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February 8, 1985
RBG- 20,114
File Nos. G9.5, G9.19.2

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 is Gulf States Utilities Company's partial response to River Bend Station Safety Evaluation Report Outstanding Issue No. 3. and a final response to Confirmatory Issue No. 4. Attachment 1 lists the information provided in Attachment 2. This information will be included in a future amendment to the Final Safety Analysis Report.

Sincerely,

Eddie R Grant

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

JEB/ERG/je

Attachments

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Attachment 1

Information Included In This Submittal

OPEN ISSUE NO. 3

1. Reactor Water Cleanup System (Outside Containment)

    a. Table 3.6A-20 (pipe stress summary)
    b. Table 3.6A-37b (pipe whip analysis)
    c. Table 3.6A-50b (jet impingement analysis)
    d. Figures 3.6A-26 through 3.6A-28 (pipe break locations)

2. Control Rod Drive System (Outside Containment)

    a. Table 3.6A-18b (pipe stress summary)
    b. Table 3.6A-36b (pipe whip analysis)
    c. Table 3.6A-49b (jet impingement analysis)
    d. Figure 3.6A-24c (pipe break locations)

3. Main Steam Drain System (Outside Containment)

    a. Tables 3.6A-17b and 3.6A-17c (pipe stress summaries)
    b. Tables 3.6A-27b and 3.6A-27c (pipe whip analysis)
    c. Tables 3.6A-40b and 3.6A-40c (jet impingement analysis)
    d. Figure 3.6A-33c (pipe break locations). Note: There are no changes to Figure 3.6A-33d submitted in FSAR Amendment 15.

Associated changes to the text in FSAR Appendix 3C are also included.

CONFIRMATORY ISSUE NO. 4

FSAR Appendix 3C, Section 3C.2.10.

ATTACHMENT 2

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 3/4 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. 16

Nonessential targets for a jet discharging from a ruptured main steam line include structural targets such as the walls, stairs, and floor framings and MSS, RHS, FWS, and WCS piping lines, all of which have been designed to ensure their structural integrity. 15

The potential targets that could be impacted by a whipping drain line, either in the steam tunnel or auxiliary 16

building, consist primarily of piping lines and their valves. However, a review of the targets in question revealed that their failure was acceptable since none of these particular portions of the essential systems were required for either safe shutdown or break isolation. Other targets include walls and floors, all of which have been designed to ensure their structural integrity.

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Essential targets impinged by a jet discharging from a drain line in either the steam tunnel or auxiliary building are essentially conduits serving area temperature monitors and MSS and FWS isolation valves. Since failure of the area temperature monitors will automatically trip the reactor protection system (fail safe) and since the area temperature monitors are not required to isolate the subject break, their failure is acceptable. A detailed review of the valve targets in question revealed that their failure was acceptable since these particular portions of the essential systems were not required for safe shutdown and break isolation.

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the floor at el 114 ft-0 in and at el 106 ft-9 in divides into two 6-in lines, which in turn become 3-in lines and supply the two pumps located in separate rooms. From the pumps' discharge, the two 3-in lines join again into a 4-in line, at el 106 ft-9 in, which goes up back into the steam tunnel and then through a penetration into the containment. In the containment building the line runs upwards through the floor, into the heat exchanger room, and then into the heat exchangers. After leaving the heat exchangers, the 4-in line splits into two 3-in lines at el 165 ft-9 in and they run into the filter/demineralizers. After the filter/demineralizers, the two 3-in lines drop down and join again into a 4-in line at el 154 ft-3 in and return to the regenerative heat exchangers. From there, the line drops to an elevation of 117 ft-9 1/2 in, runs through the containment penetration into the auxiliary building, where it joins the RHS piping to the feedwater and returns to the RPV. In every instance, when the line goes through the penetration, from the innermost zero-gap restraint in the containment building, through the penetration, and up to the outer zero-gap restraint in the auxiliary building, the piping meets the stress criteria for no postulated breaks, as discussed in Section 3.6A.

16 15 Inside the Containment

Because of the arrangement of the piping, there is very little equipment that could be damaged by the impact of a ruptured pipe. Among the possible targets, the more significant include the weir wall, SVV, CRD, and DER lines. To prevent this potential damage, a total of 11 restraints 16 have been installed, including six zero-gap restraints near the containment penetrations.

The jet produced by the postulated breaking of the pipe would impact, among other targets, primarily the piping lines and their supports. The nonessential targets include DER, SVV, WCS, and RCS systems and the supports of lines RCS, WCS, SVV, RHS, and DER. All these targets have been designed to ensure their structural integrity.

Inside the Steam Tunnel

All RWCU piping, from inboard of the first moment-limiting (zero gap) restraint in the drywell to outboard of the moment-limiting (zero gap) restraint in the auxiliary building, meets the stress criteria for no postulated breaks, as discussed in Section 3.6A.

Outside the Containment

Three zero-gap restraints have been installed outside the containment, adjacent to the penetrations, to protect the break exclusion area from the consequences of a ruptured pipe. Targets that could be impacted by a whipping line due to an RWCU piping break include RHS, ICS, and FWS lines and ICS restraints. However, in all the above instances, since the whipping line is smaller than the target line, the target cannot be damaged. Other pipe whip targets include various walls and floors, all of which have been structurally designed to withstand the pipe whip loading, and a ventilation duct that is not required for safe shutdown. 16

Even though targets impinged by a jet from a ruptured RWCU line include essential conduits leading to an RCIC fill pump motor and various valves of essential systems, a more detailed review revealed that these particular portions of the essential systems were not required for safe shutdown. Other targets affected by the jet include conduits for flow transmitters used to detect leakage. However, once a break occurs in a particular volume, the flow transmitters will not be required since area temperature monitors will detect and isolate the break. Hence, the failure of these targets is acceptable. The jet impingement targets also include conduits from area ambient temperature elements required for breakpoint isolation, but this is acceptable since, in this instance, the elements are not in the postulated breakpoint volume.

3C.2.9 RCIC Head Spray

The postulated pipe break locations and restraints are shown on Fig. 3.6A-20. The results of the associated stress calculations are summarized in Table 3.6A-11b.

The 6-in discharge pipe penetrates the containment and drywell, runs upwards, and after passing through the normally closed valve (F066), enters the RPV head at el 172 ft-11 1/4in. Only the short pressurized section of piping from the normally closed valve F066 to the RPV head is classified as high energy.

Circumferential breaks have been postulated at the terminal ends of the piping. Due to the postulated breaks, the only target the short section of pipe could whip into would be the RPV insulation frame, but the frame has been designed for pipe rupture loads. Hence, there is not a necessity for restraints.

3C.2.10 3-In and Smaller High Energy Piping

3C.2.10.1 Control Rod Drive Hydraulic System

The piping and break locations are shown on Figures 3.6A-24b and 3.6A-24c. The stress analyses used to determine the break locations are summarized in Tables 3.6A-18a and 3.6A-18b.

General

From the condensate storage tank, the CRD lines enter the fuel building and, after passing through two filters, connect to two drive water pumps. No breaks are postulated in this portion of the piping since it is not considered high-energy piping. The pressurized lines that leave the pumps go through two more filters before entering the containment building and the flow control station.

The high-energy portion of the supply piping that leaves the control station is comprised of the following four lines:

1. The charging line, which provides a constant flow of pressurized water to charge the scram accumulators in the hydraulic control units (HCUs).

2. The cooling line, which maintains proper cooling of the drive mechanisms by providing a bypass flow of water to each of the drives, via the HCUs, during normal operation periods when rod drive movement is not required. 16

3. The drive line, which supplies the HCU with the water required for rod positioning during normal operation of the system.

4. The exhaust line, which displaces excess cooling and exhaust water generated by normal drive motion to the RPV.

The supply piping emerges from the control station as a bundled group of various sized lines. This bundle of piping extends toward both the 90-deg and 270-deg side HCU banks. Upon reaching the HCU banks, each of the supply lines branches out over each bay of the HCUs and extends down into the HCUs.

The supply piping provides the necessary water and air for the proper functioning of the HCU during normal rod movement. The HCU provides the interface valving between

the supply/exhaust piping and the insert/withdraw piping that operates the drives. The insert/withdraw pipings, starting from the HCU scram valves, are bundled in groups and enter the drywell wall through the penetrations approximately at el 130 ft at both the 90-deg and 270-deg sides. The pipe bundles drop to a lower elevation, extend toward the RPV, and enter the RPV through the CRD housing at approximately el 96 ft.

In the Fuel Building

Because of the piping arrangement in the fuel building, the only targets that a whipping pipe could impact are the floors and walls of the building; however, these floors and walls have been designed to ensure their structural integrity.

Essential jet impingement targets required for plant safe shutdown include a conduit for a service water line flow transmitter. This flow transmitter monitors flow from the Division 2 standby service water pumps and flow into the standby service water system cooling tower. The failure of this target is acceptable since the operator could verify the flow by monitoring pump discharge pressure and pump motor run current, both of which are indicated in the control room. Other essential targets include certain cable trays providing power for the fuel building ventilation system fans which cool the spent fuel pool area. Failure of these cable trays is acceptable since repairs can be made in 4 hr. During this period, the spent fuel pool temperature will not increase to an unacceptable level. 16

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	Location Elevation (ft-in)	Location X (ft-in)	Location Z (ft-in)	Stress(1) Eq. 9 (psi)	Stress(1) Eq. 10 (psi)	Total Additive Stress (psi)	Pipe Break Stress Limit $0.8(1.2S_h+S_A)$ (psi)	Description of Break Points	Break Type	
1	115-0 7/16	107-9 1/2	-(4-3)	6,502	7,436	13,938	32,400	TP	CB	
13	115-0 3/8	117-0	-(15-7 1/2)				32,400	TP	CB	
14	114-3 1/8	117-3 3/8	-(5-9)	15,201	10,025	25,226	32,400	IP	CB	
18	112-4 7/8	117-8	-(9-7)	13,446	12,268	25,714	32,400	IP	CB	
19	112-0 3/8	118-0 1/2	-(9-7)	13,660	12,550	26,210	32,400	IP	CB	
20	111-8 11/16	136-9 1/2	-(9-7)	9,529	17,940	27,469	32,400	IP	CB	
21	111-4 3/16	137-2	-(9-7)	9,794	18,261	28,055	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	16
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	
62	111-10 3/4	136-3 1/2	-(9-7)	9,072	16,852	25,924	32,400	IP	CB	
67	110-3 3/4	149-0 1/2	-(12-1)	9,401	16,112	25,513	32,400	IP	CB	
69	114-7 9/16	121-0	-(38-11 1/2)	(2)			-	TP	CB	
70	114-10 9/16	121-3	-(38-11 1/2)	(2)			-	TP	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	16
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	

TABLE 3.6A-17b (Cont)

Break Point	Location Elevation (ft-in)	X (ft-in)	Z (ft-in)	Stress(1) Eq. 9 (psi)	Eq. 10 (psi)	Total Additive Stress (psi)	Pipe Break Stress Limit $0.8(1.2S_h+S_A)$ (psi)	Description of Break Points	Break Type	
87	126-7 7/8	115-3 13/16	6-11	(2)			-	IP	CB	
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)	8,552	12,286	20,838	32,400	TP	CB	
95	110-5	138-10	-(14-8)	8,980	17,850	26,830	32,400	IP	CB	
96	110-5 7/16	138-5	-(14-8)	9,089	16,581	25,670	32,400	IP	CB	
97	114-10 3/16	117-0	-(12-6)	10,091	6,039	16,130	32,400	TP	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.
(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-17c

SUMMARY OF STRESSES IN HIGH-ENERGY ASME CLASS 2 PIPING

MAIN STEAM DRAIN SYSTEM - STEAM TUNNEL AREA

Break Point	Location El (ft-in)	Location X (ft-in)	Location Z (ft-in)	Stress(1) Eq. 9 (psi)	Stress(1) Eq. 10 (psi)	Total Additive Stress (psi)	Pipe Break Stress Limit $0.8(1.2S_h+S_A)$ (psi)	Description of Break Points	Break Type	
1	125-7	107-9 1/2	-(14-8)					TP	CB	
4	125-5	122-6	-(17-1 3/4)					IP	CB	
5	125-5	122-8 1/4	-(17-4)					IP	CB	
10	111-3 1/16	127-6 3/4	-(17-4)	Stresses are not required for main steam drain piping system in the steam tunnel area since pipe breaks are postulated at every fitting and attachment.				IP	CB	16
11	111-3 1/16	127-9	-(17-1 3/4)					IP	CB	
12	111-3 1/8	127-9	-(16-9)					TP	CB	
15	125-7	107-9 1/2	-(14-1)					TP	CB	
19	125-5	123-3 7/8	16-5 3/64					IP	CB	
20	125-2 3/4	123-5	16-7					IP	CB	
23	111-3 1/8	126-9	-(16-7)					IP	CB	
46	111-3 1/8	127-0 1/2	-(16-7)					IP	CB	
53	115-0 3/8	135-5	-(16-7)					TP	CB	
25	125-7	107-9 1/2	14-1					TP	CB	
32	111-2 13/16	128-6	-(16-5)					TP	CB	
35	125-7	107-9 1/2	14-8					TP	CB	
42	111-2 13/16	129-1	-(16-5)					TP	CB	16
18	125-5	123-1	-(16-0 3/4)					IP	CB	
24	125-5	123-2 1/2	-(16-4 1/2)					IP	CB	

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

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NOTES: See Fig. 3.6A-33d 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-33d. The reference coordinate system is shown in Table 3.6A-5.

