Appendix 6A. Tables

Table 6-1. Containment Subcompartment Pressures

Compartment	Maximum Press	Time(Sec)	Element
1	0.1585E+02	0.3940	C.L. 1
2	0.1401E+02	1.0060	C.L. 2
3	0.1324E+02	1.0960	C.L. 3
4	0.1333E+02	1.0960	C.L. 4
5	0.1388E+02	1.0060	C.L. 5
6	0.1522E+02	0.3760	C.L. 6
7	0.8070E+01	0.2320	H.L. 5
8	0.6940E+01	0.6820	C.L. 4
9	0.6760E+01	2.9680	C.L. 1
10	0.7840E+01	0.2500	H.L. 6
11	0.6780E+01	2.9680	C.L. 1
12	0.6770E+01	2.9680	C.L. 1
13	0.6960E+01	0.1980	H.L. 6
14	0.6770E+01	2.9680	C.L. 1
15	0.6770E+01	2.9680	C.L. 1
16	0.6890E+01	0.1980	H.L. 1
17	0.6770E+01	2.9680	C.L. 1
18	0.6770E+01	2.9680	C.L. 1
19	0.7770E+01	0.2500	H.L. 1
20	0.6770E+01	2.9680	C.L. 1
21	0.6770E+01	2.9680	C.L. 1
22	0.7930E+01	0.2320	H.L. 2
23	0.6780E+01	0.6280	C.L. 3
24	0.6770E+01	2.9680	C.L. 1
25	0.6770E+01	2.9680	C.L. 1
26	0.1286E+02	1.6540	C.L. 1
27	0.1318E+02	1.2580	C.L. 1
28	0.1288E+02	1.6540	C.L. 1
29	0.1225E+02	2.2120	C.L. 1
30	0.1283E+02	1.6000	C.L. 1
31	0.1317E+02	1.2580	C.L. 6

Compartment	Maximum Press	Time(Sec)	Element
32	0.1279E+02	1.6360	C.L. 6
33	0.1321E+02	1.0420	C.L. 2
34	0.1289E+02	1.6540	C.L. 1
35	0.1290E+02	1.6540	C.L. 1
36	0.1287E+02	1.6000	C.L. 1
37	0.1283E+02	1.6360	C.L. 6
38	0.6770E+01	2.9680	C.L. 1
39	0.6770E+01	2.9680	C.L. 1
40	0.1067E+02	0.4660	C.L. 1
41	0.9570E+01	1.0060	C.L. 1
42	0.8940E+01	1.1140	C.L. 2
43	0.9030E+01	1.0420	C.L. 5
44	0.9410E+01	1.0600	C.L. 6
45	0.1030E+02	0.4480	C.L. 6
46	0.6770E+01	2.9680	C.L. 1
47	0.6770E+01	2.9680	C.L. 1
48	0.6770E+01	2.9680	C.L. 1
49	0.6770E+01	2.9680	C.L. 1
50	0.1284E+02	1.6000	C.L. 1
51	0.1366E+02	0.7000	C.L. 3
52	0.1286E+02	1.6360	C.L. 1
53	0.1280E+02	1.6360	C.L. 6

Table 6-2. Containment Subcompartment Differential Pressures. (Table 6-2 and Table 6-3 were originally one table)

Comp	Between And Comp	Maximum Diff Pressure	Time (Sec)	Element	Minimum Diff Pressure	Time (Sec)	Element
1	2	0.8100E+01	0.0270	H.L. 1	-0.6020E+01	0.0180	H.L. 2
1	6	0.1156E+02	0.0360	H.L. 1	-0.1181E+02	0.0360	H.L. 6
1	7	0.1636E+02	0.2860	C.L. 1	-0.2200E+00	0.0360	C.L. 6
1	8	0.1580E+02	0.3040	C.L. 1	-0.2200E+00	0.0360	C.L. 6
1	9	0.1539E+02	0.3840	C.L. 1	-0.2200E+00	0.0360	C.L. 6
1	25	0.1413E+02	0.2320	C.L. 1	-0.2200E+00	0.0360	C.L. 6
1	26	0.1390E+02	0.2320	C.L. 1	-0.4800E+00	2.5180	C.L. 6
1	27	0.1135E+02	0.0360	H.L. 1	-0.2300E+00	0.0360	C.L. 6
1	28	0.1396E+02	0.2320	C.L. 1	-0.5000E+00	2.3380	C.L. 6
1	33	0.1167E+02	0.0450	H.L. 1	-0.2240E+01	0.0900	H.L. 5
1	34	0.1296E+02	0.2140	C.L. 1	-0.4200E+00	2.5180	C.L. 6
1	38	0.1462E+02	0.2860	C.L. 1	-0.2200E+00	0.0360	C.L. 6
1	40	0.1115E+02	0.0360	H.L. 1	-0.2200E+00	0.0360	C.L. 6
1	51	0.1236E+02	0.1080	H.L. 1	-0.1550E+01	0.5380	H.L. 3
2	1	0.6020E+01	0.0180	H.L. 2	-0.8100E+01	0.0270	H.L. 1
2	3	0.7620E+01	0.0630	H.L. 1	-0.5940E+01	0.0270	H.L. 3
2	10	0.1203E+02	0.3040	C.L. 2	0.0	0.0090	C.L. 6
2	11	0.1163E+02	0.2860	C.L. 2	0.0	0.0090	C.L. 6
2	12	0.1105E+02	0.3220	C.L. 2	0.0	0.0090	C.L. 6
2	25	0.1135E+02	0.1260	H.L. 2	0.0	0.0090	C.L. 6
2	27	0.8720E+01	0.0720	H.L. 1	-0.1500E+00	2.4820	C.L. 6
2	28	0.1096E+02	0.1170	H.L. 2	-0.4900E+00	2.4100	C.L. 6
2	33	0.8880E+01	0.0630	H.L. 1	-0.1420E+01	0.0810	H.L. 5
2	39	0.1076E+02	0.2320	C.L. 2	0.0	0.0090	C.L. 6
2	41	0.9350E+01	0.0630	H.L. 1	0.0	0.0090	C.L. 6
2	51	0.1036E+02	0.1170	H.L. 2	-0.1530E+01	0.5380	H.L. 3
3	2	0.5940E+01	0.0270	H.L. 3	-0.7620E+01	0.0630	H.L. 1
3	4	0.5980E+01	0.0270	H.L. 3	-0.7340E+01	0.0270	H.L. 4
3	13	0.9920E+01	0.3040	C.L. 3	0.0	0.0180	C.L. 6

Comp	Between And Comp	Maximum Diff Pressure	Time (Sec)	Element	Minimum Diff Pressure	Time (Sec)	Element
3	14	0.9710E+01	0.3040	C.L. 3	0.0	0.0180	C.L. 6
3	15	0.9410E+01	0.3580	C.L. 3	0.0	0.0180	C.L. 6
3	25	0.9190E+01	0.2140	H.L. 4	0.0	0.0180	C.L. 6
3	27	0.7420E+01	0.0450	H.L. 3	-0.4300E+00	2.5720	C.L. 1
3	28	0.8790E+01	0.2140	H.L. 3	-0.4700E+00	2.4100	C.L. 6
3	29	0.1022E+02	0.4840	C.L. 3	-0.5500E+00	2.4640	C.L. 6
3	30	0.8780E+01	0.2140	H.L. 4	-0.4600E+00	2.4640	C.L. 6
3	33	0.6930E+01	0.0360	H.L. 3	-0.1150E+01	0.1440	H.L. 4
3	35	0.9100E+01	0.2140	H.L. 4	-0.4900E+00	2.3560	C.L. 6
3	42	0.7300E+01	0.1080	H.L. 1	0.0	0.0180	C.L. 6
3	46	0.9520E+01	0.2140	H.L. 4	0.0	0.0180	C.L. 6
3	50	0.8870E+01	0.2140	H.L. 4	-0.4600E+00	2.5180	C.L. 6
3	51	0.7820E+01	0.1170	H.L. 1	-0.1560E+01	0.5560	H.L. 1
4	5	0.6460E+01	0.0270	H.L. 4	-0.6680E+01	0.0540	H.L. 4
4	16	0.1074E+02	0.3840	C.L. 4	0.0	0.0090	C.L. 6
4	17	0.1017E+02	0.3040	C.L. 4	0.0	0.0090	C.L. 6
4	18	0.9520E+01	0.3400	C.L. 4	0.0	0.0090	C.L. 6
4	25	0.9530E+01	0.1080	H.L. 6	0.0	0.0090	C.L. 6
4	29	0.1021E+02	0.4480	C.L. 4	-0.5600E+00	2.4640	C.L. 1
4	30	0.9190E+01	0.1080	H.L. 6	-0.4700E+00	2.5540	C.L. 1
4	31	0.8090E+01	0.0360	H.L. 4	-0.3800E+00	2.5900	C.L. 6
4	33	0.7830E+01	0.0360	H.L. 4	-0.1110E+01	0.2140	C.L. 1
4	36	0.9370E+01	0.1080	H.L. 6	-0.4800E+00	2.4640	C.L. 1
4	43	0.8240E+01	0.0900	H.L. 6	0.0	0.0090	C.L. 6
4	47	0.9740E+01	0.2500	H.L. 1	0.0	0.0090	C.L. 6
4	51	0.9180E+01	0.0990	H.L. 6	-0.1720E+01	0.5560	H.L. 1
5	4	0.6680E+01	0.0540	H.L. 6	-0.6460E+01	0.0270	H.L. 4
5	6	0.5940E+01	0.0180	H.L. 5	-0.8280E+01	0.0270	H.L. 6
5	19	0.1159E+02	0.2860	C.L. 5	0.0	0.0	C.L. 6
5	20	0.1116E+02	0.2860	C.L. 5	0.0	0.0	C.L. 6
5	21	0.1060E+02	0.3220	C.L. 5	0.0	0.0	C.L. 6

Comp	Between And Comp	Maximum Diff Pressure	Time (Sec)	Element	Minimum Diff Pressure	Time (Sec)	Element
5	25	0.1125E+02	0.1170	H.L. 5	0.0	0.0	C.L. 6
5	30	0.1080E+02	0.1170	H.L. 5	-0.5000E+00	2.5540	C.L. 1
5	31	0.8280E+01	0.0630	H.L. 6	-0.1600E+00	2.4640	C.L. 1
5	32	0.1065E+02	0.1170	H.L. 5	-0.5000E+00	2.5540	C.L. 1
5	33	0.8650E+01	0.0630	H.L. 6	-0.1480E+01	0.0900	H.L. 2
5	44	0.9160E+01	0.0630	H.L. 6	0.0	0.0	C.L. 6
5	48	0.1063E+02	0.1080	H.L. 5	0.0	0.0	C.L. 6
5	51	0.1044E+02	0.1080	H.L. 5	-0.1750E+01	0.5560	H.L. 1
6	5	0.8280E+01	0.0270	H.L. 6	-0.5940E+01	0.0180	H.L. 5
6	22	0.1581E+02	0.2860	C.L. 6	-0.2100E+00	0.0360	C.L. 1
6	23	0.1521E+02	0.3040	C.L. 6	-0.2100E+00	0.0360	C.L. 1
6	24	0.1482E+02	0.3040	C.L. 6	-0.2100E+00	0.0360	C.L. 1
6	25	0.1357E+02	0.2320	C.L. 6	-0.2100E+00	0.0360	C.L. 1
6	30	0.1332E+02	0.2140	C.L. 6	-0.5000E+00	2.5900	C.L. 1
6	31	0.1156E+02	0.0360	H.L. 6	-0.2200E+00	0.0360	C.L. 1
6	32	0.1320E+02	0.2140	C.L. 6	-0.5000E+00	2.5900	C.L. 1
6	33	0.1185E+02	0.0450	H.L. 6	-0.2280E+01	0.0900	H.L. 2
6	37	0.1238E+02	0.1170	H.L. 6	-0.4400E+00	2.5900	C.L. 1
6	45	0.1136E+02	0.0360	H.L. 6	-0.2100E+00	0.0360	C.L. 1
6	49	0.1403E+02	0.2860	C.L. 6	-0.2100E+00	0.0360	C.L. 1
6	51	0.1253E+02	0.1080	H.L. 6	-0.1760E+01	0.5560	H.L. 1
7	1	0.2200E+00	0.0360	C.L. 6	-0.1636E+02	0.2860	C.L. 1
7	2	0.0	0.0090	C.L. 6	-0.1090E+02	0.2860	C.L. 1
7	8	0.3480E+01	0.1080	H.L. 2	-0.1020E+01	0.2500	H.L. 1
7	10	0.5200E+01	0.2860	H.L. 2	-0.3490E+01	0.2320	H.L. 1
7	25	0.7540E+01	0.1260	H.L. 2	-0.2550E+01	0.2680	H.L. 1
7	40	0.0	0.0990	C.L. 6	-0.1082E+02	0.2860	C.L. 1
8	1	0.2200E+00	0.0360	C.L. 6	-0.1580E+02	0.3040	C.L. 1
8	7	0.1020E+01	0.2500	H.L. 1	-0.3480E+01	0.1080	H.L. 2
8	9	0.3000E+01	0.1440	H.L. 2	-0.9100E+00	0.2320	H.L. 1
8	11	0.4290E+01	0.2680	H.L. 2	-0.2770E+01	0.2140	H.L. 1

