Piping System: Main Steam (Inside Containment)
Piping Line Numbers: 1-MSS-024-Line D
Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	R (ft-in)						
1D	155-0 1/2	288	11-10 1/2	C	P				No whip
					H	1) Drywell wall 2) SWP-010-155-3 3) SWP-010-170-3 4) Vent duct	PRP-831 -832 -833	PRP	16
10D	152-0 1/2	288	17-6	C	E	1) Top of drywell	PRP-831	PRP	16
					H	1) Structural steel E1 125'-8 3/4" 2) Structural steel E1 141'-0" 3) CHS-010-41-1	PRP-833 -832 -834	PRP	16
38D	130-10 3/4	309	19-0	C	BCH	1) Containment penetration 1DPB*21D 2) ICC 500 BD5 (ADS valve 41F conduit) 3) ICC 502 RT3 ICC 500 BD9 4) (ADS valve 41B conduit) 5) BCS-750-40-2 6) F1 E1 134'-10"	PRP-833 -834	1) PRP 2) Note C 3) Note C 4) Note C 5) Note D 6) NPS	15 16 21

TABLE 3.6A-25 (Cont)

Piping System: Main Steam (Inside Containment)
 Piping Line Numbers: 1-MSS-024-Line D
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El ft-inl	Az deg	R ft-inl						
38D-1	130-5 1/2	309	19-0	C	B6H	1) Containment penetration 1DRB*21D 2) 1CC 500 BD5 (ADS valve 41F Conduit) 3) 1CC 502 RT3 4) 1CC 500 BD9 (ADS valve 41B conduit) 5) PCS-750-40-2 6) FI El 134'-10"	PRR-833 -834	1) PRR 2) Note C 3) Note C 4) Note C 5) Note D 6) NRS	
39D	130-10 1/4	316	20-0	C	B6H	1) Containment penetration 1DRB*21D 2) 1CC 500 BD5 (ADS valve 41F conduit) 3) 1CC 502 RT3 4) 1CC 500 BD9 (ADS valve 41B conduit) 5) PCS-750-40-2 6) FI El 134'-10"	PRR-833 -834	1) PRR 2) Note C 3) Note C 4) Note C 5) Note D 6) NRS	
39D-1	130-5	316	20-0	C	B6H	1) Containment penetration 1DRB*21D 2) 1CC 500 BDS (ADS valve 41F conduit) 3) 1CC 502 RT3 4) 1CC 500 BD9 (ADS valve 41B conduit) 5) PCS-750-40-2 6) FI El 134'-10"	PRR-833 -834	1) PRR 2) Note C 3) Note C 4) Note C 5) Note D 6) NRS	

TABLE 3.6A-25 (Cont)

Piping System: Main Steam (Inside Containment)
 Piping Line Numbers: 1-MSS-024-Line D
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks	
	El (ft-in)	Az (deg)	R (ft-in)							
42D	130-10	325.5	19-6	C	B&H	1) Containment penetration 1DBB*Z1D 2) FL E1 134'-10"	PRR-833 -834	1) PRR 2) NSR		2.55 2.56 2.57 2.58
42D-1	130-5	325.5	19-6	C	B&H	1) Containment penetration 1DBB*Z1D 2) FL E1 134'-10"	PRR-b33 -834	1) PRR 2) NSR		3.4 3.5 3.6 3.7
60D	126-0 7/16	352	25-0	C	B	1) BSW 2) FWS-012-35-1	PRR-834 -832 -833	PRR		2.11 3.12 3.13
					H				No whip	3.15
30D	129-4 3/4	297.5	17-9	C	B	1) FL E1 141'-0" 2) MSS-Loop B piping	PRR-832 -831	PRR		3.18 3.19
					H	1) MSS-Loop B piping 2) FWS-012-35-1 piping	PRR-834 -833 -835	PRR		3.21 3.22 3.23

NOTE: Numbered footnotes follow Table 3.6A-51.

Amendment 21

11 of 11

July 1985

ch1547107f-21t

06/16/85

113

TABLE 3.6A-25a (Cont)

Piping System: Main Steam - Loop B (Outside Containment)
 Piping Line Numbers: 1MSS-024-58-1, 1MSS-024-5-2, 1MSS-024-45-4
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El ft-inl	I ft-inl	Z ft-inl						
348B	128-3 1/4	107-9 1/2	-(10-6)	C	F	None			No whip 17
					H	1) Tunnel ceiling 2) P1 El 123'-9" 3) PWS-010-14-2 4) MSS-Loop D 5) DTM-001-112-2 6) DTM-001-113-2 7) DTM-150-104-2 8) DTM-150-10-2	PRP-922 -923	PRP	
425B	114-7	122-5	-(43-6)	C	F	1) Tunnel wall 2) DTM-002-75-4 3) CWS-004-48-4 4) IAS-004-37-4 5) SAS-004-7-4 6) BWS-006-140 & 200-3	PRP-929 -921 -924 -922 -923	PRP	17
					F	1) Tunnel wall	PRP-927	PRP	
466B	114-0	147-11	-(9-9)	C	F	1) Tunnel wall (concrete plug) 2) P1 El 114'-0"	PRP-926 -925	PRP	17
					H				No whip
503B	114-10 1/4	119-5	-(34-11 1/2)	C	H	1) Structural steel 2) PWS-020-62-2 3) PPS-010-14-2 4) PWS-008-36-2 5) PWS-020-63-2	PRP-923 -924 -922 -921	PRP	17 21
					H	1) Tunnel wall 2) BWS-006-140-3 3) BWS-006-200-3	PRP-925 -927 -929	PRP	17

TABLE 3.6A-25a (Cont)

Piping System: Main Steam - Loop C (Outside Containment)
 Piping Line Numbers: 1MSS-024-61-1, 1MSS-024-8-2, 1MSS-024-48-4
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	1 (ft-in)	2 (ft-in)						
348C	128-3 1/4	107-9 1/2	10-6	C	B				No whip
					H	1) Tunnel ceiling 2) Pl El 123'-9" 3) MSS-Loop A 4) BHS-010-65-2 5) DTM-001-114-2 6) DTM-001-115-2 7) DTM-150-106-2 8) DTM-170-107-2	PRR-902 -903	PRR	
425C	114-7	122-5	43-6	C	B	1) Tunnel Wall 2) BHS-006-82-3 3) BHS-006-100-3 4) DTM-002-76-4	PRR-909 PRR-904 PRR-903 PRR-902 PRR-901	PRR	17
					H	1) Tunnel Wall	PRR-907	PRR	21
466C	114-3	147-11	9-9	C	B	1) Tunnel wall (concrete plug)	PRR-906 -905	PRR	17
					H				No whip
503C	114-10 1/4	119-5	34-11 1/2	C	B	1) Structural steel 2) PWS-020-62-2 3) BHS-010-65-2 4) PWS-020-63-2	PRR-903 -902 -901 -904	PRR	17 17

TABLE 3.6A-26

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Main Steam Vent Line (Inside Containment)

Piping Line Numbers: 1MSS-004-3-1, 1MSS-002-72-1, 1MSS-002-2-1, 1MSS-002-1-1

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El ft-inl	Az deg	r ft-inl						
1	173-0 5/16	90	1-3 15/16	C					No whip
					MSS.A	1) Drywell dome	DRP-840 -851	DRP	
3A	172-9	90	6-10	C					No whip
					MSS.A	1) Drywell dome	DRP-840 -851	DRP	
5A	159-11	90	13-3	C	B	1) Pen 1DRP#2161		1) DSI	
					MSS.A	1) PPV 2) 1CI507PC2 conduit for CMSPTD43A 3) 1CI507PC3 conduit for CMSPTD43C 4) 1CI507PC4 conduit for CMSPTD43E	DRP-846 2) Note A 3) Note A 4) Note A	DRP	
8	156-8	90	14-5 5/8	C	B	1) PPV 2) Pen 1DRP#2161 3) 1CI507PC2 conduit for CMSPTD43A 4) 1CI507PC3 conduit for CMSPTD43C 5) 1CI507PC4 conduit for CMSPTD43E	DRP-846 3) Note A 4) Note A 5) Note A	DRP	
					MSS.A	None			

TABLE 3.6A-26 (Cont)

Piping System: Main Steam Vent Line (Inside Containment)

Piping Line Numbers: 1MSS-004-3-1, 1MSS-002-72-1, 1MSS-002-2-1, 1MSS-002-1-1

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	E1 (ft-in)	A2 (deg)	r (ft-in)						
9	156-8	90	14-10 3/8	C	R	1) PPV 2) Pen 1D*8*2161 3) 1CX5078C2 conduit for CMSPTD43A 4) 1CX507PC3 conduit for CMSPTD43C 5) 1CX5078C4 conduit for CMSPTD43E	PRP-846	PPF 3) Note A 4) Note A 5) Note A	17
					MSS.A	None			
9A	156-5	90	15-1 1/2	C	B	1) Fl E1 157'-6"		1) DSI	17
					H	1) Platf E1 147'-6"		1) DSI	
10A	156-2	90	15-3 7/8	C	R	1) PPV 2) Pen 1D*8*2161 3) 1CX5078C2 conduit for CMSPTD43A 4) 1CX507PC3 conduit for CMSPTD43C 5) 1CX5078C4 conduit for CMSPTD43E	PRP-846	3) Note A 4) Note A 5) Note A	15 21 17
					MSS.A	None			
19	150-8 7/8	106	19-3	C	F	1) Fl E1 157'-6"		1) DSI	17
					MSS.A	1) Platf E1 147'-6"		1) DSI	17

TABLE 3.6A-26 (Cont)

Piping System: Main Steam Vent Line (Inside Containment)

Piping line Numbers: 1MSS-004-3-1, 1MSS-002-72-1, 1MSS-002-2-1, 1MSS-002-1-1

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks	
	El (ft-in)	Az (deg)	r (ft-in)							
20	150-6 1/2	105	19-6	C	R	1) 1MSS-Line C		1) SPT		21
					MSS.A	None				
33	148-6 1/2	76	16-6 3/4	C	R	1) 1MSS-Line C		1) SPT		15
					MSS.A	None				
34	156-8	90	14-8	C	R & MSS.A	1) 1CX507RC2 conduit for CMSPTD43A		1) Note A		
						2) 1CX507PC3 conduit for CMSPTD43C		2) Note A		17
						3) 1CX507PC4 conduit for CMSPTD43E		3) Note A		
47	148-6	131.5	12-2 1/4	C	R & MSS.A	1) 1-MSS-Line C snubber		1) SPI		21

NOTE: Numbered footnotes follow Table 3.6A-51.

Amendment 21

TABLE 3.6A-27a

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Main Steam Isolation Valve Drain Lines System (Inside Containment)
Piping Line Numbers: 1-DTM-002-68-1, 69-1, 70-1, 71-1, 1-DTM-003-524-1, 72-1
Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El ft-inl	Az (deg)	r ft-inl						
1	127-9 7/16	21.5	28-8	C	MSS&H	1) 1ES1*MOVFO76 2) 1ICS-008-1-1 3) 1ICS-750-2-1	PPR-803	PPR	
4	125-2 3/4	8	26-11	C	MSS&H	1) Struct beam (space frame) 2) Valve 1ES1*MOVFO63 3) Platf ladder	PPS-805 PWS-PPS-811	1) DSI 2) PPR 3) PPR	21
5	125-6 3/4	7.5	26-11	C	MSS&H	1) 1PWS-020-66-1	PPS-805	SPI	
6	127-9 7/16	7.5	26-11	C	MSS&H	1) 1PWS-020-66-1	PPS-805	SPI	21
7	125-2 3/4	7	26-11	C	MSS&H	1) Struct brace (space frame) 2) Valve stem 1ES1*MOVFO63 3) Platf ladder	PPS-805 PWS-PPS-811	1) DSI 2) PPR 3) PPR	21
8	125-1 5/8	353	26-11	C	MSS&H	1) Struct brace (space frame)	PWS-PPS-811	DSI	17 21
9	125-5 5/8	352.5	26-11	C	MSS&H	1) 1PWS-020-67-1	-	SPI	
10	127-9 7/16	352.5	26-11	C	MSS&H	1) 1PWS-020-67-1	-	SPI	
11	125-1 5/8	352	26-11	C	MSS&H	1) Struct brace (space frame) 2) 1ICS-006-6-1	PPS-813	1) DSI 2) SPI	21
18	127-9 7/16	338.5	28-8	C	MSS&H	1) Per 1KJB*219 2) Crywell wall 3) 1ICS-006-6-1	PPS-813	PPR	21

TABLE 3.6A-27a (Cont)

Piping System: Main Steam Isolation Valve Drain Lines System (Inside Containment)
Piping Line Numbers: 1-DTM-002-68-1, 69-1, 70-1, 71-1, 1-DTM-003-52A-1, 72-1
Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)						
26	115-7 1/8	351.5	28-3	C	HSS	1) Containment penetra- tion 1KJB*22 2) Valve 1B21*MOVPO16 3) Valve 1B21*VF011 & valve stem	PRR-806 -819	PRR	17
				H	None				

TABLE 3.6A-27b

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Main Steam Drain Piping (Auxiliary Building)

Piping Line Numbers: 1DTM-003-78-4, 1DTM-003-79-4, 1DTM-002-77-4, 1DTM-002-76-4, 1DTM-002-74-4,
1DTM-002-75-4

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El ft-inl	I ft-inl	Z ft-inl						
1	115-0 7/16	107-9 1/2	-(4-3)	C	Mainsteam	None			16
13	115-0 3/8	117-0	-(15-7 1/2)	C	Mainsteam	1) IMSS*PRR-924 -923		1) DSI	21
20	111-8 11/16	136-9 1/2	-(9-7)	C	Mainsteam	1) FI El 114'-0" 2) 1DTM-150-106-2 3) 1DTM-150-107-2 4) 1DTM-001-112-4 5) 1DTM-001-113-4 6) 1DTM-004-60-4		1) DSI 2) Note F 3) Note F 4) NRS 5) NRS 6) Note F, SPI	21
22	110-10 5/8	137-2	-(9-7)	C	Mainsteam	1) FI El 114'-0"		1) DSI	21
27	114-10 1/4	117-0	-(13-3 1/2)	C	Mainsteam	1) IMSS-024-5-2 2) IMSS-024-8-2 3) 1FWS-020-62-2 4) 1FWS-020-63-2 5) IMSS*PRR-902 6) IMSS*PRR-922		1) Note F, SPI 2) Note F, SPI 3) Note F, SPI 4) Note F, SPI 5) DSI 6) DSI	16

TABLE 3.6A-27b (Cont)

Piping System: Main Steam Drain Piping (Auxiliary Building)
 Piping Line Numbers: 10TM-003-78-a, 10TM-003-79-a, 10TM-002-76-a, 10TM-002-74-a,
 10TM-002-75-a

Consequence of Piping Failure: Pipe whip

Break Point	Break Location		Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El ft-inl	2 ft-inl						
28	119-9	117-0	- (13-3 1/2)	C	Mainsteam	1) MSS-024-5-2 2) MSS-024-8-2 3) PWS-020-62-2 4) PWS-020-63-2 5) MSS-PBB-902 6) MSS-PBB-922	1) Note P, SPI 2) Note P, SPI 3) Note P, SPI 4) Note P, SPI 5) DSI 6) DSI	21
29	120-0	117-0	- (13-0 1/2)	C	Mainsteam	1) WCS-V172 2) WCS-VF051 3) WCS-1633*NOVP046, V163, HWP035, SOP041 4) WCS-025-110-a 5) WCS-004-171-2 6) WCS-004-116-a 7) WCS-004-32-a 8) WCS-750-66-a 9) 10TB-002-74-a 10) 10TB-002-75-a 11) 10TB-002-76-a 12) MSS-PBB-903 13) MSS-PBB-923 14) MSS-024-5-2 15) MSS-024-8-2 16) PWS-020-62-2 17) PWS-020-63-2	1) Note P 2) Note P 3) Note P	21
34	114-7 9/16	120-5	38-11 1/2	C	Mainsteam	1) Wall (BJ AM)	1) DSI	16
35	114-10 5/16	117-0	- (13-10 1/2)	C	Mainsteam	1) MSS-024-5-2 2) MSS-024-8-2 3) PWS-020-62-2 4) PWS-020-63-2 5) MSS-PBB-922	1) Note P, SPI 2) Note P, SPI 3) Note P, SPI 4) Note P, SPI 5) DSI	21
43	127-9 1/2	118-5	30-2 1/2	C	Mainsteam	1) Wall (BJ AM)	1) DSI	16

TABLE 3.6A-27b (Cont)

Piping System: Main Steam Drain Piping (Auxiliary Building)
 Piping Line Numbers: 10TH-003-78-4, 10TH-003-79-4, 10TH-002-76-4, 10TH-002-74-4,
 10TH-002-75-4
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	II (ft-in)						
40	114-10 3/8	117-0	-(14-5 1/2)	C	Mainsteam	1) Fl El 124'-9" 2) 10TH-150-104-2 3) 10TH-150-105-2 4) 10TH-001-112-4 5) 10TH-001-113-4 6) 1MSS-024-62-2		1) DSI 2) Note F 3) Note F 4) NRS 5) NRS 6) Note F, SPI	
52	127-10 1/2	118-5	-(30-2 1/2)	C	Mainsteam	1) Wall (AA AP)		1) DSI	
53	114-10 7/16	117-0	-(15-0 1/2)	C	Mainsteam	1) Fl El 124'-9" 2) 10TH-150-104-2 3) 10TH-150-105-2 4) 10TH-001-112-4 5) 10TH-001-113-4 6) 1MSS-024-62-2		1) DSI 2) Note F 3) Note F 4) NRS 5) NRS 6) Note F, SPI	16
60	114-7 9/16	120-5	-(38-11 1/2)	C	Mainsteam	1) Wall (AA AP)		1) DSI	
69	114-7 9/16	121-0	-(38-11 1/2)	C	Mainsteam	None			21
70	114-10 9/16	121-3	-(38-11 1/2)	C	Mainsteam	1) Platf El 124'-9"		1) DSI	
71	118-1 9/16	116-2	-(38-11 1/2)	C	Mainsteam	1) Wall (AP, AA)		1) DSI	16

TABLE 3.6A-27b (Cont)

Piping System: Main Steam Drain Piping (Auxiliary Building)

Piping Line Numbers: 10TH-003-78-A, 10TH-003-79-A, 10TH-002-76-A, 10TH-002-78-A,
10TH-002-75-A

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	Fl ft-in	I ft-in	II ft-in						
84	119-1 1/8	116-5	14-5	C	Mainsteam	1) Wall (AG, AJ)		1) DSI	
85	126-4 7/8	116-5	6-11	C	Mainsteam	1) Platf E1 123'-9" 2) WCS-1G33-MOVP346 3) WCS-003-121-A 4) WCS-750-220-A 5) WCS-004-116-3 6) Wall (AG, AJ)		1) DSI 2) Note P 3) Note P, SPI 4) NPS 5) Note P, SPI 6) DSI	
86	126-7 7/8	116-2	6-11	C	Mainsteam	1) Wall (AG, AJ)		1) DSI	
87	126-7 7/8	115-3 13/16	6-11	C	Mainsteam	1) Wall (AG, AJ)		1) DSI	
88	126-7 7/8	115-0 13/16	6-8	C	Mainsteam	1) Wall (AG, AJ)		1) DSI	
89	126-6	115-0 13/16	-(7-0 3/8)	C	Mainsteam	1) Wall (AG, AE)		1) DSI	
90	126-6	115-3 13/16	-(7-3 3/8)	C	Mainsteam	1) Wall (AG, AE)		1) DSI	
94	110-1 15/16	152-0	-(14-8)	C	Mainsteam	1) Pl E1 104'-6" 2) Wall 3) 10TH-001-148-A 4) 10TH-001-149-A 5) 10TH-004-60-A		1) DSI 2) DSI 3) NPS 4) NPS 5) Note P, SPI	

TABLE 3.6A-27b (Cont)

Piping System: Main Steam Drain Piping (Auxiliary Building)

Piping Line Numbers: 10TH-003-78-4, 10TH-003-79-4, 10TH-002-76-4, 10TH-002-74-4,
10TH-002-75-4

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El	I	S						
	ft-inl	ft-inl	ft-inl						
97	114-10 3/16	117-0	-(12-6)	C	Mainsteam	1) MSS*PBB-924 923		1) DSI	

NOTE: Numbered footnotes follow Table 3.6A-51.

Amendment 21

TABLE 3.6A-28a (Cont)

Piping System: Feedwater Piping - East Loop (Inside Containment)

Piping Line Numbers: 1FWS-020-67-1, 1FWS-020-39-1, 1FWS-014-65-1, 1FWS-012-35-1, 1FWS-012-36-1

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El ft-inl	Az ft-deg	r ft-inl						
71E	122-0	334.4	18-3	C	R	1) BSW	PRR-829	PRR	21
					H	1) PHS-010-16-1 2) PHS-010-19-1	PRR-826 PRR-825	PRR	
				L	REH	1) P1 El 141'-0"	PRR-829	PRR	17
						2) P1 El 125'-8 3/4"	PRR-825 PRR-831		
130E	122-0	352.5	26-4 13/16	C	R	1) BSW	PER-829 -830	PRR	No whip
					H				

TABLE 3.6A-28b

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Feedwater Piping (Outside Containment)
Piping Line Numbers: 1FWS-020-47-1
Consequence of Piping Failure: Pipe whip

Break Point	Break Location(*)			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	2 (ft-in)						
1	121-8 1/10	107-9 1/2	3-6	C	R				No whip
					H	1) P1 El 114'-0" 2) RHS-010-65-2 3) WCS-004-22-2	PRR-902	PRR	
3	119-0 5/8	119-5	3-6	C	P	1) MSS-024-7-2 2) RHS-010-65-2 3) WCS-004-22-2	PRR-901	PRR	21
					H	1) P1 El 114'-0" 2) RHS-010-65-2 3) PHS-008-36-2 4) RHS-008-45-3 5) WCS-004-32-4	PRR-903	PRR	

TABLE 3.6A-28b (Cont)

Piping System: Feedwater Piping (Outside Containment)
Piping Line Numbers: 1FWS-020-47-1
Consequence of Piping Failure: Pipe whip

Break Point	Break Location(4)			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	2 (ft-in)						
6	108-7 15/16	119-5	35-8	C	E	1)RHS-008-36-2 2)PHS-008-45-2 3)RHS-010-65-2 4)WCS-004-171-2 5)Fl El 114'-0"	PRR-902 -903	PRR	
					H	1)IAS-003-100-4 2)SAS-004-612-4 3)CNS-004-38-4 4)West wall (steam tunnel)	PRR-905	PRR	

21

TABLE 3.6A-28b (Cont)

Piping System: Feedwater Piping (Outside Containment)
Piping Line Numbers: 1FWS-020-48-1
Consequence of Piping Failure: Pipe whip

Break Point	Break Location(6)			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	Z (ft-in)						
11	121-8 1/16	107-9 1/2	-(3-6)	C	B				No whip
					H	1) Structural steel F1 El 114'-0"	PRR-912	PRR	
						2) WCS-004-173-2			16
						3) RBS-010-14-2			21
13	119-0 5/16	121-11	-(3-6)	C	B	1) MSS-024-6-2	PRR-911	PRR	
						2) PHS-010-14-2			
						3) WCS-004-173-2			
					H	1) RBS-010-65-2	PRR-913	PRR	
						2) RBS-8-45-3			16
						3) WCS-004-32-4			21

TABLE 3.6A-28b (Cont)

Piping System: Feedwater Piping (Outside Containment)
Piping line Numbers: 1PWS-020-48-1
Consequence of Piping Failure: Pipe whip

Break Point	Break Location(6)			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	E1 (ft-in)	X (ft-in)	Z (ft-in)						
31	108-7 3/4	121-11	31-6	C	B	1)RHS-008-45-2 2)RHS-010-65-2 3)RHS-010-14-2 4)SPC-006-109-4 5)IAS-002-200-4 6)CNS-004-318-4 7)SAS-003-627-4	PRR-912 -914	PRR	

TABLE 3.6A-30a

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Reactor Core Isolation Cooling System (Inside Containment)

Piping Line Numbers: 1ICS-008-1-1

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)						
1	146-3 3/4	67.5	16-6 3/8	C C	MSS A D	1) Unit cooler 1DPS-UC1A	PRR-801 PRR-802	PRR	17
2	146-1 1/8	3.5	16-6 3/8	C	MSS A D	1) Unit cooler 1DPS-21C1A None	PRR-801 PRR-802	PRR	
3	145-1 1/8	0	16-6 3/8	C	MSS A D	1) BSW 2) 1MSS-PRR-834 1) 1ICS-PRR-804 cantilever box beam 2) ICS-006-57-1 support	PRR-802 803 PRR-804	PRR PRR	21
12	122-6 3/4	24	26-10	C C	MSS A D	1) 1FWS-020-40-1 2) 1FWS-PRR-810 None	PRR-805 -	PRR -	17 17

NOTE: Numbered footnotes follow Table 3.6A-51.

TABLE 3.6A-30b
SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Reactor Core Isolation Cooling System (Outside Containment)
Piping Line Numbers: 1-ICS-008-31-1, 1-ICS-008-4-2
Consequence of Piping Failure: Pipe whip

Break Point	Break Location(*)			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
1	121-8 1/16	107-9 1/2	10-6	C	R	1) Penetration 1KJB*Z15 2) 1ICS-MOVFP064	PRR-807	PRR	
					D	None			
17	117-0 5/8	110-3 1/2	10-6	C	R	1) Penetration 1KJB*Z15 2) 1ICS-MOVFP064 3) 1MSS-024-8-2 4) 1-WCS-004-116-4	PRR-814 -807	PRR	16
					D	None			

TABLE 3.6A-30b (Cont)

Piping System: Reactor Core Isolation Cooling System (Outside Containment)
 Piping Line Numbers: 1-ICS-004-13-2, 1-ICS-004-29-2
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location(s)			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
32	86-0 1/8	87-2 3/8	12-8	C	R	1) 1-ICS-MOVPO10 2) 1-ICS-150-25-2 3) 1-ICS-002-23-2 4) 1-ICS-006-20-2 5) Fl El 95'-9"	-	1) WPS 2) WRS 3) WRS 4) WRS 5) DSI	16 21
						D None			
33	85-9	86-11 3/8	12-8	C	R	1) Fl El 95'-9"	-	DSI	16 21
						D None			
39	73-9 1/4	89-4 1/2	12-8	C	R	1) 1-ICS-006-20-2	-	WRS	16
						D None			
39A	88-0 3/8	95-2 1/2	11-7	C	R	1) 1-ICS-002-10-2 2) Fl El 95'-9" 3) ICS*V33 valve 4) DFF*155 drain pipe 5) ICS-006-15-2 line suppt	-	1) WRS 2) DSI 3) WRS 4) WRS 5) WRS	16

TABLE 3.6A-30b (Cont)

Piping System: Residual Heat Removal System (Outside Containment)

Piping Line Numbers: 1-PHR-008-36-2

Consequence of Piping Failure: Pipe whip

Break Point	Break Location(*)			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	E1 (ft-in)	X (ft-in)	Z (ft-in)						
57	116-1 3/8	110-3 1/2	22-11	C	R	1) East wall of steam tunnel		DSI	16
					D	None			21
21	116-5 5/8	110-3 1/2	11-6	C	R	1) Jet impingement wall 2) 1-ICS-006-8-2 3) 1-WCS-006-11-3 4) 1-ICS-004-16-3	PRR-814	1) PRR 2) NRS 3) NRS 4) NRS	16
					D	None			
				L	R	1) Jet impingement wall 2) 1-WCS-004-16-3	PRP-814	1) PRR 2) NRS	16
									21

TABLE 3.6A-30b (Cont)

Piping System: Residual Heat Removal System (Outside Containment)

Piping Line Numbers: 1-RHF-008-36-2

Consequence of Piping Failure: Pipe whip

Break Point	Break Location(s)				Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)							
57A	115-11 15/16	110-3 1/2	20-10		C	R	1) Steam tunnel east wall		1) NRS	21 16
						D	None			
60	116-5 5/8	110-3 1/2	22-11		C	R	1) Jet impingement wall 2) 1-ICS-006-8-2 3) 1-ICS-006-11-3 4) 1-ICS-004-16-3	PRR-814	1) PRR 2) NRS 3) NRS 4) NRS	16
						D	None			

NOTE: Numbered footnotes follow Table 3.6A-51.