TABLE 3.6A-18b

SUMMARY OF STRESSES IN HIGH-ENERGY PIPING

CONTROL ROD DRIVE SYSTEM - FUEL BUILDING

Break Point	Location Elevation (ft-in)	Location X (ft-in)	Location Z (ft-in)	Stress Eq. 9 (psi)	Stress Eq. 10 (psi)	Total Additive Stress (psi)	Pipe Break Stress Limit $0.8(1.2 S_h + S_A)$ (psi)	Description of Break Points	Break Types
1	72-1 1/2	127-6	80-5 1/2					TP	CB
2	72-1 1/2	127-6	81-7					IP	CB
3	72-3 1/2	127-6	81-9					IP	CB
4	74-4	127-6	81-9					IP	CB
5	74-6	127-8	81-9					IP	CB
6	74-6	123-2	81-9					IP	CB
8	74-8	123-4	81-9					IP	CB
9	81-1	123-4	81-9	Stresses are not required for control rod drive piping in the fuel building since pipe breaks are postulated at every fitting and attachment.				IP	CB
10	81-3	123-4	81-7					IP	CB
11	81-3	123-6	66-5					IP	CB
12	81-3	123-4	66-7					IP	CB
13	81-3	132-2	66-5					IP	CB
15	81-3	129-2	66-5					IP	CB
18	81-3	129-2	65-3					IP	CB
19	81-1	129-2	65-1					IP	CB
20	76-9	129-2	65-1					IP	CB
21	76-7	129-2	65-1					IP	CB
22	75-0	129-2	65-1					IP	CB
23	74-10	129-2	64-11					IP	CB
25	72-1 1/2	127-6	68-1 1/2					TP	CB
26	72-1 1/2	127-6	69-3					IP	CB
27	72-3 1/2	127-6	69-5					IP	CB
28	74-4	127-6	69-5					IP	CB
29	74-6	127-8	69-5					IP	CB
31	74-6	123-2	69-5					IP	CB
33	74-8	123-4	69-5					IP	CB
34	81-3	123-4	69-5					IP	CB
37	81-3	132-4	66-7					IP	CB
38	81-3	132-4	68-9					IP	CB
39	81-3	132-2	68-11					IP	CB
40	81-3	130-4	68-11					IP	CB
41	81-1	130-2	68-11					IP	CB
42	76-8	130-2	68-11					IP	CB
49	77-0	132-6	64-4 1/2					IP	CB
50	77-0	132-6	64-4 1/2					IP	CB
56	74-10	129-2	62-11					IP	CB
57	74-10	130-0	62-9					IP	CB
59	77-0	129-0	61-9					IP	CB

TABLE 3.6A-18b (Cont)

Break Point	Location Elevation (ft-in)	Location X (ft-in)	Location Z (ft-in)	Stress Eq. 9 (psi)	Stress Eq. 10 (psi)	Total Additive Stress (psi)	Pipe Break Stress Limit $0.8(1.2 S_h + S_A)$ (psi)	Description of Break Points	Break Types
89	107-0	72-5	2-8 3/4					IP	CB
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	Stresses are not required for control				IP	CB
94	115-0	73-3	2-6 3/4	rod drive piping in the fuel building				IP	CB
95	115-10	73-3	2-6 3/4	since pipe breaks are postulated at				IP	CB
96	116-0	73-1	2-6 3/4	every fitting and attachment.				IP	CB
98	116-0	70-8	2-6 3/4					IP	CB
99	116-0	68-11 1/2	2-6 3/4					TP	CB

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-20

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

REACTOR WATER CLEANUP SYSTEM - OUTSIDE CONTAINMENT

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 Types	
	Elevation (ft-in)	X (ft-in)	Z (ft-in)	Eq. 9 (psi)	Eq. 10 (psi)	(psi)	(psi)			
1	116-0	107-9 1/2	4-3	11,659	15,354	27,013	32,400	TP	CB	16
3	115-3	109-5	4-3	6,798	15,738	22,537	32,400	IP	CB	16
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	
30	97-9	77-6	8-10	-	-	-	-	TP	CB	
36	98-1 1/2	84-0	3-5	5,381	8,102	13,483	32,400	IP	CB	
43	97-9	77-6	8-10	-	-	-	-	TP	CB	
44	117-6	107-10	10-6	-	-	-	-	TP	CB	
45	117-6	108-11	10-6	7,255	7,116	14,371	32,400	IP	CB	15
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	16
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	

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

NOTES: See Fig. 3.6A-26 through 28 for break locations. 15

Stresses were calculated in accordance with Equations 9 and 10 of ASME Section III, paragraph NC-3652. 16

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. 16

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 | 16
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	Break Location X (ft-in)	Break Location Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
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) 1MSS*PRR-924 -923		1) DSI	
14	114-3 1/8	117-3 3/8	-(5-9)	C	Mainsteam	None			
18	112-4 7/8	117-8	-(9-7)	C	Mainsteam	1) MSS*PRR-923		1) DSI	| 16
19	112-0 3/8	118-0 1/2	-(9-7)	C	Mainsteam	1) Wall		1) DSI	| 16
20	111-8 11/16	136-9 1/2	-(9-7)	C	Mainsteam	1) Fl 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	111-4 3/16	137-2	-(9-7)	C	Mainsteam	1) Fl El 114'-0"		1) DSI	16
22	110-10 5/8	137-2	-(9-7)	C	Mainsteam	1) Fl El 114'-0"		1) DSI	
27	114-10 1/4	117-0	-(13-3 1/2)	C	Mainsteam	1) 1MSS-024-5-2 2) 1MSS-024-8-2 3) 1FWS-020-62-2 4) 1FWS-020-63-2 5) 1MSS*PRR-902 6) 1MSS*PRR-922		1) Note F, SPI 2) Note F, SPI 3) Note F, SPI 4) Note F, SPI 5) DSI 6) DSI	

TABLE 3.6A-27b (Cont)

Piping System: Main Steam Drain Piping (Auxiliary Building)
Piping Line Numbers: 1DTM-003-78-4, 1DTM-003-79-4, 1DTM-002-76-4, 1DTM-002-74-4, 1DTM-002-75-4 | 16
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
28	119-9	117-0	-(13-3 1/2)	C	Mainsteam	1) 1MSS-024-5-2		1) Note F, SPI	
						2) 1MSS-024-8-2		2) Note F, SPI	
						3) 1FWS-020-62-2		3) Note F, SPI	
						4) 1FWS-020-63-2		4) Note F, SPI	
						5) 1MSS*PRR-902		5) SDI	
						6) 1MSS*PRR-922		6) SDI	
29	120-0	117-0	-(13-0 1/2)	C	Mainsteam	1) 1WCS-V172		1) Note F	
						2) 1WCS-VF051		2) Note F	
						3) 1WCS-1G33*MOVF046, V163, MOVF035, SOVF041		3) Note F	
						4) 1WCS-025-110-4		4) NRS	
						5) 1WCS-004-172-2		5) Note F, SPI	16
						6) 1WCS-004-116-4		6) Note F, SPI	
						7) 1WCS-004-32-4		7) Note F, SPI	
						8) 1WCS-750-66-4		8) NRS	
						9) 1DTM-002-74-4		9) NRS, SPI	
						10) 1DTM-002-75-4		10) NRS, SPI	
						11) 1DTM-002-76-4		11) NRS, SPI	
						12) 1MSS-PRR-903		12) DSI	
						13) 1MSS-PRR-923		13) DSI	
						14) 1MSS-024-5-2		14) Note F, SPI	
						15) 1MSS-024-8-2		15) Note F, SPI	
						16) 1FWS-020-62-2		16) Note F, SPI	
						17) 1FWS-020-63-2		17) Note F, SPI	
34	114-7 9/16	120-5	38-11 1/2	C	Mainsteam	1) Wall (AJ AN)		1) DSI	
35	114-10 5/16	117-0	-(13-10 1/2)	C	Mainsteam	1) 1MSS-024-5-2		1) Note F, SPI	
						2) 1MSS-024-8-2		2) Note F, SPI	
						3) 1FWS-020-62-2		3) Note F, SPI	
						4) 1FWS-020-63-2		4) Note F, SPI	
						5) 1MSS-PRR-922		5) DSI	
43	127-9 1/2	118-5	30-2 1/2	C	Mainsteam	1) Wall (AJ AN)		1) DSI	

TABLE 3.6A-27b (Cont)

Piping System: Main Steam Drain Piping (Auxiliary Building)
Piping Line Numbers: 1DTM-003-78-4, 1DTM-003-79-4, 1DTM-002-76-4, 1DTM-002-74-4, 1DTM-002-75-4 | 16
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
44	114-10 3/8	117-0	-(14-5 1/2)	C	Mainsteam	1) Fl El 124'-9" 2) 1DTM-150-104-2 3) 1DTM-150-105-2 4) 1DTM-001-112-4 5) 1DTM-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 AE)		1) DSI	
53	114-10 7/16	117-0	-(15-0 1/2)	C	Mainsteam	1) Fl El 124'-9" 2) 1DTM-150-104-2 3) 1DTM-150-105-2 4) 1DTM-001-112-4 5) 1DTM-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 AE)		1) DSI	
62	111-10 3/4	136-3 1/2	-(9-7)	C	Mainsteam	1) Fl 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	
67	110-3 3/4	149-0 1/2	-(12-1)	C	Mainsteam	1) Fl 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	
69	114-7 9/16	121-0	-(38-11 1/2)	C	Mainsteam	None			
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 (AE, AA)		1) DSI	16

TABLE 3.6A-27b (Cont)

Piping System: Main Steam Drain Piping (Auxiliary Building)
Piping Line Numbers: 1DTM-003-78-4, 1DTM-003-79-4, 1DTM-002-76-4, 1DTM-002-74-4, 1DTM-002-75-4 | 16
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	Break Location X (ft-in)	Break Location Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
72	118-4 9/16	115-11	-(38-11 1/2)	C	Mainsteam	1) Platf El 124'-9" 2) Platf El 111'-6"		1) DSI 2) DSI	
73	127-10 1/2	117-10	-(30-2 1/2)	C	Mainsteam	1) Wall (AE, AA)		1) DSI	
74	128-1 1/2	117-7	-(30-2 1/2)	C	Mainsteam	1) Fl El 141'-0" 2) Wall (AE, AA)		1) DSI 2) DSI	
75	133-0	117-7	-(30-2 1/2)	C	Mainsteam	1) Fl El 141'-0" 2) Platf El 124'-9" 3) Wall (AE, AA)		1) DSI 2) DSI 3) DSI	
76	133-3	117-7	-(29-11 1/2)	C	Mainsteam	1) Wall (AA, AG) 2) Wall (AE, AA)		1) DSI 2) DSI	16
77	117-11 1/2	117-0	-(14-8 1/2)	C	Mainsteam	1) Wall (AE, AG) 2) Wall (AA, AG)		1) DSI 2) DSI	
78	117-9 3/8	117-0	-(14-6 3/8)	C	Mainsteam	1) Wall (AG, AE) 2) Fl El 141-0		1) DSI 2) DSI	
79	127-9 3/4	116-3	30-2 1/2	C	Mainsteam	1) Wall (AJ, AN)		1) DSI	
80	128-0 3/4	116-0	30-2 1/2	C	Mainsteam	1) Wall (AJ, AN) 2) Fl El 141-0		1) DSI 2) DSI	
81	117-7 9/16	118-8	38-11 1/2	C	Mainsteam	1) Wall (AJ, AN)		1) DSI	
82	117-7 9/16	118-5	38-8 1/2	C	Mainsteam	1) DER-004-60-4 2) 1SFC-006-109-4		1) Note F, SPI 2) Note F, SPI	
83	118-10 1/8	116-5	14-8	C	Mainsteam	1) Platf El 114'-0" 2) 1WCS-1G33-MOVF046 3) 1WCS-003-121-4 4) 1WCS-750-229-4 5) 1WCS-004-116-3		1) DSI 2) Note F 3) Note F, SPI 4) NRS 5) Note F, SPI	

TABLE 3.6A-27b (Cont)

Piping System: Main Steam Drain Piping (Auxiliary Building)
Piping Line Numbers: 1DTM-003-78-4, 1DTM-003-79-4, 1DTM-002-76-4, 1DTM-002-74-4, 1DTM-002-75-4 | 16
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
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 El 123'-9" 2) 1WCS-1G33-MOVF046 3) 1WCS-003-121-4 4) 1WCS-750-229-4 5) 1WCS-004-116-3 6) Wall (AG, AJ)		1) DSI 2) Note F 3) Note F, SPI 4) NRS 5) Note F, 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	16
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) Fl El 104'-6" 2) Wall 3) 1DTM-001-148-4 4) 1DTM-001-149-4 5) 1DER-004-60-4		1) DSI 2) DSI 3) NRS 4) NRS 5) Note F, SPI	
95	110-5	138-10	-(14-8)	C	Mainsteam	1) Fl 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	

TABLE 3.6A-27b (Cont)

Piping System: Main Steam Drain Piping (Auxiliary Building)
Piping Line Numbers: 1DTM-003-78-4, 1DTM-003-79-4, 1DTM-002-76-4, 1DTM-002-74-4, 1DTM-002-75-4 | 16
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
96	110-5 7/16	138-5	-(14-8)	C	Mainsteam	1) Pl 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	16
97	114-10 3/16	117-0	-(12-6)	C	Mainsteam	1) MSS*PRB-924 923		1) DSI	

NOTE: Numbered footnotes follow Table 3.6A-51.