Comp	Between And Comp	Maximum Diff Pressure	Time (Sec)	Element	Minimum Diff Pressure	Time (Sec)	Element
8	25	0.6440E+01	0.1440	H.L. 2	-0.2210E+01	0.2860	H.L. 1
9	1	0.2200E+00	0.0360	C.L. 6	-0.1539E+02	0.3040	C.L. 1
9	8	0.9100E+00	0.2320	H.L. 1	-0.3000E+01	0.1440	H.L. 2
9	12	0.3350E+01	0.2500	H.L. 2	-0.2230E+01	0.2680	H.L. 1
9	25	0.4730E+01	0.1710	H.L. 2	-0.1730E+01	0.2860	H.L. 1
9	38	0.4910E+01	0.1710	H.L. 2	-0.1200E+01	0.2860	H.L. 1
10	2	0.0	0.0890	C.L. 6	-0.1203E+02	0.3040	C.L. 2
10	7	0.3490E+01	0.2320	H.L. 1	-0.5200E+01	0.2860	H.L. 2
10	11	0.2990E+01	0.1080	H.L. 1	-0.7500E+00	0.2860	H.L. 2
10	13	0.5540E+01	0.1170	H.L. 1	-0.3820E+01	0.2680	H.L. 2
10	25	0.6770E+01	0.1260	H.L. 1	-0.2270E+01	0.2860	H.L. 2
10	41	0.1000E-01	0.0360	C.L. 2	-0.7530E+01	0.2860	C.L. 2
11	2	0.0	0.0090	C.L. 6	-0.1163E+02	0.2860	C.L. 2
11	8	0.2770E+01	0.2140	H.L. 1	-0.4290E+01	0.2680	H.L. 2
11	10	0.7500E+00	0.2860	H.L. 2	-0.2990E+01	0.1080	H.L. 1
11	12	0.2720E+01	0.1440	H.L. 1	-0.9500E+00	0.2860	C.L. 2
11	14	0.4510E+01	0.1350	H.L. 1	-0.2890E+01	0.2500	H.L. 2
11	25	0.5770E+02	0.1440	H.L. 1	-0.1530E+01	0.3040	H.L. 2
12	2	0.0	0.0090	C.L. 6	-0.1105E+02	0.3220	C.L. 2
12	9	0.2230E+01	0.2680	H.L. 1	-0.3350E+01	0.2500	H.L. 2
12	11	0.9500E+00	0.2860	C.L. 2	-0.2720E+01	0.1440	H.L. 1
12	15	0.2530E+01	0.1350	H.L. 1	-0.2510E+01	0.3220	H.L. 1
12	25	0.4090E+01	0.2500	H.L. 5	-0.1220E+01	0.3040	H.L. 2
12	39	0.4700E+01	0.2500	H.L. 5	-0.9900E+00	0.2680	C.L. 2
13	3	0.0	0.0180	C.L. 6	-0.9920E+01	0.3040	C.L. 3
13	10	0.3820E+01	0.2680	H.L. 2	-0.5540E+01	0.1170	H.L. 1
13	14	0.2730E+01	0.1800	H.L. 6	-0.4500E+00	0.3760	H.L. 3
13	16	0.4440E+01	0.2500	H.L. 4	-0.4770E+01	0.1440	H.L. 6
13	25	0.6300E+01	0.1710	H.L. 1	-0.1230E+01	0.3040	H.L. 3
13	42	0.0	0.0900	C.L. 6	-0.5820E+01	0.3040	C.L. 3
13	50	0.5970E+01	0.1710	H.L. 1	-0.6850E+01	1.5820	C.L. 6

Comp	Between And Comp	Maximum Diff Pressure	Time (Sec)	Element	Minimum Diff Pressure	Time (Sec)	Element
14	3	0.0	0.0180	C.L. 6	-0.9710E+01	0.3040	C.L. 3
14	11	0.2890E+01	0.2500	H.L. 2	-0.4510E+01	0.1350	H.L. 1
14	13	0.4500E+00	0.3760	H.L. 3	-0.2730E+01	0.1800	H.L. 6
14	15	0.2490E+01	0.1800	H.L. 1	-0.8600E+00	0.2860	H.L. 3
14	17	0.3610E+01	0.2680	H.L. 4	-0.3850E+01	0.1620	H.L. 6
14	25	0.5210E+01	0.1890	H.L. 1	-0.1000E+01	0.3040	C.L. 3
14	50	0.4800E+01	0.1890	H.L. 1	-0.6870E+01	1.6000	C.L. 5
15	3	0.0	0.0180	C.L. 6	-0.9410E+01	0.3580	C.L. 3
15	12	0.2510E+01	0.3220	H.L. 1	-0.2530E+01	0.1350	H.L. 1
15	14	0.8600E+00	0.2860	H.L. 3	-0.2490E+01	0.1800	H.L. 1
15	18	0.2710E+01	0.3400	H.L. 5	-0.2230E+01	0.1620	H.L. 6
15	25	0.3720E+01	0.2140	H.L. 1	-0.8500E+00	0.3220	H.L. 3
15	46	0.4140E+01	0.2140	H.L. 1	-0.8000E+00	0.2680	H.L. 3
15	50	0.3320E+01	0.2320	H.L. 6	-0.6850E+01	1.6180	C.L. 5
16	4	0.0	0.0090	C.L. 6	-0.1074E+02	0.3040	C.L. 4
16	13	0.4770E+01	0.1440	H.L. 6	-0.4440E+01	0.2500	H.L. 4
16	17	0.2630E+01	0.1800	H.L. 1	-0.8600E+00	0.3040	H.L. 4
16	19	0.3110E+01	0.2500	H.L. 5	-0.4390E+01	0.1170	H.L. 6
16	25	0.6230E+01	0.1980	H.L. 1	-0.2240E+01	0.2860	H.L. 4
16	43	0.1000E-01	0.0360	C.L. 4	-0.6680E+01	0.2860	H.L. 4
17	4	0.0	0.0090	C.L. 6	-0.1017E+02	0.3040	C.L. 4
17	14	0.3850E+01	0.1620	H.L. 6	-0.3610E+01	0.2680	H.L. 4
17	16	0.8600E+00	0.3040	H.L. 4	-0.2630E+01	0.1800	H.L. 1
17	18	0.2380E+01	0.1710	H.L. 6	-0.1070E+01	0.2860	H.L. 4
17	20	0.2430E+01	0.2500	H.L. 5	-0.3490E+01	0.1260	H.L. 6
17	25	0.5100E+01	0.1710	H.L. 6	-0.1480E+01	0.2860	H.L. 4
18	4	0.0	0.0090	C.L. 6	-0.9520E+01	0.3400	C.L. 4
18	15	0.2230E+01	0.1620	H.L. 6	-0.2710E+01	0.3400	H.L. 5
18	17	0.1070E+01	0.2860	H.L. 4	-0.2380E+01	0.1710	H.L. 6
18	21	0.2010E+01	0.3040	H.L. 6	-0.2240E+01	0.3760	C.L. 3
18	25	0.3500E+01	0.1980	H.L. 6	-0.1030E+01	0.3220	H.L. 4

Comp	Between And Comp	Maximum Diff Pressure	Time (Sec)	Element	Minimum Diff Pressure	Time (Sec)	Element
18	47	0.4130E+01	0.2500	H.L. 1	-0.1150E+01	0.2680	H.L. 4
19	5	0.0	0.0	C.L. 6	-0.1159E+02	0.2860	C.L. 5
19	16	0.4390E+01	0.1170	H.L. 6	-0.3110E+01	0.2500	H.L. 5
19	20	0.2890E+01	0.1080	H.L. 6	-0.7800E+00	0.2860	H.L. 5
19	22	0.3370E+01	0.2320	H.L. 6	-0.4880E+01	0.2860	H.L. 5
19	25	0.6610E+01	0.2140	H.L. 2	-0.2330E+01	0.2860	H.L. 5
19	44	0.1000E-01	0.0360	C.L. 5	-0.7190E+01	0.2860	C.L. 5
20	5	0.0	0.0	C.L. 6	-0.1116E+02	0.2860	C.L. 5
20	17	0.3490E+01	0.1260	H.L. 6	-0.2430E+01	0.2500	H.L. 5
20	19	0.7800E+00	0.2860	H.L. 5	-0.2890E+01	0.1080	H.L. 6
20	21	0.2650E+01	0.1440	H.L. 6	-0.9600E+00	0.2860	C.L. 5
20	23	0.2650E+01	0.2140	H.L. 6	-0.4040E+01	0.2680	H.L. 5
20	25	0.5640E+01	0.1440	H.L. 6	-0.1550E+01	0.2860	H.L. 5
21	5	0.0	0.0	C.L. 6	-0.1060E+02	0.3220	C.L. 5
21	18	0.2240E+01	0.3760	C.L. 3	-0.2010E+01	0.3040	H.L. 6
21	20	0.9600E+00	0.2860	C.L. 5	-0.2650E+01	0.1440	H.L. 6
21	24	0.2110E+01	0.2680	H.L. 6	-0.3170E+01	0.2500	H.L. 5
21	25	0.4090E+01	0.2500	H.L. 2	-0.1270E+01	0.3040	H.L. 5
21	48	0.4700E+01	0.2500	H.L. 2	-0.1020E+01	0.2680	C.L. 5
22	6	0.2100E+00	0.0360	C.L. 1	-0.1581E+02	0.2860	C.L. 6
22	19	0.4880E+01	0.2860	H.L. 5	-0.3370E+01	0.2320	H.L. 6
22	23	0.3450E+01	0.1080	H.L. 5	-0.1050E+01	0.2500	H.L. 6
22	25	0.7510E+01	0.1260	H.L. 5	-0.2570E+01	0.2500	H.L. 6
22	45	0.0	0.0270	C.L. 6	-0.1057E+02	0.2860	C.L. 6
23	6	0.2100E+00	0.0360	C.L. 1	-0.1521E+02	0.3040	C.L. 6
23	20	0.4040E+01	0.2680	H.L. 5	-0.2650E+01	0.2140	H.L. 6
23	22	0.1050E+01	0.2500	H.L. 6	-0.3450E+01	0.1080	H.L. 5
23	24	0.3010E+01	0.1440	H.L. 5	-0.9300E+00	0.2320	H.L. 6
23	25	0.6420E+01	0.1440	H.L. 5	-0.2180E+01	0.2860	H.L. 6
24	6	0.2100E+00	0.0360	C.L. 1	-0.1482E+02	0.3040	C.L. 6
24	21	0.3170E+01	0.2500	H.L. 5	-0.2110E+01	0.2680	H.L. 6

Comp	Between And Comp	Maximum Diff Pressure	Time (Sec)	Element	Minimum Diff Pressure	Time (Sec)	Element
24	23	0.9300E+00	0.2320	H.L. 6	-0.3010E+01	0.1440	H.L. 5
24	25	0.4670E+01	0.1710	H.L. 5	-0.1750E+01	0.2860	H.L. 6
24	49	0.4850E+01	0.1800	H.L. 5	-0.1220E+01	0.2860	H.L. 6
25	25	0.0	2.9680	C.L. 6	0.0	2.9680	C.L. 6
26	1	0.4800E+00	2.5180	C.L. 6	-0.1390E+02	0.2320	C.L. 1
26	2	0.4800E+00	2.4820	C.L. 6	-0.1085E+02	0.1170	H.L. 2
26	27	0.3300E+00	2.4460	C.L. 6	-0.6610E+01	0.2320	H.L. 1
26	28	0.1500E+00	0.2860	C.L. 1	-0.1000E+00	0.6460	C.L. 5
26	32	0.5900E+00	0.4480	C.L. 2	-0.5600E+00	0.2320	H.L. 1
26	34	0.7000E-01	2.3920	C.L. 6	-0.1060E+01	0.2320	H.L. 1
26	52	0.3800E+00	0.5920	C.L. 5	-0.2500E+00	0.2320	H.L. 1
27	1	0.2300E+00	0.0360	C.L. 6	-0.1135E+02	0.0360	H.L. 1
27	2	0.1500E+00	2.4820	C.L. 6	-0.8720E+01	0.0720	H.L. 1
27	3	0.4300E+00	2.5720	C.L. 1	-0.7420E+01	0.0450	H.L. 3
27	26	0.6610E+01	0.2320	H.L. 1	-0.3300E+00	2.4460	C.L. 6
27	28	0.6670E+01	0.2320	H.L. 1	-0.3500E+00	2.3200	C.L. 6
27	34	0.5740E+01	0.4120	C.L. 1	-0.2700E+00	2.5900	C.L. 6
27	35	0.7360E+01	0.4120	C.L. 1	-0.3700E+00	2.3560	C.L. 6
27	40	0.4480E+01	1.5280	C.L. 4	-0.5670E+01	0.0900	H.L. 1
27	41	0.4600E+01	1.3660	C.L. 4	-0.3920E+01	0.1170	H.L. 2
27	42	0.4520E+01	1.7260	C.L. 1	-0.4020E+01	0.1800	H.L. 6
27	52	0.6690E+01	0.4660	C.L. 1	-0.3400E+00	2.5720	C.L. 6
28	1	0.5000E+00	2.3380	C.L. 6	-0.1396E+02	0.2320	C.L. 1
28	2	0.4900E+00	2.4100	C.L. 6	-0.1096E+02	0.1170	H.L. 2
28	3	0.4700E+00	2.4100	C.L. 6	-0.8790E+01	0.2140	H.L. 3
28	26	0.1000E+00	0.6460	C.L. 5	-0.1500E+00	0.2860	C.L. 1
28	27	0.3500E+00	2.3200	C.L. 6	-0.6670E+01	0.2320	H.L. 1
28	29	0.5550E+01	1.0960	C.L. 2	-0.1100E+00	2.5540	C.L. 5
28	30	0.5800E+00	0.4120	C.L. 3	-0.5800E+00	0.4660	C.L. 5
28	35	0.1470E+01	0.7540	C.L. 1	-0.6000E-01	1.6180	C.L. 6

Table 6-3. Containment Subcompartment Differential Pressures. (Table 6-2 and Table 6-3 were originally one table.)