Amendment 21

4 of 4

July 1985

TABLE 3.6A-32

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Low Pressure Core Spray System (Inside Containment)
 Piping Line Numbers: 1CSL-010-43-1, 1CSL-012-08-1
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	R (ft-in)						
1	140-9	90	11-7 15/16	C	R	1) Drywell wall penetration 1DRB*Z14 2) Fl El 141'-0" 3) Platform El 141'-10"	PER-801	PRR	
4	140-9	90	19-3	C	R	1) Drywell wall penetration 1DPB*Z14 2) Fl El 141'-0" 3) Platform El 141'-10"	PER-801	PRR	15
5	140-9	90	20-10	C	R	1) Drywell wall penetration 1DRB*Z14 2) Fl El 141'-0" 3) Platform El 141'-10"	PER-801	PRR	17
6	140-9	90	15-7 1/2	C	R	1) Drywell wall penetration 1DRB*Z14 2) Fl El 141'-0" 3) Platform El 141'-10"	PER-801	PRR	21

NOTE: Numbered footnotes follow Table 3.6A-51.

TABLE 3.6A-33

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Residual Heat Removal System - Low Pressure Coolant Injection Mode (Inside Containment)
 Piping Line Numbers: 1RHS-010-16-1, 1RHS-010-19-1, 1RHS-010-34-1
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)						
1A	136-3 1/4	45	11-8 7/8	C	B	1) Drywell wall 2) Pen. 1DRB*Z14 3) 1CSL-010-43-1	PRR-801	PRR	21
5A	136-3 1/4	45	20-8 1/2	C	B	1) Drywell wall 2) Pen. 1DRB*Z14 3) 1CSL-010-43-1	PRR-801	PRR	21
3A	136-31/4	45	19-11 1/2	C	B	1) Drywell wall 2) Pen. 1DRB*Z14 3) 1CSL-010-43-1	PRR-801	PRR	21
4A	136-3 1/4	345	21-11 1/2	C	B	1) Drywell wall 2) Pen. 1DRB*Z14 3) 1CSL-010-43-1	PRR-801	PRR	21
1B	136-3 1/4	225	11-8 7/8	C	B	1) Drywell wall	PRR-811	PRR	

TABLE 3.6A-34a

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Residual Heat Removal System - Shutdown Mode (Inside Containment)

Piping Line Numbers: RHS-018-53-1

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)						
1	91-6	0	18-2 1/2	C	R	1) Drywell wall 2) Fl El 95'-9"	PER-831	PRR	
2	93-9	0	20-5 1/2	C	R	1) FWS PRS-811 2) RCS B 3) SVV piping		1) DSI 2) SPI 3) Note CA	
6	100-6	0	20-5 1/2	C	R	1) RCS Loop B piping 2) Fl El 95'-9" 3) FWS PRS-811 4) SVV piping	2) PPP-831	1) SPI 2) PRR 3) DSI 4) Note CA	21
5	101-2	0	20-5 1/2	C	R	1) RCS Loop B piping 2) Fl El 95'-9" 3) FWS PRS-811 4) SVV piping	2) PRS-831	1) SPI 2) PRR 3) DSI 4) Note CA	21 21

NOTE: Numbered footnotes follow Table 3.6A-51.

TABLE 3.6A-35

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Standby Liquid Control

Piping Line Numbers: 1-SLS-150-37-1, 1-SLS-150-38-1

Consequence of Piping Failure: Pipe Whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)						
1	101-4	225	6-9	C	H	1)CRD housing		1)SPI	17
2	86-0	189.7	15-0 1/4	C	B,H	1)DER-004-451-4 Support (DER-PSST3004A4)		1)SPI	
3	86-0	187.4	15-0 3/4	C	B,H	1)DER-004-451-4 Support (DER-PSST3004A4)		1)SPI	21
4	86-0	182.5	15-3	C	B,H	1)DER-004-451-4 Support (DER-PSST3004A4)		1)SPI	

NOTE: Numbered footnotes follow Table 3.6A-51.

Amendment 21

TABLE 3.6A-36b

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Control Rod Drive System (Fuel Building)
Piping Line Numbers: 1RDS-025-17-4
Consequence of Piping Failure: Pipe Whip

Break-point	Break Location			Break Types(1)	Targets	Protection Measures(3)	Evaluation(4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
1	72-1 1/2	-(127-6)	80-5 1/2	C	1) Wall		1) DSI	
2	72-1 1/2	-(127-6)	81-7	C	1) Wall		1) DSI	
3	72-3 1/2	-(127-6)	81-9	C	1) Floor El 70'-0"		1) DSI	
					2) Ceiling		2) DSI	
4	74-4	-(127-6)	81-9	C	1) Floor El 70'-0"		1) DSI	
					2) Ceiling		2) DSI	
5	74-6	-(127-8)	81-9	C	1) Wall		1) DSI	
6	74-6	-(123-2)	81-9	C	1) Wall		1) DSI	
8	74-8	-(123-4)	81-9	C	1) Floor El 70'-0"		1) DSI	
					2) Ceiling		2) DSI	
9	81-1	-(123-4)	81-9	C	1) Floor El 70'-0"		1) DSI	
					2) Ceiling		2) DSI	
10	81-3	-(123-4)	81-7	C	1) Wall		1) DSI	
11	81-3	-(123-6)	66-5	C	1) Wall		1) DSI	
12	81-3	-(123-4)	66-7	C	1) Wall		1) DSI	
13	81-3	-(132-2)	66-5	C	1) Wall		1) DSI	
15	81-3	-(129-2)	66-5	C	1) Wall		1) DSI	
34	81-3	-(123-4)	69-5	C	1) Floor El 70'-0"		1) DSI	
					2) Ceiling		2) DSI	
37	81-3	-(132-4)	66-7	C	1) Wall		1) DSI	
38	81-3	-(132-4)	68-9	C	1) Wall		1) DSI	

TABLE 3.6A-36b (Cont)

Piping System: Control Rod Drive System (Fuel Building)
 Piping Line Numbers: 1PDS-025-17-4
 Consequence of Piping Failure: Pipe Whip

Break- point	Break Location			Break Types ⁽¹⁾	Targets	Protection Measures ⁽³⁾	Evaluation ⁽⁴⁾	Remarks
	<u>E1</u> (ft-in)	<u>X</u> (ft-in)	<u>Z</u> (ft-in)					
39	81-3	-(132-2)	68-11	C	1) Wall		1) DSI	
40	81-3	-(130-4)	68-11	C	1) Wall		1) DSI	
41	81-1	-(130-2)	68-11	C	1) Floor E1 70'-0" 2) Ceiling		1) DSI 2) DSI	
42	76-8	-(130-2)	68-11	C	1) Floor E1 70'-0" 2) Ceiling		1) DSI 2) DSI	

TABLE 3.6A-36b (Cont)

Piping System: Control Rod Drive System (Fuel Building)
 Piping Line Numbers: 1PDS-025-18-4
 Consequence of Piping Failure: Pipe Whip

Break- Point	Break Location			Break Types(1)	Targets	Protection Measures(3)	Evaluation(4)	Remarks
	El (ft-in)	1 (ft-in)	2 (ft-in)					
18	81-3	-(129-2)	65-3	C	1) Wall		1) DSI	21
19	81-1	-(129-2)	65-1	C	1) Floor El 70'-0" 2) Ceiling		1) DSI 2) DSI	
20	76-9	-(129-2)	65-1	C	1) Floor El 70'-0" 2) Ceiling		1) DSI 2) DSI	

TABLE 3.6A-36b (Cont)

Piping System: Control Rod Drive System (Fuel Building)

Piping Line Numbers: 1BDS-002-225-4

Consequence of Piping Failure: Pipe Whip

Break-point	Break Location			Break Types(1)	Targets	Protection Measures(3)	Evaluation(4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
21	76-7	-(129-2)	65-1	C	1) Floor El 70'-0" 2) Ceiling		1) DSI 2) DSI	21
22	75-0	-(129-2)	65-1	C	1) Floor El 70'-0" 2) Ceiling		1) DSI 2) DSI	
23	74-10	-(129-2)	64-11	C	None		-	

TABLE 3.6A-36b (Cont)

Piping System: Control Rod Drive System (Fuel Building)

Piping Line Numbers: 1EDS-025-11-4

Consequence of Piping Failure: Pipe Whip

Break- Point	Break Location			Break Types(1)	Targets	Protection Measures(3)	Evaluation(4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
25	72-1 1/2	-(127-6)	68-1 1/2	C	None		-	
26	72-1 1/2	-(127-6)	69-3	C	None		-	
27	72-3 1/2	-(127-6)	69-5	C	1) Floor El 70'-0" 2) Ceiling		1) DSI 2) DSI	
28	74-4	-(127-6)	69-5	C	1) Floor El 70'-0" 2) Ceiling		1) DSI 2) DSI	
29	74-6	-(127-8)	69-5	C	1) Wall		1) DSI	
31	74-6	-(123-2)	69-5	C	1) Wall		1) DSI	
33	74-8	-(123-4)	69-5	C	1) Floor El 70'-0" 2) Ceiling		1) DSI 2) DSI	

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TABLE 3.6A-36b (Cont)

Piping System: Control Rod Drive System (Fuel Building)
Piping Line Numbers: 1RDS-002-21-4
Consequence of Piping Failure: Pipe Whip

Break- Point	Break Location			Break Types(1)	Targets	Protection Measures(2)	Evaluation(4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
50	77-0	-(132-6)	64-4 1/2	C	1) Wall		1) DSI	21

TABLE 3.6A-36b (Cont)

Piping System: Control Rod Drive System (Fuel Building)
Piping Line Numbers: 1RDS-002-19-4
Consequence of Piping Failure: Pipe Whip

Break- Point	Break Location			Break Types(1)	Targets	Protection Measures(3)	Evaluation(4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
56	74-10	-(129-2)	62-11	C	1) Wall		1) DSI	
57	74-10	-(130-0)	62-9	C	1) Wall		1) DSI	
59	77-0	-(129-0)	61-9	C	1) Wall 2) Floor El 70'-0" 3) Ceiling		1) DSI 2) DSI 3) DSI	
89	107-0	-(72-5)	2-8 3/4	C	1) Wall		1) DSI	
90	107-0	-(72-7)	2-6 3/4	C	1) Wall		1) DSI	
91	107-0	-(73-1)	2-6 3/4	C	1) Wall		1) DSI	
92	107-2	-(73-3)	2-6 3/4	C	1) Floor El 95'-0" 2) Ceiling		1) DSI 2) DSI	
94	115-0	-(73-3)	2-6 3/4	C	1) Floor El 95'-0" 2) Ceiling		1) DSI 2) DSI	
95	115-10	-(73-3)	2-6 3/4	C	1) Floor El 95'-0" 2) Ceiling		1) DSI 2) DSI	
96	116-0	-(73-1)	2-6 3/4	C	1) Wall		1) DSI	

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TABLE 3.6A-36b (Cont)

Piping System: Control Pod Drive System (Fuel Building)
 Piping Line Numbers: 1BDS-002-22-2
 Consequence of Piping Failure: Pipe Whip

Break- Point	Break Location			Break Types(1)	Targets	Protection Measures(3)	Evaluation(4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					

21

NOTES: 1. C = Circumferential break
 L = Longitudinal break
 2. R = Blowdown from RPV only
 H = Blowdown from other end (i.e., header or pump side)

TABLE 3.6A-37a

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1WCS-004-1-1
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Blowdown Types Source		Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)	(1)	(2)				
1	83-5	-(18-0 1/2)	8-10 1/8	C	RCS A	None			21
				C	P E RCS B	1) FI El 81'-1 3/4"		1) DSI	17
9	82-11 1/4	-(18-0 1/2)	8-10 1/8	C	PCS A	None			21
				C	P E RCS B	1) FI Fl 81'-1 3/4"		1) DSI	
				L	RCS A E B	None			
									21

TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1-DEP-002-4-1

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
29A	82-6	17-6	-(13-3)	C	R	None			

TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1DER-002-34-1
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
3A	82-6	-(17-0)	12-10	C	FCS A & B	1) Weir wall		1) DSI	17 21

TABLE 3.6A-3a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
Piping Line Numbers: 1WCS-006-5-1
Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	E1 (ft-in)	X (ft-in)	Z (ft-in)						
14	86-6	26-6 5/8	-(8-9)	C	PCS A	1) Weir wall 2) Structure I-Beam	PRR-804	PRR	21
					PCS B	1) Weir wall 2) 1DER-004-57-4 3) 1DER-150-56-4 4) 1DER-150-55-4	PRR-806	PRR	
				L	PCS A & B	1) Weir wall 2) Structure I-Beam 3) 1DER-150-55-4 4) 1DER-150-56-4 5) 1DER-004-57-4	PRR-804 -806	PRR	
16	86-6	26-4 5/8	-(9-3)	C	PCS A	1) Weir wall 2) Structure I-Beam	PRR-804	PRR	21
					PCS B	1) Weir wall 2) 1DER-004-57-4 3) 1DER-150-56-4 4) 1DER-150-55-4	PRR-806	PRR	
				L	PCS A & B	1) Weir wall 2) Structure I-Beam 3) 1DER-150-55-4 4) 1DER-150-56-4 5) 1DER-004-57-4	PRR-804 -806	PRR	

TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
Piping Line Numbers: 1WCS-006-5-1
Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
41	89-8	28-1	- (2-0)	C	PCS A E B	1) FI El 81'-1 3/4" 2) 1DER-150-55-4 3) 1DER-150-56-4 4) 1DER-004-57-4	PRR-806	PRR	21
					H	1) FI El 95'-9" 2) 1DER-150-55-4 3) 1DER-004-57-4	PRR-806	PRR	
					L H	1) 1DER-004-57-4 2) 1DER-150-56-4	PRR-806	PRR	
42	90-4	28-1	- (2-0)	C	RCS A	1) FI El 81'-1 3/4" 2) 1DER-150-55-4 3) 1DER-150-56-4 4) 1DER-004-57-4	PRR-806	PRR	21
					H	1) FI El 95'-9" 2) 1DER-150-55-4 3) 1DER-004-57-4	PRR-806	PRR	
					L H	1) 1DER-004-57-4 2) 1DER-150-56-4	PRR-806	PRR	
51	104-0	31-2	4-3	C	RCS A	1) FI El 95'-9"		1) DSI	21
					H	1) 1SVV-012-26-3	PRR-813	PRR	

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TABLE 3.6A-37a (Cont)

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TABLE 3.6A-37 (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1-DEP-002-223-1

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
67B	81-8	18-11	-(2-0)	C	R	None			
67C	81-8	18-8	-(1-9)	C	R	None			
67D	81-8	18-8	-(0-4)	C	R	None			

TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1WCS-004-3-1

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Flowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
15	86-6	26-5 5/8	-(9-0)	C	FCS A	1) Weir wall 2) Pl El 89'-11" 3) CCP lines	PPP-804	PRR	21
					PCS B	1) Fl El 81'-1 3/4"		1) DSI	17
26A	83-0	18-8	-(8-10 1/8)	C	RCS A	1) Pl El 81'-1 3/4"		1) DSI	21
				C	RCS B				
				L	PCS A S B	1) Structure I-Beam		1) DSI	

TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1WCS-004-3-1

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
31	83-5	18-4	-(8-10 1/8)	C	PCS A	1) Pl El 81'-1 4/3"		1) DSI	21 17
				C	D	None			

TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping line Numbers: 1WCS-003-6-1

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
59	90-0	28-1	-(2-0)	C	RCS A E B	1) Weir wall	PRR-806	PRR	21
				C	R	None			17
68	82-6	20-7	-(2-0)	C	P	1) Pedestal		1) DSI	21
				C	D	None			
69	82-6	20-6	-(2-0)	C	RCS A E B	None			21
				C	D	None			

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TABLE 3.6A-37a (Cont)

em: Reactor Water Cleanup System (Inside Containment)
 e Numbers: 1WCS-003-6-1
 e of Piping Failure: Pipe whip

Break Point	Break Location		Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	X (ft-in)	Z (ft-in)						
0 /16	7-2	-(3-0)	C	RCS A E B	1) Pedestal 2) CRD lines 3) CRD housing		1) DSI 2) Note HA 3) DSI	17 21

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TABLE 3.6A-3a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1WCS-003-6-1

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
59	90-0	28-1	-(2-0)	C	RCS A E B	1) Weir wall	PRR-806	PRR	21
				C	R	None			17
68	82-6	20-7	-(2-0)	C	P	1) Pedestal		1) DSI	21
				C	D	None			
69	82-6	20-6	-(2-0)	C	RCS A E B	None			21
				C	D	None			
									21

TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
Piping Line Numbers: 1WCS-003-6-1
Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
85	100-0 13/16	7-2	-(3-0)	C	RCS A & B	1) Pedestal 2) CRD lines 3) CRD housing		1) DSI 2) Note HA 3) DSI	17 21

TABLE 3.6A-3a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1WCS-003-6-1

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
87	100-4	7-6	- (2-6)	C	RCS A	1) Pedestal		1) DSI	21
	13/16				E B	2) CRD housing		2) DSI	
				C	R	1) Pedestal		1) DSI	17
						2) CRD housing		2) DSI	
95	100-4	7-0	- (3-11)	C	PCS A	1) Pedestal		1) DSI	21
	13/16				E B	2) CRD housing		2) DSI	
				C	R	1) Pedestal		1) DSI	
						2) CRD housing		2) DSI	

TABLE 3.6A-37 (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1WCS-150-P-1

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
60	82-6	22-3	-(2-0)	C	RCS A & B	None			21
				C	R	None			17

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TABLE 3.6A-37a (Cont)

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TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1B13-D077 (GE Line)
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
93	102-0	-(0-9)	-(0-6)	C	RCS A S B	1) CRD housing 2) CRD lines		1) DSI 2) Note HA	17 p1

TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1WCS-004-172-3

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Measures (3)	Protection Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
125	149-0	44-4 7/16	-(6-1)	C	H	1) Drywell wall 2) 1WCS-004-26-3	PRR-905	PRR	
					D	None			
141	149-0	46-3 7/16	-(6-10)	C	H	1) Drywell wall 2) 1WCS-004-26-3	PRP-905	PRR	
					D	None			
142	149-0	47-5 7/16	-(6-10)	C	H	1) South wall 2) 1WCS-004-25-3		1) DSI 2) SPI	
					D	None			

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TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1WCS-004-26-3
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Plowdown Types Source		Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)	(1)	(2)				
184	149-0	40-6	-(15-3)	C	H	1) Fl El 147'-3" 2) 1WCS-025-106-4		1) DSI 2) NRS	
				R		1) Fl El 147'-3"		1) DSI	

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TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1WCS-004-26-3
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	Z (ft-in)						
186A	153-7	40-6	-(15-9)	C	H	1) Pl El 147'-3"		1) DSI	
					R	1) Pl El 147'-3" 2) East wall 3) 1WCS-004-25-3		1) DSI 2) DSI 3) SPI	

TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1WCS-004-24-3
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
195	172-10 3/8	47-0 5/16	0-11	C	H	1) Heat exch 002B		1) DSI	
					R	None			
197	154-6	40-1 7/8	-(15-9)	C	H	None			
					R	1) South wall		1) DSI	
200	149-0	37-6	-(15-9)	C	H	1) Fl El 147'-3"		1) DSI	
					P	1) Platf El 158'-0"		1) DSI	
202	154-3	2-0	-(40-1)	C	H	1) Fl El 162'-3"		1) DSI	17
					R	1) Ceiling El 155'-0" 2) 1WCS-004-26-3 3) 1WCS-025-106-4		1) DSI 2) SPI 3) NRS	
202A	151-6	17-5 7/16	-(36-4 5/8)	C	R	1) 1WCS-025-106-4		1) NRS	
					H	1) 1WCS-004-25-4		1) SPI	
202C	125-3	7-11 1/8	-(40-2 9/16)	C	H	1) Fl El 162'-3"		1) DSI	21
					R	1) Ceiling El 155'-0" 2) 1WCS-004-26-3 3) 1WCS-025-106-4		1) DSI 2) SPI 3) NRS	
201A	148-6	30-1 5/8	-(26-6)	C	H	1) Pipe chase		1) DSI	21
					R	1) Pipe chase		1) DSI	
201B	148-6	24-1	-(32-4)	C	H	1) Pipe chase		1) DSI	21

TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1WCS-004-24-3
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	2 (ft-in)						
201F	148-6	15-7 7/16	-(36-4 5/8)	C	H	None			
				R		1) Pipe chase		1) DSI	
				R		1) Pump room wall		1) DSI	

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TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping line Numbers: 1WCS-003-34-3

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
206A	158-0	-(1-6)	-(40-3)	C	H	1) Fl Fl 162'-3" 2) Fl Fl 169'-9"		1) DSI 2) DSI	
					R6H	1) Drywell wall 2) Backwash rec tank G36-A003 wall		1) DSI 2) DSI	
227	172-6	-(11-6)	-(41-3)	C	H	1) West wall 2) Ladder		1) DSI 2) DSI	
					R6H	1) East wall 2) WCS-003-45-3		1) DSI 2) SPI	

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TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1WCS-002-58-3

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El ft-inl	1 ft-inl	2 ft-inl						
217	171-6	-(8-8)	-(44-3)	C	H	None			
					D	None			
220	171-0	-(7-5)	-(45-3)	C	H	1) East wall		1) DSI	
					D	None			

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TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1WCS-003-43-3

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El	I	Z						
	ft-inl	ft-inl	ft-inl						
232	171-6	-(8-4)	-(41-0)	C	F6H	1) Worth wall 2) Fl El 175'-9" 3) Ladder		1) DSI 2) DSI 3) DSI	
				D	None				

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TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1WCS-003-35-3

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
246A	158-0	1-6	-(40-3)	C	H	1) Fl El 162'-3" 2) Fl El 169'-9"		1) DSI 2) DSI	
				BEH		None			

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TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1WCS-002-69-3
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	Z (ft-in)						
257	171-6	9-0	-(44-3)	C	H	None			
					D	None			
260	171-0	6-9	-(45-3)	C	H	1) East wall		1) DSI	
					D	None			

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TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
Piping Line Numbers: 1WCS-003-71-3
Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Blowdown Types Source		Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	2 (ft-in)	(1)	(2)				
272	171-6	8-5	-(41-0)	C	WEH	1) Fl El 175'-9" 2) South wall 3) Ladder		1) DSI 2) DSI 3) DSI	
				D	None				

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TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1WCS-003-42-3

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	2 (ft-in)						
294	163-11	-(5-5)	-(41-0)	C	B&H				
				D		None			

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TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1WCS-004-25-3

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
306	153-10 3/16	51-0	9-3	C	H	None			
					P&H	1) South wall 2) Fl El 147'-3" 3) Ladder		1) DSI 2) DSI 3) DSI	
324	149-3	43-3 7/8	-(17-2)	C	P	1) South wall		1) DSI	
					H	1) Drywell wall 2) Fl El 147'-3" 3) 1WCS-006-18-3 4) 1WCS-004-26-3		1) DSI 2) DSI 3) SPI 4) SPI	

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TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1WCS-004-33-3
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
318	150-1 1/8	43-2	-(17-2)	C	H	None			
					R&H	1) East wall 2) 1WCS-004-24-3		1) DSI 2) SPI	
323A	153-6	43-8	-(15-9)	C	H	1) Platf El 147'-3"		1) DSI	
					R&H	1) East wall 2) 1WCS-004-24-3		1) DSI 2) SPI	

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TABLE 3.6A-37a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1WCS-008-46-3

Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Blowdown		Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)	Types (1)	Source (2)				
453	167-0	-(9-6)	-(26-3)	C	H	None			
					D	None			
455A	166-1 3/4	-(12-8 1/2)	-(23-0 1/2)	C	H	1) Demineralizer D001 stand		1) Note W	
					D	None			
456A	166-1 1/2	-(13-4 15/16)	-(22-9)	C	H	1) Demineralizer D001 stand 2) West wall		1) Note W 2) DSI	17
					D	None			
458A	165-9 5/8	-(17-2)	-(27-3)	C	H	1) West Wall 2) North wall		1) DSI 2) DSI	21
					D	None			
459	165-9 7/8	-(17-2)	-(34-9)	C	H	1) West wall 2) North wall		1) DSI 2) DSI	
					D	None			

TABLE 3.6A-37b

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Reactor Water Cleanup System (Outside Containment)
Piping Line Numbers: 1WCS-006-11-3
Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	1 (ft-in)	2 (ft-in)						
1	116-0	107-9 1/2	4-3	C	R	None			
					H	1) Fl El 114'-0" 2) 1WHS-008-36-2		1) DSI 2) SPI	16
3	115-3	109-5	4-3	C	R	1) Jet impingement wall 2) 1WHS-008-36-2		1) DSI 2) SPI	16
					H	1) Fl El 114'-0" 2) 1WCS-006-7-1		1) DSI 2) SPI	16
5	106-9	108-10 1/3	3-8 1/2	C	R	1) South & west walls 2) Fl El 114'-0" 3) 1WCS-004-13-2		1) DSI 2) DSI 3) SPI	21
					H	1) South & east walls 2) 1WHS-020-56-2 3) 1WCS-006-7-1		1) DSI 2) SPI 3) SPI	21
7A	106-9	95-9	0-0	C	R	1) South & east walls 2) 1WCS-006-7-1 3) Vent duct		1) DSI 2) SPI 3) NRS	16
					H	1) East wall 2) Vent duct		1) DSI 2) NRS	16

TABLE 3.6A-37b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment)
 Piping Line Numbers: 1WCS-003-13-3
 Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	E1 (ft-in)	I (ft-in)	Z (ft-in)						
20A	105-5	79-0	3-5 1/16	C	B	1) Fl E1 114'-0"		1) DSI	
					H	None			
24	97-9	78-7 1/2	3-5	C	B	1) Pump room wall		1) DSI	
					H	None			
30	97-9	77-6	8-10	C	B	1) Pump room wall		1) DSI	
					H	None			

TABLE 3.6A-37b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment)
Piping Line Numbers: 1WCS-003-12-3
Consequence of Piping Failure: Pipe whip

16

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	2 (ft-in)						
37	97-9	84-4 1/2	3-5	C	B	1) Pump room ceiling		1) DSI	
					H	1) Pump room wall		1) DSI	
43	97-9	85-6 1/2	8-7	C	B	1) Pump room ceiling		1) DSI	
					H	None			

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TABLE 3.6A-37b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment)
Piping Line Numbers: 1WCS-004-16-3
Consequence of Piping Failure: Pipe whip

Break Point	Break Location			Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)						
44	117-6	107-10	10-6	C	R	None			
					H	1) IICS-008-4-2 2) IHS-008-36-2 3) IICS-restraint		1) SPI 2) SPI 3) SPI	16 21
46	117-0	109-5	10-6	C	P	1) Jet impingement wall 2) IICS-008-4-2	PPP-902	PRR 2) SPI	21
					H	1) Fl El 114'-0"		1) DSI	16
50A	106-9	102-11	5-9	C	R	1) ICS-006-11-3 2) West wall 3) East wall 4) Vent duct		1) SPI 2) DSI 3) DSI 4) NRS	21
					H	1) ICS-004-13-2 2) South wall		1) SPI 2) DSI	
52A	106-9	92-4	11-3	C	P	1) East wall 2) IICS-006-7-1		1) DSI 2) SPI	16 21
					H	1) West wall 2) Vent duct		1) DSI 2) NRS	
57	106-9	81-5	5-5	C	P	1) West wall 2) Fl El 114'-0" 3) Vent duct		1) DSI 2) DSI 3) NRS	16
					H	1) Fl El 114'-0" 2) Pump room ceiling 3) IICS-006-11-3		1) DSI 2) DSI 3) SPI	16

TABLE 3.6A-38a
SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Main Steam (Inside Containment)
Piping Line Numbers: 1MSS-024-Line A
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
1A	155-0 1/2	72	11-10 1/2	C	1) RPV 2) MSS Line A 3) 1CX540rs7 CMS conduit 4) 1CX507rc2 CMS conduit 5) 1CX507rc3 CMS conduit 6) 1CX507rc4 CMS conduit		1) DSS 2) RL 3) Note A 4) Note A 5) Note A 6) Note A	
10A	152-0 1/2	72	17-6	C	1) RHS*165 line & supports (LPCS) 2) CSL*043 support (LPCS) 3) MSS-Line A & supports 4) 1CK500ba3 (G33P001 valve cable) 5) MSS Line C & supports 6) 1M4SIGN41A conduit (H ₂ ignitor)		1) RSS 2) RSS 3) RL 4) Note E 5) SPI 6) Note B	21
30A	129-4 3/4	62-2	17-9	C	1) MSS Line A & supports 2) 1RCS*035 line & supports 3) MSS Line C & supports 4) MSS valve 22A 5) MSS valve 22C		1) RL, RSS, ACI 2) Note D 3) SPI, RSS, ACI 4) Note H 5) Note H	21 16 21
38A	130-10 3/4	51	19-0	C	1) 1RCS*029 RPV press and level trans 2) 1RHS*034 line (LPCI-A) 3) 1E12*VP039A valve (LPCI-A) 4) 1CC502rd1 ADS conduit 5) 1CC502re ADS conduit 6) 1CX507rc2 CMS conduit 7) 1CX540rs7 CMS conduit		1) Note H 2) SPI 3) DSS 4) Note C 5) DSS 6) Note A 7) Note A	21 21