TABLE 3.6A-27c

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Main Steam Drain Lines System (Steam Tunnel)
Piping Line Numbers: 1DTM-150-104-2, 1DTM-150-105-2, 1DTM-150-106-2, 1DTM-150-107-2, 1DTM-003-108-2 | 16
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	Break Location X (ft-in)	Break Location Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
1	125-7	107-9 1/2	-(14-8)	C	R	1) Platf El 123'-9" 2) 1DTM-150-105-2 3) 1DTM-001-112-4 4) 1DTM-001-113-4 5) 1MSS-024-5-2		1) DSI 2) Note F, SPI 3) NRS 4) NRS 5) Note F, SPI	
4	125-5	122-6	-(17-1 3/4)	C	R	1) Valve 1E12*VF050B 2) 1DTM-150-105-2 3) 1MSS-024-60-2 4) Platf El 123'-9" 5) Platf El 124'-9"		1) DSI 2) Note F 3) Note F, SPI 4) DSI 5) DSI	
5	125-5	122-8 1/4	-(17-4)	C	R	1) Platf El 123'-9" 2) 1DTM-150-105-2		1) DSI 2) Note F, SPI	16
10	111-3 1/16	127-6 3/4	-(17-4)	C	R	1) 1MSS-024-5-2 2) 1DTM-001-146-4 3) 1DTM-003-110-4		1) Note F, SPI 2) NRS 3) Note F, SPI	
11	111-3 1/16	127-9	-(17-1 3/4)	C	R	1) Struct col for platf 2) 1DTM-003-110-4		1) DSI 2) Note F, SPI	
12	111-3 1/8	127-9	-(16-9)	C	R	1) Struct col for platf 2) 1DTM-003-110-4		1) DSI 2) Note F, SPI	
15	125-7	107-9 1/2	-(14-1)	C	R	1) Platf El 123'-9" 2) 1MSS-024-5-2 3) 1DTM-001-112-4 4) 1DTM-001-113-4		1) DSI 2) Note F, SPI 3) NRS 4) NRS	
19	125-5	123-3 7/8	16-5 3/64	C	R	1) Platf El 123'-9" and 124'-9" 2) Valve 1E12*VF050B 3) 1MSS-024-5-2 4) 1DTM-150-104-2		1) DSI 2) DSI 3) Note F, SPI 4) Note F, SPI	

TABLE 3.6A-27c (Cont)

Piping System: Main Steam Drain Lines System (Steam Tunnel)
Piping Line Numbers: 1DTM-150-104-2, 1DTM-150-105-2, 1DTM-150-106-2, 1DTM-150-107-2, 1DTM-003-108-2 16
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
20	125-2 3/4	123-5	16-7	C	R	1) 1MSS-024-6-2 2) 1DTM-001-112-4 3) 1DTM-001-113-4 4) 1RHS-010-14-2 5) 1DTM-001-147-4 6) 1RHS-008-45-3 7) 1MSS*PRR-924		1) Note F, SPI 2) NRS 3) NRS 4) Note F, SPI 5) NRS 6) Note F, SPI 7) DSI	
23	111-3 1/8	126-9	-(16-7)	C	R	1) 1DTM-001-147-4 2) 1MSS-024-5-2 3) 1MSS*PRR-924		1) NRS 2) Note F, SPI 3) DSI	
46	111-3 1/8	127-1/2	-(16-7)	C	R	1) 1DTM-001-147-4 2) 1MSS-024-5-2 3) 1MSS*PRR-924		1) NRS 2) Note F, SPI 3) DSI	16
53	115-0 3/8	135-5	-(16-7)	C	R	1) 1DTM-001-113-4 2) 1MSS-024-5-2 3) 1DTM-001-147-4 4) 1DTM-001-146-4 5) 1DTM-001-112-4 6) 1MSS*PRR-924		1) NRS 2) Note F, SPI 3) NRS 4) NRS 5) NRS 6) DSI	
25	125-7	107-9 1/2	14-1	C	R	1) Platf El 123'-9" 2) 1MSS-024-7-2		1) DSI 2) Note F, SPI	
32	111-2 13/16	128-6	-(16-5)	C	R	1) 1DTM-150-107-2 2) 1DTM-001-148-4 3) 1DTM-001-149-4 4) 1DER-004-60-4 5) Equip rem plugs El 114'-0"		1) Note F, SPI 2) NRS 3) NRS 4) Note F, SPI 5) DSI	
35	125-7	107-9 1/2	14-8	C	R	1) Platf El 123'-9" 2) 1MSS-024-7-2		1) DSI 2) Note F, SPI	

TABLE 3.6A-27c (Cont)

Piping System: Main Steam Drain Lines System (Steam Tunnel)
Piping Line Numbers: 1DTM-150-104-2, 1DTM-150-105-2, 1DTM-150-106-2, 1DTM-150-107-2, 1DTM-003-108-2 | 16
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	Break Location X (ft-in)	Break Location Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
42	111-2 13/16	129-1	-(16-5)	C	R	1) 1DTM-150-107-2 2) 1DTM-001-148-4 3) 1DTM-001-149-4 4) 1DER-004-60-4 5) Equip rem plugs El 114'-0"		1) Note F, SPI 2) NRS 3) NRS 4) Note F, SPI 5) DSI	
18	125-5	123-1	-(16-0 3/4)	C	R	1) Fl El 123'-9" and 124'-9" 2) Valve 1E12*VF050B 3) 1MSS-024-5-2 4) 1DTM-150-104-2		1) DSI 2) DSI 3) Note F, SPI 4) Note F, SPI	16
24	125-5	123-2 1/2	-(16-4 1/2)	C	R	1) Fl El 123'-9" and 124'-9" 2) Valve 1E12*VF050B 3) 1MSS-024-5-2 4) 1DTM-150-104-2		1) DSI 2) DSI 3) Note F, SPI 4) Note F, SPI	

NOTE: Numbered footnotes follow Table 3.6A-51.

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 El (ft-in)	Break Location X (ft-in)	Break Location Z (ft-in)	Break Types(1)	Targets	Protection Measures(3)	Evaluation(4)	Remarks
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" 2) Ceiling		1) DSI 2) DSI	
4	74-4	127-6	81-9	C	1) Floor El 70'-0" 2) Ceiling		1) DSI 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" 2) Ceiling		1) DSI 2) DSI	
9	81-1	123-4	81-9	C	1) Floor El 70'-0" 2) Ceiling		1) DSI 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" 2) Ceiling		1) DSI 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: 1RDS-025-17-4
Consequence of Piping Failure: Pipe Whip

Break-point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types(1)	Targets	Protection Measures(3)	Evaluation(4)	Remarks
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 El 70'-0" 2) Ceiling		1) DSI 2) DSI	
42	76-8	130-2	68-11	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: 1RDS-025-18-4
Consequence of Piping Failure: Pipe Whip

Break-point	Break Location El (ft-in)	Break Location X (ft-in)	Break Location Z (ft-in)	Break Types(1)	Targets	Protection Measures(3)	Evaluation(4)	Remarks
18	81-3	129-2	65-3	C	1) Wall		1) DSI	
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: 1RDS-002-225-4
Consequence of Piping Failure: Pipe Whip

Break-point	Break Location El (ft-in)	Break Location X (ft-in)	Break Location Z (ft-in)	Break Types(1)	Targets	Protection Measures(3)	Evaluation(4)	Remarks
21	76-7	129-2	65-1	C	1) Floor El 70'-0" 2) Ceiling		1) DSI 2) DSI	
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: 1RDS-025-11-4
Consequence of Piping Failure: Pipe Whip

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

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 El (ft-in)	X (ft-in)	Z (ft-in)	Break Types(1)	Targets	Protection Measures(3)	Evaluation(4)	Remarks
50	77-0	132-6	64-4 1/2	C	1) Wall		1) DSI	

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

TABLE 3.6A-36b (Cont)

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

Break-point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types(1)	Targets	Protection Measures(3)	Evaluation(4)	Remarks
98	116-0	70-8	2-6 3/4	C	None		-	
99	116-0	68-11 1/2	2-6 3/4	C	None		-	

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-37b

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Reactor Water Cleanup System (Outside Containment) | 16
Piping Line Numbers: 1WCS-006-11-3
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks	
1	116-0	107-9 1/2	4-3	C	R	None				
					H	1) Fl El 114'-0"		1) DSI		16
						2) 1RHS-008-36-2		2) SPI		
3	115-3	109-5	4-3	C	R	1) Jet impingement shield		1) DSI		16
						2) 1RHS-008-36-2		2) SPI		
					H	1) Fl El 114'-0"		1) DSI		16
						2) 1ICS-006-7-1		2) SPI		
5	106-9	108-10 1/3	3-8 1/2	C	R	1) South & west walls		1) DSI		16
						2) Fl El 114'-0"		2) DSI		
					H	1) South & east walls		1) DSI		16
						2) RHS-014-176-2		2) SPI		
						3) 1ICS-006-7-1		3) SPI		
						4) RHS-018-55-2		4) SPI		16
7A	106-9	95-9	0-0	C	R	1) South & east walls		1) DSI		16
						2) 1ICS-006-7-1		2) SPI		
						3) Vent duct		3) NRS		16
					H	1) East wall		1) DSI		
						2) Vent duct		2) NRS		16

TABLE 3.6A-37b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment) | 16
Piping Line Numbers: 1WCS-003-13-3
Consequence of Piping Failure: Pipe whip

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

TABLE 3.6A-37b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment) 16
Piping Line Numbers: 1WCS-003-12-3
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	Break Location X (ft-in)	Break Location Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks	
36	98-1 1/2	84-0	3-5	C	R	1) Fl El 114'-0"		1) DSI		16
					H	1) Fl El 95'-9"		1) DSI		16
43	97-9	85-6 1/2	8-7	C	R	1) Pump room ceiling		1) DSI		
					H	None				

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 El (ft-in)	Break Location Y (ft-in)	Break Location Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
44	117-6	107-10	10-6	C	R	None			
					H	1) 1ICS-008-4-2		1) SPI	
						2) 1RHS-008-36-2		2) SPI	
						3) 1ICS-restraint		3) SPI	16
45	117-6	108-11	10-6	C	R	None			
					H	1) 1ICS-008-4-2		1) SPI	16
						2) 1RHS-008-36-2		2) SPI	
						3) 1ICS-restraint		3) SPI	
46	117-0	109-5	10-6	C	R	1) Jet impingement wall	PRR-902	PRR	
						2) 1ICS-008-40-2		2) SPI	
					H	1) Fl El 114'-0"		1) DSI	16
52A	106-9	92-4	11-3	C	R	1) East wall		1) DSI	
						2) 1ICS-006-7-3		2) SPI	16
					H	1) West wall		1) DSI	
						2) Vent duct		2) NRS	
57	106-9	81-5	5-5	C	R	1) West wall		1) DSI	
						2) Fl El 114'-0"		2) DSI	16
						3) Vent duct		3) NRS	
					H	1) Fl El 114'-0"		1) DSI	
						2) Pump room ceiling		2) DSI	16
						3) 1ICS-006-11-3		3) SPI	