Comp	Between And Comp	Maximum Diff Pressure	Time (Sec)	Element	Minimum Diff Pressure	Time (Sec)	Element
29	3	0.5500E+00	2.4640	C.L. 6	-0.1022E+02	0.4840	C.L. 3
29	4	0.5600E+00	2.4640	C.L. 1	-0.1021E+02	0.4480	C.L. 4
29	28	0.1100E+00	2.5540	C.L. 5	-0.5550E+01	1.0960	C.L. 2
29	30	0.1400E+00	2.2660	C.L. 4	-0.5570E+01	1.0780	C.L. 2
29	35	0.1100E+00	2.4460	C.L. 5	-0.5160E+01	1.0780	C.L. 1
29	36	0.1400E+00	2.2660	C.L. 2	-0.5200E+01	1.0960	C.L. 2
29	42	0.4000E+01	2.2660	C.L. 6	-0.6790E+01	0.1800	H.L. 6
29	43	0.4020E+01	2.2120	C.L. 1	-0.7150E+01	0.2680	H.L. 1
30	4	0.4700E+00	2.5540	C.L. 1	-0.9190E+01	0.1080	H.L. 4
30	5	0.5000E+00	2.5540	C.L. 1	-0.1080E+02	0.1170	H.L. 5
30	28	0.5800E+00	0.4660	C.L. 5	-0.5800E+00	0.4120	C.L. 3
30	29	0.5570E+01	1.0780	C.L. 2	-0.1400E+00	2.2660	C.L. 4
30	31	0.3500E+00	2.5540	C.L. 1	-0.6500E+01	0.2320	H.L. 6
30	32	0.1200E+00	0.7540	H.L. 2	-0.2800E+00	0.5380	C.L. 2
30	36	0.1390E+01	0.7540	C.L. 6	-0.4000E-01	1.6360	C.L. 3
31	4	0.3800E+00	2.5900	C.L. 6	-0.8090E+01	0.0360	H.L. 4
31	5	0.1600E+00	2.4640	C.L. 1	-0.8280E+01	0.0630	H.L. 6
31	6	0.2200E+00	0.0360	C.L. 1	-0.1156E+02	0.0360	H.L. 6
31	30	0.6500E+01	0.2320	H.L. 6	-0.3500E+00	2.5540	C.L. 1
31	32	0.6340E+01	0.4660	C.L. 6	-0.3500E+00	2.5540	C.L. 1
31	36	0.7170E+01	0.4300	C.L. 6	-0.3500E+00	2.6980	C.L. 1
31	37	0.5550E+01	0.4660	C.L. 6	-0.2900E+00	2.6260	C.L. 1
31	43	0.4440E+01	1.7260	C.L. 6	-0.3970E+01	0.1800	H.L. 1
31	44	0.4550E+01	1.4020	C.L. 3	-0.3870E+01	0.1890	H.L. 2
31	45	0.4510E+01	1.4380	C.L. 3	-0.5510E+01	0.0810	H.L. 6
31	53	0.6780E+01	0.4660	C.L. 6	-0.3600E+00	2.5540	C.L. 1
32	4	0.4700E+00	2.5540	C.L. 1	-0.9050E+01	0.1080	H.L. 6
32	6	0.5000E+00	2.5900	C.L. 1	-0.1320E+02	0.2140	C.L. 6
32	26	0.5600E+00	0.2320	H.L. 1	-0.5900E+00	0.4480	C.L. 2

Comp	Between And Comp	Maximum Diff Pressure	Time (Sec)	Element	Minimum Diff Pressure	Time (Sec)	Element
32	30	0.2800E+00	0.5380	C.L. 2	-0.1200E+00	0.7540	H.L. 2
32	31	0.3500E+00	2.5540	C.L. 1	-0.6340E+01	0.4660	C.L. 6
32	37	0.6000E-01	2.9680	C.L. 1	-0.1050E+01	0.2140	H.L. 6
33	1	0.2240E+01	0.0900	H.L. 5	-0.1167E+02	0.0450	H.L. 1
33	2	0.1420E+01	0.0810	H.L. 5	-0.8880E+01	0.0630	H.L. 1
33	3	0.1150E+01	0.1440	H.L. 4	-0.6930E+01	0.0360	H.L. 3
33	4	0.1110E+01	0.2140	C.L. 1	-0.7830E+01	0.0360	H.L. 4
33	5	0.1480E+01	0.0900	H.L. 2	-0.8650E+01	0.0630	H.L. 6
33	6	0.2280E+01	0.0900	H.L. 2	-0.1185E+02	0.0450	H.L. 6
33	25	0.8840E+01	0.1980	H.L. 1	-0.2000E-01	0.0360	C.L. 4
33	51	0.6550E+01	0.1800	H.L. 5	-0.1560E+01	0.5560	H.L. 1
34	1	0.4200E+00	2.5180	C.L. 6	-0.1296E+02	0.2140	C.L. 1
34	25	0.6840E+01	1.5460	C.L. 5	0.0	0.0630	C.L. 6
34	26	0.1060E+01	0.2320	H.L. 1	-0.7000E-01	2.3920	C.L. 6
34	27	0.2700E+00	2.5900	C.L. 6	-0.5740E+01	0.4120	C.L. 1
34	40	0.4490E+01	1.6540	C.L. 4	-0.8120E+01	0.1170	H.L. 1
34	52	0.1010E+01	0.4840	C.L. 1	-0.7000E-01	2.5720	C.L. 6
35	3	0.4900E+00	2.3560	C.L. 6	-0.9100E+01	0.2140	H.L. 4
35	27	0.3700E+00	2.3560	C.L. 6	-0.7360E+01	0.4120	C.L. 1
35	28	0.6000E-01	1.6180	C.L. 6	-0.1470E+01	0.7540	C.L. 1
35	29	0.5160E+01	1.0780	C.L. 1	-0.1100E+00	2.4460	C.L. 5
35	42	0.4480E+01	1.6360	C.L. 6	-0.6520E+01	0.1800	H.L. 6
36	4	0.4800E+00	2.4640	C.L. 1	-0.9370E+01	0.1080	H.L. 6
36	29	0.5200E+01	1.0860	C.L. 2	-0.1400E+00	2.2660	C.L. 2
36	30	0.4000E-01	1.6360	C.L. 3	-0.1390E+01	0.7540	C.L. 6
36	31	0.3500E+00	2.6980	C.L. 1	-0.7170E+01	0.4300	C.L. 6
36	43	0.4460E+01	1.6180	C.L. 1	-0.6400E+01	0.2500	H.L. 1
37	6	0.4400E+00	2.5900	C.L. 1	-0.1238E+02	0.1170	H.L. 6
37	25	0.6850E+01	1.5640	C.L. 5	0.0	0.0180	C.L. 6
37	31	0.2900E+00	2.6260	C.L. 1	-0.5550E+01	0.4660	C.L. 6
37	32	0.1050E+01	0.2140	H.L. 6	-0.6000E-01	2.9680	C.L. 1

Comp	Between And Comp	Maximum Diff Pressure	Time (Sec)	Element	Minimum Diff Pressure	Time (Sec)	Element
37	45	0.4470E+01	1.6180	C.L. 3	-0.7970E+01	0.0990	H.L. 6
37	53	0.1250E+01	0.4840	C.L. 6	-0.9000E-01	1.7980	C.L. 1
38	1	0.2200E+00	0.0360	C.L. 6	-0.1462E+02	0.2860	C.L. 1
38	9	0.1200E+01	0.2860	H.L. 1	-0.4910E+01	0.1710	H.L. 2
38	25	0.1850E+01	0.1530	H.L. 2	-0.7300E+00	0.2680	H.L. 1
38	39	0.1930E+01	0.1530	H.L. 2	-0.2150E+01	0.1530	H.L. 1
39	2	0.0	0.0090	C.L. 6	-0.1076E+02	0.2320	C.L. 2
39	12	0.9900E+00	0.2680	C.L. 2	-0.4700E+01	0.2500	H.L. 5
39	25	0.1580E+01	0.1530	H.L. 1	-0.7000E+00	0.2680	C.L. 5
39	38	0.2150E+01	0.1530	H.L. 1	-0.1930E+01	0.1530	H.L. 2
39	46	0.1870E+01	0.2320	H.L. 5	-0.1880E+01	0.1890	H.L. 1
40	1	0.2200E+00	0.0360	C.L. 6	-0.1115E+02	0.0360	H.L. 1
40	7	0.1082E+02	0.2860	C.L. 1	0.0	0.0990	C.L. 6
40	25	0.8710E+01	0.1170	H.L. 1	0.0	0.0990	C.L. 6
40	27	0.5670E+01	0.0900	H.L. 1	-0.4480E+01	1.5280	C.L. 4
40	34	0.8120E+01	0.1170	H.L. 1	-0.4490E+01	1.6540	C.L. 4
40	41	0.5090E+01	0.0720	H.L. 1	-0.2190E+01	0.0630	H.L. 2
40	52	0.8420E+01	0.1170	H.L. 1	-0.4520E+01	1.6540	C.L. 4
41	2	0.0	0.0090	C.L. 6	-0.9350E+02	0.0630	H.L. 1
41	10	0.7530E+01	0.2860	C.L. 2	-0.1000E-01	0.0360	C.L. 2
41	25	0.7690E+01	0.2320	H.L. 6	-0.1000E-01	0.0360	C.L. 2
41	27	0.3920E+01	0.1170	H.L. 2	-0.4600E+01	1.3660	C.L. 4
41	40	0.2190E+01	0.0630	H.L. 2	-0.5090E+01	0.0720	H.L. 1
41	42	0.6090E+01	0.1080	H.L. 1	-0.3100E+01	0.0810	H.L. 3
42	3	0.0	0.0180	C.L. 6	-0.7300E+01	0.1080	H.L. 1
42	13	0.5820E+01	0.3040	C.L. 3	0.0	0.0900	C.L. 6
42	25	0.6730E+01	0.1620	H.L. 1	0.0	0.0900	C.L. 6
42	27	0.4020E+01	0.1800	H.L. 6	-0.4520E+01	1.7260	C.L. 1
42	29	0.6790E+01	0.1800	H.L. 6	-0.4000E+01	2.2660	C.L. 6
42	35	0.6520E+01	0.1800	H.L. 6	-0.4480E+01	1.6360	C.L. 6
42	41	0.3100E+01	0.0810	H.L. 3	-0.6090E+01	0.1080	H.L. 1