TABLE 3.6A-38a (Cont)

Piping System: Main Steam (Inside Containment)
 Piping Line Numbers: 1MSS-024-Line A
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
38A-1	130'-10 3/4"	51	19'-0"	C	1) 1RCS*029 RPV press and level trans 2) 1RHS*034 line (LPCI-A) 3) 1E12*VF039A (LPCI-A) 4) 1CC502rd1 ADS conduit 5) 1CC502re ADS conduit 6) 1CX507rc2 CMS conduit 7) 1CX540rs7 CMS conduit		1) Note H 2) SPI 3) DSS 4) Note C 5) DSS 6) Note A 7) Note A	21 21 21
42A	130-10	34.5	20-0	C	1) RCS*33 line & supports (RPV press & level trans) 2) RCS*029 line 3) RHS*164 line (LPCI-A) 4) SVV*010 line 5) SVV*PTG-1H tank		1) Note D 2) Note G 3) Note J 4) RL 5) RL	16
42A-1	130-4 3/4	34.5	20-0	C	1) RCS*033 line & supports (RPV Press & level trans) 2) RCS*029 line (RPV press & level trans) 3) PHS*164 (LPCI-A) line 4) SVV*10 line 5) SVV*PTG-1H tank		1) Note D 2) Note G 3) Note J 4) RL 5) RL	
60A	129-0 7/16	8	25-0	C	1) 1B21*AOVF22A 2) MSS Line A		1) Note H 2) RL	

TABLE 3.6A-38a (Cont)

Piping System: Main Steam (Inside Containment)
 Piping Line Numbers: 1MSS-024-Line B
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (2)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
1B	155-0 1/2	252	11-10 1/2	C	1) RPV 2) MSS Line B 3) RCS*57 line (RPV press & level trans) 4) 1CX501bd CMS conduit 5) 1CX501ba1 CMS conduit 6) 1CX501ba2 CMS conduit 7) 1CC500bl2 conduit (H ₂ igniter)		1) DSS 2) RL 3) Note D 4) Note A 5) Note A 6) Note A 7) Note B	
10B	152-0 1/2	252	17-5	C	1) MSS Line B & supports 2) CSH line supports 3) 1CX501ba2 CMS conduit 4) 1CX501ba1 CMS conduit 5) RCS*57 line (RPV press & level trans) 6) 1CC502RN4 conduit (H ₂ ignitor)		1) RL 2) RSS, ACI 3) Note A 4) Note A 5) Note D 6) Note B	16
35B	129-6 1/8	264.5	23-8	C	1) MSS Line B & supports		1) RL	
37B	131-1 1/4	272	23-6	C	1) CSH*41 line support 2) 1E22*AOV005 CSH valve 3) 1CC500bd7 ADS conduit 4) 1CC500bd9 ADS conduit 5) 1CC502rt4 ADS conduit 6) CSH-750-006 line & support		1) ACI 2) RSS, ACI 3) Note C 4) Note C 5) Note C 6) Note J	
37B-1	130-8	272	23-6	C	1) CSH*41 line support 2) 1E22*AOV005 valve 3) 1CC500bd7 ADS conduit 4) 1CC500bd9 ADS conduit 5) 1CC502rt4 ADS conduit 6) CSH-750-006 line & support		1) ACI 2) RSS, ACI 3) Note C 4) Note C 5) Note C 6) Note J	21

TABLE 3.6A-38a (Cont)

Piping System: Main Steam (Inside Containment)
 Piping Line Numbers: 1BSS-024-Line B
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
38B	131-0 1/4	278	23-9	C	1)CSH*41 line & supports 2)1CC500bd7 ADS conduit 3)1CC500bd9 ADS conduit 4)1CC502rt4 ADS conduit		1)ACI 2) Note C 3) Note C 4) Note C	
38B-1	131-7	278	23-9	C	1)CSH*41 line & supports 2)1CC500bd7 ADS conduit 3)1CC500bd9 ADS conduit 4)1CC502rt4 ADS conduit		1)ACI 2) Note C 3) Note C 4) Note C	
39B	130-11 3/4	284	24-4	C	1)CSH*41 line & supports 2)1CC500bd7 ADS conduit 3)1CC500bd9 ADS conduit 4)1CC502rt4 ADS conduit		1)ACI 2) Note C 3) Note C 4) Note C	
39B-1	130-6 1/2	284	24-4	C	1)CSH*41 line & supports 2)1CC500bd7 ADS conduit 3)1CC500bd9 ADS conduit 4)1CC502rt4 ADS conduit		1)ACI 2) Note C 3) Note C 4) Note C	16
47B	130-11 1/8	297	25-6	C	1)CMS*58 line support 2)1CC500bd9 ADS conduit 3)1CC500bl2 conduit (H ₂ ignitor) 4)1CC500bl3 conduit (H ₂ ignitor) 5)1CC502rt3 ADS conduit 6)1CC502rt4 ADS conduit 7)1CX501ba CMS conduit 8)1CX501ba1 CMS conduit 9)1CX501ba2 CMS conduit 10)1CX501ba3 CMS conduit 11)1CX501bd CMS conduit		1) Note I 2) Note C 3) Note G 4) Note B 5) Note C 6) Note C 7) Note A 8) Note A 9) Note A 10) Note A 11) Note A	21

TABLE 3.6A-38a (Cont)

Piping System: Main Steam (Inside Containment)
 Piping line Numbers: 1MSS-024-Line B
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (2)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
47B-1	130-5 7/8	297	25-6	C	1) CMS*58 line support 2) 1CC500bd9 ADS conduit 3) 1CC500bl2 conduit (H ₂ ignitor) 4) 1CC500bl3 conduit (H ₂ ignitor) 5) 1CC502rt3 ADS conduit 6) 1CC502rt4 ADS conduit 7) 1CX501ba CMS conduit 8) 1CX501ba1 CMS conduit 9) 1CX501ba2 CMS conduit 10) 1CX501ba3 CMS conduit 11) 1CX501bd CMS conduit		1) Note I 2) Note C 3) Note G 4) Note B 5) Note C 6) Note C 7) Note A 8) Note A 9) Note A 10) Note A 11) Note A	21
48B	130-11	302	25-5	C	1) CMS*58 line support 2) 1CC500bd9 ADS conduit 3) 1CC500bl2 conduit (H ₂ ignitor) 4) 1CC500bl3 conduit (H ₂ ignitor) 5) 1CC502rt3 ADS conduit 6) 1CC502rt4 ADS conduit 7) 1CX501ba CMS conduit 8) 1CX501ba1 CMS conduit 9) 1CX501ba2 CMS conduit 10) 1CX501ba3 CMS conduit 11) 1CX501bd CMS conduit		1) Note I 2) Note C 3) Note G 4) Note B 5) Note C 6) Note C 7) Note A 8) Note A 9) Note A 10) Note A 11) Note A	16 21
48B-1	130-5 3/4	302	25-5	C	1) CMS*58 line support 2) 1CC500bd9 ADS conduit 3) 1CC500bl2 conduit (H ₂ ignitor) 4) 1CC500bl3 conduit (H ₂ ignitor) 5) 1CC502rt3 ADS conduit 6) 1CC502rt4 ADS conduit 7) 1CX501ba CMS conduit 8) 1CX501ba1 CMS conduit		1) Note I 2) Note C 3) Note G 4) Note B 5) Note C 6) Note C 7) Note A 8) Note A	21

TABLE 3.6A-38a (Cont)

Piping System: Main Steam (Inside Containment)
 Piping Line Numbers: 1MSS-024-Line C
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
1C	155-0 1/2	108	11-10 1/2	C	1)RPV 2)MSS-Line C pipe and supports 3)1CX540RS7 CMS conduit 4)1CX507BC1 CMS conduit		1)DSS 2)RL 3)Note A 4)Note A	
10C	152-0 1/2	108	17-5	C	1)CSL*43 support wall 2)1CX507BC3 CMS conduit 3)1CX507BC4 CMS conduit 4)MSS supports		1)RSS,ACI 2)Note A 3)Note A 4)RL	
35C	129-6 1/8	95.5	23-8	C	1)RCS-750-034-2 and supports 2)MSS Line C and supports 3)CSL-10-43-1		1)Note D 2)RL 3)RSS,ACI	
37C	131-1 1/4	88.1	23-6	C	1)CSL-010-43-1 and valve AOV006 2)SVV-010-11-3 and valve FTG-1C 3)RHS-750-165-2 (LPCS) 4)RHS*165 support (LPCS) 5)1CC502RN4 conduit (H ₂ ignitor)		1)RSS,ACI 2)RL 3)RSS 4)RSS 5)Note B	16 21
37C-1	130-8	88.1	23-6	C	1)CSL-010-43-1 and valve AOV006 2)SVV-010-11-3 and valve FTG-1C 3)RHS-750-165-2 (LPCS) 4)RHS*165 support (LPCS) 5)1CC502RN4 conduit (H ₂ ignitor)		1)RSS,ACI 3)RSS 4)RSS 5)Note B	21
38C	131-0 1/4	82.1	23-9	C	1)CSL valve AOV*006 2)RHS-750-165-2 (LPCS) 3)RHS*165 support (LPCS) 4)1CC502RN4 conduit (H ₂ ignitor)		1)ACI,RSS 2)RSS 3)RSS 4)Note B	21

TABLE 3.6A-38a (Cont)

Piping System: Main Steam (Inside Containment)
 Piping Line Numbers: 1MSS-024-Line C
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
38C-1	130-7	82.2	23-9	C	1) CSL valve AOV*006 2) RHS-750-165-2 (LPCS) 3) RHS*165 support (LPCS) 4) 1CC5024RN4 conduit (H ₂ ignitor)		1) RSS, ACI 2) RSS 3) RSS 4) Note B	21
39C	130-11 3/4	76.2	24-4	C	1) RHS-750-165-2 (LPCS) 2) RHS*165 support (LPCS) 3) 1CC502RD1 (ADS valve 47A conduit) 4) 1CC502RD3 (ADS valve 41A conduit) 5) 1CC502RN4 conduit (H ₂ ignitor) 6) RCS-075-33-2 RPV pressure and level transmitter		1) RSS 2) RSS 3) Note C 4) Note C 5) Note B 6) Note D	16 21
39C-1	130-6 1/2	76	24-4	C	1) RHS-750-165-2 (LPCS) 2) RHS*165 support (LPCS) 3) 1CC502RD1 ADS valve 47A conduit 4) 1CC502RD3 ADS valve 41A conduit 5) 1CC502RN4 conduit (H ₂ ignitor) 6) RCS-075-33-2 RPV pressure and level transmitter		1) RSS 2) RSS 3) Note C 4) Note C 5) Note B 6) Note D	16 21

TABLE 3.6A-38a (Cont)

Piping System: Main Steam (Inside Containment)
 Piping Line Numbers: 1MSS-024-Line C
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	R (ft-in)					
40C	130-11 1/2	70.6	25-0	C	1)SVV-010-14-3 and valve FTG-1K 2)SVV-150-175-2 3)RHS-750-165-2 (LPCS) 4)RHS*165 support (LPCS) 5)1CC502RD1 (ADS valve 47A conduit) 6)1CC502RD3 (ADS valve 41A conduit) 7)1CC502PN4 conduit (H ₂ ignitor) 8)RCS-075-33-2 RPV pressure and level transmitter		1)BL 2)RL 3)RSS 4)RSS 5)Note C 6)Note C 7)Note B 8)Note D	21 16 21
7.30								
40C-1	130-6 1/4	71	25-0	C	1)SVV-010-14-3 and valve FTG-1K 2)SVV-150-175-2 3)RHS-750-165-2 (LPCS) 4)RHS*165 support (LPCS) 5)1CC502RD1 (ADS valve 47A conduit) 6)1CC502RD3 (ADS valve 41A conduit) 7)1CC502PN4 conduit (H ₂ ignitor) 8)RCS-075-33-2 RPV pressure and level transmitter		1)BL 3)RSS 4)RSS 5)Note C 6)Note C 7)Note B 8)Note D	16 21
47C	130-11 1/8	63	25-6	C	1)RHS-750-165-2 (LPCS) 2)RHS*165 supports (LPCS) 3)1CC502PN4 conduit (H ₂ ignitor) 4)RCS-075-33-2 support		1)RSS 2)RSS 3)Note B 4)Note D	16 21

TABLE 3.6A-38a (Cont)

Piping System: Main Steam (Inside Containment)
 Piping Line Numbers: 1MSS-024-Line C
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
47C-1	130-5 7/8	63.0	25-6	C	1) RBS-750-165-2 (LPCS) 2) RBS*165 support (LPCS) 3) ICC502RN4 conduit (H ₂ ignitor) 4) RCS-075-33-2 support		1) RSS 2) RSS 3) Note B 4) Note D	16 21
48C	130-11	58	25-5	C	1) RBS-750-165-2 (LPCS) 2) RBS*165 supports (LPCS) 3) SVV-010-16-3 4) CMS-750-154-2 5) ICC502RN4 conduit (H ₂ ignitor) 6) RCS-075-33-2 support		1) RSS 2) RSS 3) RL 4) Note A 5) Note B 6) Note D	16 21
48C-1	130-5 3/4	58.0	25-5	C	1) RBS-750-165-2 (LPCS) 2) RBS*165 supports (LPCS) 3) SVV-010-16-3 4) CMS-750-154-2 5) ICC502RN4 conduit 6) RCS-075-33-2 support		1) RSS 2) RSS 3) RL 4) Note A 5) Note B 6) Note D	16 21
70C	129-0 5/8	23.0	28-0	C	1) MSS Line C and supports 2) ICS-1E51*MOV-63 valve 3) MSS-1B21*AOVP022C 4) RCS-750-35-2 and supports 5) MSS Line A and supports 6) CX540RS6 CMS conduit 7) CC500BK1 (H ₂ ignitor conduit)		1) RL 2) Note B 3) ACI 4) Note D 5) SPI 6) Note A 7) Note B	16 21

TABLE 3.6A-38a (Cont)

Piping System: Main Steam (Inside Containment)
 Piping Line Numbers: 1MSS-024-Line D
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
1D	155-0 1/2	288	11-10 1/2	C	1)RPV 2)MSS Line D and supports 3)1CX501bd CMS conduit 4)1CX501ba1 CMS conduit 5)1CX501ba2 CMS conduit 6)1CC500b12 (H ₂ ignitor 29B conduit)		1)DSS 2)RL 3)Note A 4)Note A 5)Note A 6)Note B	21
10D	152-0 1/2	288	17-6	C	1)MSS line and supports 2)CSH line and supports 3)1CX501ba1 CMS conduit 4)1CX501ba2 CMS conduit 5)1CC500bk7 conduit (H ₂ ignitor)		1)RL, ACI, SPI 2)RSS, ACI 3)Note A 4)Note A 5)Note X	16 21
30D	129-4 3/4	297.5	17-9	C	1)MSS line and supports 2)RCS*42 line and supports 3)1B21*AOVP022B MSS valve 4)1B21*AOVP022D MSS valve 5)RCS*43 line		1)RL 2)Note D 3)ACI 4)ACI 5)Note B	

TABLE 3.6A-38a (Cont)

Piping System: Main Steam (Inside Containment)
 Piping Line Numbers: 1MSS-024-Line D
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
38D	130-10 3/4	309	19-0	C	1) CMS*58 line and support 2) CMS*167 line and support 3) 1CC500bd4 (ADS valve 41D conduit) 4) 1CX501ba1 CMS conduit 5) 1CX501ba2 CMS conduit 6) 1CX501ba3 CMS conduit 7) RCS*39 line 8) 1CC500bk1 conduit (H ₂ ignitor)		1) Note I 2) Note I 3) RL 4) Note A 5) Note A 6) Note A 7) Note B 8) Note B	21 16 21
38D-1	130-5 1/2	309	19-0	C	1) CMS*58 line and support 2) CMS*167 line and support 3) 1CC500bd4 (ADS valve 41D conduit) 4) 1CX501ba1 CMS conduit 5) 1CX501ba2 CMS conduit 6) 1CX501ba3 CMS conduit 7) RCS*39 line 8) 1CC500bk1 conduit (H ₂ ignitor)		1) Note I 2) Note I 3) RL 4) Note A 5) Note A 6) Note A 7) Note B 8) Note B	21 16 21
39D	130-10 1/4	316	20-0	C	1) CMS*58 line and support 2) CMS*167 line and support 3) 1CC500bd4 (ADS valve 41D conduit) 4) 1CX501ba1 CMS conduit 5) 1CX501ba2 CMS		1) Note I 2) Note I 3) Note CE 4) Note A 5) Note A	21 16 21

TABLE 3.6A-38a (Cont)

Piping System: Main Steam (Inside Containment)
 Piping Line Numbers: 1MSS-024-Line D
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
					conduit 6) 1CX501ba3 CMS conduit 7) RCS*39 line 8) 1CC500bk1 conduit (H ₂ ignitor)		6) Note A 7) Note H 8) Note B	21
39D-1	130-5	316	20-0	C	1) CMS*58 line and support 2) CMS*167 line and support 3) 1CC500bd4 (ADS valve 41D conduit) 4) 1CX501ba1 CMS conduit 5) 1CX501ba2 CMS conduit 6) 1CX501ba3 CMS conduit 7) RCS*39 line 8) 1CC500bk1 conduit (H ₂ ignitor)		1) Note I 2) Note I 3) Note CE 4) Note A 5) Note A 6) Note A 7) Note H 8) Note B	21
42D	130-10	325.5	19-6	C	1) RCS*39 line and supports 2) CMS*167 line and supports 3) RCS*40 support		1) Note H 2) Note I 3) Note D	21 21 21
42D-1	130-5	325.5	19-6	C	1) RCS*39 line and supports 2) CMS*167 line and supports 3) RCS*40 support		1) Note H 2) Note I 3) Note D	21 21 21
60D	126-0 7/16	352	25-0	C	1) MSS line and support 2) 1B21*AOVP022D MSS valve 3) ICS*57 supports		1) RL 2) Note H 3) ACI	

TABLE 3.6A-38b (Cont)

Piping System: Main Steam Piping - Loop C (Outside Containment)
Piping Line Numbers: 1-MSS-024-49-4
Consequence of Piping Failure: Jet Impingement

| 21

Break Point	Break Location			Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
425C	114-7	122-5	43-6	C	None			

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TABLE 3.6A-38b (Cont)

Piping System: Main Steam Piping - Loop C (Outside Containment)

Piping Line Numbers: 1-MSS-024-48-4

Consequence of Piping Failure: Jet Impingement

Break Point	<u>Break Location</u>			Break Types (1)	<u>Targets</u>	<u>Protection Measures (2)</u>	<u>Evaluation (4)</u>	<u>Remarks</u>
	<u>El</u> <u>(ft-in)</u>	<u>1</u> <u>(ft-in)</u>	<u>2</u> <u>(ft-in)</u>					
503C	114-10 1/4	119-5	34-11 1/2	C	None			

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TABLE 3.6A-39

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Main Steam Vent Line (Inside Containment)

Piping Line Numbers: 1MSS-004-3-1

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks	
	El (ft-in)	Az (deg)	r (ft-in)						
1	173-0 5/16	90	1-3 15/16	C	1) 1E51*AOVP066 valve		1) ACI		15 17 21
3A	172-9	90	6-10	C	None				

TABLE 3.6A-39 (Cont)

Piping System: Main Steam Vent Line (Inside Containment)
Piping Line Numbers: 1HSS-002-72-1
Consequence of Piping Failure: Jet Impingement

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Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (2)	Evaluation (4)	Remarks	17
	El (ft-in)	Az (deg)	r (ft-in)						
5A	159-11	90	13-3	C	None				21

TABLE 3.6A-39 (Cont)

Piping System: Main Steam Vent Line (Inside Containment)
 Piping Line Numbers: 1MSS-002-2-1, 1MSS-002-1-1
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks	17
	El (ft-in)	Az (deg)	r (ft-in)						
8	156-8	90	15-5 1/2	C	1) 1CX507RC1 conduit for CMSRTD43A, 43C, 43E 2) 1CX507RC2 conduit for CMSRTD43A 3) 1CX507RC3 conduit for CMSRTD43C 4) 1CX507RC4 conduit for CMSPTD43E 5) 1XJB5440 junction box for CMSPTD43A, 43C, 43E 6) 1E51*AOVP066 valve		1) Note A 2) Note A 3) Note A 4) Note A 5) Note A 6) ACI		15 17 21
9	156-8	90	15-10 1/2	C	1) 1CX507RC1 conduit for CMSRTD43A, 43C, 43E 2) 1CX507RC2 conduit for CMSPTD43A 3) 1CX507RC3 conduit for CMSRTD43C 4) 1CX507RC4 conduit for CMSRTD43E 5) 1XJB5440 junction box for CMSPTD43A, 43C, 43E 6) 1E51*AOVP066 valve		1) Note A 2) Note A 3) Note A 4) Note A 5) Note A 6) ACI		15 17 21
9A	156-5	90	15-1 1/2	C	1) 1CC502RD1 conduit for ADS valve 1B21PVP047A 2) 1CC502RD3 conduit for ADS valve 1B21PVP051G		1) Note S 2) DSI		15 17
10A	156-2	90	15-3 7/8	C	1) 1CX507RC2 conduit for CMSRTD43A 2) 1CX507RC3 conduit for CMSRTD43C 3) 1CX507RC4 conduit for CMSRTD43E 4) 1E51*AOVP066 valve		1) Note A 2) Note A 3) Note A 4) ACI		21
19	150-8 7/8	106	19-3	C	None				15 17

TABLE 3.6A-39 (Cont)

Piping System: Main Steam Vent Line (Inside Containment)
Piping Line Numbers: 1MSS-002-2-1, 1MSS-002-1-1
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
20	150-6 1/2	105	19-6	C	None			
33	148-6 1/2	76	16-6 3/4	C	None			
34	156-8	90	14-8	C	1) 1CX507RC2 conduit for CMSPTD43A 2) 1CX507PC3 conduit for CMSRTD43C 3) 1CX507PC4 conduit for CMSRTD43E 4) 1E51*AOVP066 valve		1) Note A 2) Note A 3) Note A 4) ACI	

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TABLE 3.6A-39 (Cont)

Piping System: Main Steam Vent Line (Inside Containment)
 Piping Line Numbers: 1MSS-002-2-1
 Consequence of Piping Failure: Jet Impingement

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Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
47	148-6	131	12-2 1/4	C	None			

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NOTE: Numbered footnotes follow Table 3.6A-51.

Amendment 21

5 of 5

July 1985

TABLE 3.6A-40a

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: DTM (Inside Containment)
Piping Line Numbers: 1DTM-002-71-1
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Blowdown Sources(2)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)						
1	127-4 7/16	21.5	28-8	C		1) MSS valve 1B21*AOV022B 2) ICS-750-2-2		1) ACI 2) ACI	17

TABLE 3.6A-40a (Cont)

Piping System: DTM - (Inside Containment)
Piping Line Numbers: 1DTM-003-524-1
Consequence of Piping Failure: Jet Impingement

[illegible]

TABLE 3.6A-40a

Piping System: DTM - (Inside Containment)

Piping Line Numbers: 1DTM-003-524-1

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Blowdown Sources(2)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)						
7	125-2 3/4	7	26-11	C		1) ICC500BB1 (PHS- valve 1E12*F009, WCS-valve 1G33*F001 conduit) 2) ICC500BE1 (CCP- valve 1CCP*MOV144 conduit) 3) ICC500BE2 (ICS - valve 1E51*F063 conduit) 4) ICC500BR (PCS - valve 1B33*AOVP019 conduit) 5) ICC500BC1 (CCP - valve 1CCP*MOV144 conduit) 6) ICC500BC2 (ICS - valve 1E51*F063 conduit) 7) MSS valve 1B21*AOV022D		1) Note E 2) Note F 3) ACI 4) Note F 5) Note F 6) ACI 7) ACI	21
8	125-1 5/8	353	26-11	C		1) ICC500BR1 (PHS- valve 1E12*F009, WCS-valve 1G33*F001 conduit) 2) ICC500BE1 (CCP- valve 1CCP*MOV144 conduit) 3) ICC500BE2 (ICS - valve 1E51*F063 conduit) 4) ICC500BR (PCS - valve 1B33*AOVP019 conduit) 5) ICC500BC1 (CCP - valve 1CCP*MOV144 conduit) 6) ICC500BC2 (ICS - valve 1E51*F063 conduit)		1) Note F 2) Note F 3) ACI 4) Note F 5) Note F 6) ACI	17

TABLE 3.6A-40a

Piping System: DTM - (Inside Containment)

Piping Line Numbers: 1DTM-003-524-1

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Blowdown Sources(2)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)						
11	125-1 5/8	352	26-11	C		1) ICC500BB1 (RHS- valve 1B12*P009, WCS-valve 1G33*P001 conduit) 2) ICC500BE1 (CCP- valve 1CCP*MOV144 conduit) 3) ICC500BE2 (ICS - valve 1E51*P063 conduit) 4) ICC500BE (RCS - valve 1B33*AOVP019 conduit) 5) ICC500BC1 (CCP - valve 1CCP*MOV144 conduit) 6) ICC500BC2 (ICS - valve 1E51*P063 conduit) 7) MSS valve 1B21*AOV22P		1) Note F 2) Note F 3) ACI 4) Note F 5) Note F 6) ACI 7) ACI	

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TABLE 3.6A-40a (Cont)

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TABLE 3.6A-40a (Cont)

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TABLE 3.6A-40a (Cont)

Piping System: DTM - (Inside Containment)
 Piping Line Numbers: 1DTM-002-68-1
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Blowdown Sources(2)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks	17 21
	El (ft-in)	Az (deg)	r (ft-in)							
18	127-9 7/16	338.5	28-8	C		None				

TABLE 3.6A-40a (Cont)

Piping System: DTM - (Inside Containment)

Piping Line Numbers: 1DTM-003-72-1

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Flowdown Sources (2)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks	17 21
	El (ft-in)	Az (deg)	r (ft-in)							
26	115-7 1/8	346.5	28-3	C		None				

TABLE 3.6A-40b (Cont)

Piping System: Main Steam Drain System (Auxiliary Building)

Piping Line Numbers: 1-DTM-003-79-4

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
20	111-8 11/16	136-9 1/2	-(9-7)	C	1) 1-DTM-150-106-2 2) 1-DTM-150-107-2		1) Note F 2) Note F	
22	110-10 5/8	137-2	-(9-7)	C	None			

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TABLE 3.6A-40b (Cont)

Piping System: Main Steam Drain System (Auxiliary Building)
 Piping Line Numbers: 1-DTM-003-110-4
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
94	110-1 15/16	152-0	-(14-8)	C	None		-	

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TABLE 3.6A-40c

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Main Steam Drain System (Steam Tunnel Area)

Piping Line Numbers: 1DTM-150-104-2

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
1	125-7	107-9 1/2	-(14-8)	C	1) 1CX939SA3 (area temperature monitor 1LDS*RTD2A conduit) 2) 1CX939TA3 (area temperature monitor 1LDS*RTD2B conduit)		1) Note L 2) Note L	
4	125-5	122-6	-(17-1 3/4)	C	1) 1CK809BC2 (main steam valve 1B2*MOVFO98F conduit)		1) Note F	
5	125-5	122-8 1/4	-(17-1 3/4)	C	None		-	
10	111-1 1/16	127-6 3/4	-(17-1 3/4)	C	None		-	
11	111-3 1/16	127-9	-(17-1 3/4)	C	1) 1CK809BC2 (main steam valve 1B21*MOVFO98B conduit)		1) Note F	
12	111-3 1/8	127-9	-(16-9)	C	1) 1CK809BC2 (main steam valve 1B21*MOVFO98B conduit)		1) Note F	

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TABLE 3.6A-40c (Cont)

Piping System: Main Steam Drain System (Steam Tunnel Area)

Piping Line Numbers: 1DTM-150-105-2

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	E (ft-in)	X (ft-in)	Z (ft-in)					
15	125-7	107-9 1/2	-(14-1)	C	1) 1CX939SA3 (area temperature monitor 1LDS*PTD2A conduit) 2) 1CX939TA3 (area temperature monitor 1LDS*PTD2B conduit)		1) Note L 2) Note L	
18	125-5	123-1	-(16-0 3/4)	C	1) 1CK809BC2 (main steam valve 1B21*M07F098B conduit)		1) Note F	
19	125-5	123-3 7/8	16-5 3/64	C	None		-	
20	125-2 3/4	123-5	16-7	C	1) 1CC817B66 (main steam valve 1B21*P086 conduit)		1) Note F	
23	111-3 1/8	126-9	-(160-4 1/2)	C	None		-	
24	125-5	123-2 1/2	-(16-4 1/2)	C	None		-	