TABLE 3.6A-37b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment) | 16
Piping Line Numbers: 1WCS-004-20-3
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	Break Location X (ft-in)	Break Location Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks	
58	106-9	80-11	4-11	C	R&H	1) Fl El 114'-0" 2) Pump room ceiling		1) DSI 2) DSI		16
					H	1) Fl El 114'-0" 2) Pump room ceiling		1) DSI 2) DSI		16

TABLE 3.6A-37b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment) | 16
Piping Line Numbers: 1WCS-003-15-3
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	Break Location X (ft-in)	Break Location Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
72	98-10	77-11	9-2	C	R&H	1) Pump room wall		1) DSI		16
					H	None			

TABLE 3.6A-37b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment)
Piping Line Numbers: 1WCS-003-14-3
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
87	98-10	86-1	9-3	C	R&H	1) Pump room wall		1) DSI	
					H	None			

TABLE 3.6A-37b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment) |16
Piping Line Numbers: 1WCS-004-171-2
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	Break Location Y (ft-in)	Break Location Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
90	117-9 1/2	107-11	0-0	C	H	None			
					D	1) Fl El 114'-0" 2) 1RHS-008-36-2 3) 1FWS-020-63-2		1) DSI 2) SPI 3) SPI	

|16

TABLE 3.6A-37b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment)
Piping Line Numbers: 1WCS-004-173-2
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
90A	126-0 1/2	116-3	-(2-0)	C	H				
					D				
98B	117-9 1/2	116-6 7/8	2-0	C	H				
					D				
108	124-9	121-5 3/4	6-8 5/8	C	H	1) Platf El 123'-9"		1) DSI	
					D	None			

TABLE 3.6A-37b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment) | 16
Piping Line Numbers: 1WCS-004-022-2(z)
Consequence of Piping Failure: Pipe whip

Break Point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Blowdown Source (2)	Targets	Protection Measures (3)	Evaluation (4)	Remarks	
117	124-9	120-6 1/8	-(6-6 7/8)	C	H	1)Fl El 123'-9"		1)DSI		16
					D	None				

TABLE 3.6A-40b

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Main Steam Drain System (Auxiliary Building)
Piping Line Numbers: 1-DTM-003-78-4
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location(6) EL (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks	
1	115-0 7/16	107-9 1/2	-(4-3)	C	None				
13	115-0 3/8	117-0	-(15-7 1/2)	C	Later				16
97	114-10 3/16	117-0	-(12-6)	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(6) El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
14	114-3 1/8	117-3 3/8	-(5-9)	C	None			
18	112-4 7/8	117-8	-(9-7)	C	None			
19	112-0 3/8	118-0 1/2	-(9-7)	C	1) 1-DTM-150-106-2 2) 1-DTM-150-107-2		1) Note F 2) Note F	
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	16
21	111-. 3/16	137-2	-(9-7)	C	None			
22	110-10 5/8	137-2	-(9-7)	C	None			
62	110-10 3/4	136-3 1/2	-(9-7)	C	1) 1-DTM-150-106-2 2) 1-DTM-150-107-2		1) Note F 2) Note F	

TABLE 3.6A-40b (Cont)

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

Break Point	Break Location(6) El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
67	110-3 3/4	149-5	-(9-7)	C	None		-	
94	110-1 15/16	152-0	-(14-8)	C	None		-	
95	110-5	138-10	-(14-8)	C	None		-	
96	110-5 7/16	138-5	-(14-8)	C	None		-	

16

TABLE 3.6A-40b (Cont)

Piping System: Main Steam Drain System (Auxiliary Building)
Piping Line Numbers: 1-DTM-002-77-4
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location(4) El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
27	114-10 1/4	117-0	-(13-3 1/2)	C	None			
28	119-9	117-0	-(13-3 1/2)	C	None			
29	120-0	117-0	-(13-0 1/2)	C	None			
34	114-7 9/16	120-5	38-11 1/2	C	None			
81	117-7 9/16	118-8	38-11 1/2	C	None			
82	117-7 9/16	118-5	38-8 1/2	C	None			
83	118-10 1/8	116-5	14-8	C	None			
84	119-1 1/8	116-5	14-5	C	None			16
85	126-4 7/8	116-5	6-11	C	None			
86	126-7 7/8	116-2	6-11	C	1) 1CC817BG7 (feedwater system valve 1FWS*MOV7B conduit)		1) Note F	
87	126-7 7/8	115-3 13/16	6-11	C	1) 1CC817BG7 (feedwater system valve 1FWS*MOV7A conduit)		1) Note F	
88	126-7 7/8	115-0 13/16	6-8	C	None			
89	126-6	115-0 13/16	-(7-0 3/8)	C	None			
90	126-6	115-3 13/16	-(7-3 3/8)	C	1) 1CC817BG8 (feedwater system valve 1FWS*MOV7B conduit)		1) Note F	

TABLE 3.6A-40b (Cont)

Piping System: Main Steam Drain System (Auxiliary Building)
Piping Line Numbers: 1-DTM-002-76-4
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location(6) El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
35	114-10 5/16	117-0	-(13-10 1/2)	C	None			
43	127-9 1/2	118-5	30-2 1/2	C	None			16
79	127-9 3/4	116-3	30-2 1/2	C	None			
80	128-0 3/4	116-0	30-2 1/2	C	None			

TABLE 3.6A-40b (Cont)

Piping System: Main Steam Drain System (Auxiliary Building)
Piping Line Numbers: 1-DTM-002-75-4
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location(6) El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
44	118-10 3/8	117-0	-(18-5 1/2)	C	None			
52	127-10 1/2	118-5	-(30-2 1/2)	C	None			
73	127-10 1/2	117-10	-(30-2 1/2)	C	None			
74	128-1 1/2	117-7	-(30-2 1/2)	C	None			
75	133-0	117-7	-(30-2 1/2)	C	None			
76	133-3	117-7	-(29-11 1/2)	C	1) 1CK809BC6 (main steam line isolation valve seal system valve 1E33*F028 conduit) 2) 1CC868BA1 (main steam line isolation valve seal system valve 1E33*F028 conduit) 3) 1CC868BA2 (main steam line isolation valve seal system valve 1E33*F027 conduit) 4) 1CC817BJ1 (main steam line isolation valve seal system valve 1E33*F027 conduit) 5) 1CC817BJ2 (main steam line isolation valve seal system valve 1E33*F028 conduit) 6) 1CC939BB2 (main steam line isolation valve seal system valve 1E33*F028 conduit)	1) Note F 2) Note F 3) Note F 4) Note F 5) Note F 6) Note F		16
77	117-11 1/2	117-0	-(18-8 1/2)	C	None			

TABLE 3.6A-40b (Cont)

Piping System: Main Steam Drain System (Auxiliary Building)
Piping Line Numbers: 1-DTM-002-75-4
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location(2) El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks	
78	117-9 3/8	117-0	-(14-6 3/8)	C	None				16

TABLE 3.6A-40b (Cont)

Piping System: Main Steam Drain System (Auxiliary Building)
Piping Line Numbers: 1-DTS-002-74-4
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location(4) Y (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Targets	Protection Measures (3)	Evaluation (4)	Remarks
53	114-10 7/16	117-0	-(15-0 1/2)	C	None			
60	114-7 9/16	120-5	-(38-11 1/2)	C	None			
69	114-7 9/16	121-0	-(38-11 1/2)	C	None			16
70	114-10 9/16	121-3	-(38-11 1/2)	C	None			
71	118-1 9/16	116-2	-(38-11 1/2)	C	None			
72	118-4 9/16	115-11	-(38-11 1/2)	C	1) 1CC817BJ2 (main steam line isolation valve seal system valve 1E33*F028 conduit) 2) 1CC817BJ1 (main steam isolation valve seal system valve 1E33*F027 conduit)		1) Note F 2) Note F	

NOTE: Numbered footnotes follow Table 3.6A-51.

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 El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
3	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) 1CK809BCZ (main steam valve 1B2*MOVF098B conduit)		1) Note P	
5	125-5	122-8 1/4	-(17-4)	C	None		-	
10	111-3 1/16	127-6 3/4	-(17-4)	C	None		-	
11	111-3 1/16	127-9	-(17-1 3/4)	C	1) 1CK809BC2 (main steam valve 1B21*MOVF098B conduit)		1) Note P	16
12	111-3 1/8	127-9	-(16-9)	C	1) 1CK809BC2 (main steam valve 1B21*MOVF098B conduit)		1) Note P	

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 El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
15	125-7	107-9 1/2	-(14-1)	C	1) 1CX939SA3 (area temperature monitor 1LDS*RTD2A conduit) 2) 1CX939TA3 (area temperature monitor 1LDS*RTD2B conduit)		1) Note L 2) Note L	
18	125-5	123-1	-(16-0 3/4)	C	1) 1CK809BC2 (main steam valve 1B21*MOVF098B conduit)		1) Note F	16
19	125-5	123-3 7/8	16-5 3/64	C	None		-	
20	125-2 3/4	123-5	16-7	C	1) 1CC817BG1 (conduit to junction box controls main steam valves 1B21*MOVF098A,D, & feedwater valves 1FWS*MOV7A & B)		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		-	

TABLE 3.6A-40c (Cont)

SUMMARY OF PIPING FAILURE ANALYSIS

Piping System: Main Steam Drain System (Steam Tunnel Area)
Piping Line Numbers: 1DTM-150-106-2
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location El (ft-in)	Break Location X (ft-in)	Break Location Z (ft-in)	Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
25	125-7	107-9 1/2	14-1	C	1) 1CX939UA4 (area temperature monitor 1LDS*RTD2C conduit) 2) 1CX939VA4 (area temperature monitor 1LDS*RTD2D conduit)		1) Note L 2) Note L	16
32	111-2 13/16	128-6	-(6-5)	C	None		-	

TABLE 3.6A-40c (Cont)

Piping System: Main Steam Drain System (Steam Tunnel Area)
Piping Line Numbers: 1DTM-150-107-2
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location El (ft-in)	Break Location X (ft-in)	Break Location Z (ft-in)	Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
35	125-7	107-9 1/2	14-8	C	1) 1CX939UA4 (area temperature monitor 1LDS*RTD2C conduit) 2) 1CX939VA4 (area temperature monitor 1LDS*RTD2D conduit)		1) Note L 2) Note L	16
42	111-2 13/16	129-1	-(16-5)	C	None		-	

TABLE 3.6A-40c (Cont)

Piping System: Main Steam Drain System (Steam Tunnel Area)
Piping Line Numbers: 1DTM-003-108-2
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location El (ft-in)	Break Location X (ft-in)	Break Location Z (ft-in)	Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks	
53	115-0 3/8	135-5	-(16-7)	C	1) 1CX939SA3 (area temperature monitor 1LDS*RTD2A conduit) 2) 1CX939TA3 (area temperature monitor 1LDS*RTD2B conduit)		1) Note L 2) Note L		16

NOTE: Number footnotes follow Table 3.6A-51.

TABLE 3.6A-49b

SUMMARY OF PIPING FAILURE ANALYSIS

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 El (ft-in)	X (ft-in)	Z (ft-in)	Break Types(1)	Essential Targets	Protection Measures(3)	Evaluation(4)	Remarks
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-025-18-4
Consequence of Piping Failure: Jet Impingement

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

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

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

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

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 El (ft-in)	X (ft-in)	Z (ft-in)	Break Types[1]	Essential Targets	Protection Measures[3]	Evaluation[4]	Remarks
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	None		-	
90	107-0	72-7	2-6 3/4	C	1) 1CX601BA (service water flow transmitter 1SWP*FT59B, 60B conduit) 2) 1CC918BA (conduit between switchgear and terminal cabinet for RCS system)		1) Note M 2) NBS	
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 HVF*FN3B, 7B cable tray) 2) 1TC602B (various HVF flow switches and air operated damper cable tray) 3) 1TX602B (various resistant temperature detector and flow switches HVF 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		-	

TABLE 3.6A-49b (Cont)

Piping System: Control Rod Drive System (Fuel Building)
Piping Line Numbers: 1FDS-002-22-2
Consequence of Piping Failure: Jet Impingement

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

NOTE: Numbered footnotes follow Table 3.6A-51.