Comp	Between And Comp	Maximum Diff Pressure	Time (Sec)	Element	Minimum Diff Pressure	Time (Sec)	Element
42	43	0.4190E+01	0.1440	H.L. 1	-0.5140E+01	0.1350	H.L. 6
42	50	0.6480E+01	0.1530	H.L. 1	-0.4530E+01	1.6900	C.L. 6
43	4	0.0	0.0090	C.L. 6	-0.8240E+01	0.0900	C.L. 6
43	16	0.6680E+01	0.2860	H.L. 4	-0.1000E-01	0.0360	H.L. 4
43	25	0.6610E+01	0.1890	H.L. 1	-0.1000E-01	0.0360	C.L. 4
43	29	0.7150E+01	0.2680	H.L. 1	-0.4020E+01	2.2120	C.L. 1
43	31	0.3970E+01	0.1800	H.L. 1	-0.4440E+01	1.7260	C.L. 6
43	36	0.6400E+01	0.2500	H.L. 1	-0.4460E+01	1.6180	C.L. 1
43	42	0.5140E+01	0.1350	H.L. 6	-0.4190E+01	0.1440	H.L. 1
43	44	0.2620E+01	0.0720	H.L. 4	-0.4970E+01	0.0990	H.L. 6
44	5	0.0	0.0	C.L. 6	-0.9160E+01	0.0630	H.L. 6
44	19	0.7190E+01	0.2860	C.L. 5	-0.1000E-01	0.0360	C.L. 5
44	25	0.7690E+01	0.2320	H.L. 1	-0.1000E-01	0.0360	C.L. 5
44	31	0.3870E+01	0.1890	H.L. 2	-0.4550E+01	1.4020	C.L. 3
44	43	0.4970E+01	0.0990	H.L. 6	-0.2620E+01	0.0720	H.L. 4
44	45	0.2300E+01	0.0990	H.L. 4	-0.5260E+01	0.0720	H.L. 6
45	6	0.2100E+00	0.0360	C.L. 1	-0.1136E+02	0.0360	H.L. 6
45	22	0.1057E+02	0.2860	C.L. 6	0.0	0.0270	C.L. 6
45	25	0.8620E+01	0.1170	H.L. 6	0.0	0.0270	C.L. 6
45	31	0.5510E+01	0.0810	H.L. 6	-0.4510E+01	1.4380	C.L. 3
45	37	0.7930E+01	0.0990	H.L. 6	-0.4470E+01	1.6180	C.L. 3
45	44	0.5260E+01	0.0720	H.L. 6	-0.2300E+01	0.0990	H.L. 4
45	53	0.8280E+01	0.1080	H.L. 6	-0.4490E+01	1.6180	C.L. 2
46	3	0.0	0.0180	C.L. 6	-0.9520E+01	0.2140	H.L. 4
46	15	0.8000E+00	0.2680	H.L. 3	-0.4140E+01	0.2140	H.L. 1
46	25	0.1590E+01	0.2140	H.L. 6	-0.7400E+00	0.2500	H.L. 6
46	46	0.0	2.9680	C.L. 6	0.0	2.9680	C.L. 6
46	48	0.1590E+01	0.2140	H.L. 6	-0.1920E+01	0.2320	C.L. 1
46	50	0.1270E+01	0.2140	H.L. 6	-0.6840E+01	1.6000	C.L. 5
47	4	0.0	0.0890	C.L. 6	-0.9740E+01	0.2500	H.L. 1
47	18	0.1150E+01	0.2680	H.L. 4	-0.4130E+01	0.2500	H.L. 1

Comp	Between And Comp	Maximum Diff Pressure	Time (Sec)	Element	Minimum Diff Pressure	Time (Sec)	Element
47	25	0.1580E+01	0.2140	H.L. 1	-0.7400E+00	0.2500	H.L. 1
47	46	0.2000E+01	0.2140	H.L. 1	-0.2150E+01	0.2140	H.L. 6
47	48	0.2050E+01	0.1800	H.L. 6	-0.1880E+01	0.1620	H.L. 4
48	5	0.0	0.0	C.L. 6	-0.1063E+02	0.1080	H.L. 5
48	21	0.1020E+01	0.2680	C.L. 5	-0.4700E+01	0.2500	H.L. 2
48	25	0.15800+01	0.1530	H.L. 6	-0.7000E+00	0.2680	C.L. 2
48	47	0.1880E+01	0.1620	H.L. 4	-0.2050E+01	0.1800	H.L. 6
48	49	0.2170E+01	0.1530	H.L. 6	-0.1900E+01	0.1530	H.L. 5
49	6	0.2100E+00	0.0360	C.L. 1	-0.1403E+02	0.2860	C.L. 6
49	24	0.1220E+01	0.2860	H.L. 6	-0.4850E+01	0.1800	H.L. 5
49	25	0.1830E+01	0.1530	H.L. 5	-0.7600E+00	0.2500	C.L. 3
49	48	0.1900E+01	0.1530	H.L. 5	-0.2170E+01	0.1530	H.L. 6
50	3	0.4600E+00	2.5180	C.L. 6	-0.8870E+01	0.2140	H.L. 4
50	13	0.6850E+01	1.5820	C.L. 6	-0.5970E+01	0.1710	H.L. 1
50	14	0.6870E+01	1.6000	C.L. 5	-0.4800E+01	0.1890	H.L. 1
50	15	0.6850E+01	1.6180	C.L. 5	-0.3320E+01	0.2320	H.L. 6
50	42	0.4530E+01	1.6900	C.L. 6	-0.6480E+01	0.1530	H.L. 1
50	46	0.6840E+01	1.6000	C.L. 5	-0.1270E+01	0.2140	H.L. 6
51	1	0.1550E+01	0.5380	H.L. 3	-0.1236E+02	0.1080	H.L. 1
51	2	0.1530E+01	0.5380	H.L. 3	-0.1036E+02	0.1170	H.L. 2
51	3	0.1560E+01	0.5560	H.L. 1	-0.7820E+01	0.1170	H.L. 1
51	4	0.1720E+01	0.5560	H.L. 1	-0.9180E+01	0.0990	H.L. 6
51	5	0.1750E+01	0.5560	H.L. 1	-0.1044E+02	0.1080	H.L. 5
51	6	0.1760E+01	0.5560	H.L. 1	-0.1253E+02	0.1080	H.L. 6
51	33	0.1560E+01	0.5560	H.L. 1	-0.6550E+01	0.1800	H.L. 5
52	2	0.4800E+00	2.4820	C.L. 6	-0.1102E+02	0.1170	H.L. 2
52	6	0.5100E+00	2.5900	C.L. 1	-0.1299E+02	0.2320	C.L. 6
52	27	0.3400E+00	2.5720	C.L. 6	-0.6690E+01	0.4660	C.L. 1
52	34	0.7000E-01	2.5720	C.L. 6	-0.1010E+01	0.4840	C.L. 1
52	40	0.4520E+01	1.6540	C.L. 4	-0.8420E+01	0.1170	H.L. 1
53	31	0.3600E+00	2.5540	C.L. 1	-0.6780E+01	0.4660	C.L. 6

Comp	Between And Comp	Maximum Diff Pressure	Time (Sec)	Element	Minimum Diff Pressure	Time (Sec)	Element
53	32	0.2500E+00	0.2860	C.L. 5	-0.4600E+00	0.4840	C.L. 6
53	37	0.9000E+01	1.7980	C.L. 1	-0.1250E+01	0.4840	C.L. 6
53	45	0.4490E+01	1.6180	C.L. 2	-0.8280E+01	0.1080	H.L. 6

Table 6-4. TMD Element Input Data

Element Number	Volume (ft^3)	Ice Mass (lbm)	Ice Heat Transfer Area (ft^2)	Initial Steam Pressure (psia)	Initial Air Pressure (psia)	Initial Temperature (°F)
1	30091.	0	0	.3	14.7	120.
2	36965.	0	0	.3	14.7	120.
3	52737.	0	0	.3	14.7	120.
4	36012.	0	0	.3	14.7	120.
5	36965	0	0	.3	14.7	120.
6	28512	0	0	.3	14.7	120.
7	3295.	93576.	11290.	0.07	14.93	30.0
8	3295.	93576.	11290.	0.07	14.93	30.0
9	3295.	46788.	5645	0.07	14.93	30.0
10	3895.	110595.	13342.	0.07	14.93	30.0
11	3895.	110595.	13342.	0.07	14.93	30.0
12	3895.	55295.	6671	0.07	14.93	30.0
13	7789.	221180.	26685.	0.07	14.93	30.0
14	7789.	221180.	26685.	0.07	14.93	30.0
15	7789.	110590.	13343.	0.07	14.93	30.0
16	5393.	153125.	18474.	0.07	14.93	30.0
17	5393.	153125	18474.	0.07	14.93	30.0
18	5393.	76562.	9237.	0.07	14.93	30.0
19	4194.	119097.	14369.	0.07	14.93	30.0
20	4194.	119097.	14369.	0.07	14.93	30.0
21	4194.	59549.	7185.	0.07	14.93	30.0
22	4194.	119097.	14369.	0.07	14.93	30.0
23	4194.	119097.	14369.	0.07	14.93	30.0
24	4194.	59549	7185.	0.07	14.93	30.0
25	670101.	0	0	.3	14.7	120.
26	11706.	0	0	.3	14.7	120.
27	14953.	0	0	.3	14.7	120.
28	11207.	0	0	.3	14.7	120.
29	11835.	0	0	.3	14.7	120.
30	11099.	0	0	.3	14.7	120.

Element Number	Volume (ft^3)	Ice Mass (lbm)	Ice Heat Transfer Area (ft^2)	Initial Steam Pressure (psia)	Initial Air Pressure (psia)	Initial Temperature (°F)
31	14955.	0	0	.3	14.7	120.
32	9762.	0	0	.3	14.7	120.
33	16129.	0	0	.3	14.7	120.
34	4301.	0	0	.3	14.7	120.
35	4140.	0	0	.3	14.7	120.
36	4140.	0	0	.3	14.7	120.
37	3662.	0	0	.3	14.7	120.
38	5385.	0	0	0.07	14.93	30.0
39	6365.	0	0	0.07	14.93	30.0
40	2778.	46788.	5645.	0.07	14.93	30.0
41	3283.	55295.	6671.	0.07	14.93	30.0
42	6565.	110590.	13343.	0.07	14.93	30.0
43	4545.	76562	9237	0.07	14.93	30.0
44	3535.	59549.	7185.	0.07	14.93	30.0
45	3535.	45549.	7185.	0.07	14.93	30.0
46	12729.	0	0	0.07	14.93	30.0
47	8813.	0	0	0.07	14.93	30.0
48	6854.	0	0	0.07	14.93	30.0
49	6854.	0	0	0.07	14.93	30.0
50	1078.	0	0	.3	14.7	120.
51	15349.	0	0	.3	14.7	120.
52	7657.	0	0	.3	14.7	120.
53	5058.	0.	0	.3	14.7	120.

Table 6-5. TMD Flow Path Input Data - Ventilation Duct Intact

Flow Path Element to Element	Flow Path Length (ft)	Flow Area (ft^2)	Loss Coefficient K	Flow Resistance $f\frac{L}{D}$	Contraction a/A
1 to 2	15.0	681.	0.150	0.035	0.54
2 to 3	21.3	681.	0.150	0.050	0.54
3 to 4	23.2	679.	0.076	0.050	0.54
4 to 5	17.4	681.	0.120	0.044	0.54
5 to 6	15.0	681.	0.150	0.035	0.54
6 to 1	29.0	100.	1.58	0	0.080
26 to 32	29.0	26.3	1.59	0.007	0.18
27 to 1	8.87	46.0	2.40	0	0.13
28 to 26	80.0	146	0	0.21	1.0
29 to 28	2.45	9.0	2.22	0	.027
30 to 28	59.4	90.0	1.1	0.081	0.62
31 to 4	8.77	46.0	2.40	0.	0.13
32 to 30	80.0	146.	0	0.21	1.0
2 to 33	5.81	38.3	2.15	0	0.030
34 to 27	4.63	16.00	2.60	0.001	0.076
37 to 31	4.64	16.0	2.60	0.001	0.083
40 to 1	10.46	121.9	1.16	0	1.0
41 to 2	10.36	144.0	1.16	0	1.0
42 to 3	10.36	288.0	1.16	0	1.0
43 to 4	10.36	199.4	1.16	0	1.0
44 to 5	10.36	155.1	1.16	0	1.0
45 to 6	10.36	155.1	1.16	0	1.0
1 to 33	11.5	20.0	2.15	0	0.016
3 to 33	6.60	72.0	2.15	0	0.035
4 to 33	6.24	52.0	2.15	0.	0.041
6 to 33	5.90	18.0	2.15	0.	0.041
7 to 8	12.278	112.80	0.	.5165	.239
8 to 9	12.278	112.80	0.	.5165	.359
9 to 38	8.8558	112.80	.812	.2582	.359

Flow Path Element to Element	Flow Path Length (ft)	Flow Area (ft^2)	Loss Coefficient K	Flow Resistance $f\frac{L}{D}$	Contraction a/A
10 to 11	12.278	131.31	0.	.5165	.239
11 to 12	12.278	131.31	0.	.5165	.359
12 to 39	8.8558	131.31	.812	.2582	.359
13 to 14	12.278	266.63	0.	.5165	.239
14 to 15	12.278	266.63	0.	.5165	.359
15 to 46	8.8558	266.63	.812	.2582	.359
16 to 17	12.278	184.59	0.	.5165	.239
17 to 18	12.278	184.59	0.	.5165	.359
18 to 47	8.8558	184.59	.812	.2582	.359
19 to 20	12.278	143.57	0.	.5165	.239
20 to 21	12.278	143.57	0.	.5165	.359
21 to 48	8.8558	143.57	.812	.2582	.359
22 to 23	12.278	143.57	0.	.5165	.239
23 to 24	12.278	143.57	0.	.5165	.359
24 to 49	8.8558	143.57	.812	.2582	.359
26 to 27	6.86	17.5	2.69	0.002	0.12
27 to 3	8.70	46.0	2.40	0.	0.13
28 to 27	6.86	17.5	2.69	0.002	0.12
30 to 31	6.86	17.5	2.69	0.002	0.12
31 to 6	9.08	46.0	2.40	0.	0.13
32 to 31	6.03	17.5	2.69	0.002	0.12
5 to 33	5.81	38.3	2.15	0.	0.03
34 to 26	2.86	12.0	2.39	0.	0.057
35 to 28	3.48	12.0	2.38	0.	0.036
36 to 30	3.48	12.0	2.38	0.	0.036
37 to 32	2.91	12.0	2.40	0.	0.062
38 to 25	2.80	233.80	1.45	0.	.269
39 to 25	2.80	267.60	1.43	0.	.269
40 to 7	8.222	106.7	0.227	.1419	.230
40 to 10	8.222	126.1	0.227	.1419	.230