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TABLE 3.6A-41a (Cont)
SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Feedwater Piping - East Loop (Inside Containment)
Piping Line Numbers: 1FWS-020-39-1
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
41 60AE	122-0	327.91	20-4 1/16	L	1) ICC500BK6 (conduit for H2 igniter 49B) 2) WCS*5 support		1) Note B 2) ACI	
				C	1) ADS line SVV*106 2) ADS line SVU*109 3) ADS line SVV*111 4) PDS line 5) LPCI-C line support 6) LPCI-B line support 7) ICS-006-57-1 supports 8) Drain line DTM-003-072-1 9) MSS lines A, C, and D 10) Line WCS-006-005-1 11) ICS valve E51*MOV063		1) Note CA 2) Note CA 3) Note CA 4) DSS 5) PSS, ACI 6) PSS 7) ACI 8) ACI 9) SPI 10) ACI 11) ACI	21 17
				L	1) RHS*53 support 2) IRCS-750-39-2 3) IRCS-750-40-2 and supports 4) MSS-1B21*AOVP022B 5) MSS-Line D and supports 6) ICC500B11 (conduit for H2 igniter 28P) 7) ICC500BK6 (conduit for H2 igniter 49B)		1) SPI 2) Note D 3) MSS 4) ACI 5) SPI 6) Note B 7) Note B	21 21 21
				C	1) ADS line SVV*106 2) ADS line SVV*109 3) ADS line SVV*111 4) PDS line 5) LPCI-C line support 6) LPCI-B line support 7) ICS-006-57-1 supports 8) Drain line DTM-003-072-1		1) Note CA 2) Note CA 3) Note CA 4) DSS 5) PSS, ACI 6) PSS 7) ACI 8) ACI	21 21
60CE	122-0	334.46	21-0 1/2	L	1) RHS*53 support 2) IRCS-750-39-2 3) IRCS-750-40-2 and supports 4) MSS-1B21*AOVP022B 5) MSS-Line D and supports 6) ICC500B11 (conduit for H2 igniter 28P) 7) ICC500BK6 (conduit for H2 igniter 49B)		1) SPI 2) Note D 3) MSS 4) ACI 5) SPI 6) Note B 7) Note B	21 21 21 21 21 21 21
				C	1) ADS line SVV*106 2) ADS line SVV*109 3) ADS line SVV*111 4) PDS line 5) LPCI-C line support 6) LPCI-B line support 7) ICS-006-57-1 supports 8) Drain line DTM-003-072-1		1) Note CA 2) Note CA 3) Note CA 4) DSS 5) PSS, ACI 6) PSS 7) ACI 8) ACI	21 21 21 21 21 21 21

TABLE 3.6A-41a (Cont)

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Feedwater Piping - East Loop (Inside Containment)
 Piping Line Numbers: 1FWS-014-65-1
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
60BE	122-0	332.25	19-6 7/16	C	1) ICC500BR (terminal cabinet for conduits for RCS, DTS, ADS, CMS)		1) DSS	
					2) SVV*6 support		2) RSS	
					3) 1ICS-006-57-1		3) ACI	
					4) 1RHS-010-19-1		4) ACI	
					5) 1CX504RH (conduit for position indicator probes B13*D120-001A)		5) DSS	21
					6) 1CX504RD (conduit for position indicator probes B13*D120-002A)		6) Note H	
					7) 1*JB5458 (junction box containing conduits for H2 igniters 51B, 50B, 49B)		7) Note H	17
					8) LPCI-B line RHS-010-16-1		8) RSS	
					9) LPCI-C line RHS-010-19-1		9) RSS, ACI	
				L	1) 1RCS-750-39-2		1) Note D	
					2) 1RCS-750-40-2 and supports		2) RSS	
					3) RHS*53 support		3) SPI	
					4) MSS-1B27*AOVP022B		4) ACI	21
					5) MSS-Line D and supports		5) SPI	
					6) ICS*57 support		6) ACI	
					7) 1CC500BL1 (conduit for H2 igniter 28B)		7) Note B	
					8) 1CC500BK6 (conduit for H2 igniter 49B)		8) Note B	21

TABLE 3.6A-41a (Cont)
SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Feedwater Piping - East Loop (Inside Containment)
Piping Line Numbers: 1PWS-012-35-1
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	R (ft-in)					
				L	1) RDS bundles 2) 1RHS-010-19-1 and supports 3) ADS tank B21*TKA0033B 4) LPCI-B line and supports 5) LPCI-C line and supports 6) PHS-750-160-2 (LPCI-B) 7) SVV-012-18-3 support 8) SVV lines 106, 109, 111		1) DSS 2) RSS, ACI 3) RSS 4) RSS 5) ACI, RSS 6) RSS 7) RSS 8) Note CA	17
100E	142-3 1/2	315	12-0 3/16	C	None			21

TABLE 3.6A-41a (Cont)

Piping System: Feedwater Piping - West Loop (Inside Containment)

Piping line Numbers: 1FWS-020-66-1, 1FWS-020-040-1, 1FWS-014-64-1, 1FWS-012-37-1, 1FWS-012-38-1

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
60AW	122-0	33.08	20-4 1/16	C	1) MSS valve B21*AOVP22A		1) ACI	
					2) MSS valve B21*AOVP22D		2) ACI	
					3) RHR suction line		3) ACI	
					PHS-018-53-1 supports			
					4) MSS lines A, B, D		4) SPI	
					5) Drain line DTM-003-72-1		5) ACI	
					6) ICS spray ICS-006-57-1		6) ACI	
					7) PDS bundles		7) DSS	
				L	1) Drain line DER-004-057-4 support		1) ACI	
					2) RHR suction PHS-018-053-1 support		2) ACI	
					3) ICC502BN6 (conduit for H2 igniter 49A)		3) Note B	17
60BW	122-0	27.75	19-6 7/16	C	1) ICC500BN6 (conduit for H2 igniter 49B)		1) Note B	21
				L	1) Drain line DER-004-057-4 support		1) ACI	
					2) RHR suction PHS-018-053-1 support		2) ACI	
					3) ICC502BN6 (conduit for H2 igniter 49A)		3) Note B	
					4) ICC500BL1 (conduit for H2 igniter 28B)		4) Note B	
					5) ICC500BP1 (conduit for H2 igniter)		5) Note B	
					6) BSS line supports		6) ACI	

TABLE 3.6A-41a (Cont)

Piping System: Feedwater Piping - West Loop (Inside Containment)

Piping Line Numbers: 1FWS-020-66-1, 1FWS-020-040-1, 1FWS-014-64-1, 1FWS-012-37-1, 1FWS-012-38-1

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
60CW	122-0	25.44	21-0 1/2	C	1) MSS valve B21*AOVP22A		1) ACI	
					2) MSS valve B21*AOVP22D		2) ACI	
					3) RHR suction line RHS-018-53-1 supports		3) ACI	
					4) MSS lines A, B, D		4) SPI	
					5) Drain line DTM-003-72-1		5) ACI	
					6) ICS spray ICS-006-57-1		6) ACI	
					7) PDS bundles		7) DSS	
				L	1) Drain line DEP-004-057-4 support		1) ACI	
					2) RHE suction RHS-018-053-1 support		2) ACI	
					3) 1CC502RW6 (conduit for H2 igniter 49A)		3) Note B	
					4) 1CC500BL1 (conduit for H2 igniter 28B)		4) Note H	
					5) 1CC500RP1 (conduit for H2 igniter 38A)		5) Note H	
					6) MSS line supports		6) ACI	
70W	123-9	24.59	17-9 11/16	C	1) 1CC502RW6 (conduit for H2 igniter 49A)		1) Note B	
					2) 1CC502RE (for ADS valves 41B, 41D, 41F)		2) Note CA	
					3) RPV press and level inst line RCS-750-35-2		3) Note D	
					4) PPV press and level inst line RCS-029		4) Note G	
					5) PPV press and level inst line RCS-028		5) DDS	
				L	1) ICS-006-57-1 line and support		1) ACI	
					2) RHS-018-053-1 supports		2) ACI	
					3) WCS-250-108-2 support		3) ACI	
					4) DTM-003-72-1		4) ACI	

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TABLE 3.6A-41a (Cont)

Piping System: Feedwater Piping - West Loop (Inside Containment)

Piping Line Numbers: 1FWS-020-66-1, 1FWS-020-040-1, 1FWS-014-64-1, 1FWS-012-37-1, 1FWS-012-38-1

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks	
	El (ft-in)	Az (deg)	r (ft-in)						
					5) MSS Line B 6) ICC502RN6 conduit for H ₂ igniter 49A 7) HCS*IGN49A H ₂ ignitor		5) RSS, SPI 6) Note B 7) Note B		17 21
71W	122-0	26.5	18-3	C	1) ICC500B (conduit for H ₂ igniter 49B)		1) Note B		
				L	1) ICS-006-57-1 line and support 2) RBS-018-053-1 supports 3) WCS-250-108-2 support 4) DTM-003-72-1 5) MSS line B 6) ICC500BK6 (for igniter 49B)		1) ACI 2) ACI 3) ACI 4) ACI 5) RSS, SPI 6) Note B		17
130W	122-0	7.5	26-4 13/16	C	1) ICC500BK6 (conduit for H ₂ igniter 49B)		1) Note B		
100W	142-3 1/2	45	12-0 3/16	C	1) ICC502RE conduit for ADS valves		1) Note CA		21

NOTE: Numbered footnotes follow Table 3.6A-51.

TABLE 3.6A-41b

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Feedwater Piping (Outside Containment)

Piping Line Numbers: 1-FWS-020-47-1, 1FWS-020-62-2

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	P1 (ft-in)	X (ft-in)	Z (ft-in)					
1	121-8 1/10	107-9 1/2	3-6	C	1) 1CC817BG7 conduit for valve 1FWS*MOV7A		1) Note F	
3	119-0 5/8	119-5	3-6	C	1) 1CC817BG5 conduit for valve 1B21*F098C 2) 1CC817BG4 conduit for valve 1B21*F098A 3) 1CC817BG7 conduit for valve 1FWS*MOV7A 4) 1CC817BG8 conduit for valve 1FWS*MOV7B		1) Note F 2) Note F 3) Note F 4) Note F	21 16
6	108-7 15/16	119-5	35-8	C	None			21

TABLE 3.6A-41b (Cont)

Piping System: Feedwater Piping (Outside Containment)

Piping Line Numbers: 1-FWS-020-48-1

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	E1 (ft-in)	I (ft-in)	Z (ft-in)					
11	121-8 1/16	107-9 1/2	-(3-6)	C	1) ICC817EG8 conduit for valve 1FWS*MOV7B		1) Note F	

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TABLE 3.6A-01b (Cont)

Piping System: Feedwater Piping (Outside Containment)
 Piping Line Numbers: 1-FWS-020-63-2
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	E1 (ft-in)	I (ft-in)	Z (ft-in)					
13	119-0 5/16	121-11	-(3-6)	C	1) 1CC817BG5 conduit for valve 1B21*P098C 2) 1CC817BG4 conduit for valve 1B21*P098A 3) 1CC817BG7 conduit for valve 1FWS*MOV7A 4) 1CC817BG8 conduit for valve 1FWS*MOV7B		1) Note F 2) Note F 3) Note F 4) Note F	16
31	108-7 3/4	121-11	31-6	C	None			21

16

NOTE: Numbered footnotes follow Table 3.6A-51.

TABLE 3.6A- (Cont)

Piping System: Reactor Core Isolation Cooling System (Inside Containment)
 Piping Line Numbers: 1-ICS-008-1-1
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	Fl (ft-in)	Az (deg)	r (ft-in)					
2	146-1 1/8	3.5	16-6 3/8	C	1) RCS-750-40-2 inst. pipe for RPV press & level		1) Note D	
3	145-1 1/8	0	16-6 3/8	C	1) ICC500BK1 Flex-conduit for H ₂ ignitor 40B		1) Note B	

TABLE 3.6A-43a (Cont)

Piping System: Reactor Core Isolation Cooling System (Inside Containment)
Piping Line Numbers: 1-ICS-008-1-1
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	E1 (ft-in)	A2 (deg)	r (ft-in)					
12	122-6 3/4	24	26-10	C	None			

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NOTF: Numbered footnotes follow Table 3.6A-51.

TABLE 3.6-43b

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Reactor Core Isolation System (Outside Containment)
 Piping Line Numbers: 1-ICS-008-4-2
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
1	121-8 1/16	107-9 1/2	10-6	C	None			
17	117-0 5/8	110-3 1/2	10-6	C	None			

TABLE 3.6A-4b (Cont)

Piping System: Isolation Cooling System (Outside Containment)
 Piping Line Numbers: 1-ICS-004-13-2
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	Z (ft-in)					
32	86-0 1/8	87-2 3/8	12-8	C	1) 1E3177/C M004B leak detection conduit 2) 1CK8092A RCIC turbine 1E51*C002 conduit 3) 1CC8142B RCIC turbine 1E51*C002 conduit 4) 1CC8142D RCIC turbine inlet valve 1E51*F045 conduit		1) Note G 2) RL 3) RL 4) RL	
33	85-9	86-11 3/8	12-8	C	1) 1CC8382D4 RCIC turbine stm sup 1E51*LSW010 conduit 2) 1CC8142D4 RCIC cst suct valve 1E51*F010 conduit 3) 1CK8132F1 RCIC turbine inlet valve 1E51*F045 conduit 4) 1CC8142D1 RCIC turbine inlet valve 1E51*F045 conduit		1) RL 2) RL 3) RL 4) RL	

21

TABLE 3.6A-4b (Cont)

Piping System: Isolation Cooling System (Outside Containment)
 Piping Line Numbers: 1-ICS-004-13-2
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El ft-inl	I ft-inl	Z ft-inl					
39	73-9 1/4	89-4 1/2	12-8	C	1) ICC814WD PCIC turbine inlet valve 1E51*F045 conduit 2) ICC838WD PCIC turbine stm sup 1E51*LSN010 conduit 3) ICC814WD2 PCIC turbine 1E51*C002V conduit 4) ICX809WF1 PCIC pump suct 1E51*PTN052 conduit 5) ICC838WD7 PCIC turbine stm sup 1E51*LSN010 conduit		1) RL 2) RL 3) RL 4) RL 5) RL	
39A	88-0 1/4	95-2 1/2	11-7	C	1) 1E31*T/C N0048 leak detection 2) ICC845WP5 (conduit for position indicator for valve 1E51*MOV F045		1) DSS 2) RL	

BB:

TABLE 3.6A-43b (Cont)

Piping System: Reactor Heat Spray (Outside Containment)
Piping Line Numbers: 1-PHS-008-36-2
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	2 (ft-in)					
21	116-5 5/8	110-3 1/2	11-6	C	None			21
				L	1) 1CK815PA conduit 2) 1CK815PA3 conduit 3) 1*JB8202 junction box 4) 1CC825PA3 conduit 5) 1*JB8240 junction box		1) Note K 2) Note K 3) Note K 4) Note K 5) Note K	21
60	116-5 5/8	110-3 1/2	22-11	C	None			
57	116-1 3/8	110-3 1/2	22-11	C	1) 1TX808B ADS, CMS cable 2) 1TC817B HVR unit cooler cable 3) 1TK815B HVR unit cooler cable		1) Note H 2) Note H 3) Note H	21
57A	116-0	110-3 1/2	20-10	C	None			

NOTE: Numbered footnotes follow Table 3.6A-51.

Amendment 21

TABLE 3.6A-45

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Low Pressure Core Spray System (Inside Containment)

Piping Line Numbers: 1-CSL-010-43-1

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
1	140-9	90	11-7 15/16	C	1) ICC502RD1 (conduit for ADS valve 1B21*RVF047A) 2) ICC502RD3 (conduit for ADS valve 1B21*RVF051G) 3) ICC502RD5 (conduit for ADS valve 1B21*RVF047C) 4) 1PCS-750-33-2 (instrument tubing for RPV level and pressure) 5) 1RHS-750-165-2 line and supports (LPCI-A) 6) MSS line support 7) 1E21*AOV006 valve on CSL*043 8) 1E21*VP007 valve on CSL*043 9) ICC502RN4 conduit (H ₂ ignitor)		1) Note CD 2) Note CD 3) Note CD 4) Note D 5) Note B 6) ACI 7) ACI, RL 8) ACI, RL 9) Note B	15 17 21
6	140-9	90	15-7 1/2	C	1) ICC502RD1 (conduit for ADS valve 1B21*RVF047A) 2) ICC502RD3 (conduit for ADS valve 1B21*RVF051G) 3) ICC502RD5 (conduit for ADS valve 1B21*RVF047C) 4) 1PCS-750-33-2 (instrument tubing for RPV level and pressure) 5) 1RHS-750-165-1 line and supports (LPCI-A) 6) MSS line support 7) 1E21*AOV006 valve on CSL*043 8) 1E21*VP007 valve on CSL*043 9) ICC502RN4 conduit (H ₂ ignitor)		1) Note CD 2) Note CD 3) Note CD 4) Note D 5) Note B 6) ACI 7) ACI, RL 8) ACI, RL 9) Note B	15 17 21

TABLE 3.6A-45 (Cont)

Piping System: Low Pressure Core Spray System (Inside Containment)
 Piping Line Numbers: 1-CSL-010-43-1
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
4	140-9	90	19-3	C	1) 1CC502RD1 conduit for ADS valve 1B21*PVP047A		1) Note CD	
					2) 1CC502RD3 conduit for ADS valve 1B21*PVP051G		2) Note CD	15
					3) 1CC502RD5 conduit for ADS valve 1B21*PVP047C		3) Note CD	
					4) 1RCS-750-33-2 instrument tubing for RPV level and pressure		4) Note D	17
					5) 1RHS-750-165-1 line and supports (LPCI-A)		5) Note H	21
					6) MSS line support		6) ACI	
					7) 1E21*AOV006 valve on CSL*043		7) ACI	
					8) 1CC502RN4 conduit (H ₂ ignitor)		8) Note B	21
5	140-9	90	20-10	C	1) 1CC502RD1 conduit for ADS ADS valve 1B21*PVP047A		1) Note CD	
					2) 1CC502RD3 conduit for ADS valve 1B21*PVP051G		2) Note CD	
					3) 1CC502RD5 conduit for ADS valve 1B21*PVP047C		3) Note CD	15
					4) 1RCS-750-33-2 instrument tubing for RPV level and pressure		4) Note D	17
					5) 1RHS-750-165-1 line and supports (LPCI-A)		5) Note H	21
					6) MSS line support		6) ACI	
					7) 1E21*AOV006 valve on CSL*043		7) ACI	
					8) 1CC502RN4 conduit (H ₂ ignitor)		8) Note B	21

NOTE: Numbered footnotes follow Table 3.6A-51.

TABLE 3.6A-46

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Residual Heat Removal System - Low Pressure Coolant Injection Mode (Inside Containment)

Piping Line Numbers: 1RHS-010-34-1

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
1A	136-3 1/4	45	11-8 7/8	C	1) 1CC500BA1 conduit for ADS valve 1B21*PVP047A 2) 1CC502RD1 conduit for ADS valve 1B21*PVP047A 3) 1CC502RD3 conduit for ADS valve 1B21*PVP051G 4) 1CC502RE conduit for ADS valves 1B21*PVP041B, 041D, and 041F 5) 1RHS-750-165-1 and supports (LPCS) 6) 1PCS-075-33-2 and supports inst piping for RPV level and pressure 7) CSL-010-43-1 (LPCS) 8) SVV-150-176-2 piping for ADS valve 1B21*PVP051G 9) 1RHS-750-164-2 and supp (LPCI-A) 10) MSS supports 11) 1RHS-010-34-1 and supp 12) 1E12*VP039A valve (LPCI-A) 13) 1E12*AOVP041A valve (LPCI-A) 14) 1CC502RD2 conduit for ADS valve 1B21*PVP041A		1) Note CD 2) Note CD 3) Note CD 4) DSS 5) Note J 6) Note D 7) SPI, ACI 8) Note CD 9) RSS, RL 10) ACI 11) ACI, RL 12) RL 13) ACI, RL 14) Note F	
5A	136-3 1/4	45	20-8 1/2	C	1) 1CC500BA1 conduit for ADS valve 1B21*PVP047A 2) 1CC502RD1 conduit for ADS valve 1B21*PVP047A 3) 1CC502RD3 conduit for ADS valve 1B21*PVP051G		1) Note CD 2) Note CD 3) Note CD	

TABLE 3.6A-46 (Cont)

Piping System: Residual Heat Removal System - Low Pressure Coolant Injection Mode (Inside Containment)
Piping Line Numbers: 1RHS-010-34-1
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	R (ft-in)					
					4) ICC502RE conduit for ADS valves 1B21*RVF041B, 041D, and 041F		4) DSS	
					5) 1RHS-750-165-1 and supports (LPCS)		5) Note J	
					6) 1RCS-075-33-2 and supports inst piping for RPV level and pressure		6) Note D	
					7) CSL-010-43-1 (LPCS)		7) SPI, ACI	
					8) SVV-150-176-2 piping for ADS valve 1B21*RVF051G		8) Note CD	
					9) 1RHS-750-164-2 and supp (LPCI-A)		9) RSS, RL	
					10) MSS supports		10) ACI	
					11) 1RHS-010-34-1 and supp		11) ACI, RL	
					12) 1E12*VF039A valve (LPCI-A)		12) RL	
					13) 1E12*AOVF041A valve (LPCI-A)		13) ACI, RL	
					14) ICC502PD2 conduit for ADS valve 1B21*RVF041A		14) Note F	
3A	136-3 1/4	45	19-11 1/2	C	1) ICC500BA1 conduit for ADS valve 1B21*RVF047A		1) Note CD	
					2) ICC502PD1 conduit for ADS valve 1B21*RVF047A		2) Note CD	
					3) ICC502PD3 conduit for ADS valve 1B21*RVF051G		3) Note CD	
					4) ICC502RE conduit for ADS valves 1B21*RVF041B, 041D, and 041F		4) DSS	
					5) 1RHS-750-165-1 and supports (LPCS)		5) Note J	

TABLE 3.6A-46 (Cont)

Piping System: Residual Heat Removal System - Low Pressure Coolant Injection Mode (Inside Containment)

Piping Line Numbers: 1RHS-010-34-1

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	R (ft-in)					
					6) 1PCS-075-33-2 and supports inst piping for RPV level and pressure		6) Note D	
					7) CSL-010-43-1 (LPCS)		7) SPI, ACI	
					8) SVV-150-176-2 piping for ADS valve 1B21*RVF051G		8) Note CD	
					9) 1RHS-750-164-2 and supp (LPCI-A)		9) RSS, RL	
					10) MSS supports		10) ACI	
					11) 1RHS-010-34-1 and supp		11) ACI, RL	
					12) 1E12*VP039A valve (LPCI-A)		12) RL	
					13) 1E12*AOVP041A valve (LPCI-A)		13) ACI, RL	
					14) 1CC502RD2 conduit for ADS valve 1B21*RVF041A		14) Note F	
4A	136-3 1/4	45	21-11 1/2	C	1) 1CC500BA1 conduit for ADS valve 1B21*RVF047A		1) Note CD	
					2) 1CC502RD1 conduit for ADS valve 1B21*RVF047A		2) Note CD	
					3) 1CC502RD3 conduit for ADS valve 1B21*RVF051G		3) Note CD	
					4) 1CC502RE conduit for ADS valves 1B21*RVF041B, 041D, and 041F		4) DSS	
					5) 1RHS-750-165-1 and supports (LPCS)		5) Note J	
					6) 1PCS-075-33-2 and supports inst piping for RPV level and pressure		6) Note D	
					7) CSL-010-43-1 (LPCS)		7) SPI, ACI	

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TABLE 3.6A-46 (Cont)

Piping System: Residual Heat Removal System - Low Pressure Coolant Injection Mode (Inside Containment)
 Piping Line Numbers: 1RHS-010-34-1
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	R (ft-in)					
					8) SVV-150-176-2 piping for ADS valve 1B21*RVF051G		8) Note CD	
					9) 1RHS-750-164-2 and supp (LPCI-A)		9) PSS, RL	
					10) MSS supports		10) ACI	
					11) 1RHS-010-34-1 and supp		11) ACI, RL	
					12) 1E12*VP039A valve (LPCI-A)		12) RL	
					13) 1E12*AVF041A valve (LPCI-A)		13) ACI, RL	
					14) 1CC502RD2 conduit for ADS valve 1B21*RVF041A		14) Note F	

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TABLE 3.6A-46 (Cont)

Piping System: Residual Heat Removal System - Low Pressure Coolant Injection Mode (Inside Containment)
 Piping Line Numbers: 1RHS-010-16-1
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
1B	136-3 1/4	225	11-8 7/8	C	1) Inst piping RCS-750-57-2 and RCS-750-41-2 2) LPCI-B piping and support and valve E12*AOVP041B		1) Note D 2) RL, ACI	
3B	136-3 1/4	225	19-11 1/2	C	1) Inst piping RCS-750-57-2 and RCS-750-41-2 2) LPCI-B piping and support and valve E12*AOVP041B		1) Note D 2) RL, ACI	21
4B	136-3 1/4	225	21-11 1/2	C	1) Inst piping RCS-750-57-2 and RCS-750-41-2 2) LPCI-B piping and support and valve E12*AOVP041B		1) Note D 2) RL, ACI	21
5B	136-3 1/4	135	21-0	C	1) Inst piping RCS-750-57-2 and RCS-750-41-2 2) LPCI-B piping and support and valve E12*AOVP041B		1) Note D 2) RL, ACI	21

TABLE 3.6A-46 (Cont)

Piping System: Residual Heat Removal System - Low Pressure Coolant Injection Mode (Inside Containment)

Piping Line Numbers: 1RHS-010-19-1

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
1C	136-3 1/4	135	11-8 7/8	C	1) 1CC502RD for ADS valves 41C, 47A, 47C, 51G 2) RHS-750-161-2 (LPCI-C) 3) LPCI-C piping and supports and valve E12*AOVP041C		1) DSS 2) RL 3) RL	21
3C	136-3 1/4	135	19-11 1/2	C	1) 1CC502PD for ADS valves 41C, 47A, 47C, 51G 2) RHS-750-161-2 (LPCI-C) 3) LPCI-C piping and supports and valve E12*AOVP041C		1) DSS 2) RL 3) RL	21 17
4C	136-3 1/4	135	21-11 1/2	C	1) 1CC502PD for ADS valves 41C, 47A, 47C, 51G 2) RHS-750-161-2 (LPCI-C) 3) LPCI-C piping and supports and valve E12*AOVP041C		1) DSS 2) RL 3) RL	21
5C	136-3 1/4	135	20-8 1/2	C	1) 1CC502RD for ADS valves 41C, 47A, 47C, 51G 2) RHS-750-161-2 (LPCI-C) 3) LPCI-C piping and supports and valve E12*AOVP041C		1) DSS 2) RL 3) RL	21

NOTF: Numbered footnotes follow Table 3.6A-51.

TABLE 3.6A-47a

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Residual Heat Removal System - Shutdown Mode (Inside Containment)
Piping Line Numbers: 188C-010-53-1

Piping Line Numbers: 1BHS-010-53-1

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
1	91-6	0	18-2 1/2	C	None			
2	93-9	0	20-5 1/2	C	1) ICC502RE conduit for ADS valves 1B21*PVP041D, 1B21*RVF041B, 1B21*RVF041F 2) ICC500BL1 conduit for hydrogen ignitor 1HCS*IGN28B 3) RCS*75-039 PPV press ref leg instru- mentation line 4) ICS-006-57-1 line and supports 5) 24" MSS line support 6) RBS-018-53-1 supports 7) RBS-750-351-2 line 8) 1E12*NOVP009 and 1E12*VP010 (valve on RBS-053 line) 9) RBS line valve V240 10) ICC502RN6 conduit (H ₂ ignitor) 11) 1HCS*IGN49A H ₂ ignitor		1) Note CB 2) DSS 3) DSS 4) ACI 5) ACI, SPI 6) PL, ACI 7) ACI 8) PL, ACI 9) DSI, ACI 10) Note B 11) Note B	
6	100-6	0	20-5 1/2	C	1) ICC502RE conduit for ADS valve 1B21*PVP041D, 1B21*RVF041B, 1B21*RVF041F 2) ICC500BL1 conduit for hydrogen ignitor 1HCS*IGN28B 3) RCS*75-039 PPV press ref leg instru- mentation line 4) ICS-006-57-1 line		1) Note CB 2) DSS 3) DSS 4) ACI	

TABLE 3.6A-47a (Cont)

Piping System: Residual Heat Removal System - Shutdown Mode (Inside Containment)
 Piping Line Numbers: 1RHS-018-53-1
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
					and supports			
					5) 24" MSS line support		5) ACI, SPI	21
					6) PHS-018-53-1 supports		6) FL, ACI	17
					7) RHS-750-351-2 line		7) ACI	
					8) 1E12*MOVPO09 (valve on RHS-053 line)		8) EL, ACI	
					9) PHS line valve V240		9) DSI, ACI	
					10) 1CC502BN6 conduit (H ₂ ignitor)		10) Note B	
					11) 1HCS*1GN49A H ₂ ignitor		11) Note B	21
5	101-2	0	20-5 1/2	C	1) 1CC502BN6 conduit for ADS valve 1B21*PVFO41D, 1E21*PVFO41B, 1B21*PVFO41P		1) Note CB	
					2) 1CC500BL1 conduit for hydrogen ignitor 1HCS*IGN28B		2) DSS	
					3) PCS*75-039 RPV press ref leg instru- mentation line		3) DSS	
					4) ICS-006-57-1 line and supports		4) ACI	17
					5) 24" MSS line support		5) ACI, SPI	
					6) PHS-018-53-1 supports		6) FL, ACI	
					7) RHS-750-351-2 line		7) ACI	
					8) 1E12*MOVPO09 (valve on RHS-053 line)		8) EL, ACI	
					9) PHS line valve V240		9) DSI, ACI	
					10) 1CC502BN6 conduit (H ₂ ignitor)		10) Note B	
					11) 1HCS*1GN49A H ₂ ignitor		11) Note B	21

NOTE: Numbered footnotes follow Table 3.6A-51.