TABLE 3.6A-50b

SUMMARY OF PIPING FAILURE ANALYSIS

16

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

Break Point	Break Location El (ft-in)	Break Location X (ft-in)	Break Location Z (ft-in)	Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
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	1) 1CC814RA (reactor core isolation cooling system valves 1E51*F059, 013, 046 conduit) 2) 1CK827RA (RCIC fill pump motor 1E51C003 conduit)		1) Note F 2) Note F	
7A	106-9	95-9	0-0	C	1) 1TC814R (reactor core isolation cooling system valve 1E12*F023 cable tray) 2) 1CX809RS (leak detection 1E31FTN077A conduit) 3) 1CX809RS1 (leak detection 1E31FTN075A conduit) 4) 1CX817BF2 (WCS thermocouple 1E31*T/CN040B conduit) 5) 1CX817BF3 (WCS thermocouple 1E31*T/CN037B conduit) 6) 1CX817BF4 (WCS thermocouple 1E31*T/CN039B & 42B conduit) 7) 1CC814RA (reactor core isolation cooling system valves 1E51*F059, 013, 046) 8) 1CK827RA (RCIC fill pump motor 1E51C003 conduit)		1) Note 2) Note N 3) Note N 4) Note Q 5) Note Q 6) Note P 7) Note P 8) Note F	16

TABLE 3.6A-50b (Cont)

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

Break Point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
44	117-6	107-10	10-6	C	None			
45	117-6	108-11	10-6	C	None			
46	117-0	109-5	10-6	C	None			
52A	106-9	92-4	11-3	C	None			
57	106-9	81-5	5-5	C	1) 1CX939RA (residual heat removal conductivity element 1E12*CEN001A conduit)		1) Note F	
					2) 1CC825RE (reactor core isolation cooling system valve 1E51*F013 conduit)		2) Note F	
					3) 1CX817BF3 (WCS thermocouple 1E31*T/CN037B conduit)		3) Note Q	16
					4) 1CX809RO (WCS thermocouple 1E31*T/CN037A conduit)		4) Note O	
					5) 1TK825R (RCIC valves cable tray)		5) Note F	
					6) 1TL820R (RCIC valves cable tray)		6) Note F	
					7) 1E31*T/CN039A (WCS temperature element)		7) Note D	
					8) IE31*T/CN039B (WCS temperature element)		8) Note D	

TABLE 3.6A-50b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment) 16
Piping Line Numbers: 1-WCS-004-20-3
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
58	106-9	80-11	4-11	C	1) 1CL820RD (reactor core isolation cooling system valve 1E51*F013 conduit)		1) Note F	
					2) 1CK820RA (reactor core isolation cooling system valve 1E51*F068 conduit)		2) Note F	16
					3) 1CL820RC (reactor core isolation cooling system valve 1E51*F013 conduit)		3) Note F	

TABLE 3.6A-50b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment) | 16
Piping Line Numbers: 1-WCS-003-14-3
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks	
87	98-10	86-1	9-3	C	None				16

TABLE 3.6A-50b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment) 16
Piping Line Numbers: 1-WCS-003-13-2
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks	
20A	105-5	79-0	3-5 1/16	C	None				16

TABLE 3.6A-50b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment) | 16
Piping Line Numbers: 1-WCS-003-13-3
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks	
30	97-9	77-6	8-10	C	None				16

TABLE 3.6A-50b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment) 16
Piping Line Numbers: 1-WCS-003-12-3
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks	
36	98-1 1/2	84-0	3-5	C	None				16
43	97-9	85-6 1/2	8-7	C	None				

TABLE 3.6A-50b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment) 16
Piping Line Numbers: 1-WCS-003-15-3
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location El (ft-in)	Break Location X (ft-in)	Break Location Z (ft-in)	Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks	
72	98-10	77-11	9-2	C	None				16

TABLE 3.6A-50b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment) | 16
Piping Line Numbers: 1-WCS-004-171-2
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location El (ft-in)	Break Location X (ft-in)	Break Location Z (ft-in)	Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks
90	117-9 1/2	107-11	0-0	C	1) 1CC817BG5 (main steam valve 1B21*MOVF098C conduit) 2) 1CC817BG4 (main steam valve 1B21*MOVF098A conduit) 3) 1CC817BG7 (feedwater valve 1FWS*MOV7A conduit) 4) 1CC817BG8 (feedwater valve 1FWS*MOV7B conduit)		1) Note F 2) Note F 3) Note F 4) Note F	16
90A	126-0 1/2	116-3	-(2-0)	C	None			
98B	117-9 1/2	116-6 7/8	2-0	C	None			

TABLE 3.6A-50b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment) 16
Piping Line Numbers: 1-WCS-004-173-2
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location EL (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks	
108	124-9	121-5 3/4	6-8 5/8	C	None				16

TABLE 3.6A-50b (Cont)

Piping System: Reactor Water Cleanup System (Outside Containment) | 16
Piping Line Numbers: 1-WCS-004-22-2
Consequence of Piping Failure: Jet Impingement

Break Point	Break Location El (ft-in)	X (ft-in)	Z (ft-in)	Break Types (1)	Essential Targets	Protection Measures (3)	Evaluation (4)	Remarks	
117	124-9	120-6 1/8	-(6-6 7/8)	C	1) 1CL824BB (feedwater valve 1FWS*MOV7B conduit) 2) 1CC817BG8 (feedwater valve 1FWS*MOV7B conduit)		1) Note F 2) Note F		16

NOTES FOR TABLES 3.6A-25 THROUGH 3.6A-51

(1) C = Circumferential break
L = Longitudinal break

(2) R = Blowdown from RPV only
H = Blowdown from other end (i.e., header or pump side)
D = Blowdown from a dead end such as a normally closed valve | 15

(3) Protection measures include:

a. Pipe whip restraint
b. Protective structures (i.e., impacted structures are designed for pipe rupture loads in accordance with SRP 3.6.1)
c. Redundant safety systems
d. Separation and isolation by plant arrangement. | 15

(4) ACI = System affected by pipe whip or jet impingement is required for containment isolation. Analysis of the system indicates that the system requirement can be met. | 16

DSS = System impacted by a whipping pipe or by the jet discharging from a ruptured pipe is a system required for plant safe shutdown, and has been designed or analyzed to withstand the impact loading. | 15 | 16

DSI = System impacted by the whipping pipe or by the jet has been designed to maintain structural integrity and to prevent pipe break initiation if the impacted target is a piping system. | 16

NRS = System affected by pipe whip or jet impingement is not required for safe shutdown. Failure consequence is acceptable. | 16

PRR = Target is protected by pipe rupture restraint(s).

RL = Rupture line impacts its own piping, component, or support. No failure consequence needs to be considered. | 15

RSS = System affected by pipe whip or jet impingement is a system required for safe shutdown. However, the failure consequence is acceptable since alternative systems are available to shut | 16

down the plant even if loss-of-site power and single active failure were considered to be coincident with the rupture event. 16

SPI = Piping, piping component, or pipe support impacted by a whipping pipe or by the jet discharging from a ruptured pipe is of smaller or equal pipe size and smaller or equal wall thickness. No failure consequence of the impacted pipe needs to be considered. 15

Note A: Of the four resistance temperature detectors (RTDs) associated with post-accident monitoring (1CMS*RTD41A, B, C, and D), the failure of one of them due to jet impingement from a high energy line break (HELB) is acceptable. Since this failure and a worst single active or passive failure will cause a maximum of three of the four RTDs to be inoperative, at least one RTD will remain in service. 16

Note B: The failure of one hydrogen igniter in the drywell due to jet impingement from a HELB is acceptable since this failure and a worst single active or passive failure will not affect the safety function of this system.

Note C: Since the break has the equivalent flow area of approximately two times the flow area of a safety relief valve, the failure of two safety relief valves if the HPCS is available or the failure of one safety relief valve if HPCS is unavailable, is acceptable.

Note D: It is acceptable to fail this reactor pressure vessel (RPV) level and pressure instrument piping because of jet impingement from a HELB since this instrumentation, even though associated with the ECCS instrumentation, is not required to automatically initiate the ECCS, provided this instrument pressure leg piping fails as a break and not as a crimp.

Note E: The failure of this containment penetration isolation valve to close because of jet impingement from a main steam HELB is acceptable since the piping inside the containment associated with this penetration will remain full of water from the RPV and thereby provide a water seal.

Note F: The portion of the essential system is not required for safe shutdown.

Note G: Jet impingement restraint is incorporated in the plant design such that the line will accept the jet impingement load.

Note H: A more detailed review of the jet shows that the item is either outside the jet cone or shielded by existing design.

Note I: Total failure of this line is acceptable since the drywell sample flow will be maintained.

Note J: A failure of the 3/4 in instrument branch line will not degrade the ECCS function.

Note K: A shield is incorporated into the design, and/or the item is relocated to mitigate the jet consequence.

16

Note L: These items are not required to isolate the subject break and are nonessential. Their failure will automatically trip the reactor protection system (fail safe).

Note M: Failure of these flow transmitters is acceptable for the associated HELB. These items monitor flow from the Division 2 standby service water pumps and flow into the standby service water system cooling tower. The operator can verify flow by monitoring the pump discharge pressure and pump motor run current that is indicated in the main control room.

Note N: These flow transmitters, which detect leakage based upon high flow, are not required once the break has occurred since the area temperature monitors will detect and isolate the break.

Note P: The redundant area ambient temperature elements in each volume will provide the automatic breakpoint isolation. The differential temperature elements in each volume are not required for the HELB event.

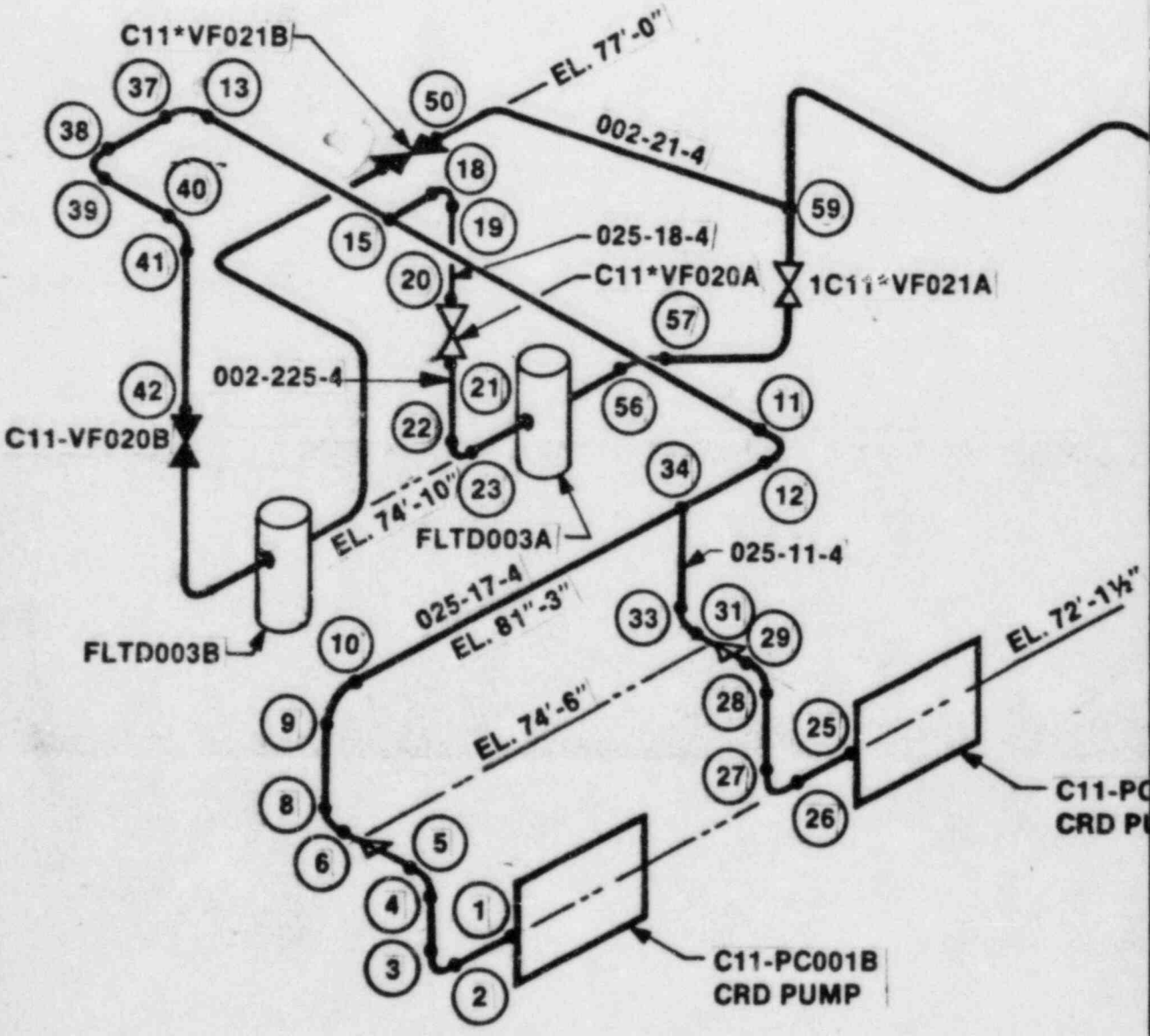
Note Q: The temperature element served by this conduit is not in the postulated break location volume.