Flow Path Element to Element	Flow Path Length (ft)	Flow Area (ft^2)	Loss Coefficient K	Flow Resistance $f\frac{L}{D}$	Contraction a/A
42 to 13	8.222	252.6	0.227	.1419	.230
43 to 16	8.222	174.6	0.227	.1419	.230
44 to 19	8.222	135.8	.227	.1419	.230
45 to 22	8.222	135.8	.227	.1419	.230
46 to 25	2.80	539.5	1.43	0.	.269
47 to 25	2.80	376.5	1.41	0.	.269
48 to 25	2.80	289.4	1.44	0.	.269
49 to 25	2.80	296.3	1.43	0.	.269
30 to 50	2.55	5.0	2.20	0.	0.034
34 to 52	4.06	16.0	2.57	0.	0.076
52 to 53	25.19	40.25	1.58	0.	0.22
53 to 37	3.34	16.0	2.58	0.	0.079
53 to 32	2.87	7.5	2.20	0.	0.037
52 to 26	13.45	35.0	2.72	0.	0.187
51 to 3	32.89	45.0	1.62	0.	0.117
40 to 41	13.8	24.7	7.5	0.	.075
41 to 42	22.4	24.7	12.5	0.	.046
42 to 43	25.3	24.7	12.5	0.	.041
43 to 44	18.4	24.7	10.0	0.	0.56
44 to 45	16.1	24.7	10.0	0.	0.64

Table 6-6. TMD Flow Path Input Data - Ventilation Duct Intact

Flow Path Element to Element	Flow Path Length (ft)	Flow Area (ft^2)	Loss Coefficient K	Flow Resistance $f\frac{L}{D}$	Contraction a/A
3 to 33	6.13	56.6	2.15	---	0.026
4 to 33	5.78	39.8	2.15	---	0.031

Table 6-7. Mass And Energy Release Rates For Peak Reverse Differential Pressure

Time (sec)	Steam Mass (lbm/sec)	Steam Energy (Btu/sec)	Spill Mass (lbm/sec)	Spill Energy (Btu/sec)
0.	0.	0.	0.	0.
1.	71,304.	39,106,924.	1,247.	74072.
2.	52,769.	29,384,776.	1,200.	71268.
3.	45,106.	26,213,749.	1,159.	68845.
4.	41,675.	24,112,360.	1,122.	66647.
5.	38,687.	23,089,906.	1,088.	64627.
6.	33,982.	20,897,219.	1,057.	62815.
7.	31,240.	19,440,588.	1,030.	61182.
8.	25,628.	16,783,231.	1,004.	59638.
9.	19,552.	14,038,088.	980.	58236.
10.	15,183.	12,003,759.	958.	56935.
12.	11,403.	9,291,704.	919.	54589.
14.	8,957.	6,897,938.	884.	52510.
16.	4,748.	3,569,112.	853.	50668.
18.	5,302.	3,719,017.	825.	49005.
20.	4,500.	2,185,549.	800.	47520.
22.	3,518.	1,684,524.	778.	46213.
24.	3,125.	1,405,670.	757.	44966.
26.	3,335.	1,379,978.	737.	43778.
28.	3,518.	1,439,306.	719.	42709.
30.	3,551.	1,457,023.	703.	41758.
35.	5,696.	1,699,314.	666.	39560.
40.	2,059.	497,881.	634.	37660.
45.	0.	0.	607.	36056.
50.	0.	0.	582.	34571.
55.	0.	0.	561.	33323.
60.	0.	0.	541.	32135.
65.	0.	0.	523.	31066.
70.	3,900.	863,783.	507.	30116.
75.	4,657.	1,066,886.	492.	29225.
80.	4,079.	1,028,210.	479.	28453.

Time (sec)	Steam Mass (lbm/sec)	Steam Energy (Btu/sec)	Spill Mass (lbm/sec)	Spill Energy (Btu/sec)
85.	4,922.	1,257,468.	466.	27680.
90.	5,287.	1,377,635.	454.	26968.
93.5[1]	-----	---------	447.	26552.
95.	5,445.	1,378,187.	---	-----
99.	5,344.	1,378,742.	---	-----
100.[2]	0.	0.	211.	3789.
110.	0.	0.	211.	3789.
124.	15.	19,681.	211.	3789.
136.	12.	14,953.	211.	3789.
153.	11.	13,930.	211.	3789.
177.	17.	21,240.	211.	3789.
213.	25.	32,142.	211.	3789.
260.	444.	112,347.	211.	3789.
333.	460.	108,733.	211.	3789.

Note:

1. Broken loop accumulator spill ends at 93.5 sec
2. Beginning of reflood release

Table 6-8. Compartment Volume and Initial Condition Data For Peak Reverse Differential Pressure

I.	Containment Volume (ft^3)	
	Upper Compartment	720,000
	Lower Compartment	250,100
	Ice Condenser	122,400
	Dead Ended Compartments (includes all accumulator rooms, both fan compartments, instrument room and pipe tunnel)	125,400
		_____
		1,217,900
II.	Initial Conditions	
	1. Highest Containment Pressure	15.0 psia
	2. Lowest Operational Containment Temperature for	
	a. Upper Compartment	75°F
	b. Lower Compartment	100°F
	c. Dead Ended Compartments	100°F
	3. Highest Refueling Water Storage Tank Temperature	100°F
	4. Lowest Temperature Outside Containment	10°F
	5. Highest Initial Spray Temperature	100°F

Table 6-9. Active Heat Sink Data For Peak Reverse Differential Pressure

I.	Containment Spray System Parameters	
	1. Runout flow for one pump	4800 gpm
	2. Number of pumps operating with no diesel failure	2
	3. Number of pumps operating with one diesel failure	1
	4. Fastest post-LOCA initiation of spray system (assuming offsite power loss at start of LOCA)	25 sec
II.	Containment Air Return Fan System Parameters	
	1. Conservatively high flow rate (per fan)	40,000 cfm
	2. Fastest post-LOCA initiation	25 sec
III.	Hydrogen Skimmer Fan System Parameters	
	1. Conservatively low flow rate (per fan)	3000 cfm

Table 6-10. Upper Compartment Passive Heat Sink Data For Peak Reverse Differential Pressure

Structure	Heat Transfer Area (ft^2)	Thickness and Material	Thermal Conductivity (Btu/ft-hr-°F)	Volumetric Heat Capacity (Btu/ft^3-°F)
Structural Walls, Doghouses	28686	1.34 ft. Concrete	1.05	31.95
Containment Dome and Shell	25473	0.58 in. Carbon Steel	32.0	58.8
Miscellaneous Equipment, Crane Platforms, Electrical Equipment	34364	0.02 ft. Carbon Steel	32.0	58.8
Reactor Vessel Head Stand, Internals Storage Stand	1218	0.028 ft. Stainless Steel	9.4	55.11
Refueling Canal	6531	0.016 ft. Stainless Steel	9.4	55.11
		1.5 ft. Concrete	1.05	31.95

Table 6-11. Lower and Dead Ended Compartments Passive Heat Sink Data For Peak Reverse Differential Pressure

Structure	Heat Transfer Area (ft^2)	Thickness and Material	Thermal Conductivity (Btu/ft-hr-°F)	Volmetric Heat Capacity (Btu/ft^3-°F)
Structural Concrete (operating deck, walls, doghouses, refueling canal)	71873	1.5 ft. Concrete	1.05	31.95
Structural Steel (SG supports, platforms, steel columns)	23147	0.072 ft. Carbon Steel	32.0	58.8
Containment Shell	19037	0.063 ft. Carbon Steel	32.0	58.8
Refueling Canal	2615	0.016 ft. Stainless Steel	9.4	
		1.5 ft. Concrete	1.05	31.95
Mechanical Equipment	1785	0.003 ft. Stainless Steel	9.4	55.11
Cooling Coils	71400	0.004 ft. Copper	224.0	51.4
Steam Generator Doghouse	5964	0.063 ft. Carbon Steel	32.0	58.8
Floors and Slabs	8789	2.04 ft. Concrete	1.05	31.95

Table 6-12. Sensitivity Studies For D.C. Cook Plant

Parameter	Change Made From Base Value	Change In Operating Deck ΔP	Change In Peak Pressure Against the Shell
Blowdown	+ 10%	+ 11%	+ 12%
Blowdown	- 10%	- 10%	- 12%
Blowdown	- 20%	- 20%	- 23%
Blowdown	- 50%	- 50%	- 53%
Break Compartment Inertia Length	+ 10%	+ 4%	+ 1%
Break Compartment Inertia Length	- 10%	- 4%	- 1%
Break Compartment Volume	+ 10%	- 2%	- 1%
Break Compartment Volume	- 10%	+ 2%	+ 1%
Break Compartment Vent Areas	+ 10%	- 6%	- 5%
Break Compartment Vent Areas	- 10%	+ 8%	+ 5%
Door Port Failure in Break Compartment	one door port fails to open	+ 1	- 1%
Ice Mass	+ 10%	0	0
Ice Mass	- 10%	0	0
Door Inertia	+ 10%	+ 1%	0
Door Inertia	- 10%	- 1%	0
All Inertia Lengths	+ 10%	+ 5%	+ 4%
All Inertia Lengths	- 10%	- 5%	- 3%
Ice Bed Loss Coefficients	+ 10%	0	0
Ice Bed Loss Coefficients	- 10%	0	0
Entrainment Level	0% Ent	- 27%	- 11%
Entrainment Level	30% Ent	- 19%	- 15%
Entrainment Level	50% Ent	- 13%	- 12%
Entrainment Level	75% Ent	- 6%	- 6%
Lower Compartment Loss Coefficients	+ 10%	0	0
Lower Compartment Loss Coefficients	- 10%	0	0
Cross Flow Lower Plenum	in low estimate of resistance	0	- 7%
Cross Flow Lower Plenum	in high estimate of resistance	0	- 3%

Parameter	Change Made From Base Value	Change In Operating Deck ΔP	Change In Peak Pressure Against the Shell
Ice Condenser Flow Area	+ 10%	0	- 3%
Ice Condenser Flow Area	- 10%	0	+ 4%
Ice Condenser Flow Area	+ 20%	0	- 6%
Ice Condenser Flow Area	- 20%	0	+ 8%
Initial Pressure in Containment	+ 0.3 psi	+ 2%	+ 2%
Initial Pressure in Containment	-0.3 psi	- 2%	- 2%
Initial Ice Bed Temperature	+ 15°F	0	0
Initial Ice Bed Temperature	- 15°F	0	+ 1%

Notes:

1. All valves shown are to the nearest percent.

Table 6-13. McGuire Ice Condenser Design Parameters

Reactor Containment Volume	(Net free volume, ft^3)
Upper Compartment	670,101
Upper Plenum	47,000
Ice Condenser	86,300
Lower Plenum	24,200
Lower Compartment (Active)	237,411
Lower Compartment (Dead Ended)	130,899
Total Containment Volume	1,195,911

Note:

1. Reactor Power, MWt 3,479

Table 6-14. Deleted Per 1998 Update

Table 6-15. Containment Sump Volume Vs. Time Peak Containment Pressure Transient

Time (sec)	Total Volume (ft^3)
45	11593
60	17541
75	19018
90	19496
160	21097
230	22822
300	24015
450	26316
600	28813
750	31258
1200	38391
1800	47481
2400	55550
3000	63597
3600	70763
4200	72147
4800	74657
5400	76237
6000	77512
6600	77981
8200	77961
10600	77915

Table 6-16. Containment Sump Volume Vs. Elevation[1]

Building Elevation (ft)	Accumulated Active Volume[2] (ft^3)
726	7226
727	14600
728	21893
729	29046
730	35798
731	42844
732	50050
733	57352
734	64154
735	71386
736	78596
737	83722
738	88065
739	112398
740	119884

Note:

1. Volumes are determined by calculating the total volume and subtracting the volumes of all obstructions such as interior structures, equipment, piping, cable, etc. The volumes are considered to be accurate within ± 5%.
2. Assumes incore instrumentation area floods at elevation 738'-6".