Amendment 21

TABLE 3.6A-49a (Cont)

Piping System: Control Rod Drive (Inside Containment)
 Piping Line Numbers: 1-RDS-002-23-4
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
					11) 1CC540TP2 (CPD scram dis- charge volume solenoid valve 1C11*SOV182 conduit)		11) Note F	
					12) 1C11*VF122 (control rod drive system valve)		12) Note F	
					13) 1C11-AOVF180 (control rod drive system valve)		13) Note H	

TABLE 3.6A-49a (Cont)

Piping System: Control Rod Drive (Inside Containment)
 Piping Line Numbers: 1-RDS-150-29-4
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
107	116-0	184	54-7 9/16	C	1) PCP*TCR04P (reactor pressure vessel level and pressure instrument panel 1B22*PNLP026 termination cabinet)		1) Notes DA, DB	
137	116-0	191.15	55-6 9/16	C	1) 1CX507BA (containment ambient & suppression pool temperature monitoring systems 1CMS*RTD24B, 24D, 40D & 42P conduit) 2) 1CX507BA1 (containment ambient temperature monitoring system 1CMS*RTD24B conduit) 3) 1B22*PNL027 (reactor pressure vessel level & pressure instrument panel has LPCI A, B, C & PV level transmitters) 4) 1CX540BD (RPV level & pressure termination cabinet 1BCP*TCR10A & radiation monitor 1RMS*RE20P conduit)		1) Notes AA, AB 2) Note AB 3) Notes DA, DC 4) Note V	21

<u>Break Point</u>	<u>Break Location</u>			<u>Break Types (1)</u>	<u>Essential Targets</u>	<u>Protection Measures</u>	<u>Evaluation</u>	<u>Remarks</u>
	<u>E1 (ft-in)</u>	<u>Az (deg)</u>	<u>r (ft-in)</u>			<u>(3)</u>	<u>(4)</u>	
125	116-0	185	54-8 27/32	C	1) 1XJP5248 (containment ambient & suppression pool temperature monitoring systems 1CMS*RTD24B, 24D, 40D & 42F conduit) 2) 1CC507BA1 (suppression pool temperature monitoring system 1CMS*RTD24E conduit) 3) 1CX507BA (containment ambient temperature monitoring systems 1CMS*PTD24B, 24D, 40D, & 42F conduit) 4) 1CX507AA1 (containment ambient temperature monitoring system 1CMS*RTD24B conduit) 5) 1CX507BA2 (containment ambient temperature monitoring system 1CMS*RTD40D conduit) 6) 1CX507BA3 (containment ambient temperature monitoring system 1CMS*RTD24D conduit) 7) 1CX507BA4 (containment ambient temperature monitoring system 1CMS*PTD42F conduit)		1) Notes AA, AB 2) Note AB 3) Note AA, AB 4) Note AB 5) Note AB 6) Note AB 7) Note AB	21

Break Point	<u>Break Location</u>			Break Types (1)	<u>Essential Targets</u>	<u>Protection Measures (3)</u>	<u>Evaluation (4)</u>	<u>Remarks</u>
	<u>El</u> <u>(ft-in)</u>	<u>Az</u> <u>(deg)</u>	<u>r</u> <u>(ft-in)</u>					
227	121-3	191.3	54-8 3/4	C	1) 1H22-P027 (reactor pres- sure vessel level & pres- sure instrument panel has LPCI A, B, and C BPV level transmitters) 2) 1CX540VG (1PCP*T/CP04F termination cabinet to 1H22*PNL026 reactor pressure vessel level & pressure instrument panel conduit) 3) 1CX540UC (main steam flow instrument panel 1H22*PNLP041 conduit) 4) 1CX540UG (CFD level transmitter 1C11*LTN012C conduit) 5) 1CX540UA (mainsteam flow instrument panel 1H22*PNLP041 conduit) 6) 1CX540UB (jet pump panel 1H22*PNLP009 & BPV level & pressure instrument panel 1H22*PNLP026 conduit) 7) 1CX540VF (CRD level transmitter 1C11*LTN012U conduit) 8) 1CX540VC (main steam flow instrument panel 1H22*PNLP041 conduit) 9) 1CX540VA (main steam flow instrument panel 1H22*PNLP041 conduit) 10) 1CC540LG (neutron monitoring motor modules 1C51*S001 E,H,D conduit)		1) Notes DA, DC 2) Notes DA, DB 3) Note F 4) Note DD 5) Note F 6) Notes F, DA, DE 7) Note DD 8) Note F 9) Note F 10) Note F	21

TABLE 3.6A-49a (Cont)

Piping System: Control Rod Drive (Inside Containment)
Piping Line Numbers: 1-RDS-002-71-4
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
241	122-0	194.5	50-8 1/8	C	1) 1CC540SD2 (CRD scram discharge volume solenoid valve 1C11*SOVP182 conduit) 2) 1CC540SD1 (CRD scram discharge valve 1C11*SOVP009 conduit) 3) 1CC540TP1 (CRD scram discharge valve 1C11*SOVP009 conduit) 4) 1CC540TP2 (CRD scram discharge volume solenoid valve 1C11*SOVP182 conduit)		1) Note F 2) Note F 3) Note F 4) Note F	
302	127-5	274.8	40-2	C	1) Withdraw line 1237		1) DSS	
307	127-1 7/18	121.28	40-0	C	1) 1SLC-002-42-1		1) Notes SPI, F	
309	127-5	85.2	40-2	C	1) Withdraw line 5233		1) DSS	
411	126-11	156.3	40-0	C	1) 1SLC-002-42-1		1) SPI	
412	127-1	129.98	40-0	C	1) 1C11*SOVP009 (control rod drive system valve) 2) 1C11*SOVP182 (control rod drive system valve) 3) 1H22*PNL-P005 (RPV level & pressure instrument panel has EPCS RPV level transmitters) 4) 1SLC-002-42-1		1) Note F 2) Note F 3) Notes DA, DB 4) Note F	21

TABLE 3.6A-49a (Cont)

Piping System: Control Rod Drive (Inside Containment)
 Piping Line Numbers: 1-RDS-150-72-4
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
288	127-4 1/2	238.72	40-0	C	1) 1TX509B (CRD position multiplexer cabinet 1H22*PNLP072 conduit) 2) 1CX540UG (CRD level transmitter 1C11*LTN012C conduit) 3) 1CX540OB (jet pump panel 1H22*PNLP009 & RPV level & pressure instrument panel 1H22*DNLP026 conduit) 4) 1CX507BP (reactor pressure vessel level & pressure instrument panel has LPCI A, B, and C RPV level transmitters 1H22*P027 conduit)		1) Note F 2) Note DD 3) Notes F, DA, DB 4) Notes DA, DC	

TABLE 3.6A-49a (Cont)

Piping System: Control Rod Drive (Inside Containment)
 Piping Line Numbers: 1-PDS-150-72-4
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	R (ft-in)					
315	127-10	274.8	40-2	C	1) Withdraw line 1237		1) DSS	
319	127-6 7/8	121.28	40-0	C	1) 1CX507RH (containment ambient temperature monitoring system 1CMS* RTD24A & 42G conduit) 2) 1CC5400A (1PCP*T/CPOF1 termination cabinet to 1H22*P005 RPV level & pressure instrument panel conduit) 3) 1H22-P005 (RPV level & pressure instrument panel has HPCS RPV level transmitters) 4) 1C11*SOVP009 (control rod drive system valve) 5) 1C11*SOV182 (control rod drive system valve) 6) 1CX507RA1 (CRD level transmitter 1C11*LTN017A conduit) 7) 1CX570UA (termination cabinet 1PCP*TCR01F, power range detector 1C51*JEN011 various conduit) 8) 1CX540SL (CRD level transmitter 1C11*LTN012A conduit) 9) 1CC540UB (control rod drive level switch 1C11* LSN013C conduit) 10) 1CC540VB (control rod drive level switch 1C11*LSN013D conduit) 11) 1SLC-002-42-1		1) Note AA 2) Notes DA, DB 3) Notes DA, DE 4) Note F 5) Note F 6) Note DD 7) Note F 8) Note DD 9) Note DD 10) Note DD 11) Note F	
322	127-10	85.2	40-2	C	1) Withdraw line 5233		1) DSS	

TABLE 3.6A-49b

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Control Rod Drive System (Fuel Building)

Piping Line Numbers: 1FDS-025-17-0

Consequence of Piping Failure: Jet Impingement

Break- point	Break Location			Break Types(1)	Essential Targets	Protection Measures(3)	Evaluation(4)	Remarks
	El ft-in	X ft-in	Z ft-in					
1	72-1 1/2	-(127-6)	80-5 1/2	C	None		-	
2	72-1 1/2	-(127-6)	81-7	C	None		-	
3	72-3 1/2	-(127-6)	81-9	C	None		-	
4	74-4	-(127-6)	81-9	C	None		-	
5	74-6	-(127-8)	81-9	C	None		-	
6	74-6	-(123-2)	81-9	C	None		-	
8	74-8	-(123-4)	81-9	C	None		-	
9	81-1	-(123-4)	81-9	C	None		-	
10	81-3	-(123-4)	81-7	C	None		-	
11	81-3	-(123-6)	66-5	C	None		-	
12	81-3	-(123-4)	66-7	C	None		-	
13	81-3	-(132-2)	66-5	C	None		-	
15	81-3	-(129-2)	66-5	C	None		-	
34	81-3	-(123-4)	69-5	C	None		-	
37	81-3	-(132-4)	66-7	C	None		-	
38	81-3	-(132-4)	68-9	C	None		-	
39	81-3	-(132-2)	68-11	C	None		-	
40	81-3	-(130-4)	68-11	C	None		-	

TABLE 3.6A-49b (Cont)

Piping System: Control Rod Drive System (Fuel Building)

Piping Line Numbers: 1RDS-025-17-4

Consequence of Piping Failure: Jet Impingement

Break- point	Break Location			Break Types(1)	Essential Targets	Protection Measures(3)	Evaluation(4)	Remarks
	<u>El</u> (ft-in)	<u>X</u> (ft-in)	<u>Z</u> (ft-in)					
41	81-1	-(130-2)	68-11	C	None		-	
42	76-8	-(130-2)	68-11	C	None		-	

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TABLE 3.6A-49b (Cont)

Piping System: Control Rod Drive System (Fuel Building)
Piping Line Numbers: 1RDS-025-18-4
Consequence of Piping Failure: Jet Impingement

Break- point	Break Location			Break Types(1)	Essential Targets	Protection Measures(3)	Evaluation(4)	Remarks
	<u>E1</u> (ft-in)	<u>X</u> (ft-in)	<u>Z</u> (ft-in)					
18	81-3	-(129-2)	65-3	C	None		-	
19	81-1	-(129-2)	65-1	C	None		-	
20	76-9	-(129-2)	65-1	C	None		-	

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TABLE 3.6A-49b (Cont)

Piping System: Control Rod Drive System (Fuel Building)

Piping Line Numbers: 1RDS-002-225-4

Consequence of Piping Failure: Jet Impingement

Break- point	Break Location			Break Types(1)	Essential Targets	Protection Measures(3)	Evaluation(4)	Remarks
	<u>El</u> (ft-in)	<u>X</u> (ft-in)	<u>Z</u> (ft-in)					
21	76-7	-(129-2)	65-1	C	None		-	
22	75-0	-(129-2)	65-1	C	None		-	
23	74-10	-(129-2)	65-11	C	None		-	

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TABLE 3.6A-49b (Cont)

Piping System: Control Rod Drive System (Fuel Building)

Piping Line Numbers: 1RDS-025-11-4

Consequence of Piping Failure: Jet Impingement

Break- Point	Break Location			Break Types(1)	Essential Targets	Protection Measures(3)	Evaluation(4)	Remarks
	<u>El</u> (ft-in)	<u>X</u> (ft-in)	<u>Z</u> (ft-in)					
25	72-1 1/2	-(127-6)	68-1 1/2	C	None		-	
26	72-1 1/2	-(127-6)	69-3	C	None		-	
27	72-3 1/2	-(127-6)	69-5	C	None		-	
28	74-4	-(127-6)	69-5	C	None		-	
29	74-6	-(127-8)	69-5	C	None		-	
31	74-6	-(123-2)	69-5	C	None		-	
33	74-8	-(123-4)	69-5	C	None		-	

TABLE 3.6A-49b (Cont)

Piping System: Control Rod Drive System (Fuel Building)

Piping Line Numbers: 1RDS-002-21-4

Consequence of Piping Failure: Jet Impingement

Break- point	Break Location			Break Types(1)	Essential Targets	Protection Measures(3)	Evaluation(4)	Remarks
	<u>Y</u> (ft-in)	<u>X</u> (ft-in)	<u>Z</u> (ft-in)					
50	77-0	-(132-6)	64-4 1/2	C	None		-	

21

TABLE 3.6A-49b (Cont)

Piping System: Control Rod Drive System (Fuel Building)

Piping Line Numbers: 1RDS-002-19-4

Consequence of Piping Failure: Jet Impingement

Break- Point	Break Location			Break Types(1)	Essential Targets	Protection Measures(3)	Evaluation(4)	Remarks
	E1 (ft-in)	X (ft-in)	Z (ft-in)					
56	74-10	-(129-2)	62-11	C	None		-	
57	74-10	-(130-0)	62-9	C	None		-	
59	77-0	-(129-0)	61-9	C	None		-	
89	107-0	-(72-5)	2-8 3/4	C	1) 1CL602BA conduit 2) 1CC602BA conduit 3) 1CC602BB conduit		1) NRS 2) NRS 3) DSS	
90	107-0	-(72-7)	2-6 3/4	C	1) 1CX601BA (service water flow transmitter 1SWP*FT59B, 60B conduit) 2) 1CC918PA (conduit between switchgear and terminal cabinet for PCS system)		1) Note M 2) NRS	
91	107-0	-(73-1)	2-6 3/4	C	None		-	
92	107-2	-(73-3)	2-6 3/4	C	1) 1TL602B (fuel building ventilation system fan HVP*FN3B, 7B cable tray) 2) 1TC602B (various HVP flow switches and air operated damper cable tray) 3) 1TI602B (various resistant temperature detector and flow switches HVP cable tray)		1) Note R 2) Note R 3) Note R	
94	115-0	-(73-3)	2-6 3/4	C	None		-	
95	115-10	-(73-3)	2-6 3/4	C	None		-	
96	116-0	-(73-1)	2-6 3/4	C	None		-	

21

TABLE 3.6A-49b (Cont)

Piping System: Control Rod Drive System (Fuel Building)

Piping Line Numbers: 1RDS-002-22-2

Consequence of Piping Failure: Jet Impingement

Break- Point	Break Location			Break Types(1)	Essential Targets	Protection Measures(3)	Evaluation(4)	Remarks
	<u>E1</u> (ft-in)	<u>X</u> (ft-in)	<u>Z</u> (ft-in)					
98	116-0	-(70-8)	2-6 3/4	C	None		-	
99	116-0	-(68- 11 1/2)	2-6 3/4	C	None		-	

21

NOTE: Numbered footnotes follow Table 3.6A-51.

Amendment 21

TABLE 3.6A-50a

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Reactor Water Cleanup System (Inside Containment)
Piping Line Numbers: 1WCS-004-1-1
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
1	83-5	-(18-0 7/16)	8-10 1/8	C	None			
9	82-11 1/4	-(18-0 1/2)	8-10	C	None			
				L	None			

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TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1WCS-006-5-1
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks	
	E1 (ft-in)	X (ft-in)	Z (ft-in)						
14	86-6	26-6 5/8	-(8-9)	C	None				21
				L	None				
16	86-6	26-4 5/8	-(9-3)	C	None				
41	89-8	28-1	-(2-0)	C	None				21
				L	None				17
42	90-4	28-1	-(2-0)	C	None				21
				L	None				21

TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1WCS-006-5-1

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
51	104-0	31-2	4-3	C	1) ISVV-012-26-3		1) SPI	

17 21

TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1WCS-004-3-1
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	1 (ft-in)	2 (ft-in)					
15	86-6	26-5 5/8	- (9-0)	C	None			21
				L	None			17
31	83-5	18-4	- (9-0)	C	None			21
26A	83-0	17-2	- (8-6)	C	None			
				L	None			21

TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1WCS-003-6-1
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
59	90-0	28-1	-(2-0)	C	None			
68	82-6	20-7	-(2-0)	C	None			
69	82-6	20-6	-(2-0)	C	None			
85	100-0	13/16 7-2	3-0	C	1) 1B33*T/CN002 (RCS- thermocouple) 2) 1B33*T/CN021 (RCS- thermocouple) 3) 1B21*T/C030A (reactor pressure vessel thermocouple)		1) Note F 2) Note F 3) Note F	

21

17

TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1WCS-150-8-1
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
60A	82-6	22-3	-(2-7)	C	None			

TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1DEN-002-225-1
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	E1 ft-inl	I ft-inl	2 ft-inl					
67B	81-8	18-11	-(2-0)	C	None			
67C	81-8	18-8	-(1-9)	C	None			
67D	81-8	18-8	-(0-4)	C	None			

TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1B13-D077

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
87	100-4 13/16	7-6	-(2-6)	C	1) 1B33*T/CN022 (RCS- thermocouple) 2) 1B33*T/CN021 (RCS- thermocouple) 3) 1B21*T/C030A (reactor pressure vessel thermocouple)		1) Note F 2) Note F 3) NRS	

TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1B13-D077
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	Z (ft-in)					
93	102-0	-(0-9)	-(0-6)	C	None			
95	100-4 13/16	7-0	-(3-11)	C	1) 1B33*T/CN022 (RCS- thermocouple) 2) 1B33*T/CN021 (RCS- thermocouple) 3) 1B21*T/C030A (reactor pressure vessel thermocouple)		1) Note F 2) Note F 3) NRS	

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TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
Piping Line Numbers: 1DE9-002-34-1
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
3A	82-6	-(17-0)	12-10	C	None			

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TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
Piping Line Numbers: 1-WCS-004-79-3
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	Z (ft-in)					
169	149-0	45-7 1/16	-(11-10 1/2)	C	1) WCS supports 2) 1CK500BE5 (WCS valve 1G33*MOVFP028 conduit) 3) 1CC500BG5 (WCS valve 1G33*MOVFP040 conduit) 4) 1G33*MOVFP040 (WCS valve) 5) 1CC500BG3 (WCS valve 1G33*MOVFP040 conduit) 6) 1CK500BE2 (WCS valve 1G33*MOVFP040 conduit)		1) ACI 2) Note F 3) Note CF 4) Note CF 5) Note CF 6) Note CF	
170	149-0	45-7 1/16	-(10-4)	C	1) WCS supports 2) 1CK500BE5 (WCS valve 1G33*MOVFP028 conduit) 3) 1CC500BG5 (WCS valve 1G33*MOVFP028 conduit) 4) 1G33*MOVFP040 (WCS valve) 5) 1CC500BG3 (WCS valve 1G33*MOVFP040 conduit) 6) 1CK500BE2 (WCS valve 1G33*MOVFP040 conduit) 7) WCS-250-108-2		1) ACI 2) Note F 3) Note F 4) Note CF 5) Note CF 6) Note CF 7) ACI	
174A	154-6	41-0	-(8-9)	C	1) 1CK500BE5 (WCS valve 1G33*MOVFP028 conduit) 2) 1CC500BG5 (WCS valve 1G33*MOVFP028 conduit)		1) Note F 2) Note F	
178	149-6	40-6	-(11-1 1/2)	C	1) 1CK500BE5 (WCS valve 1G33*MOVFP028 conduit) 2) 1CC500BG5 (WCS valve 1G33*MOVFP028 conduit)		1) Note F 2) Note F	

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TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
Piping Line Numbers: 1-WCS-004-29-2
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El	I	Z					
	(ft-in)	(ft-in)	(ft-in)					
180	149-0	40-6	-(8-6)	C	1) WCS supports		1) ACI, RL	

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TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1-WCS-004-26-3
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	Y1 (ft-in)	X (ft-in)	Z (ft-in)					
186A	153-7	40-6	-(15-9)	C	None			
184	149-0	40-6	-(15-3)	C	None			

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TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1-WCS-004-24-3
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	Z (ft-in)					
195	172-10 3/8	47-0 5/16	(0-11)	C	None			
197	154-6	40-1 7/8	-(15-9)	C	None			
201P	148-6	15-7 7/16	-(36-4 5/8)	C	None			
200	149-0	37-6	-(15-9)	C	None			
201A	148-6	30-1 5/8	-(26-6)	C	None			
201B	148-6	24-1	-(32-4)	C	None			
202A	151-6	17-5 7/16	-(36-4 5/8)	C	None			
202C	125-3	7-11 1/8	-(40-2 9/16)	C	None			
202	154-3	2-0	-(40-1)	C	1) 1CX500°D4 (leak detection 1E31°T/C No. 56A conduit)		1) Note P	

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TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1-WCS-003-34-3

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	E1 (ft-in)	X (ft-in)	Z (ft-in)					
206A	158-0	-(1-6)	-(40-3)	C	1) 1E31*T/C No. 55B thermocouple for leak detection		1) Note F	

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TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1-WCS-002-58-3

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	2 (ft-in)					
217	171-6	-(8-8)	-(44-3)	C	None			
220	171-0	-(7-5)	-(45-3)	C	None			

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TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1-WCS-003-45-3

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El	1	2					
	(ft-in)	(ft-in)	(ft-in)					
232	171-6	-(8-4)	-(41-0)	C	1) 1CX501PE9 (leak detection 1P31*T/CW044A conduit)		1) Note P	

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TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1-WCS-003-35-3

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	E1 (ft-in)	X (ft-in)	Z (ft-in)					
246A	158-0	1-6	-(40-3)	C	None			
249	164-9	1-6	-(41-6)	C	None			
256	172-6	8-8	-(44-3)	C	1) Leak detection 1E31*T/CN043P 2) 1CX500B24 (leak detection 1E31*T/CN045B conduit)		1) Note K 2) Note P	

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TABLE 3.6a-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1-WCS-002-69-3

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	E1 (ft-in)	I (ft-in)	Z (ft-in)					
257	171-6	9-0	-(44-3)	C	None			
260	171-0	6-9	-(45-3)	C	None			

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TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1-WCS-003-71-3
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	Z (ft-in)					
272	171-6	8-5	-(41-0)	C	1) 1CX500BE2 leak detection 1E31*T/CN043B conduit) 2) 1CX500BE4 (leak detection 1E31*T/CN045B conduit)		1) Note K 2) Note P	

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TABLE 3.6A-50a (Cont)

THE INFORMATION ON THIS PAGE HAS BEEN DELETED.

TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
Piping Line Numbers: 1-WCS-004-25-3
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	P1 (ft-in)	I (ft-in)	Z (ft-in)					
306	153- 10 3/16	50-0	9-3	C	None			
324A	149-3	30-1 5/8	-(26-6)	C	None			
327A	151-6	18-3	-(35-10 1/4)	C	None			
325A	149-3	24-2 1/4	-(32-1 7/8)	C	None			
326A	150-11	18-4	-(35-10 1/4)	C	None			

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TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1-WCS-004-33-3

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
318	150-1 1/8	43-2	-(17-2)	C	None			
320	150-6	43-8	-(16-9)	C	None			
323A	153-6	43-8	-(15-9)	C	None			

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TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)
 Piping Line Numbers: 1WCS-008-46-3
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (*)	Remarks
	El (ft-in)	X (ft-in)	Z (ft-in)					
453	167-0	-(9-6)	-(26-3)	C	None			
458A	165-10 5/8	-(17-2)	-(27-3)	C	None			
459	165-9 7/8	-(17-2)	-(34-9)	C	None			
455A	166-1 3/4	-(12-8 1/2)	-(23-0 1/2)	C	None			
456A	166-1 1/2	-(13-4 15/16)	-(22-9)	C	None			

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TABLE 3.6A-50a (Cont)

Piping System: Reactor Water Cleanup System (Inside Containment)

Piping Line Numbers: 1WCS-004-154-3

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (2)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	Z (ft-in)					
632	158-2 5/8	50-9 1/2	-(2-8)	C	1) 1G33*MOVFP053 (WCS valve) 2) 1CC500BG (flex cable to WCS valve 1G33*MOVFP053 conduit) 3) 1CK500BE (flex cable to WCS valve 1G33*MOVFP053 conduit) 4) 1CC500BG3 (WCS valve 1G33*MOVFP040 conduit) 5) 1CK500BE2 (WCS valve 1G33*MOVFP040 conduit)		1) Note CG 2) Note CG 3) Note CG 4) Note CF 5) Note CF	17 21
636	160-8 5/8	49-8 3/4	-(2-1 5/8)	C	None			
640	157-8 5/8	49-7 1/4	-(1-2 1/4)	C	1) 1CC500BG5 (WCS valve 1G33*MOVFP028 conduit) 2) 1CK500BE5 (WCS valve 1G33*MOVFP028 conduit)		1) Note F 2) Note F	21
631	157-8 5/8	50-4 7/8	-(3-3 7/8)	C	None			21

TABLE 3.6A-50b

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Reactor Water Cleanup System (Outside Containment)

Piping Line Numbers: 1-WCS-006-11-3

Consequence of Piping Failure: Jet Impingement

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Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	I (ft-in)	Z (ft-in)					
1	116-0	107-9 1/2	4-3	C	None			
3	115-3	109-5	4-3	C	None			
5	106-9	108-10 1/3	3-8 1/2	C	None			
7A	106-9	95-9	0-0	C	1) 1TC814B (reactor core isolation cooling system valve 1E12*P023 cable tray) 2) 1CI809RS (leak detection 1E31PTN077A conduit) 3) 1CI809RS1 (leak detection 1E31PTN075A conduit) 4) 1CI817BF2 (WCS thermocouple 1E31*T/C No40B conduit) 5) 1CI817BF3 (WCS thermocouple 1E31*T/C No37B conduit) 6) 1CI817BF4 (WCS thermocouples 1E31*T/C No39B & 42B conduit) 7) 1CC814RA (reactor core isolation cooling system valves 1E51*P059, 013, 046) 8) 1CK827RA (RCIC fill pump motor 1E51*C003 conduit)		1) Note P 2) Note M 3) Note M 4) Note Q 5) Note Q 6) Note P 7) Note P 8) Note P	

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TABLE 3.6A-51
SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Reactor Recirculation System - Loop A (Inside Containment)

Piping Line Numbers: 20", 16", 10"

Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	R (ft-in)					
PS1	115-10 1/2	180	11-6	C	1) RBS-010-19-1 (LPCI-C) and support 2) ICC502PN8 conduit (H ₂ ignitor) 3) ICC500BK5 conduit (H ₂ ignitor) 4) 1HCS*1GN50B (H ₂ ignitor)		1) RSS 2) Note I 3) Note I 4) Note I	16 21
PS2II	113-4 1/2	180	17-0	L	1) CPM-006-004-2 (hydrogen mixing) and support 2) RDS lines (bundles)		1) Note H 2) DSS	16
PD1	116-3 1/2	150	11-7 1/64	C	1) RBS-010-19-1 (LPCI-C) 2) DER-004-58-4 drain line 3) ICC502PN8 conduit (H ₂ ignitor)		1) SPI 2) ACI 3) Note B	21
RD2	116-3 1/2	120	11-7 1/64	C	1) DER-004-57-4 and support 2) RDS lines and support 3) ICC502RN6 conduit (H ₂ ignitor) 4) ICC502RN8 conduit (H ₂ ignitor) 5) ICC502RN7 conduit (H ₂ ignitor) 6) 1HCS*1GN50A conduit (H ₂ ignitor)		1) ACI 2) DSS 3) DSS 4) DDS 5) Note B 6) Note B	16 21