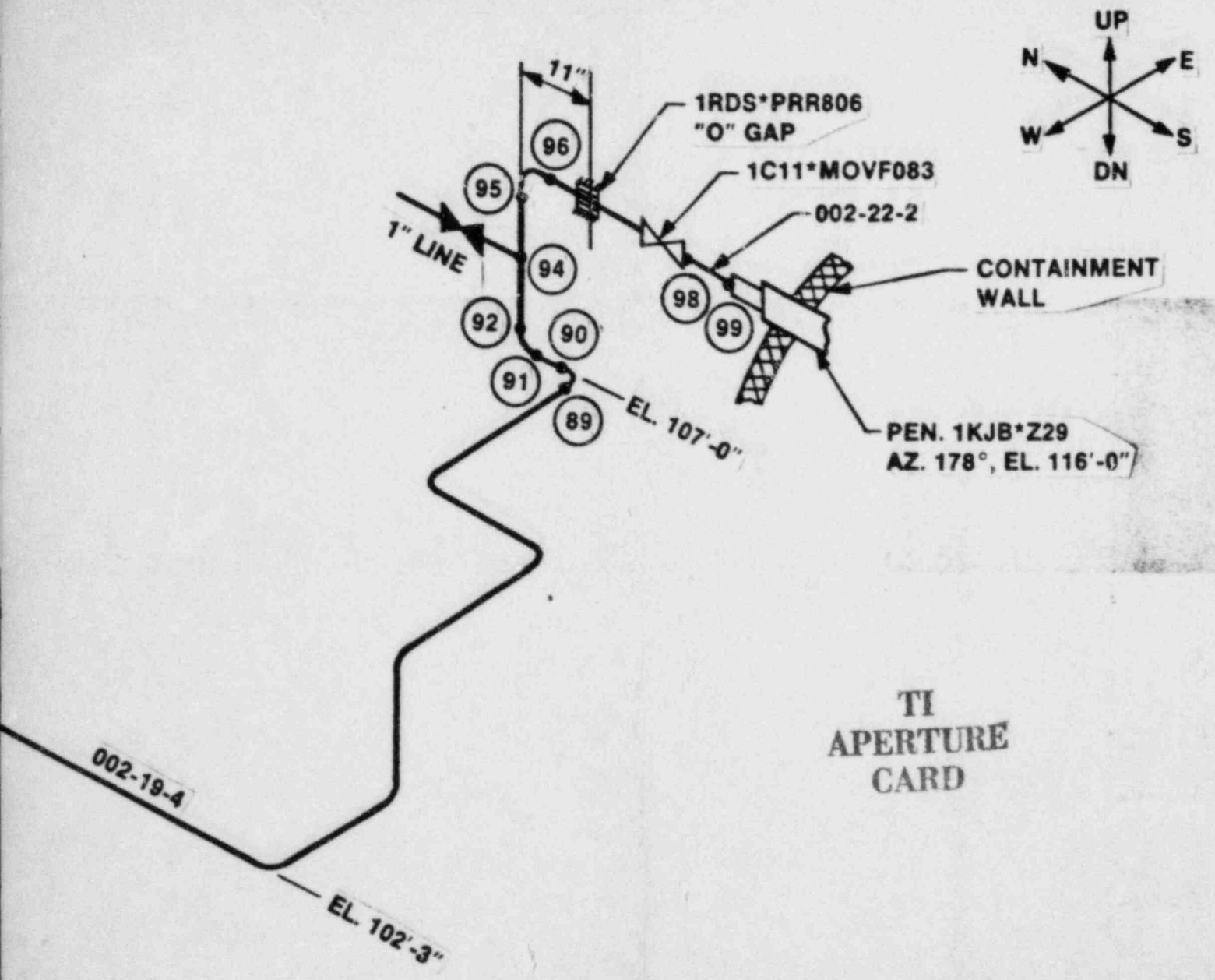
Note R: A failure of these cable trays is acceptable since the fuel building ventilation system (HVC) cables requried to power the ventilation fans and air-operated dampers (AODs) can be repaired within 4 hr.

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. 16

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



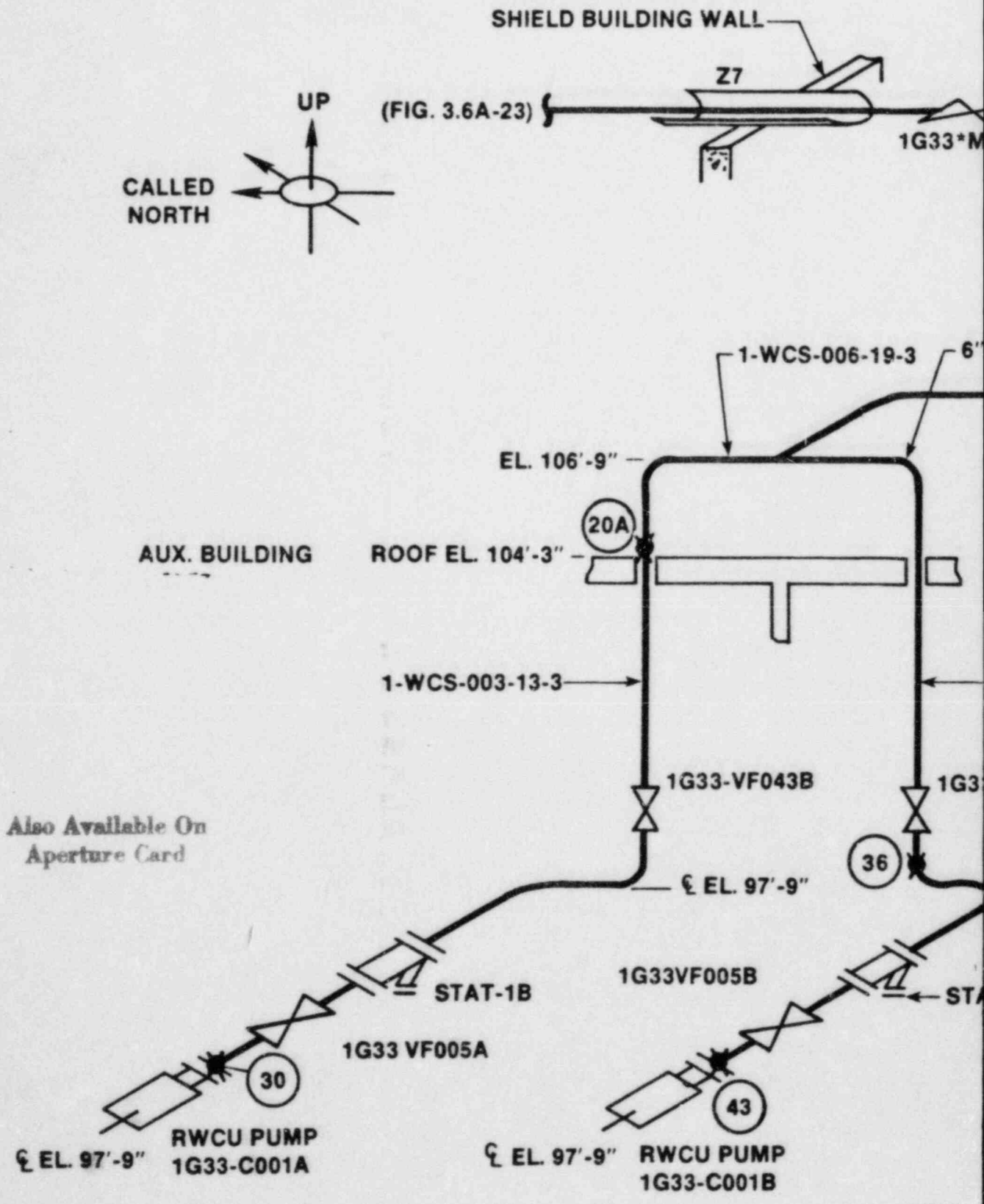


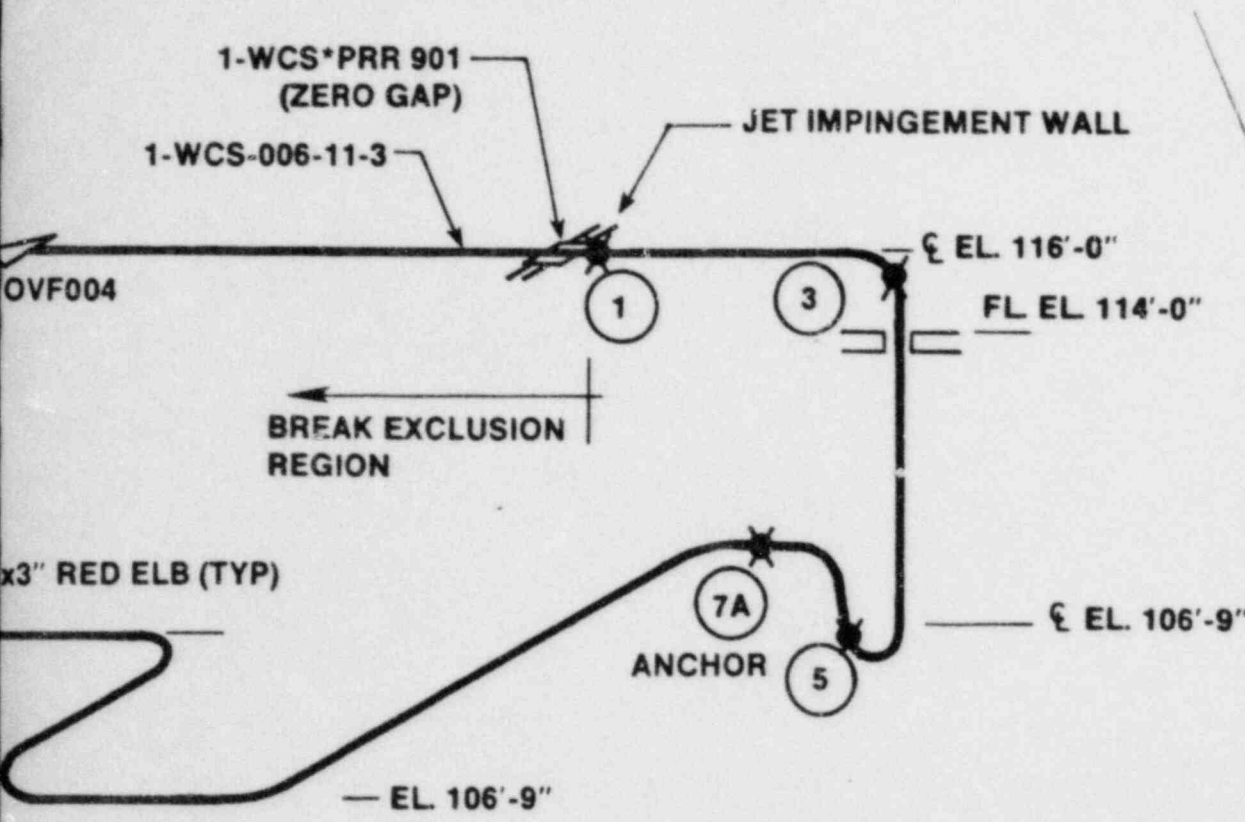
C001A
UMP

FIGURE 3.6A-24c

HIGH ENERGY PIPE BREAK
CONTROL ROD DRIVE PIPING
— FUEL BUILDING

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT





— 1-WCS-003-12-3

3-VF043A

— ℄ EL. 97'-9"