Table 6-17. ECCS Flow Rates[1]

Time from Beginning of CLR (seconds)	ECCS Flow from RWST (gpm)	Spilled Flow from RWST (gpm)	Spray Flow from RWST (gpm)	Non-Spilled ECCS Flow from Sump (gpm)	Spilled ECCS Flow from Sump (gpm)	Spray Flow from Sump (gpm)	Auxiliary Spray Flow from Sump (gpm)
ECCS Flow Rate During Cold Leg Recirculation (CLR) - with Spilling Simulation							
0.0 to 95.0	3280	1805	0	0	0	0	0
95.01 to 555.0[2]	680	255	0	1465	1490	0	0
555.01 to t_{LO-LO}[2]	0.0	0	0	1465	1490	3325	0
t_{LO-LO}[2] to end	0	0	0	2190	1750	3325	0

Time fromBeginning of CLR (seconds)	ECCS Flow from RWST (gpm)	Spray Flow from RWST (gpm)	ECCS Flow from Sump (gpm)	Spray Flow from Sump (gpm)	Auxiliary Spray Flow from Sump (gpm)
ECCS Flow Rate During Cold Leg Recirculation (CLR) - with No Spilling Simulation					
0.0 to 95.00	4580	05	0	0	0
95.01 to 555.0[2]	880	0	2950	0	0
555.01 to t_{LO-LO}[2]	0.0	0	2950	3325	0
t_{LO-LO}[2] to end	0.0	0	3916	3325	0

Notes:

1. The flow values used in the containment analyses have been reduced by approximately 2% to account for the frequency variation of ±2% allowed by the Technical Specifications.
2. T_{LO-LO} may occur prior to t_{CLR}+555, in which case spray flow alignment is delayed until after t_{LO-LO}.

Table 6-18. Structural Heat Sink Data

A. Upper Containment	Area (sq. ft)	Thickness (ft)	Material
1. Containment Vessel Dome	20,773.8	0.00059 0.0573	Paint Carbon Steel
2. Containment Shell	3,139	0.00059 0.0625	Paint Carbon Steel
3. Crane Wall, CRDM Gate, S/G Doghouse	11,319	0.001167 1.5	Paint Concrete
4. Ice Condenser End Wall, Operating Floor, Pressurizer Doghouse, S/G Doghouse, S/G Dome Slab	7,016	0.001167 1.0	Paint Concrete
5. CRDM Missile Shield, Walls	734	0.001167 3.0	Paint Concrete
6. CRDM Missile Shield, Structures	753	0.00059 0.042	Paint Carbon Steel
7. S/G Shell, S/G Dome, RX vessel Head Stand, Internals Storage Stands	5,611	0.00059 0.03125	Paint Carbon Steel
8. Refueling Canal, Refueling Canal Floor Slab	7,234	0.01563	Stainless Steel
9. RX Vessel Hand Stand, Internals Storage Stands	1,179	0.04165	Stainless Steel
10. Polar Crane	6,000	0.00059 0.04917	Paint Carbon Steel
11. Platforms	9,000	0.00059 0.00917	Paint Carbon Steel
12. Equipment Hatch Guide	310 190	0.00059 0.02417	Paint Carbon Steel
13. Dead-Ended Compartments	3,941.4	0.001167 2.0	Paint Concrete
14. Dead-Ended Compartments	649	0.001167 2.5	Paint Concrete
B. LOWER CONTAINMENT	**Area (sq ft)**	**Thickness (ft)**	**Material**
1. Operating Deck Floor	1,709.9	0.001167 1.25	Paint Concrete
2. Crane Wall	10,979.1	0.001167 1.5	Paint Concrete
3. Refueling Canal Wall	411.4	0.001167 8.0	Paint Concrete
4. Refueling Canal Wall	6,316.1	0.001167 3.0	Paint Concrete

5. Refueling Canal Floor	4,110.4	0.001167	Paint
		2.0	Concrete
6. Lower S/G Support	1,700	0.00059	Paint
		0.101	Carbon Steel
7. Upper S/G Support	3,972	0.00059	Paint
		0.066	Carbon Steel
8. RCP Support Columns	768.8	0.00059	Paint
		0.0833	Carbon Steel
9. Platforms	3,000	0.00059	Paint
		8.7E-3	Carbon Steel
10. S/G Enclosure Walls, Dome Slab, Pressurizer Doghouse	4,038	0.001167	Paint
		1.0	Concrete
11. S/G Enclosure Walls, Dome Slab	2,262	0.001167	Paint
		1.384	Concrete
12. S/G Dome, Shell	3,878	0.00059	Paint
		0.031	Carbon Steel
13. Lower SM Line Restraints	627	0.00059	Paint
		0.0108	Carbon Steel
14. Upper SM Line Restraints	2,399	0.00059	Paint
		0.116	Carbon Steel
15. RX Vessel Support	284	0.00059	Paint
		0.166	Carbon Steel
16. Lower PRZ Support	1,220	0.00059	Paint
		0.038	Carbon Steel
17. Dead-Ended Compartments Slabs	39,715	0.001167	Paint
	12,272.4	1.0	Concrete
	1,196	1.25	Concrete
	11,092	1.5	Concrete
	8,671.6	2.0	Concrete
	4,165.2	2.5	Concrete
	2,317.8	3.0	Concrete
18. Dead-Ended Compartments Slabs	17,913.7	0.00059	Paint
	14,161.7	0.0625	Carbon Steel
	2,454.9	0.0417	Carbon Steel
	1,297.1	0.0352	Carbon Steel
C. ICE CONDENSER	**Area (sq. ft)**	**Thickness (ft)**	**Material**
1. Ice Baskets	180,628	0.00663	Carbon Steel
2. Lattice Frames	76,650	0.0217	Carbon Steel
3. Lower Support Structure	28,670	0.0267	Carbon Steel

Note:

1. Ice condenser walls are not considered in the GOTHIC model due to the insulation present. Since these structures would condense additional steam and remove energy from the containment, their omission is conservative.

Table 6-19. Comparison of Design Parameters - McGuire and D. C. Cook

	McGuire	Cook
Reactor Containment Values (Net free volume)		
Upper Compartment, ft^3	670,101	695,390
Ice Condenser (Upper Plenum), ft^3	47,000	47,000
Ice Condenser (Ice Bed Region), ft^3	86,300	86,300
Ice Condenser (Lower Plenum), ft^3	24,200	24,200
Lower Compartment (Active), ft^3	237,411	235,481
Lower Compartment (Dead Ended), ft^3	130,899	111,571
Total Containment Volume, ft^3	1,195,911	1,199,942
Reactor Power, MWt	3,479	3,394
Weight of Ice in Condenser Used for Safety Analysis, lbs	1.89×10^6	2.45×10^6
Normal Spray Flow Rate To Upper Compartment (gpm/pump)	3,400[2]	2,000
Normal Spray Flow Rate To Lower Compartment (gpm/pump)	0	900
Auxiliary Spray Flow Rate To Upper Compartment (gpm/pump)	2,350[1,2]	2,000
Auxiliary Spray Flow Rate To Lower Compartment (gpm/pump)	------	------

Note:

1. Flow is available at approximately 50 minutes after reactor trip
2. Note the flow values used in the containment analyses have been reduced by approximately 2% to account for the frequency variation of ±2% allowed by the Technical Specifications.

Table 6-20. Allowable Leakage Area For Various Reactor Coolant System Break Sizes

Break Size	5 ft Deck Leak Air Compression Peak (psig)	Deck Leakage Area (ft)	Resultant Peak Containment Pressure (psig)
Double-ended	7.7	50	11.9
0.6 Double-ended	6.6	50	12.5
3 ft	6.25	50	12.2
0.5 ft	5.75	50	14.5
0.5 ft[1]	5.75	50	11.8[1]
8 inch diameter	5.5	40	14.9
8 inch diameter[1]	5.5	50	12.0[1]
6 inch diameter	5.0	40	14.7
2 1/2 inch diameter	4.0	50	13.4
1/2 inch diameter	3.0	>50	3.0

Note:

1. This case assumes upper compartment structural heat sink steam condensation of 6 lb/sec and 30 percent of deck leakage is air.

Deleted Per 2011 Update.

Table 6-21. Summary Of Heat Transfer Correlations Used To Calculate Steam Generator Heat Flow In The SATAN Code

Primary to Secondary Heat Flow	
Primary	Secondary
(Tube Side)	(Shell Side)
Dittus-Boelter	Jens-Lottes

Secondary to Primary Heat Flow	
Primary	Secondary
Jens-Lottes	
Dougall-Rohsenow	McAdams
McEligot	

Table 6-22. Deleted Per 2009 Update.

Table 6-23. Deleted Per 2009 Update.

Table 6-24. Deleted Per 2009 Update.

Table 6-25. Deleted Per 2009 Update.

Table 6-26. Deleted Per 2009 Update.

Table 6-27. Deleted Per 2009 Update.

Table 6-28. Deleted Per 1998 Update

Table 6-29. Deleted Per 1998 Update

Table 6-30. Deleted Per 1998 Update

Table 6-31. Deleted Per 1998 Update

Table 6-32. Deleted Per 1998 Update

Table 6-33. Deleted Per 1998 Update

Table 6-34. Deleted Per 1998 Update

Table 6-35. Deleted Per 1998 Update

Table 6-36. Deleted Per 1998 Update

Table 6-37. Deleted Per 1998 Update

Table 6-38. Deleted Per 1998 Update

Table 6-39. Deleted Per 1998 Udpate

Table 6-40. Deleted Per 1998 Update

Table 6-41. Deleted Per 1998 Update

Table 6-42. TMD Input Data - 2 Node Steam Generator Enclosure

Element	Volume
1	5298 ft^3
2	6370 ft^3

Flow Path	K	$f\frac{L}{D}$	Inertia Length (ft)	Flow Area (ft^2)	Contraction a/A
1 to 2	0.12		20.14	217.7	0.765
2 to Lower Compartment	1.48	0.044	12.43	188.0	0.864
2 to Adjacent S.G. Volume 2	2.09		30.45	168.0	1.0

Table 6-43. TMD Input Data - 9 Node Steam Generator Enclosure

Element	Volume (ft^3)
1	5298
2	788
3	329
4	251
5	996
6	1331
7	567
8	433
9	1673

Flow Path (Element to Element)	K	$f\frac{L}{D}$	Inertia Length (ft)	Flow Area (ft^2)	Contraction a_t/A_u
1. Steam Generator					
1-2	0.372	----	7.39	72.9	0.257
1-3	0.448	----	6.17	29.9	0.105
1-4	0.460	----	5.97	22.8	0.081
1-5	0.338	----	7.93	92.0	0.325
2-6	-----	0.025	13.83	72.9	1.0
3-7	-----	0.044	13.83	29.9	1.0
4-8	-----	0.049	13.83	22.8	1.0
5-9	-----	0.022	13.83	92.0	1.0
6-10	1.06	----	8.48	72.60	0.997
7-10	1.85	----	5.45	14.7	0.492
8-10	1.49	----	6.95	16.9	0.741
9-10	1.43	----	7.87	82.4	0.896
2-3	0.286	----	10.45	27.4	0.556
3-4	0.108	----	10.50	25.1	0.916
4-5	0.393	----	8.64	25.1	.429
5-2	0.286	----	15.14	49.25	0.841
6-7	0.313	----	10.49	46.67	0.561

Flow Path (Element to Element)	K	$f\frac{L}{D}$	Inertia Length (ft)	Flow Area (ft^2)	Contraction a_t/A_u
7-8	0.129	----	10.57	43.3	0.928
8-9	0.407	----	8.74	43.3	.440
9-6	0.169	----	15.19	83.19	0.845
2-Adjacent 2	0.366	----	9.0	112.0	0.75
6-Adjacent 6	0.99	----	6.76	112.0	0.471

Table 6-44. Peak Differential Pressures - 2 Node Steam Generator Enclosure

Nodes	Differential Pressure (psi)	Time (sec)
Across Enclosure Walls		
1 to Upper Conpartment	13.75	3.38
2 to Upper Compartment	13.0	3.39

Table 6-45. Peak Differential Pressure - Steam Generator Enclosure - 9 Node

Nodes	Differential Pressure (PSI)	Time (sec)
Across Enclosure Walls		
1. Upper Compartment	12.5	3.08
2. Upper Compartment	7.5	.028
3. Upper Compartment	9.3	.026
4. Upper Compartment	9.8	.026
5. Upper Compartment	9.8	.027
6. Upper Compartment	6.7	3.34
7. Upper Compartment	7.6	.045
8. Upper Compartment	8.4	.045
9. Upper Compartment	8.3	.045
Across Steam Generator Vessel		
4 - 2	2.4	.023
5 - 3	0.59	.03
8 - 6	2.7	.042
9 - 7	0.8	.051

Table 6-46. TMD Input Data - 2 Node Pressurizer Enclosure

Element	Volume
1	1763 ft^3
2	2251 ft^3

Flow Path	K	$f\frac{L}{D}$	Inertial Length (ft)	Flow Area (ft^2)	Contraction a/A
1 to 2	0.17		17.22	88.64	0.657
2 to Lower Compartment	1.7	0.075	10.07	69.0	0.778