TABLE 3.6A-51 (Cont)

Piping System: Reactor Recirculation System - Loop A (Inside Containment)
 Piping Line Numbers: 20", 16", 10"
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (2)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
PD3	116-3 1/2	90	11-7	C	1) PDS lines and supports 2) DER-004-57-4 drain line 3) ICC502RW6 conduit (H ₂ ignitor)		1) DSS 2) ACI 3) Note B	16 21
PD4	116-3 1/2	60	11-17 1/64	C	1) DER*57 drain line support 2) RDS lines and supports 3) 1HCS*1GN49B (H ₂ ignitor)		1) ACI 2) DSS 3) Note B	16 21
PD5	116-3 1/2	30	11-6 43/64	C	1) DER*57 supports		1) ACI	
PD6	108-3 1/2	30	16-10	C	1) CX507 PC2 CMS conduit 2) 1B21*TKD004A tank 3) 1RHS-750-164-2 (LPCI-A) 4) 1RCS*035 line and support 5) ICS-006-57-1 6) 1E12*VP039A valve 7) 1B21*AOVP022C valve 8) 1PCS-001-28-1 9) 1RCS-750-029-2 10) 1RHS*53 support 11) 1RHS-010-34-1 (LPCI-A) 12) 1RCS supports 13) PCS*33 support 14) RCS*35 support		1) Note A 2) Note H 3) Note J 4) Note D 5) ACI 6) SPI 7) Note H 8) Note H 9) DSS 10) SPI 11) SPI 12) SPI 13) Note D 14) Note D	16 21
RD6LL	108-3 1/2	30	10 3/64	L	1) 1DER-004-57-4 and supports		1) ACI	16

TABLE 3.6A-51 (Cont)

Piping System: Reactor Recirculation System - Loop A (Inside Containment)
 Piping Line Numbers: 20", 16", 10"
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (2)	Evaluation (3)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
RD7	108-3 1/2	60	16-10 3/64	C	1) CX507RC2 CMS conduit 2) MSS and supports 3) RDS lines and supports 4) CMS-750-154-2 5) MCS-001-28-1 6) RCS-750-29-2 7) PHS-010-34-1 (LPCI-A) 8) PHS-1E21*VF039A (LPCI-A valve) 9) ICC502RN6 conduit 10) HCS*1GN49B (H ₂ ignitor)		1) Note A 2) ACI 3) DSS 4) DSS 5) Note H 6) DSS 7) SPI 8) SPI 9) DSS 10) Note B	21 16 21
RD7LL	108-3 1/2	120	16-10 3/64	L	1) DER-004-57-4 and support 2) RDS lines and supports		1) ACI 2) DSS	21 16
RD8	108-3 1/2	120	16-10 3/64	C	1) RDS lines and supports 2) MSS - Line C and supports 3) PHS-010-19-1 and support (LPCI-C) 4) ICC502RNG conduit (H ₂ ignitor) 5) ICC502RN8 conduit (H ₂ ignitor) 6) ICC502RN7 conduit (H ₂ ignitor) 7) HCS*1GN50A (H ₂ ignitor)		1) DSS 2) SPI 3) SPI 4) DSS 5) Note B 6) Note H 7) Note H	16 21
RD8LL	108-3 1/2	120	16-10 3/64	L	1) DER-004-57-4 and supports 2) RDS*204 support 3) PDS lines		1) ACI 2) DSS 3) DSS	16

TABLE 3.6A-51 (Cont)

Piping System: Reactor Recirculation System - Loop A (Inside Containment)
 Piping Line Numbers: 20", 16", 10"
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	R (ft-in)					
BD9	108-3 1/2	150	16-10 3/64	C	1) ICC502BW8 conduit (H ₂ ignitor) 2) PHS-750-161-2 and supports (LPCI-C) 3) PHS-010-19-1 and supports (LPCI-C) 4) PCS*34 support		1) Note B 2) PSS 3) PSS, SPI 4) Note D	21 16 21
BD9LL	108-3 1/2	150	16-10 3/64	L	1) DEP*58 line support 2) DEP*57 line support		1) ACI 2) ACI	16

TABLE 3.6A-51 (Cont)

Piping System: Reactor Recirculation System - Loop B (Inside Containment)
 Piping Line Numbers: 20", 16", 10"
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (2)	Evaluation (4)	Remarks
	El ft-inl	Az (deg)	R ft-inl					
BS1	115-10 1/2	0	11-6	C	1) RHS-018-53-1 and support 2) 1B21*MOV0016 (drain line valve)		1) ACI 2) Note F	21
BS2LL	113-4 1/2	0	17-0	L	1) RHS*53 support (RHS suction) 2) DTM-003-072 drain line		1) ACI 2) ACI	16
BD1	116-3 1/2	330	11-7 1/64	C	None			
BD2	116-3 1/2	330	11-7 1/64	C	1) PDS*404 support		1) DSS	
BD3	116-3 1/2	270	11-7	C	1) PDS*304 support 2) PDS*404 support 3) PDS lines 4) ICC500BK5 conduit (H ₂ ignitor)		1) DSS 2) DSS 3) DSS 4) Note B	21
BD4	116-3 1/2	240	11-7 1/64	C	1) PDS*304 2) PDS lines 3) ICC502RWB conduit (H ₂ ignitor) 4) ICC500BK5 conduit (H ₂ ignitor)		1) DSS 2) DSS 3) Note B 4) DSS	16 21
BD5	116-3 1/2	210	11-6 43/64	C	1) ICC502RWB conduit (H ₂ ignitor) 2) ICC500BK5 conduit (H ₂ ignitor)		1) DSS 2) DSS	21
BD6	108-3 1/2	210	16-10 3/64	C	1) RCS-750-43-2 and support 2) RHS*160 (LPCI-B) supports 3) RHS-750-161-2 (LPCI-C) and support 4) RHS-010-19-1 (LPCI-C) and support		1) Note D 2) RSS 3) Note J 4) SPI	16

TABLE 3.6A-51 (Cont)

Piping System: Reactor Recirculation System - Loop B (Inside Containment)
 Piping Line Numbers: 20", 16", 10"
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (2)	Evaluation (4)	Remarks
	El ft-in)	Az (deg)	r (ft-in)					
					5) RBS-010-16-1 (LPCI-B) and support 6) ICS-006-57-1 7) MSS - Line D 8) RCS*41 and support 9) ICC502RW8 (H ₂ ignitor) 10) ICC500RW5 conduit (H ₂ ignitor)		5) RSS, SPI 6) ACI 7) SPI 8) Note D 9) DSS 10) DSS	16 21
RD6LL	108-3 1/2	210	16-10 3/64	L	1) RDS lines		1) DSS	
RD7	108-3 1/2	240	16-10 3/64	C	1) RCS*43 support 2) RBS*16 (LPCI-B) and support 3) RBS*19 (LPCI-C) support 4) RDS*304 support 5) RBS-750-160-2 (LPCI-B) 6) RDS lines and racks 7) MSS - Line D and supports 8) ICC502RW8 conduit (H ₂ ignitor) 9) RCS*1GN61A (H ₂ ignitor)		1) Note D 2) RSS, SPI 3) RSS, SPI 4) DSS 5) RSS 6) DSS 7) SPI 8) Note B 9) Note B	16 21
RD7LL	108-3 1/2	240	16-10 3/64	L1 L2	1) RDS*304 supports 2) RDS bundles		1) DSS 2) DSS	
RD8	108-3 1/2	300	16-10	C	1) CSB*41 support 2) RCS*42 line and supports 3) RDS*404 supports 4) MSS - Line B and supports		1) SPI 2) Note A 3) DSS 4) SPI	16

TABLE 3.6A-51 (Cont)

Piping System: Reactor Recirculation System - Loop B (Inside Containment)
 Piping Line Numbers: 20", 16", 10"
 Consequence of Piping Failure: Jet Impingement

Break Point	Break Location			Break Types (1)	Essential Targets	Protection Measures (2)	Evaluation (4)	Remarks
	El (ft-in)	Az (deg)	r (ft-in)					
					5) RDS lines and racks 6) RRS-010-16-1 (LPCI-B)		5) DSS 6) RSS	
BD8LL	108-3 1/2	300	16-10 3/64	L	1) DFR*37 drain line support 2) RDS*404 supports 3) RDS lines 4) ICC500BK6 conduit (H ₂ ignitor)		1) ACI 2) DSS 3) DSS 4) Note B	16 21
BD9	108-3 1/2	330	16-10 3/64	C	1) ICS*57 support 2) RRS*53 (RRS suction) support 3) RRS-750-160-2 (LPCI-B) 4) ICC500BK6 conduit (H ₂ ignitor)		1) ACI 2) SPI 3) RSS 4) Note B	16 21
BD9LL	108-3 1/2	330	16-10 3/64	L	1) RRS*53 supports		1) ACI	16

NOTES (Cont)

The spent fuel pool cooling system pumps that are cooled by these fans may be shut down for approximately 4 hr before an unacceptable spent fuel pool temperature is reached.

Note S: If HPCS is available, three ADS valves are required for safe shutdown; with a single failure of HPCS, six ADS valves will be required. Hence, failure of one of the seven available ADS valves due to HELB jet impingement is acceptable.

16

Note T: LPCI-A, B, and C systems are acceptable targets for this break.

Note U: The valve serviced by this conduit will fail open, its fail safe position, on a loss of power.

Note V: This radiation monitor is not required for this break since it monitors radiation in the drywell during post-LOCA and this break is not a LOCA.

Note W: The effects of pipe whip or pipe rupture on the demineralizer and its supports is acceptable for this break. Since the ruptured line enters the demineralizer at the bottom, the base support bolts would be loaded in shear and, even if the bolts fail locally, the tank would still be held in place by the platform halfway up the tank, and by the piping connected to the top of the tank.

17

Note X: A failure of the hydrogen ignitor(s) as a result of this break is acceptable since, even with the failure of one division of power, the distance from any given point in the drywell to an unaffected hydrogen ignitor does not exceed 30 ft.

21

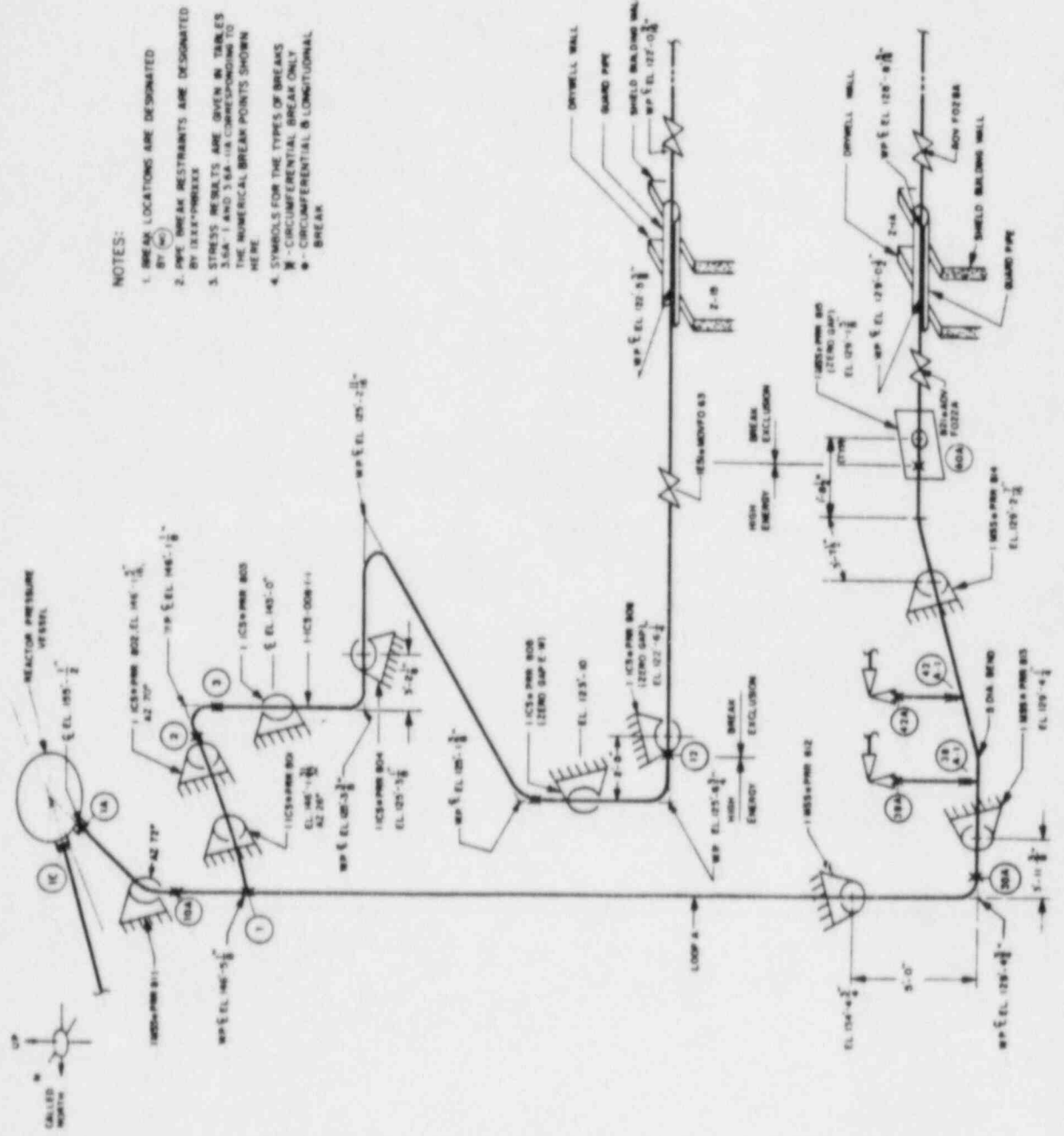
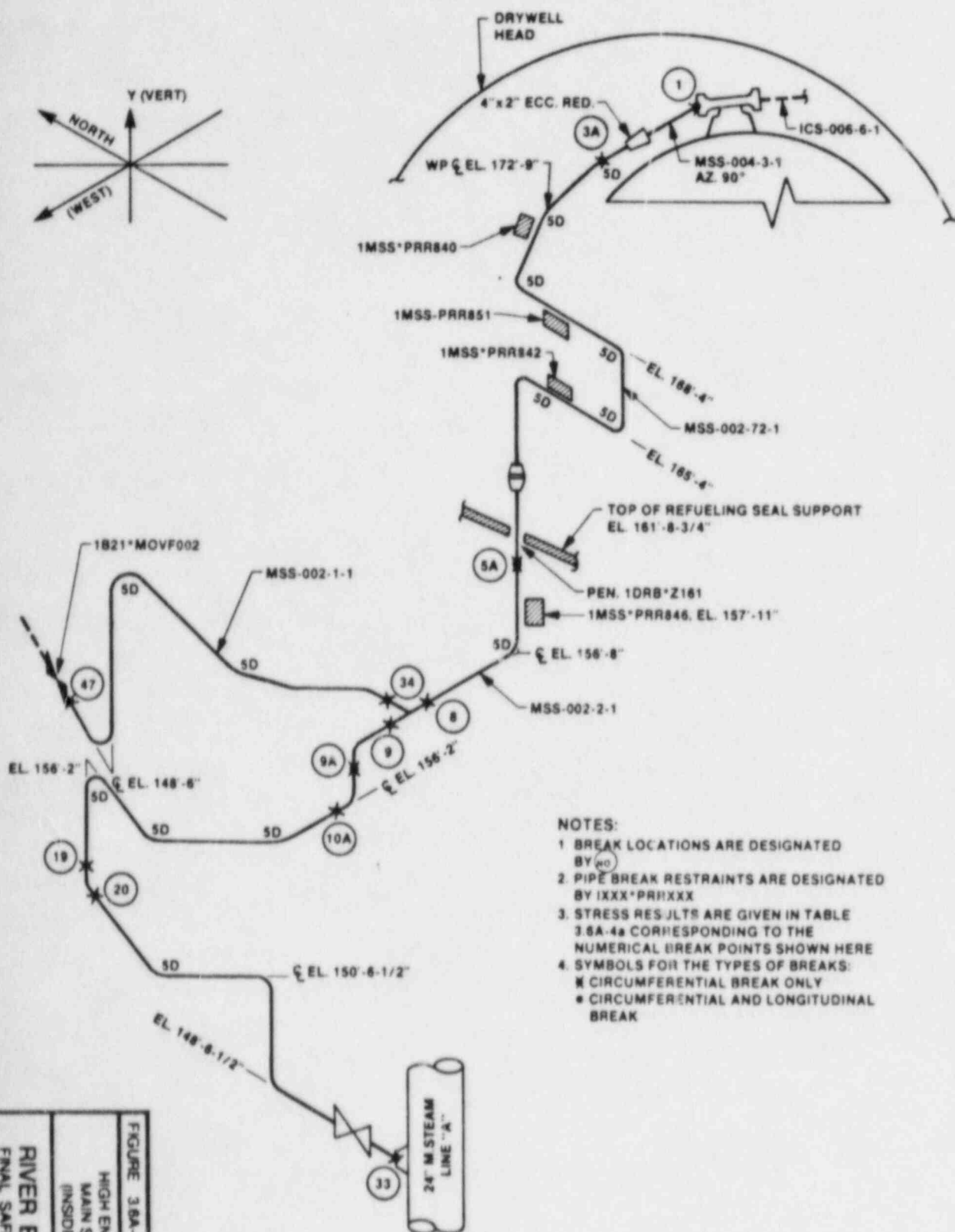
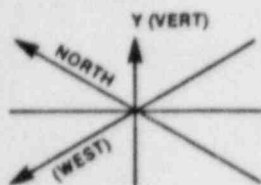


FIGURE 3.6A-12

HIGH ENERGY PIPE BREAK
 MAIN STEAM LOOP A AND
 R/C PIPING
 (INSIDE CONTAINMENT)



NOTES:

1. BREAK LOCATIONS ARE DESIGNATED BY NO.
2. PIPE BREAK RESTRAINTS ARE DESIGNATED BY IXXX*PRHXXX
3. STRESS RESULTS ARE GIVEN IN TABLE 3.6A-4a CORRESPONDING TO THE NUMERICAL BREAK POINTS SHOWN HERE
4. SYMBOLS FOR THE TYPES OF BREAKS:
 X CIRCUMFERENTIAL BREAK ONLY
 • CIRCUMFERENTIAL AND LONGITUDINAL BREAK

FIGURE 3.6A-14a

RIVER BEND STATION
 HIGH ENERGY PIPE BREAK
 MAIN STEAM VENT LINE
 (INSIDE CONTAINMENT)
 FINAL SAFETY ANALYSIS REPORT

NOTES:

1. BREAK LOCATIONS ARE DESIGNATED BY (W)
2. PIPE BREAK RESTRAINTS ARE DESIGNATED BY IXXX*PRRXXX
3. STRESS RESULTS ARE GIVEN IN TABLES 3.6A-10A AND 3.6A-10B CORRESPONDING TO THE NUMERICAL BREAK POINTS SHOWN HERE
4. SYMBOLS FOR THE TYPES OF BREAKS
 M - CIRCUMFERENTIAL BREAK ONLY
 • - CIRCUMFERENTIAL & LONGITUDINAL BREAK

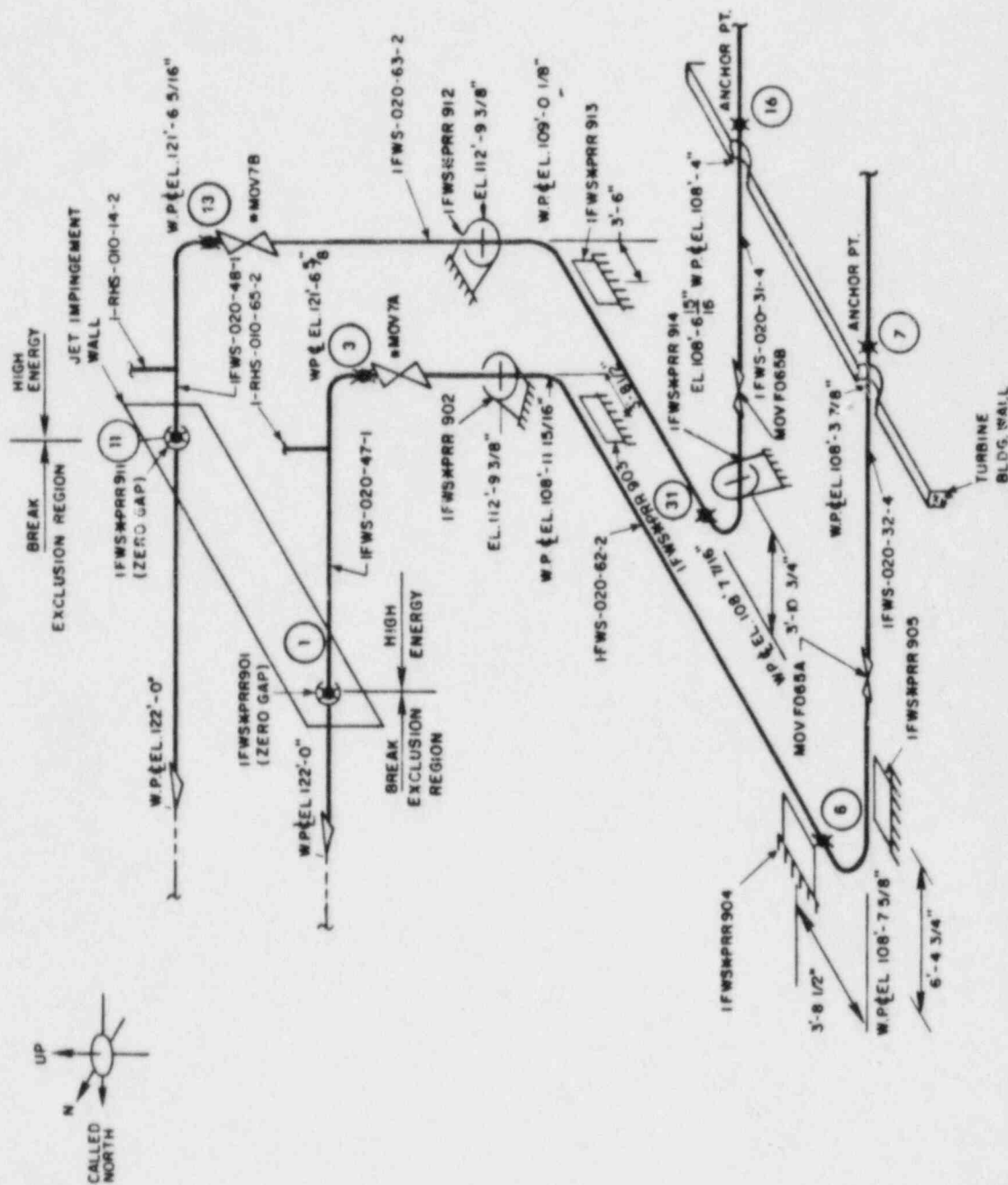
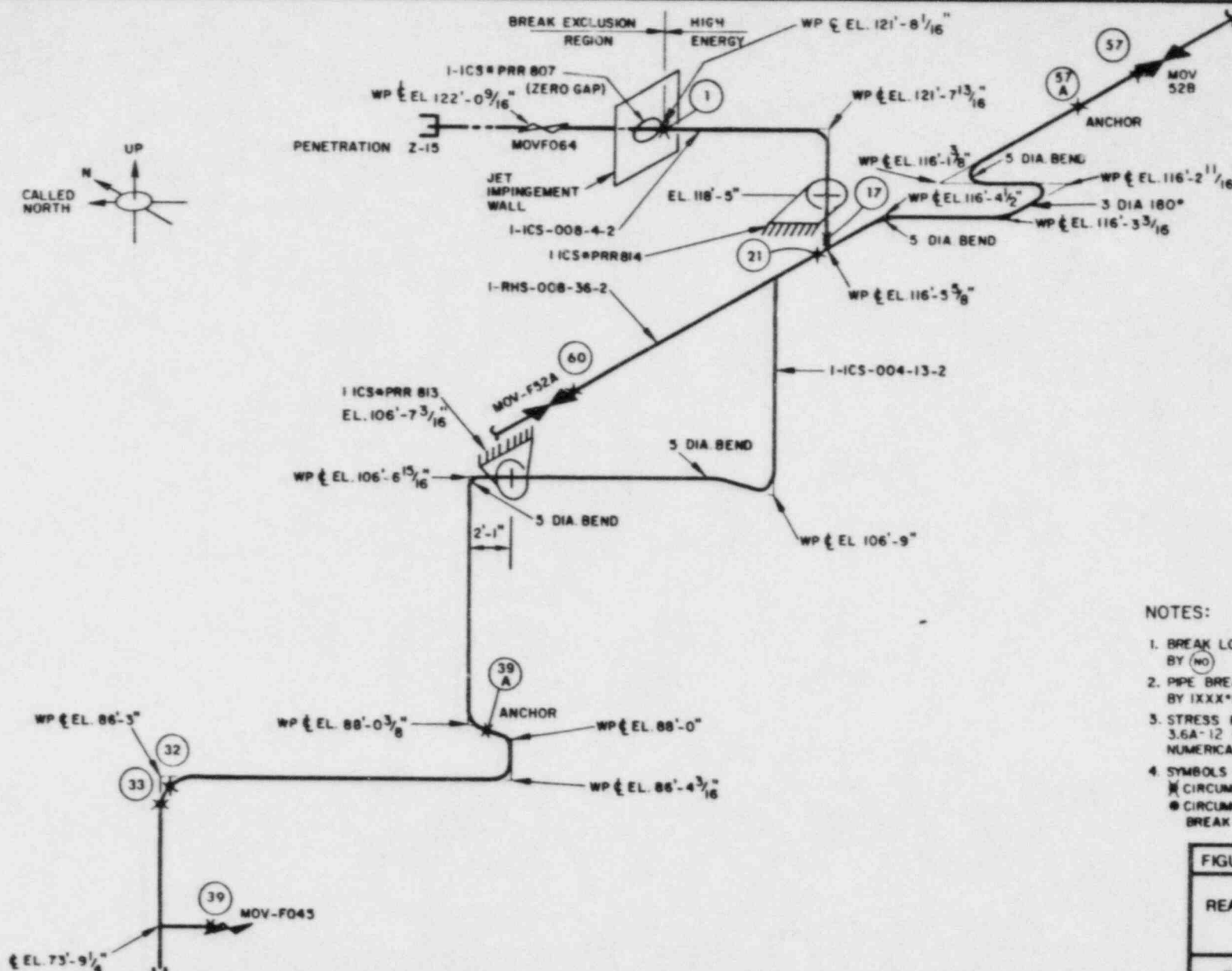


FIGURE 3.6A-18

HIGH ENERGY PIPE BREAK
FEEDWATER SYSTEM
OUTSIDE CONTAINMENT

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT



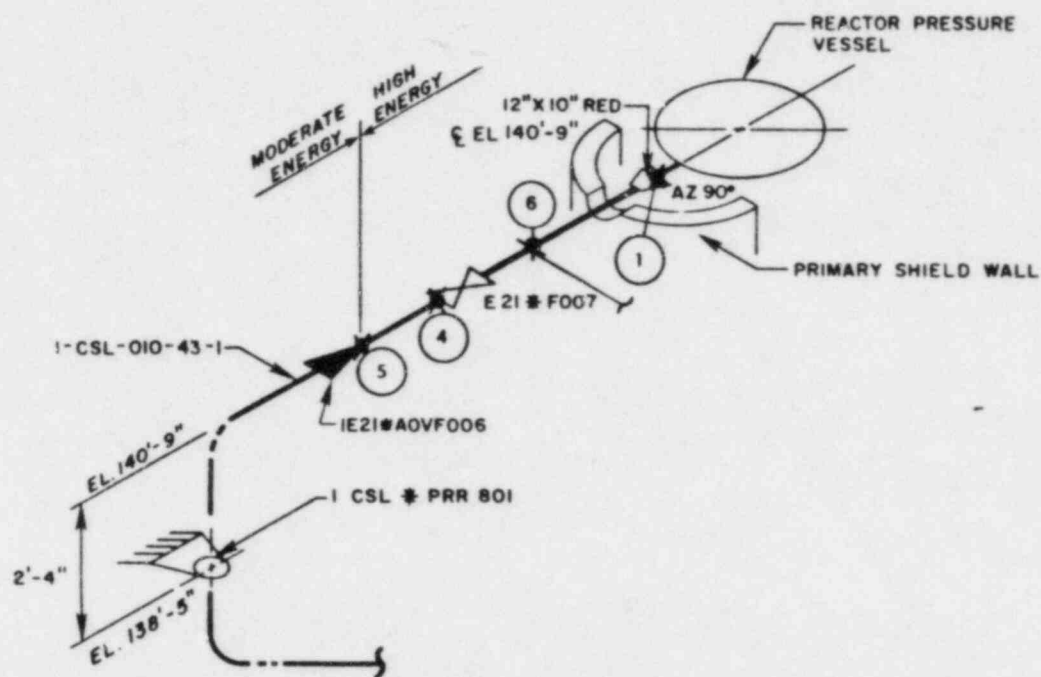
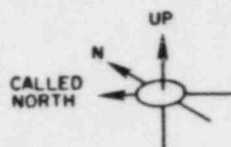
NOTES:

1. BREAK LOCATIONS ARE DESIGNATED BY (NO)
2. PIPE BREAK RESTRAINTS ARE DESIGNATED BY IXXX*PRRXXX
3. STRESS RESULTS ARE GIVEN IN TABLE 3.6A-12 CORRESPONDING TO THE NUMERICAL BREAK POINTS SHOWN HERE
4. SYMBOLS FOR THE TYPES OF BREAKS:
 X CIRCUMFERENTIAL BREAK ONLY
 • CIRCUMFERENTIAL AND LONGITUDINAL BREAK

FIGURE 3.6A-19

HIGH ENERGY PIPE BREAK
 REACTOR CORE ISOLATION COOLING &
 RESIDUAL HEAT REMOVAL-
 OUTSIDE CONTAINMENT

RIVER BEND STATION
 FINAL SAFETY ANALYSIS REPORT



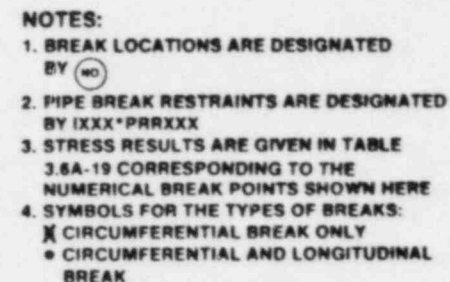
NOTES:

1. BREAK LOCATIONS ARE DESIGNATED BY (NO)
2. PIPE BREAK RESTRAINTS ARE DESIGNATED BY IXXX*PRRXXX
3. STRESS RESULTS ARE GIVEN IN TABLE 3.6A-14 CORRESPONDING TO THE NUMERICAL BREAK POINTS SHOWN HERE
4. SYMBOLS FOR THE TYPES OF BREAKS
 - * CIRCUMFERENTIAL BREAK ONLY
 - CIRCUMFERENTIAL AND LONGITUDINAL BREAK

FIGURE 3.6A-22

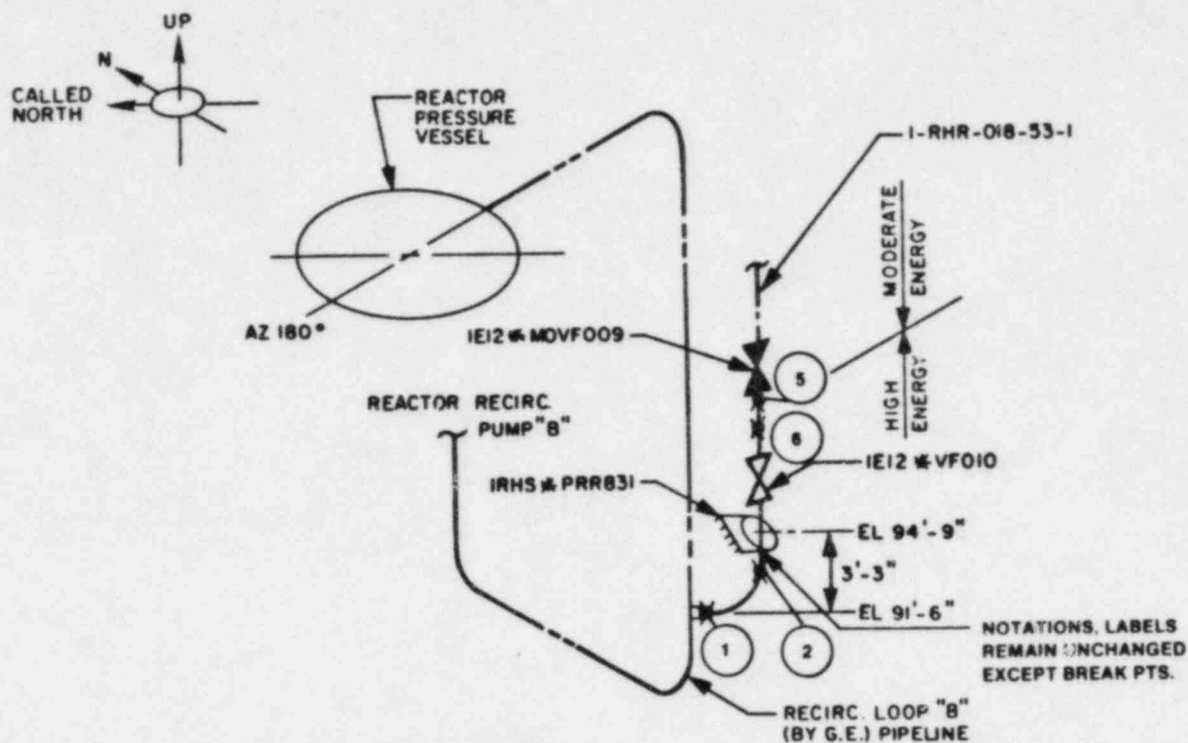
HIGH ENERGY PIPE BREAK
LOW PRESSURE CORE SPRAY
PIPING

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT



HIGH ENERGY PIPE BREAK
REACTOR WATER CLEANUP PIPING
(INSIDE CONTAINMENT)

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT



NOTES:

1. BREAK LOCATIONS ARE DESIGNATED BY NO
2. PIPE BREAK RESTRAINTS ARE DESIGNATED BY IXXX * PRRXXX
3. STRESS RESULTS ARE GIVEN IN TABLE 3.6A-15 CORRESPONDING TO THE NUMERICAL BREAK POINTS SHOWN HERE
4. SYMBOLS FOR THE TYPES OF BREAKS
 - * CIRCUMFERENTIAL BREAK ONLY
 - CIRCUMFERENTIAL AND LONGITUDINAL BREAK

FIGURE 3.6A-24

HIGH ENERGY PIPE BREAK
RHR-SHUTDOWN MODE PIPING

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT

NOTES:

1. BREAK LOCATIONS ARE DESIGNATED BY (NO)
2. PIPE BREAK RESTRAINTS ARE DESIGNATED BY 1MSS*PRR XXX
3. STRESS RESULTS ARE GIVEN IN TABLE 3.6A-18b
CORRESPONDING TO THE NUMERICAL BREAK POINTS
SHOWN HERE.
4. SYMBOLS FOR THE TYPES OF BREAKS
 - ✕ - CIRCUMFERENTIAL BREAK ONLY
 - - CIRCUMFERENTIAL & LONGITUDINAL BREAK

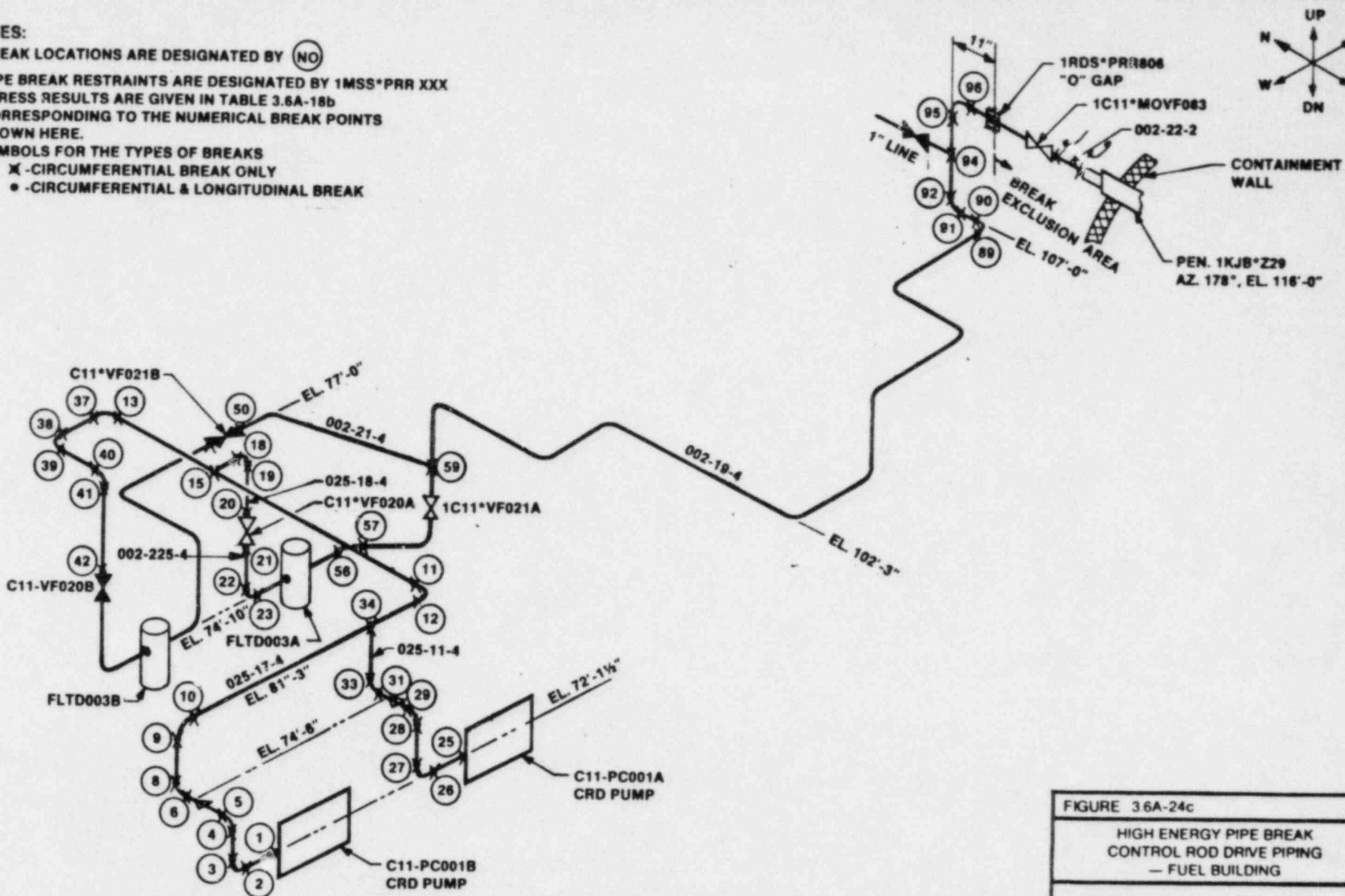
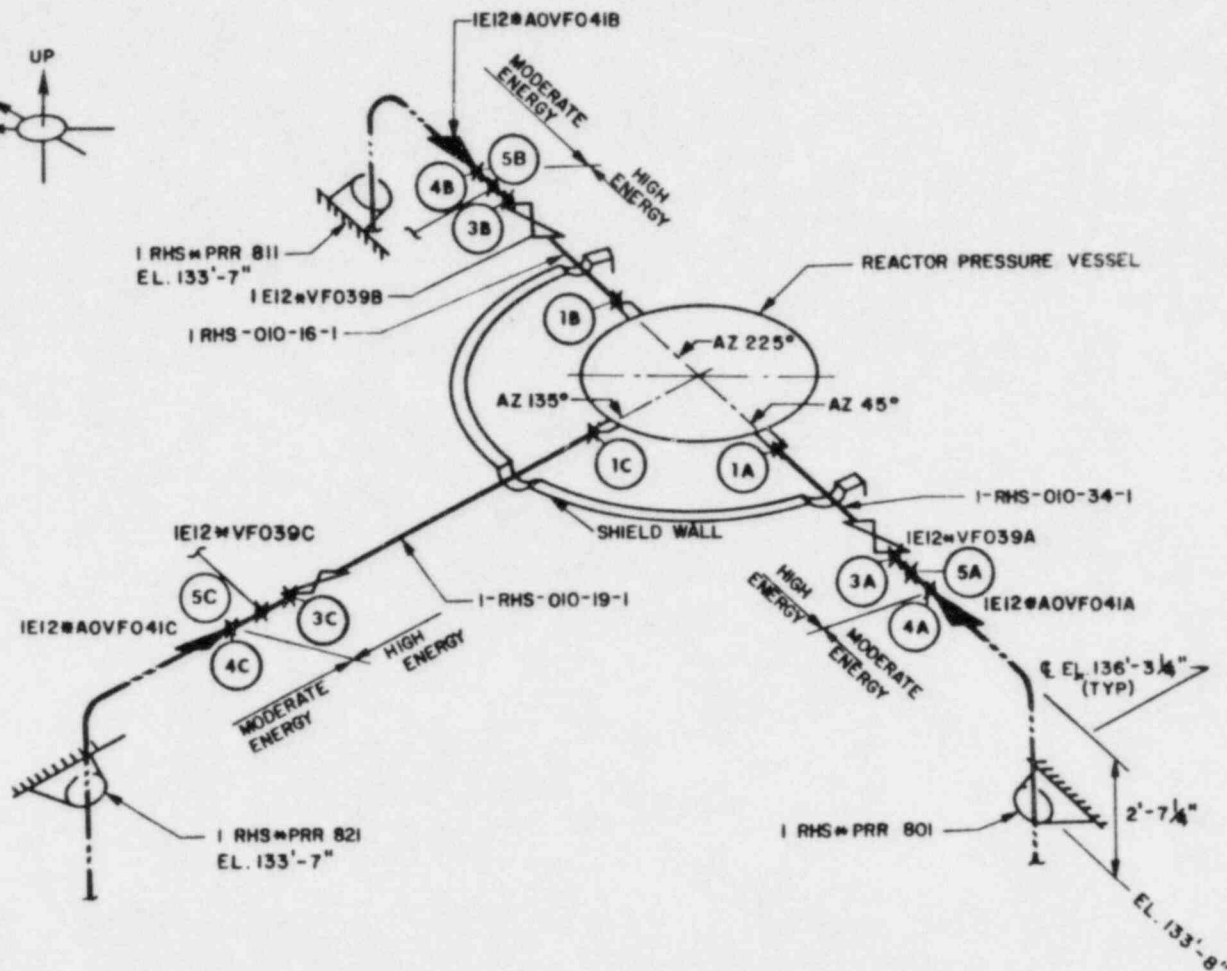
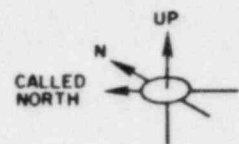


FIGURE 3.6A-24c

HIGH ENERGY PIPE BREAK
CONTROL ROD DRIVE PIPING
— FUEL BUILDING

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT



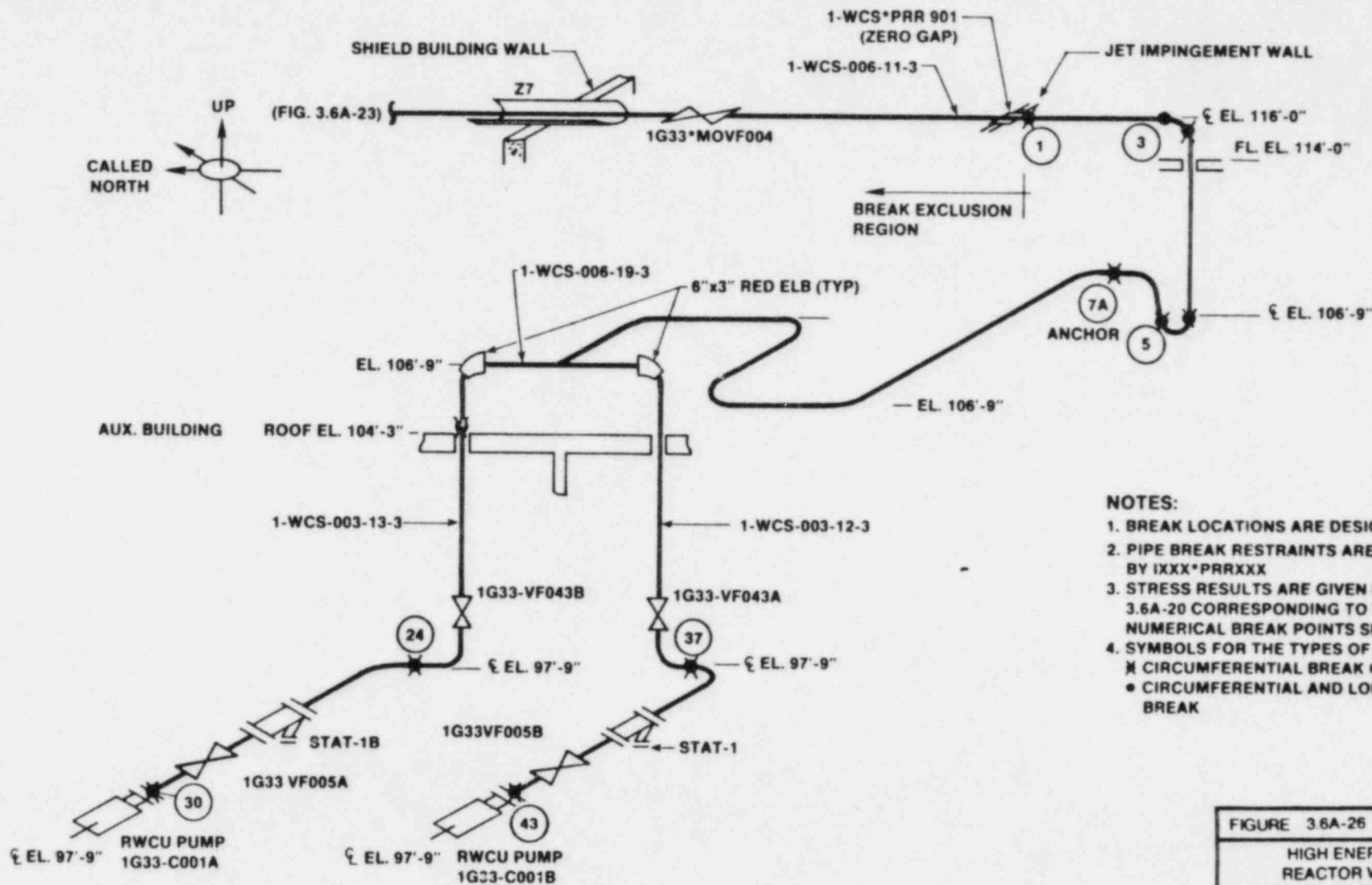
NOTES:

1. BREAK LOCATIONS ARE DESIGNATED BY (NO)
2. PIPE BREAK RESTRAINTS ARE DESIGNATED BY IXXX*PRRXXX
3. STRESS RESULTS ARE GIVEN IN TABLE 3.6A-16 CORRESPONDING TO THE NUMERICAL BREAK POINTS SHOWN HERE
4. SYMBOLS FOR THE TYPES OF BREAKS
 - * CIRCUMFERENTIAL BREAK ONLY
 - CIRCUMFERENTIAL AND LONGITUDINAL BREAK

FIGURE 3.6A-25

HIGH ENERGY PIPE BREAK
RHR-LPCI PIPING

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT



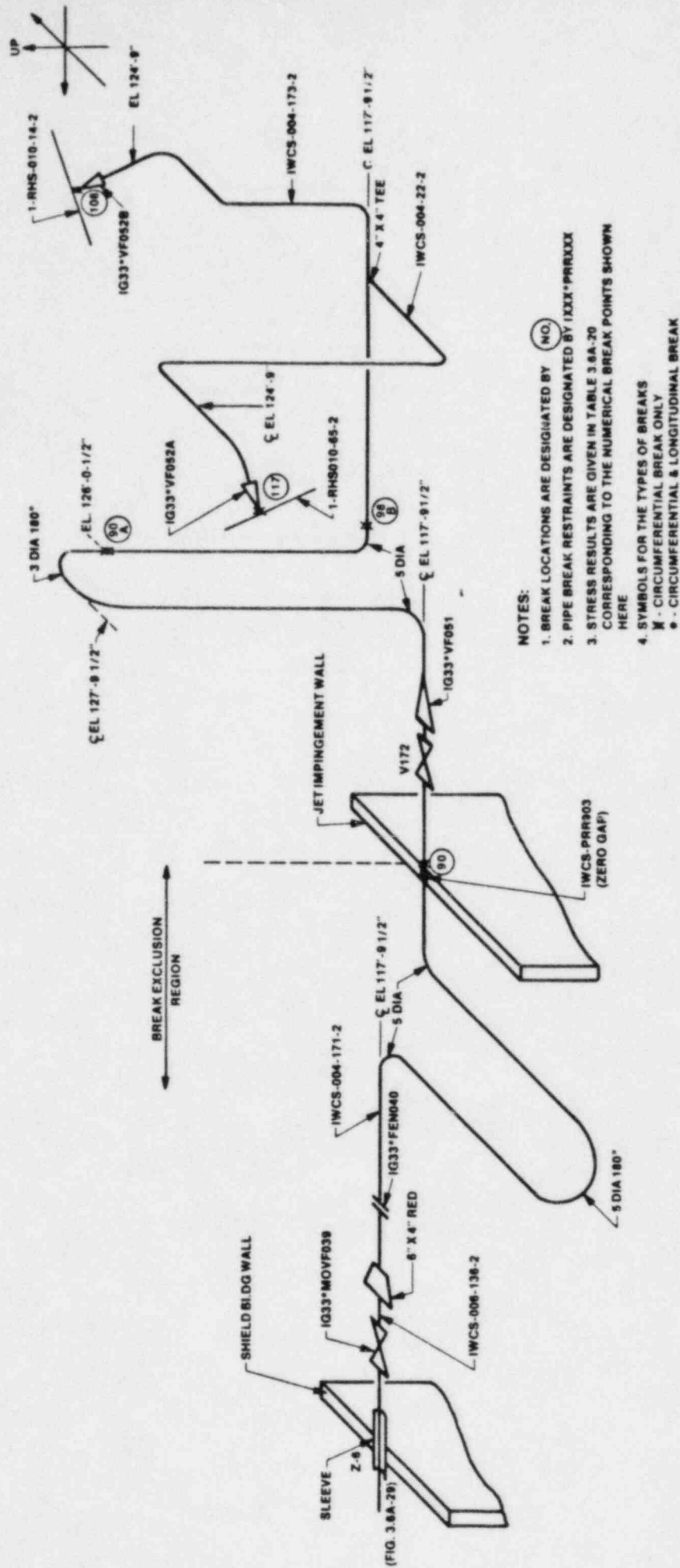
NOTES:

1. BREAK LOCATIONS ARE DESIGNATED BY (NO)
2. PIPE BREAK RESTRAINTS ARE DESIGNATED BY IXXX*PRRXXX
3. STRESS RESULTS ARE GIVEN IN TABLE 3.6A-20 CORRESPONDING TO THE NUMERICAL BREAK POINTS SHOWN HERE
4. SYMBOLS FOR THE TYPES OF BREAKS:
 X CIRCUMFERENTIAL BREAK ONLY
 • CIRCUMFERENTIAL AND LONGITUDINAL BREAK

FIGURE 3.6A-26

HIGH ENERGY PIPE BREAK
 REACTOR WATER CLEANUP
 PIPING - OUTSIDE CONTAINMENT

RIVER BEND STATION
 FINAL SAFETY ANALYSIS REPORT

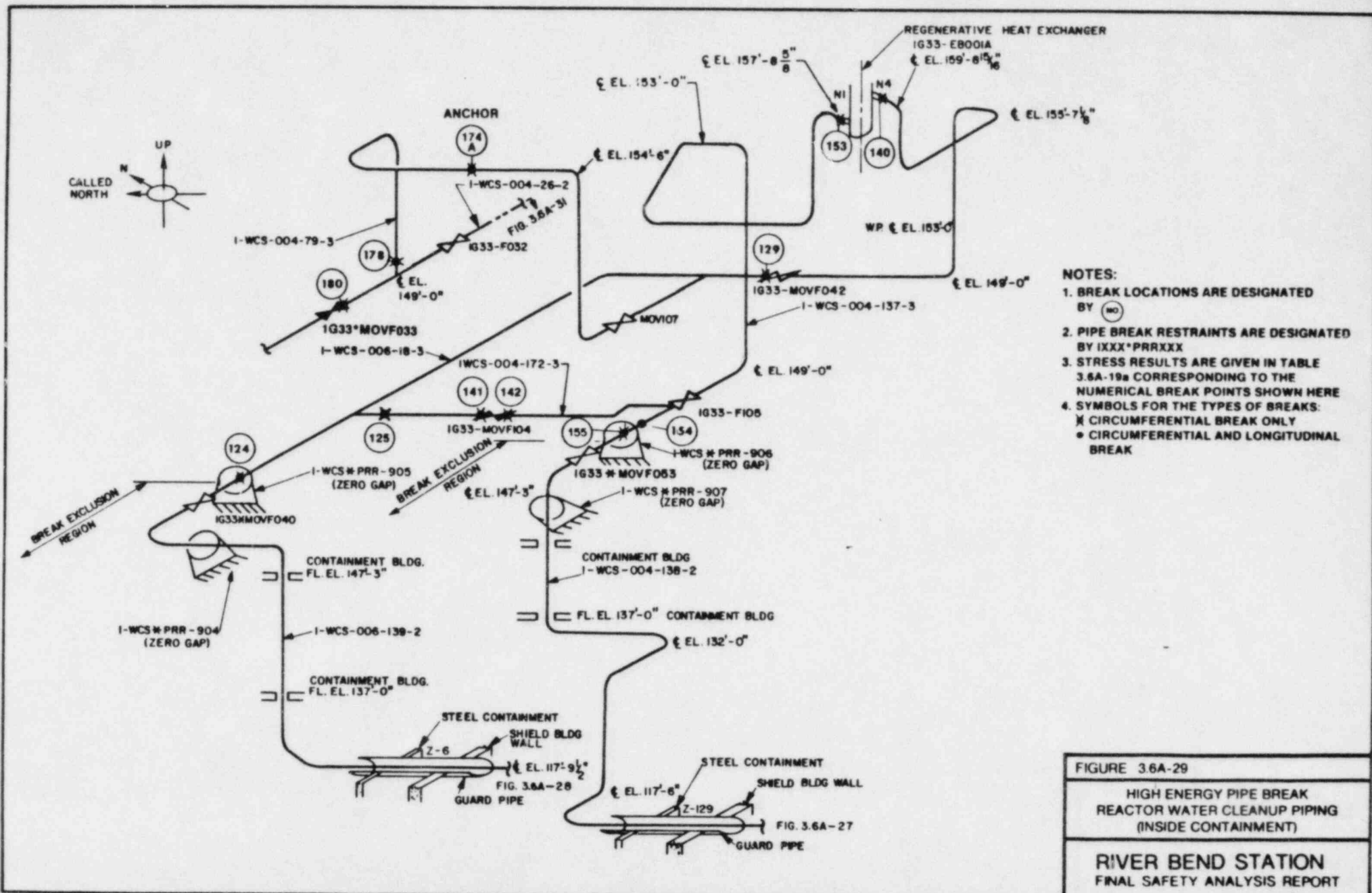


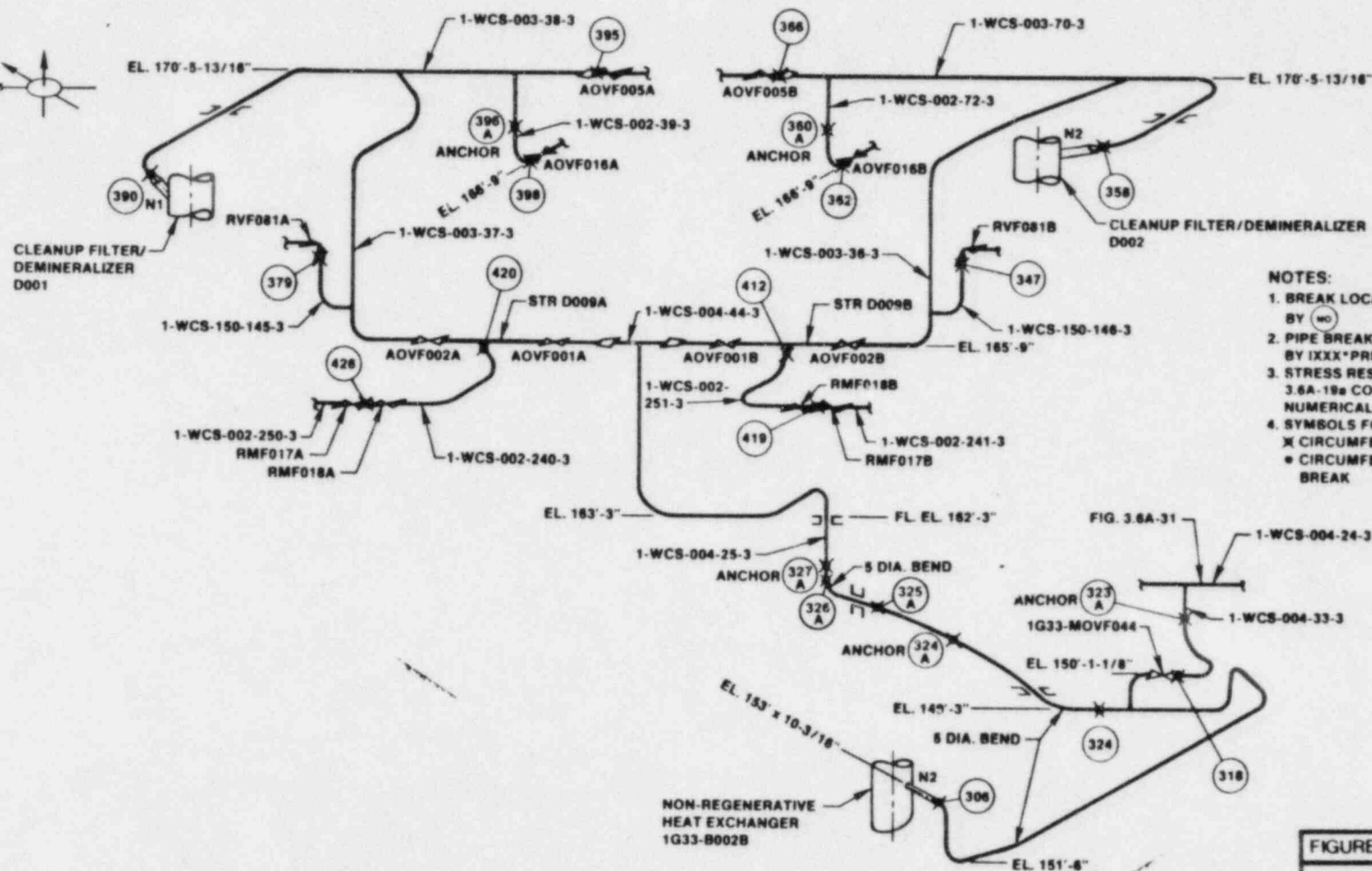
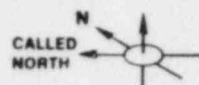
NOTES:

1. BREAK LOCATIONS ARE DESIGNATED BY (NO.)
2. PIPE BREAK RESTRAINTS ARE DESIGNATED BY IXXX*PRRXXX
3. STRESS RESULTS ARE GIVEN IN TABLE 3.6A-20 CORRESPONDING TO THE NUMERICAL BREAK POINTS SHOWN HERE
4. SYMBOLS FOR THE TYPES OF BREAKS
 ○ - CIRCUMFERENTIAL BREAK ONLY
 ● - CIRCUMFERENTIAL & LONGITUDINAL BREAK

FIGURE 3.6A-28

HIGH ENERGY PIPE BREAK
 REACTOR WATER CLEANUP
 PIPING OUTSIDE CONTAINMENT
 RIVER BEND STATION
 FINAL SAFETY ANALYSIS REPORT





NOTES:

1. BREAK LOCATIONS ARE DESIGNATED BY (CIRCLE WITH NUMBER)
2. PIPE BREAK RESTRAINTS ARE DESIGNATED BY XXX*PRRXXX
3. STRESS RESULTS ARE GIVEN IN TABLE 3.6A-19a CORRESPONDING TO THE NUMERICAL BREAK POINTS SHOWN HERE
4. SYMBOLS FOR THE TYPES OF BREAKS
 X CIRCUMFERENTIAL BREAK ONLY
 • CIRCUMFERENTIAL AND LONGITUDINAL BREAK

FIGURE 3.6A-30

HIGH ENERGY PIPE BREAK
 REACTOR WATER CLEANUP PIPING
 (INSIDE CONTAINMENT)

RIVER BEND STATION
 FINAL SAFETY ANALYSIS REPORT

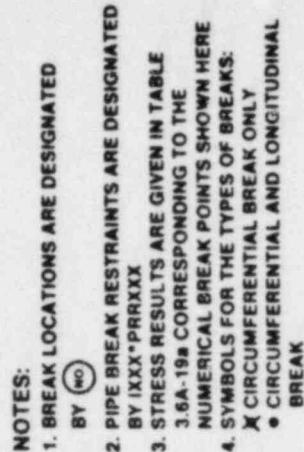


FIGURE 3.6A-31

HIGH ENERGY PIPE BREAK
REACTOR WATER CLEANUP PIPING
(INSIDE CONTAINMENT)

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT

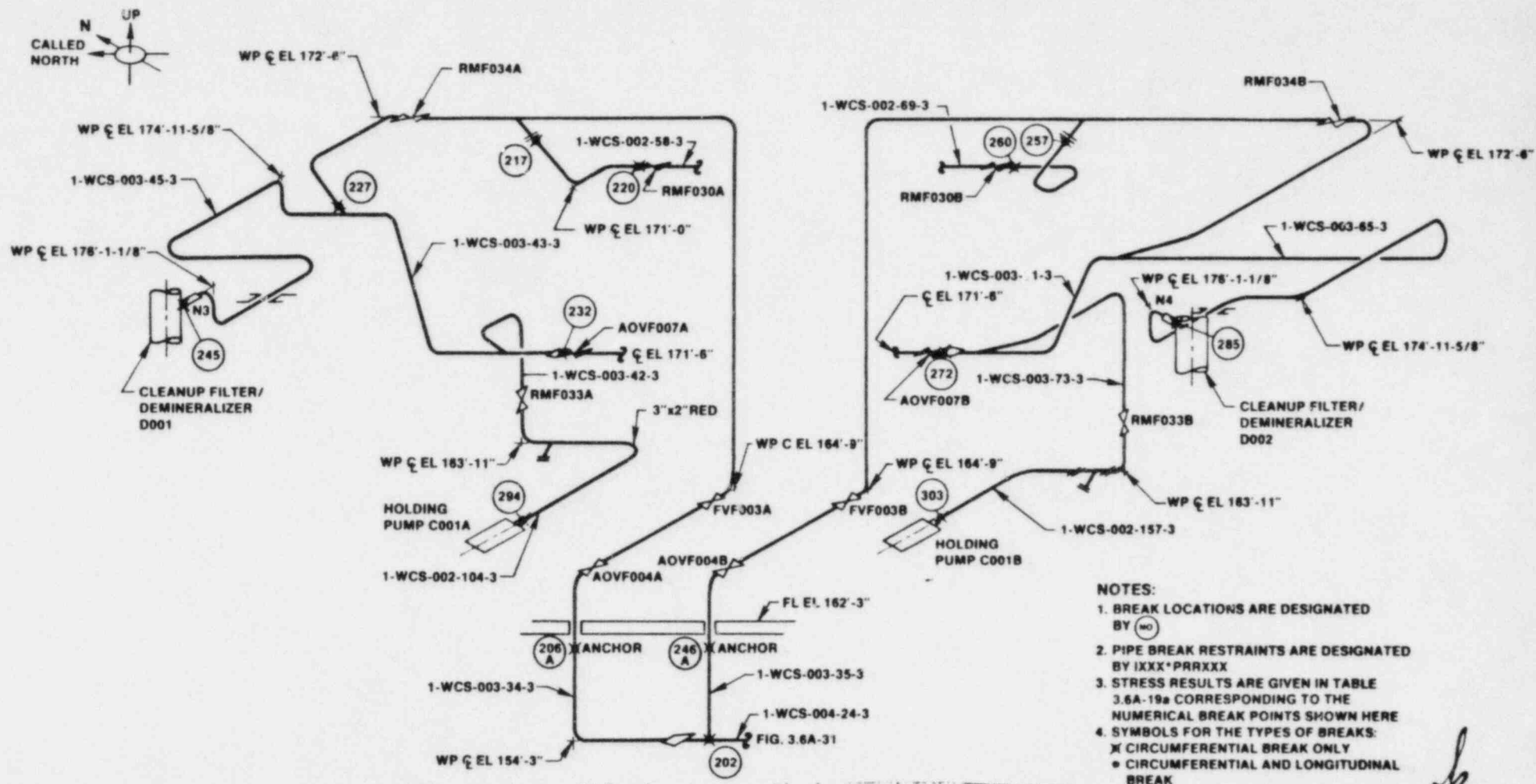
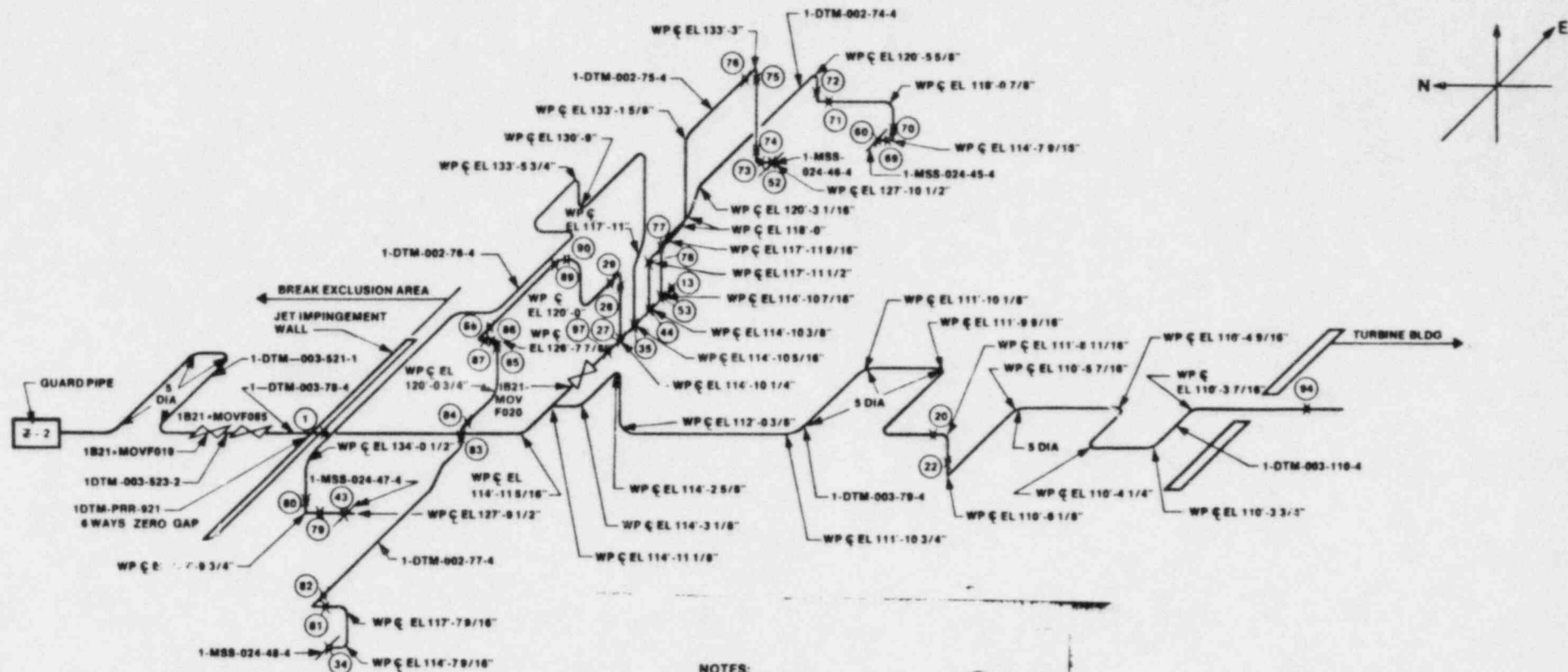


FIGURE 3.6A-32

HIGH ENERGY PIPE BREAK
 REACTOR WATER CLEANUP PIPING
 (INSIDE CONTAINMENT)

RIVER BEND STATION
 FINAL SAFETY ANALYSIS REPORT



NOTES:

1. BREAK LOCATIONS ARE DESIGNATED BY (NO)
2. PIPE BREAK RESTRAINTS ARE DESIGNATED BY 1XXX*PRRXX
3. UPON COMPLETION OF PIPE STRESS ANALYSIS, SOME BREAKS AND/OR RESTRAINTS MAY BE ELIMINATED IN ACCORDANCE WITH THE CRITERIA DESCRIBED IN SECTION 3.6.2A
4. STRESS RESULTS ARE GIVEN IN TABLE 3.6A-17b CORRESPONDING TO THE NUMERICAL BREAK POINTS SHOWN HERE.
5. SYMBOLS FOR THE TYPES OF BREAKS
 - ⊗ — CIRCUMFERENTIAL BREAK ONLY
 - ⊙ — CIRCUMFERENTIAL & LONGITUDINAL BREAK

FIGURE 3.6A-33c

HIGH ENERGY PIPE BREAK
MAIN STEAM DRAIN PIPING
AUXILIARY BUILDING

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT

RBS FSAR

APPENDIX 3C

FAILURE MODE ANALYSIS
FOR PIPE BREAKS AND CRACKS

TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>	
3C.1	GENERAL	3C.1-1	
3C.2	HIGH ENERGY PIPE BREAKS AND EFFECTS OF PIPE WHIP AND JET IMPINGEMENT	3C.2-1	
3C.2.1	Main Steam Piping System Includ- ing RPV Vent and MS Drain Piping	3C.2-1a	21
3C.2.2	Feedwater Piping System	3C.2-6	
3C.2.3	Reactor Recirculation System	3C.2-9	
3C.2.4	RCIC and Connected RHR Systems	3C.2-10	15
3C.2.5	LPCS/HPCS System	3C.2-12	
3C.2.6	LPCI Mode of RHR	3C.2-13	
3C.2.7	RHR System	3C.2-14a	17
3C.2.8	RWCU System	3C.2-15	
3C.2.9	RCIC Head Spray	3C.2-17	
3C.2.10	3-In and Smaller High Energy Piping	3C.2-18	
3C.2.10.1	Control Rod Drive Hydraulic System	3C.2-18	
3C.2.10.2	Standby Liquid Control (SLC) System	3C.2-20	17
3C.3	MODERATE-ENERGY PIPE CRACKS AND EFFECTS OF SPRAYING	3C.3-1	15
3C.3.1	Discussion	3C.3-1	
3C.3.2	Evaluation Procedure - Spraying	3C.3-1	
3C.3.3	Evaluation Guidelines - Spraying	3C.3-3	
3C.3.4	Analytical Methods	3C.3-4	
3C.3.5	Results of Evaluation - Spraying	3C.3-4	
3C.3.5.1	Reactor Building (Including Drywell, Containment, and Annulus)	3C.3-4	16
3C.3.5.2	Auxiliary Building	3C.3-5	
3C.3.5.3	Control Building	3C.3-5	
3C.3.5.4	Diesel Generator Building	3C.3-5	
3C.3.5.5	Piping Tunnels	3C.3-6	
3C.3.5.6	Electrical Tunnels	3C.3-6	
3C.3.5.7	Standby Service Water Cooling Tower	3C.3-6	
3C.3.5.8	Fuel Building	3C.3-6	

Restraints 1MSS-PRR-805, 815, 826, and 835 are to protect the MSIV and to insure that the stress allowables are within the limits as defined for the break exclusion region.

Essential targets that a jet discharging from a ruptured main steam line could impact include other main steam lines and supports required for safe shutdown and containment isolation. Since these target lines are the same size as the ruptured line, the jet would not affect the safety function of the main steam system. Other piping systems impinged by the jet and required for safe shutdown are the CSH and RHS lines and their respective supports. The impingement of these lines was found to be acceptable since alternate systems were available to meet safety requirements. For the RPV level and pressure instrument lines required for safe shutdown and being impinged by the jet, additional jet impingement restraints were incorporated in the plant design to ensure that the lines could withstand the impact loads and perform their safety function. All essential field-routed small bore piping has been evaluated for the effects of jet impingement.

Essential conduit targets impinged by a jet include conduits associated with resistance temperature detectors (RTDs) required for containment monitoring systems (CMS) and those associated with automatic depressurization systems (ADS). Of the four RTDs associated with post-accident monitoring, the failure of one due to jet impingement was found to be acceptable, since this failure and a worst single active or passive failure will cause a maximum of three of the RTDs to be inoperative with at least one RTD remaining in service. In the case of conduits associated with the ADS, it was found that for any given main steam rupture event, a maximum of three of the seven valves involved were affected between pipe whip and jet impingement (leaving four valves available for safety functions), and this was found to be acceptable.

For the RPV vent line, four restraints have been added to preclude the piping from whipping into targets such as the RPV and drywell dome. Other targets that could be impacted are structural steel at various elevations and the refueling seal penetration, both of which have been evaluated to ensure their structural integrity, and the MSS line, which would not be damaged since it is larger than the whipping pipe. A ruptured vent line could also whip into conduits

associated with RTDs whose failure is acceptable since they are not required for post-accident monitoring. Conduits associated with RTDs are also jet impingement targets and, again, their failure is acceptable since they are not required for post-accident monitoring. Other jet impingement targets include conduits for two valves required for the ADS. Failure of one of these valves would not affect the ADS since only six ADS valves are required even with a single failure of HPCS. The conduit of the other ADS valve has been evaluated to ensure that it is capable of withstanding the jet loading.

17

Potential targets such as the drywell wall, RCIC and FWS isolation valves, and the RCIC and DTM containment penetrations are protected from an unrestrained whipping drain line, by a total of eight restraints and their supporting structural steel. Other pipe whip targets include structural steel at various elevations, which has been evaluated to ensure structural integrity, and RCIC and FWS lines and an FWS check valve, none of which would be damaged since the targets belong to a piping system with lines larger than the whipping line.

21

Essential jet impingement targets for the drain line include conduits for RCS and CCP valves; these are acceptable since the valves of these essential systems are not required for safe shutdown. Another essential conduit target is the conduit for an RHS valve required for containment isolation. Failure of this valve to close is acceptable since piping inside the containment that is associated with this penetration will remain full of water from the RPV and thereby provide a water seal. Other essential jet impingement targets are MSS and ICS valves, conduits for an ICS valve, and an ICS line, all of which are required for containment isolation and which are acceptable since an analysis of the systems indicates that the system requirements can still be met after the rupture event.

17

Inside the Steam Tunnels

The main steam piping, from the moment-limiting restraint inboard of the first isolation valve (inside the drywell) to and including the moment-limiting restraint at the jet impingement wall meets the stress criteria for no postulated breaks, as discussed in Section 3.6A.

15

The four zero-gap restraints provided for the drain lines primarily protect the isolation valves and the break exclusion zone from the potential whipping of the lines.

15

In the Auxiliary Building

From the steam tunnel, the four 24-in main steam lines (MSL) (A,B,C, and D) enter the auxiliary building at the center of the north wall at approximate el 128 ft-0 in. Lines B and C drop to an elevation of 115 ft-0 in (line C is a mirror image of line B and line A is a mirror image of line D). MSLs A and C run along the perimeter of the western half of the auxiliary building while B and D run along the perimeter of the eastern half of the auxiliary building, until they meet at the center of the south wall, where lines A and D drop to the elevation of approximately 114 ft-0 in. From this point all four lines run south into the turbine building. 15

Pipe whip of the MSLs in the auxiliary building has been precluded by the placement of restraints. Restraints 1MSS-PRR-902 (zero gap), 903 and 904 (omnidirectional) keep the northern portion of line C from whipping in the auxiliary building. Restraints 1MSS-PRR-922 (zero gap), 923 and 924 (omnidirectional) do the same for line B. Similarly, restraints 1MSS-PRR-912 (zero gap) and 913 (omnidirectional) for line A and 1MSS-PRR-932 (zero gap) and 933 (omnidirectional) for line D, are provided for the same purpose.

Bumper or omnidirectional restraints are provided at the elbows of the main steam piping in the four corners of the auxiliary building to prevent damage to the walls due to pipe whip. Strap restraints are provided to prevent whipping of the southern portion of the MSLs into the center of the auxiliary building.

A total of five zero-gap moment limiting restraints have been installed adjacent to the jet impingement wall, outside the containment, on the four drain lines running in the steam tunnel area and on the 3-in DTM line in the auxiliary building. These restraints protect the break exclusion area from the impact of a ruptured pipe as well as keep stresses within acceptable limits in the break exclusion zone. 21

Essential targets for a jet discharging from a ruptured main steam line primarily are conduits for valves of the following systems: MSS, FWS, DTM, penetration valve leakage control, and main steam line isolation valve seal. However, since these particular valves in these systems are not required for safe shutdown or break isolation, failure of these targets is acceptable. 17

3C.2.3 Reactor Recirculation

For the recirculation system, the locations of the postulated breaks and restraints are shown in Fig. 3.6B-4. The results of the associated stress calculations are summarized in Table 3.6B-3.

General

Each of the two reactor recirculation loops leaves the RPV at el 115 ft-10 1/2 in as a 20-in line, drops vertically to el 84 ft-4 1/2 in, turns horizontally through the suction isolation valve F023A (or F023B for loop B), and turns up into the pump suction port. The 20-in pump discharge line runs horizontally at approximate el 89 ft through the flow control valve F060A (or F060B) and the isolation valve F067 and turns up to el 108 ft-3 1/2 in where it joins the C-shaped 16-in horizontal header. From this header, five 12-in risers go up and enter the RPV at el 116 ft-3 1/2 in. In addition, from loop B only, an 18-in RHR suction line branches off from the vertical run between the reactor outlet and valve F023B at el 91 ft-6 in, turns up through the normally open valve F010 and normally closed valve F009, and turns out to leave the drywell and containment at el 116 ft-10 in.

GE is responsible for the location and design of restraints for the recirculation system.

Recirculation Loop A

A total of ten restraints have been installed on this loop to prevent the whipping of the piping in the event of a rupture. A restraint has been installed on the vertical leg of each of the six risers to limit the travel of the ruptured pipe radially from the RPV. Four restraints have been installed on the header to limit both radial and downward travel.

If the pipe were to whip totally unrestrained, the possible targets would include primary shield wall, RDS tube bundle, and HVAC ducting. Essential jet impingement targets for a break in the RCS line include the MSS lines required for containment isolation, but since the target lines are larger than the ruptured line, the jet would not affect the safety function of the main steam system. For the RPV level and pressure instrument lines which are impinged by the jet and are required for safe shutdown, additional jet impingement restraints were incorporated in the plant design to ensure that the line could withstand impact loads and perform its

21 | 16 | safety function. Conduits for hydrogen ignitors are also
impinged by jets. However, this failure is acceptable since
even with this failure and a worst single active or passive
failure either the safety function of this system will not
be affected or the distance from any given point in the
drywell to an unaffected hydrogen ignitor does not exceed
30 ft. Other essential lines impinged by a jet from an RCS
break and required for either containment isolation or safe
shutdown include the RDS, ICS, and DER lines. While
16 | alternate safety systems were available for some of these
systems, an analysis of the others was done to ensure that
they could withstand impact loads. All essential
field-routed small bore piping has been evaluated for the
effects of jet impingement.

is classified as high energy while from the valve to the RCIC turbine, it is classified as moderate energy.

From the moment-limiting device adjacent to the inner isolation valve F063, through the guard pipe and outer isolation valve F064, up to the moment limiting device adjacent to the jet impingement wall, the piping meets the stress criteria for no postulated breaks, as discussed in Section 3.6A.

Inside the Drywell

For stress analyses, the RCIC steam line within the drywell was modeled as a branch of the main steam piping. Due to the postulated breaks, the line could potentially whip into several targets, including the unit cooler, MSS, FWS, and ICS restraints, FWS and ICS lines and supports, and the shield wall.

To preclude the damage that could be caused by the whipping RCIC line, a total of six restraints have been installed along the RCIC lines inside the drywell. All of these restraints are omnidirectional except for restraints PRR-805 and PRR-806 which are moment-limiting (zero gap) restraints to keep the stress within acceptable limits in the isolation valve and the break exclusion zone.

Essential jet impingement targets for the ICS piping system include conduits for the RCIC isolation valve and main steam safety relief valves. Since the conduits are capable of withstanding jet impingement loads, the safety function of these targets would not be affected. A conduit for a hydrogen igniter is also impinged by a jet, but the failure of one igniter is acceptable since this failure and a worst single active or passive failure will not affect the safety function of this system. For the RPV level and pressure instrument

The only postulated breaks for the 4-in line entering the auxiliary building are at each of the terminal ends, and any whipping of the pipe is precluded by the two restraints on each leg.

Due to the postulated breaks, the 8-in line could potentially whip into the ICS and WCS lines and the jet impingement wall, and this is precluded by Restraint PRR-914.

For the 4-in line, which branches vertically downwards from the 8-in line, apart from the terminal end breaks, three other breaks are postulated at the elbows. In this instance, however, since the potential structural and piping targets have been designed to withstand the pipe whip loading, restraints are not required.

The essential conduit targets included conduits associated with an ICS containment isolation valve which was impinged by a jet discharging through a penetration hole in the jet impingement wall. The conduit was protected by providing a shield at the jet impingement wall.

3C.2.5 LPCS/HPCS System

These systems do not operate during normal plant operation, and hence only a small portion of the piping which is normally exposed to reactor pressure is classified as high energy.

The postulated pipe break locations and restraints for the LPCS and HPCS systems are shown on Fig. 3.6A-22 and 3.6A-21, respectively. The results of the associated stress analyses are summarized in Tables 3.6A-14 and 3.6A-13, respectively.

LPCS

The 10-in LPCS piping is attached to the RPV nozzle at el 140 ft-9 in and azimuth 90 degrees. After passing through the primary shield wall, the line passes through the locked-open valve F007 and normally closed check valve F006, at which point the high-energy portion ends. The line beyond that point is classified as moderate energy.

Unrestrained whipping of dead-end piping would impact the drywell wall and structural steel at various elevations and affect the drywell wall penetration. To avoid such an occurrence, a restraint has been installed on the vertical leg of the piping, just beyond check valve F006. Pipe whip of dead-end piping is due solely to the jet thrust resulting from the pipe breaks postulated on the high energy portion of the line.

17

Essential targets that a jet discharging from a ruptured LPCS line could impact include conduits for ADS valves, RPV level and pressure instrument tubing, and an RHS line required for safe shutdown. In the case of ADS valves, since the break has the equivalent flow area of approximately two and one-half times the flow area of a safety relief valve and since HPCS is available, failure of these three ADS valves is acceptable. Failure of instrument tubing would be acceptable since it is not associated with ECCS; and, since alternative safety systems are available, failure of the RHR line would be acceptable as well. A conduit for a hydrogen ignitor is also impinged by a jet, but the failure of one ignitor is acceptable since this failure and a worst single active or passive failure will not affect the safety function of this system. Other essential jet impingement targets are main steam line supports and isolation valves on the LPCS line; they are acceptable since an analysis of the systems indicates that system requirements could still be met after the rupture event.

21

17

HPCS

The 10-in HPCS piping is very similar to the LPCS piping discussed above, except that it is located at azimuth 270 degrees. The two valves it runs through are the locked-open valve F036 and the normally closed valve F005. Targets similar to those on the LPCS line are protected by a similar restraint. Essential jet impingement targets include the HPCS line and supports, a valve on the HPCS line, and MSS supports, all of which are required for containment isolation. However, an analysis of these systems indicates that system requirements could still be met after the rupture event; hence, these targets are acceptable.

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3C.2.6 LPCI Mode of RHR

The LPCI subsystems are not in use during normal plant operation, and, as a result, only that portion of the piping that is pressurized is classified as high energy.

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The postulated pipe break locations and restraints for the LPCI function of the RHR system are shown on Fig. 3.6A-25. The results of the associated stress analyses are summarized in Table 3.6A-16.

18 LPCI A

From the RPV nozzle, el 136 ft-3 1/4 in, azimuth 45 degrees, the line passes through the primary shield wall and through the locked-open valve F039A and normally closed check valve F041A. The line is classified as high energy from the RPV nozzle up to check valve F041A and as moderate energy beyond that.

17 In addition to the circumferential breaks postulated at each terminal end, breaks have also been postulated at either end of locked-open valve F039A. Due to postulated breaks, the lines could potentially whip into the drywell and primary shield walls, containment penetration, CSL and SVV lines, and structural steel at various elevations. To protect these targets and to preclude the possibility of pipe whip, PRR-801 has been installed on the vertical leg of the piping, just beyond check valve F041A.

General

From the RPV nozzle, elevation 102 ft-8 1/8 in, azimuth 225 deg, the 1 1/2-in line drops down, passes through the pedestal penetration at elevation 96 ft-10 3/4 in, and through locked-open valve F008 and normally closed check valve F007. The line is classified as high energy from the RPV nozzle up to check valve F007 and as moderate energy beyond that.

Apart from the circumferential breaks postulated at the terminal ends, breaks have also been postulated at either end of locked-open valve F008.

Inside the Drywell

Due to postulated breaks, the only essential target the pipe could whip into is the CRD housing. However, since the CRD housing pipe is much larger than the ruptured line, the target would not be damaged. Hence, restraints are not necessary on this line. The jet emanating from the ruptured pipe would also impact the CRD housing, and this is acceptable for the same reasons given above.