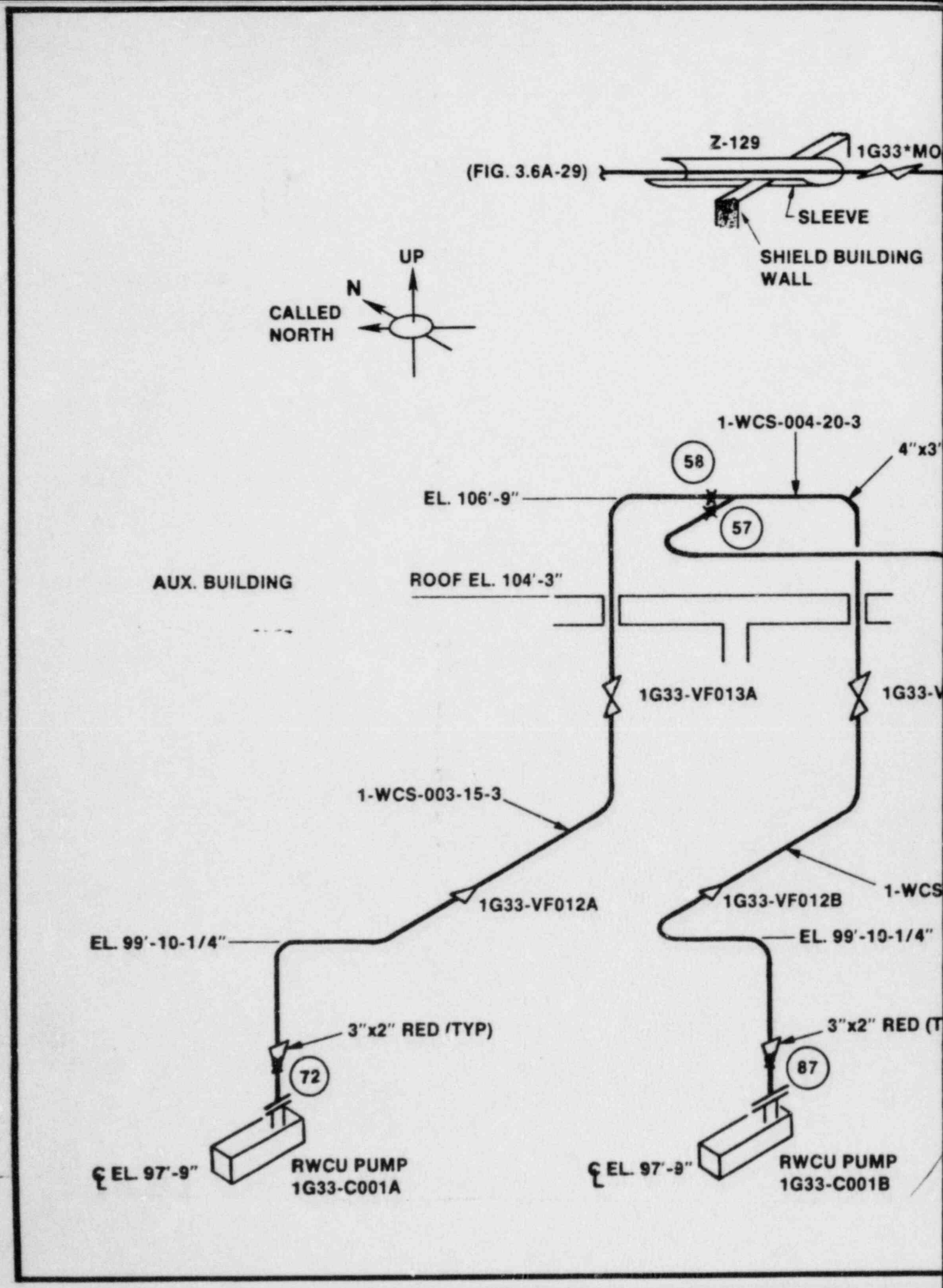
AT-1

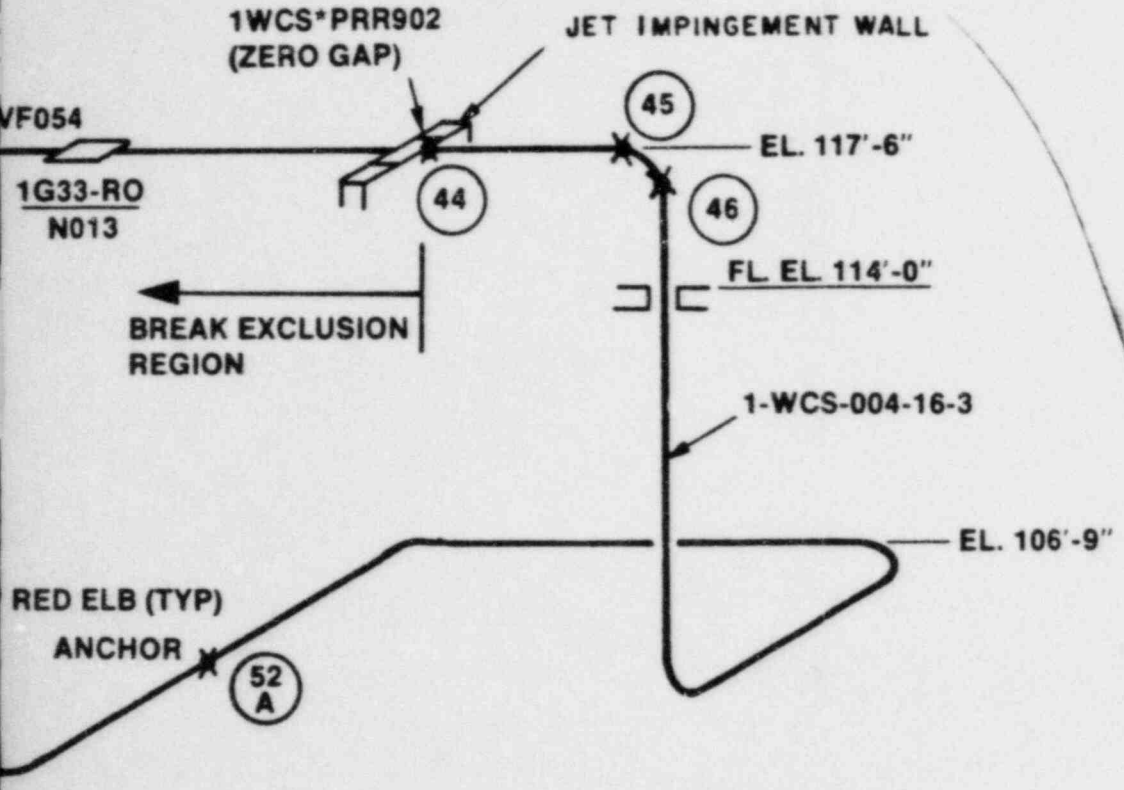
NOTES:

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 AND LONGITUDINAL BREAK

FIGURE 3.6A-26

HIGH ENERGY PIPE BREAK
REACTOR WATER CLEANUP
PIPING - OUTSIDE CONTAINMENT


Z-129
1G33*MO
(FIG. 3.6A-29)
SLEEVE
SHIELD BUILDING WALL
UP
N
CALLED NORTH
1-WCS-004-20-3
4"x3"
58
EL. 106'-9"
57
AUX. BUILDING
ROOF EL. 104'-3"
1G33-VF013A
1G33-V
1-WCS-003-15-3
1G33-VF012A
1G33-VF012B
1-WCS
EL. 99'-10-1/4"
EL. 99'-10-1/4"
3"x2" RED (TYP)
3"x2" RED (T
72
87
℄ EL. 97'-9"
RWCU PUMP 1G33-C001A
℄ EL. 97'-9"
RWCU PUMP 1G33-C001B