Table 6-47. TMD Input Data - 4 Node Pressurizer Enclosure

Element	Volume(ft^3)
1	1763
2	886
3	477
4	906

Flow Path (Element to Element)	K	$f\frac{L}{D}$	Inertial Length (ft)	Flow Area (ft^2)	Contraction a_t/A_u
1-2	0.384	----	14.3	34.5	0.233
1-3	0.439	----	13.55	18.2	0.123
1-4	0.381	----	14.3	35.25	0.239
2-5	1.59	----	11.0	29.5	0.855
3-5	1.66	----	6.16	8.2	0.451
4-5	1.58	----	11.04	30.25	0.858
2-3	0.416	----	9.68	29.8	0.336
3-4	0.534	----	9.64	29.8	1.0
4-2	0.531	----	7.51	61.7	0.681

Table 6-48. Mass and Energy Releases into Steam Generator Enclosure

Time (Sec)	Mass Flow (10^3 lbs/sec)	Energy Flow (10^6 BTU/Sec)
0	7.015	8.34
2.453999	7.015	8.34
2.454	20.530	12.69
2.8164999	20.530	12.69
2.8165	23.180	13.54
10.0	23.180	13.54

Table 6-49. Mass and Energy Release Rates Into Pressurizer Enclosure

Time (sec)	Mass Flow X 10^{-3} (lbm/sec)	Energy x 10^{-5} (Btu/sec)
0.0	0.0	0.0
0.00251	5.0473	3.0977
0.00502	5.2333	3.2013
0.01002	5.1051	3.1226
0.01251	5.0746	3.1029
0.01755	5.3833	3.2753
0.02505	5.5402	3.3601
0.03259	5.8746	3.5479
0.04002	5.9221	3.5716
0.05005	5.6865	3.4332
0.07250	5.7877	3.4868
0.09001	5.4917	3.3157
0.11253	5.9404	3.5710
0.13756	5.5454	3.3445
0.15755	5.6392	3.3979
0.17760	5.4721	3.3026
0.19254	5.5189	3.3291
0.21254	5.4725	3.3025
0.23508	5.5465	3.3446
0.27752	5.5345	3.3378
0.35027	5.3649	3.2411
0.38001	5.2985	3.2031
0.41515	5.3825	3.2507
0.45006	5.2660	3.1842
0.57002	5.2492	3.1738
0.77015	5.1816	3.1336
1.00005	5.1562	3.1169
2.00015	5.0326	3.0400

Table 6-50. Reactor Cavity Analysis Volumes - Cold Leg Break

	FT^3
1. Break Location	109.6
2. Lower Reactor Cavity	15,830.0
3. Reactor Vessel Annulus	16.09
4. Reactor Vessel Annulus	2.29
5. Reactor Vessel Annulus	6.99
6. Reactor Vessel Annulus	6.99
7. Reactor Vessel Annulus	9.12
8. Reactor Vessel Annulus	13.98
9. Reactor Vessel Annulus	9.12
10. Reactor Vessel Annulus	3.54
11. Reactor Vessel Annulus	8.86
12. Reactor Vessel Annulus	3.54
13. Reactor Vessel Annulus	8.86
14. Reactor Vessel Annulus	3.54
15. Reactor Vessel Annulus	9.12
16. Reactor Vessel Annulus	3.54
17. Reactor Vessel Annulus	9.12
18. Reactor Vessel Annulus	13.98
19. Reactor Vessel Annulus	8.86
20. Reactor Vessel Annulus	13.98
21. Lower Containment	42,250.0
22. Lower Containment	42,250.0
23. Lower Containment	42,250.0
24. Lower Containment	42,250.0
25. Pipe Annulus	38.10
26. Pipe Annulus	38.10
27. Pipe Annulus	42.42
28. Pipe Annulus	42.42
29. Pipe Annulus	38.10
30. Pipe Annulus	38.10
31. Pipe Annulus	79.55

	FT^3
32. Upper Containment	670,100.
33. Reactor Vessel Annulus	0.721
34. Reactor Vessel Annulus	0.721
35. Reactor Vessel Annulus	2.29
36. Reactor Vessel Annulus	6.99
37. Reactor Vessel Annulus	6.99
38. Reactor Vessel Annulus	13.98
39. Reactor Vessel Annulus	13.98
40. Reactor Vessel Annulus	13.98
41. Reactor Vessel Annulus	13.98
42. Reactor Vessel Annulus	13.98
43. Reactor Vessel Annulus	13.98
44. Reactor Vessel Annulus	13.98
45. Reactor Vessel Annulus	0.721
46. Reactor Vessel Annulus	0.721
47. Upper Reactor Cavity	16,270.
48. Ice Condenser	24,240.0
49. Ice Condenser	28,760.0
50. Ice Condenser	28,760.0
51. Ice Condenser	28,760.0
52. Ice Condenser	47,000.0
53. Inspection Port Above the Break	30.63
54. Broken Loop Pipe Annulus	50.32

Table 6-51. Reactor Cavity Analysis Flow Paths - Cold Leg Break Flow

Flow Path Between Compartments		K	fl/d	Inertia Length (ft)	Minimum Flow Area (ft^2)	Area Ratio (For 'y' factor)
1	3	0.73	0.0	1.61	7.42	0.267
2	22	1.62	0.0	15.85	45.0	0.111
3	34	1.2	0.0	3.39	0.834	0.112
4	35	0.0	0.23	3.33	0.687	1.0
4	45	0.33	0.0	2.74	0.625	1.0
4	47	1.0	0.13	1.86	0.625	1.0
5	36	0.0	0.23	3.33	2.11	1.0
5	47	2.15	0.0	18.2	0.175	0.000339
5	46	0.33	0.0	7.14	0.552	1.0
6	37	0.0	0.23	3.33	2.11	1.0
6	2	1.0	0.0	6.37	0.552	1.0
6	5	0.0	0.91	12.67	0.552	1.0
7	9	0.33	0.45	6.67	0.95	1.0
7	38	1.24	0.0	6.58	0.266	0.213
7	47	1.0	0.37	5.21	1.25	1.0
8	10	0.75	0.45	4.18	0.534	0.253
8	2	1.0	0.0	6.41	1.103	1.0
9	11	0.33	0.45	6.67	0.950	1.0
9	39	1.24	0.0	6.58	0.266	0.213
9	47	1.0	0.37	5.21	1.25	1.0
10	12	0.0	0.45	6.66	0.534	1.0

Flow Path Between Compartments		K	fl/d	Inertia Length (ft)	Minimum Flow Area (ft^2)	Area Ratio (For 'y' factor)
10	2	1.0	0.0	1.65	1.103	1.0
11	13	0.33	0.45	6.67	0.950	1.0
11	40	1.24	0.0	6.58	0.266	0.213
11	47	1.0	0.37	5.21	1.25	1.0
12	14	0.0	0.45	6.66	0.534	1.0
12	2	1.0	0.0	1.65	1.103	1.0
13	15	0.33	0.45	6.67	0.950	1.0
13	41	1.24	0.0	6.58	0.266	0.213
13	47	1.0	0.37	5.21	1.25	1.0
14	16	0.0	0.45	6.66	0.534	1.0
14	2	1.0	0.0	1.65	1.103	1.0
15	17	0.33	0.45	6.67	0.950	1.0
15	42	1.24	0.0	6.58	0.266	0.213
15	47	1.0	0.37	5.21	1.25	1.0
16	18	0.75	0.45	4.18	0.534	0.253
16	2	1.0	0.0	1.65	1.103	1.0
17	19	0.33	0.45	6.67	0.950	1.0
17	43	1.24	0.0	6.58	0.266	0.213
17	47	1.0	0.37	5.21	1.25	1.0
18	20	0.0	0.45	6.66	2.11	1.0
18	2	1.0	0.0	6.41	1.103	1.0
19	4	0.65	0.35	4.08	0.687	0.72

Flow Path Between Compartments		K	fl/d	Inertia Length (ft)	Minimum Flow Area (ft^2)	Area Ratio (For 'y' factor)
19	44	1.24	0.0	6.58	0.266	0.213
19	47	1.0	0.37	5.21	1.25	1.0
20	6	0.0	0.35	5.0	2.11	1.0
20	2	1.0	0.0	6.41	1.103	1.0
21	22	0.30	0.09	38.4	852.7	0.84
21	25	1.14	0.0	4.05	4.76	0.0023
21	48	0.7837	0.0	10.36	265.875	0.096
22	23	0.30	0.09	40.2	739.0	0.73
22	26	1.14	0.0	4.05	4.76	0.0023
22	48	0.7837	0.0	10.36	265.875	0.096
23	24	0.30	0.09	38.4	852.7	0.84
23	28	1.14	0.0	4.05	5.30	0.0026
23	48	0.7837	0.0	10.36	265.875	0.096
24	21	1.58	0.0	31.1	100.0	0.099
24	47	2.15	0.0	5.43	52.75	0.072
24	48	0.7837	0.0	10.36	265.875	0.096
25	7	1.2	0.0	5.16	1.06	0.22
25	47	1.43	0.0	2.81	2.60	0.54
26	9	1.2	0.0	5.16	1.06	0.22
26	47	1.43	0.0	2.81	1.60	0.54
27	11	1.2	0.0	4.98	1.06	0.20
27	47	1.43	0.0	5.07	5.30	1.0

Flow Path Between Compartments		K	fl/d	Inertia Length (ft)	Minimum Flow Area (ft^2)	Area Ratio (For 'y' factor)
27	22	1.14	0.0	4.05	5.30	0.00259
28	13	1.2	0.0	4.98	1.06	0.20
28	47	1.43	0.0	5.07	5.30	1.0
29	15	1.2	0.0	5.16	1.06	0.22
29	47	1.43	0.0	2.81	2.60	0.54
29	23	1.14	0.0	4.05	4.76	0.00232
30	17	1.2	0.0	5.16	1.06	0.22
30	47	1.43	0.0	2.81	2.60	0.54
30	24	1.14	0.0	4.05	4.76	0.00232
31	19	1.2	0.0	5.68	1.06	0.20
31	47	1.43	0.0	7.07	5.30	1.0
31	24	1.14	0.0	7.55	5.30	0.00259
33	3	1.2	0.0	3.393	0.834	0.112
33	46	0.0	0.45	6.6	0.0545	1.0
33	19	0.68	0.33	3.45	0.950	0.76
34	7	0.68	0.33	3.45	0.950	0.76
34	46	0.0	0.45	6.6	0.0545	1.0
35	7	0.65	0.35	4.08	0.687	0.725
35	47	1.0	0.13	1.86	0.625	1.0
35	45	0.33	0.0	2.74	0.625	1.0
36	37	0.0	0.91	12.67	0.552	1.0
36	47	2.15	0.0	18.2	0.175	0.00034

Flow Path Between Compartments		K	fl/d	Inertia Length (ft)	Minimum Flow Area (ft^2)	Area Ratio (For 'y' factor)
36	46	0.33	0.0	7.14	0.552	1.0
36	38	0.0	0.35	5.0	2.11	1.0
37	8	0.0	0.35	5.0	2.11	1.0
37	2	1.0	0.0	6.37	0.552	1.0
38	39	0.0	0.45	6.66	2.11	1.0
38	8	0.0	0.91	12.66	1.10	1.0
38	47	2.15	0.0	18.2	0.350	0.000678
39	40	0.0	0.45	6.66	2.11	1.0
39	10	0.0	0.57	7.94	1.10	1.0
39	47	2.15	0.0	18.2	0.350	0.000678
40	41	0.0	0.45	6.66	2.11	1.0
40	12	0.0	0.57	7.94	1.10	1.0
40	47	2.15	0.0	18.2	0.350	0.000678
41	42	0.0	0.45	6.66	2.11	1.0
41	14	0.0	0.57	7.94	1.10	1.0
41	47	2.15	0.0	18.2	0.350	0.000678
42	43	0.0	0.45	6.66	2.11	1.0
42	16	0.0	0.57	7.94	1.10	1.0
42	47	2.15	0.0	18.2	0.350	0.000678
43	44	0.0	0.45	6.66	2.11	1.0
43	18	0.0	0.57	12.66	1.10	1.0
43	47	2.15	0.0	18.2	0.350	0.000678

Flow Path Between Compartments		K	fl/d	Inertia Length (ft)	Minimum Flow Area (ft^2)	Area Ratio (For 'y' factor)
44	5	0.0	0.35	5.0	2.11	1.0
44	20	0.0	0.91	12.66	1.10	1.0
44	47	2.15	0.0	18.2	0.350	0.000678
45	3	1.2	0.0	3.393	0.834	0.112
45	33	0.0	0.45	6.6	0.0545	1.0
45	34	0.0	0.45	6.6	0.0545	1.0
46	3	1.2	0.0	3.393	0.834	0.123
47	21	2.15	0.0	5.43	52.75	0.072
47	22	2.15	0.0	5.43	52.75	0.072
47	23	2.15	0.0	5.43	52.75	0.072
48	49	0.0	0.987	8.733	989.01	0.23
49	50	0.0	1.108	12.278	982.47	0.239
50	51	0.0	1.108	12.278	982.47	0.359
51	52	0.87979	1.169	8.8558	982.47	0.359
52	32	1.43	0.0	2.80	2003.1	0.269
53	1	0.72	0.0	3.29	7.5	0.309
53	47	0.97	0.0	2.32	7.5	1.0
54	1	0.83	0.0	5.13	5.3	0.19
54	21	1.14	0.0	4.80	5.3	1.0