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 AND LONGITUDINAL BREAK

F013B

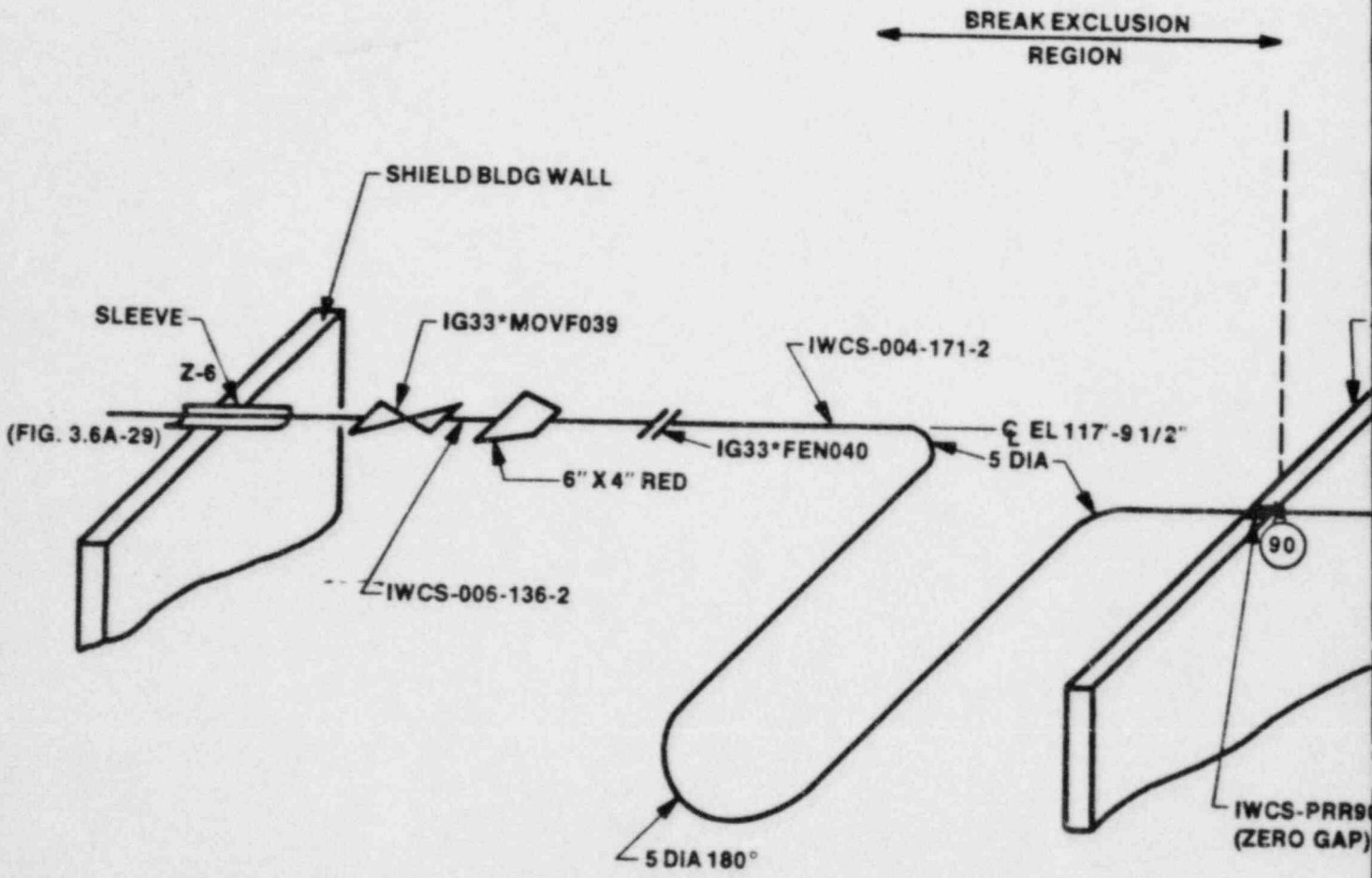
003-14-3

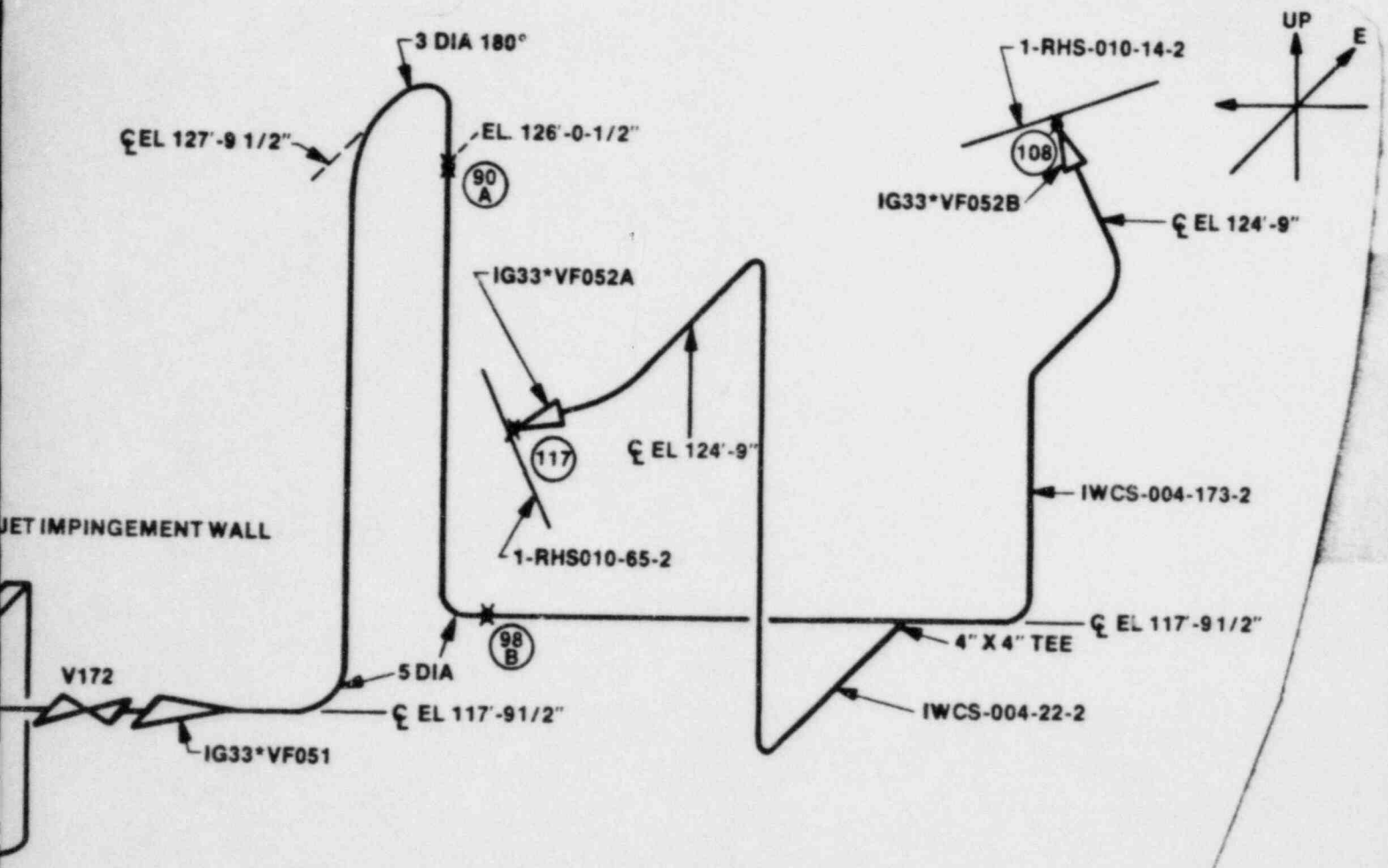
YP)

FIGURE 3.6A-27

HIGH ENERGY PIPE BREAK
REACTOR WATER CLEANUP
PIPING - OUTSIDE CONTAINMENT

RIVER BEND STATION
FINAL SAFETY ANALYSIS REPORT


BREAK EXCLUSION
REGION
SHIELD BLDG WALL
SLEEVE
Z-6
(FIG. 3.6A-29)
IG33*MOVF039
IWCS-004-171-2
℄ EL 117'-9 1/2"
IG33*FEN040
5 DIA
6" X 4" RED
IWCS-006-136-2
90
5 DIA 180°
IWCS-PRR9
(ZERO GAP)



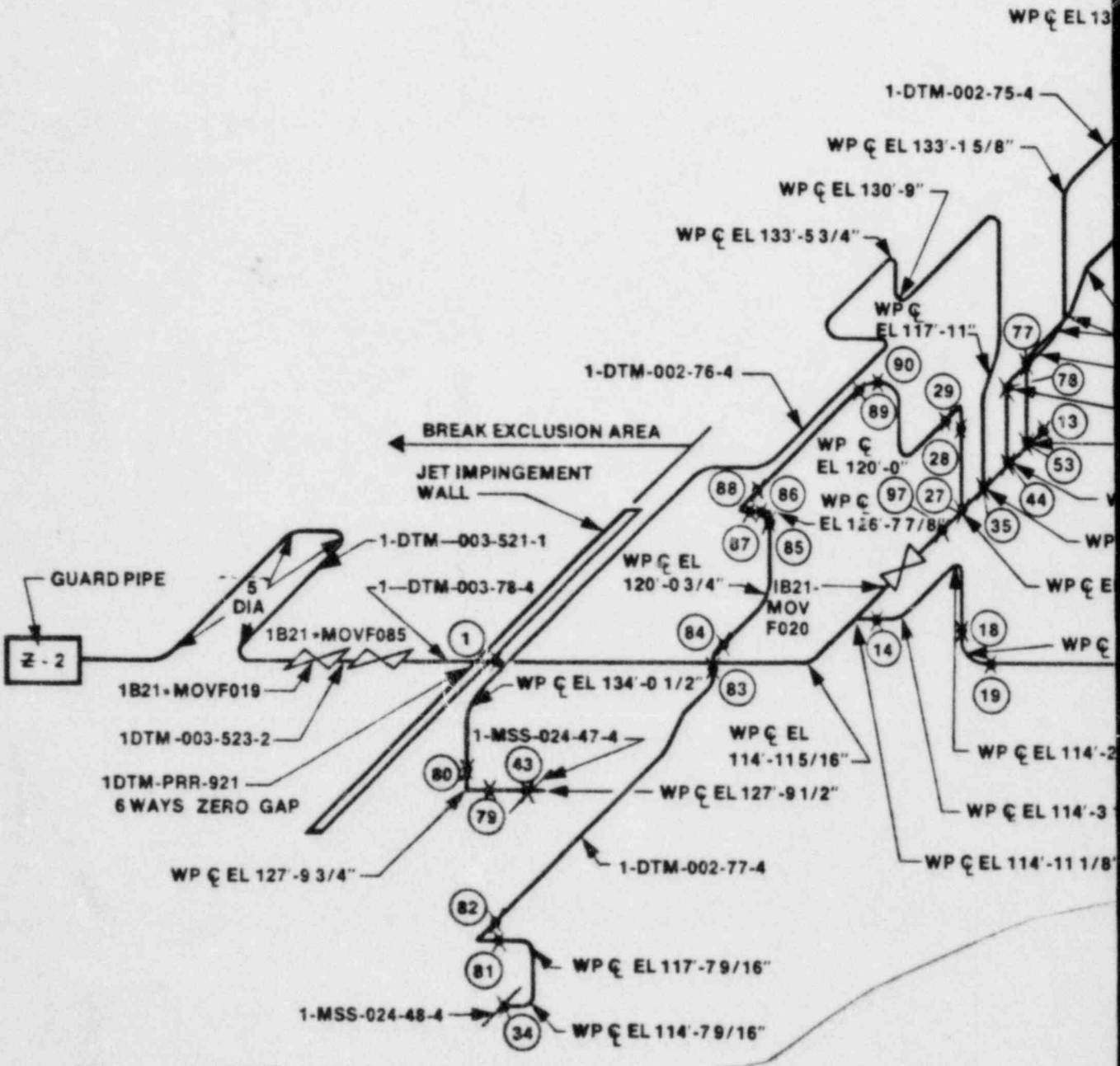
NOTES:

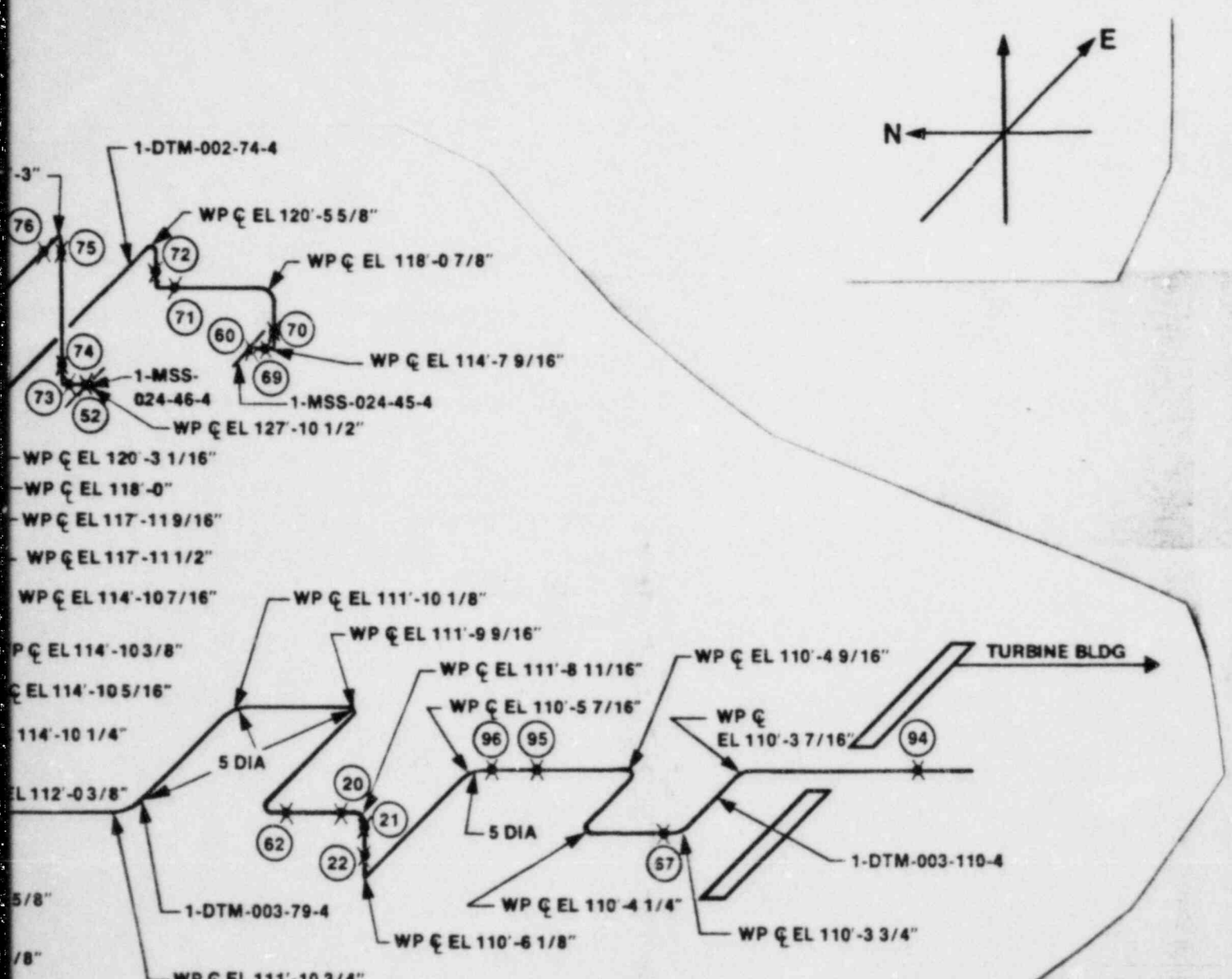
1. BREAK LOCATIONS ARE DESIGNATED BY (NO.)
2. PIPE BREAK RESTRAINTS ARE DESIGNATED BY IXXX*PRRXXX
3. UPON COMPLETION OF PIPE STRESS ANALYSIS, SOME BREAKS AND/OR RESTRAINTS MAY BE ELIMINATED IN ACCORDANCE WITH THE CRITERIA DESCRIBED IN SECTION 3.6.2A
4. STRESS RESULTS ARE GIVEN IN TABLE 3.6A-20 CORRESPONDING TO THE NUMERICAL BREAK POINTS SHOWN HERE
5. 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


WP ℄ EL 13
1-DTM-002-75-4
WP ℄ EL 133'-1 5/8"
WP ℄ EL 130'-9"
WP ℄ EL 133'-5 3/4"
WP ℄ EL 117'-11"
1-DTM-002-76-4
BREAK EXCLUSION AREA
JET IMPINGEMENT WALL
WP ℄ EL 120'-0"
WP ℄ EL 126'-7 7/8"
WP ℄ EL 120'-0 3/4"
1B21-MOV F020
1-DTM—003-521-1
1—DTM-003-78-4
GUARD PIPE
5 DIA
1B21•MOVF085
1B21•MOVF019
1DTM-003-523-2
1DTM-PRR-921 6 WAYS ZERO GAP
WP ℄ EL 134'-0 1/2"
1-MSS-024-47-4
WP ℄ EL 127'-9 1/2"
WP ℄ EL 127'-9 3/4"
WP ℄ EL 114'-11 5/16"
WP ℄ EL 114'-2
WP ℄ EL 114'-3
WP ℄ EL 114'-11 1/8"
1-DTM-002-77-4
WP ℄ EL 117'-7 9/16"
1-MSS-024-48-4
WP ℄ EL 114'-7 9/16"
Z - 2



NOTES:

1. BREAK LOCATIONS ARE DESIGNATED BY (NO)
2. PIPE BREAK RESTRAINTS ARE DESIGNATED BY 1XXX*PRRXXX
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