Table 6-52. Mass and Energy Release Rates Into Reactor Cavity

Time (Seconds)	Mass Flow (lbm/sec)	Energy Flow (BTU/sec)	Average Enthalpy (BTU/lbm)
.00000	0.	0.	0.00
.00251	9.9265719E+03	5.5810926E+06	562.24
.00501	1.1996164E+04	6.7475607E+06	562.48
.00752	1.3233810E+04	7.4455849E+06	562.62
.01002	1.4091650E+04	7.9264327E+06	562.49
.01251	1.4409537E+04	8.1005473E+06	562.17
.01502	1.4142837E+04	7.9419806E+06	561.55
.01754	1.5556178E+04	8.7440378E+06	562.09
.02002	1.5479448E+04	8.6925244E+06	561.55
.02257	1.4945158E+04	8.3812365E+06	560.80
.02502	1.4754991E+04	8.2686786E+06	560.40
.02756	1.4995451E+04	8.4018550E+06	560.29
.03009	1.5105915E+04	8.4611159E+06	560.12
.03256	1.5327930E+04	8.5847750E+06	560.07
.03500	1.5534006E+04	8.6996402E+06	560.04
.03753	1.5755386E+04	8.8234720E+06	560.03
.04005	1.5932306E+04	8.9220306E+06	560.00
.04256	1.6007855E+04	8.9624880E+06	559.88
.04507	1.5937503E+04	8.9194894E+06	559.65
.04756	1.5791651E+04	8.8334786E+06	559.38
.05013	1.5682074E+04	8.7686914E+06	559.15
.05266	1.5627088E+04	8.7355483E+06	559.00
.05512	1.5619501E+04	8.7298691E+06	558.91
.05758	1.5614221E+04	8.7255869E+06	558.82
.06011	1.5544992E+04	8.6847656E+06	558.69
.06251	1.5389808E+04	8.5950588E+06	558.49
.06513	1.5177310E+04	8.4728420E+06	558.26
.06759	1.5052222E+04	8.4009295E+06	558.12
.07002	1.5081665E+04	8.4173614E+06	558.12
.07258	1.5236779E+04	8.5055382E+06	558.22
.07511	1.5383879E+04	8.5890617E+06	558.32

Time (Seconds)	Mass Flow (lbm/sec)	Energy Flow (BTU/sec)	Average Enthalpy (BTU/lbm)
.07759	1.5432242E+04	8.6160899E+06	558.32
.08007	1.5361472E+04	8.5750865E+06	558.22
.08259	1.5190944E+04	8.4771985E+06	558.04
.08511	1.4960042E+04	8.3452565E+06	557.84
.08750	1.4715283E+04	8.2056107E+06	557.63
.09010	1.4486184E+04	8.0750512E+06	557.43
.09266	1.4319134E+04	7.9800178E+06	557.30
.09503	1.4235376E+04	7.9323669E+06	557.23
.09765	1.4231012E+04	7.9293979E+06	557.23
.10006	1.4282532E+04	7.9594587E+06	557.29
.10251	1.4359900E+04	8.0082867E+06	557.36
.10501	1.4426338E+04	8.0414862E+06	557.41
.10762	1.4476293E+04	8.0699480E+06	557.46
.11010	1.4519938E+04	8.0948219E+06	557.50
.11251	1.4579716E+04	8.1288788E+06	557.55
.11514	1.4669909E+04	8.1802678E+06	557.62
.11756	1.4757387E+04	8.2300978E+06	557.69
.12012	1.4819932E+04	8.2656890E+06	557.74
.12266	1.4833146E+04	8.2780465E+06	557.74
.12506	1.4798966E+04	8.2588166E+06	557.70
.12762	1.4730734E+04	8.2142001E+06	557.62
.13019	1.4653788E+04	8.1702015E+06	557.55
.13261	1.4575724E+04	8.1256136E+06	557.48
.13503	1.4490726E+04	8.0771046E+06	557.40
.13761	1.4381127E+04	8.0146862E+06	557.30
.14013	1.4252918E+04	7.9617471E+06	557.20
.14259	1.4109847E+04	7.8604785E+06	557.09
.14508	1.3979587E+04	7.7865863E+06	556.99
.14769	1.3872871E+04	7.7260891E+06	556.92
.15007	1.3803656E+04	7.6868199E+06	556.87
.15256	1.3755215E+04	7.6594169E+06	556.84

Time (Seconds)	Mass Flow (lbm/sec)	Energy Flow (BTU/sec)	Average Enthalpy (BTU/lbm)
.15501	1.3717337E+04	7.6380874E+06	556.82
.15754	1.3677591E+04	7.6156883E+06	556.80
.16008	1.3636039E+04	7.5921894E+06	556.77
.16259	1.3585770E+04	7.5694620E+06	556.75
.16511	1.3562338E+04	7.5506910E+06	556.74
.16751	1.3542948E+04	7.5398045E+06	556.73
.17012	1.3535876E+04	7.5359680E+06	556.74
.17260	1.3540160E+04	7.5385622E+06	556.76
.17502	1.3549904E+04	7.5442238E+06	556.77
.17758	1.3561441E+04	7.5508714E+06	556.78
.18008	1.3571935E+04	7.5569200E+06	556.80
.18259	1.3580840E+04	7.5620472E+06	556.82
.18508	1.3589190E+04	7.5668517E+06	556.83
.18757	1.3597466E+04	7.5716113E+06	556.84
.19013	1.3605632E+04	7.5763052E+06	556.85
.19255	1.3611081E+04	7.5794446E+06	556.86
.19509	1.3610029E+04	7.5788894E+06	556.86
.19751	1.3597787E+04	7.5719753E+06	556.85
.20006	1.3569176E+04	7.5557697E+06	556.83
.20255	1.3524785E+04	7.5306058E+06	556.80
.20512	1.3461390E+04	7.4946504E+06	556.75
.20758	1.3389894E+04	7.4541126E+06	556.70
.21007	1.3313788E+04	7.4110186E+06	556.64
.21262	1.3237469E+04	7.3677920E+06	556.59
.21507	1.3173072E+04	7.3313852E+06	556.54
.21760	1.3117533E+04	7.2999754E+06	556.51
.22017	1.3075166E+04	7.2760872E+06	556.48
.22261	1.3045530E+04	7.2594105E+06	556.47
.22507	1.3024000E+04	7.2473247E+06	556.46
.22761	1.3004926E+04	7.2366416E+06	556.45
.23011	1.2985724E+04	7.2258736E+06	556.45

Time (Seconds)	Mass Flow (lbm/sec)	Energy Flow (BTU/sec)	Average Enthalpy (BTU/lbm)
.23259	1.2967820E+04	7.2158372E+06	556.44
.23500	1.2955953E+04	7.2092296E+06	556.44
.23757	1.2956229E+04	7.2095013E+06	556.45
.24004	1.2966409E+04	7.2153668E+06	556.47
.24259	1.2979069E+04	7.2226275E+06	556.48
.24522	1.2989317E+04	7.2285040E+06	556.50
.24752	1.2997306E+04	7.2330964E+06	556.51
.25010	1.3003499E+04	7.2366512E+06	556.52
.25258	1.3005511E+04	7.2378307E+06	556.52
.25500	1.3006371E+04	7.2383506E+06	556.52
.25750	1.3014605E+04	7.2430532E+06	556.53
.26002	1.3037028E+04	7.2557898E+06	556.55
.26251	1.3076561E+04	7.2782069E+06	556.58
.26503	1.3131110E+04	7.3091468E+06	556.63
.26752	1.3192863E+04	7.3441626E+06	556.68
.27008	1.3260912E+04	7.3827354E+06	556.73
.27250	1.3318805E+04	7.4155405E+06	556.77
.27514	1.3369619E+04	7.4443079E+06	556.81
.27762	1.3399130E+04	7.4609742E+06	556.83
.28004	1.3405746E+04	7.4646462E+06	556.82
.28256	1.3388945E+04	7.4550256E+06	556.80
.28510	1.3351130E+04	7.4334882E+06	556.77
.28752	1.3299072E+04	7.4039010E+06	556.72
.29013	1.3233614E+04	7.3667271E+06	556.67
.29267	1.3169566E+04	7.3303843E+06	556.62
.29504	1.3112882E+04	7.2982537E+06	556.57
.29753	1.3065961E+04	7.2716760E+06	556.54
.30005	1.3031336E+04	7.2520869E+06	556.51
.30259	1.3011966E+04	7.2411505E+06	556.50
.30504	1.3006657E+04	7.2381848E+06	556.50
.30756	1.3012753E+04	7.2416825E+06	556.51

Time (Seconds)	Mass Flow (lbm/sec)	Energy Flow (BTU/sec)	Average Enthalpy (BTU/lbm)
.31007	1.3027687E+04	7.2501695E+06	556.52
.31256	1.3050914E+04	7.2633548E+06	556.54
.31505	1.3077352E+04	7.2783456E+06	556.56
.31755	1.3107524E+04	7.2954552E+06	556.59
.32006	1.3137286E+04	7.3123225E+06	556.61
.32263	1.3163790E+04	7.3273358E+06	556.63
.32511	1.3182603E+04	7.3379691E+06	556.64
.32750	1.3191145E+04	7.3427834E+06	556.64
.33001	1.3188970E+04	7.3415128E+06	556.64
.33254	1.3175263E+04	7.3337032E+06	556.63
.33510	1.3151590E+04	7.3202530E+06	556.61
.33761	1.3122216E+04	7.3035726E+06	556.58
.34013	1.3092526E+04	7.2867370E+06	556.56
.34251	1.3067030E+04	7.2722834E+06	556.54
.34505	1.3046299E+04	7.2605431E+06	556.52
.34757	1.3033479E+04	7.2532973E+06	556.51
.35005	1.3028586E+04	7.2505390E+06	556.51
.35253	1.3030386E+04	7.2515714E+06	556.51
.35512	1.3037739E+04	7.2557484E+06	556.52
.35751	1.3047622E+04	7.2613515E+06	556.53
.36009	1.3061122E+04	7.2690005E+06	556.54
.36252	1.3073795E+04	7.2761725E+06	556.55
.36509	1.3088888E+04	7.2847073E+06	556.56
.36758	1.3102772E+04	7.2925486E+06	556.57
.37002	1.3121311E+04	7.3030318E+06	556.58
.37257	1.3145933E+04	7.3169613E+06	556.60
.37512	1.3179982E+04	7.3362342E+06	556.62
.37753	1.3219502E+04	7.3586179E+06	556.65
.38013	1.3263486E+04	7.3835022E+06	556.68
.38255	1.3304048E+04	7.4064474E+06	556.71
.38506	1.3334162E+04	7.4234597E+06	556.72

Time (Seconds)	Mass Flow (lbm/sec)	Energy Flow (BTU/sec)	Average Enthalpy (BTU/lbm)
.38754	1.3355980E+04	7.4357614E+06	556.74
.39001	1.3363145E+04	7.4397421E+06	556.74
.39252	1.3356871E+04	7.4361067E+06	556.73
.39501	1.3339691E+04	7.4262822E+06	556.71
.39756	1.3313468E+04	7.4113522E+06	556.68
.40003	1.3279755E+04	7.3921732E+06	556.65
.40260	1.3240302E+04	7.3697503E+06	556.61
.40519	1.3196109E+04	7.3446702E+06	556.58
.40754	1.3151988E+04	7.3196351E+06	556.54
.41011	1.3106422E+04	7.2938052E+06	556.51
.41266	1.3065819E+04	7.2708073E+06	556.48
.41501	1.3036883E+04	7.2544335E+06	556.45
.41751	1.3018344E+04	7.2439630E+06	556.44
.42003	1.3014608E+04	7.2418838E+06	556.44
.42258	1.3025218E+04	7.2479293E+06	556.45
.42503	1.3047845E+04	7.2607762E+06	556.47
.42759	1.3080286E+04	7.2791833E+06	556.50
.43014	1.3117193E+04	7.3000986E+06	556.53
.43251	1.3155457E+04	7.3217883E+06	556.56
.43506	1.3191987E+04	7.3424708E+06	556.69
.43755	1.3224867E+04	7.3610879E+06	556.61
.44010	1.3250482E+04	7.3755613E+06	556.63
.44262	1.3264813E+04	7.3836279E+06	556.63
.44511	1.3269304E+04	7.3861164E+06	556.63
.44760	1.3264219E+04	7.3831822E+06	556.62
.45009	1.3251389E+04	7.3758547E+06	556.61
.45262	1.3234123E+04	7.3660352E+06	556.59
.45507	1.3213626E+04	7.3543821E+06	556.58
.45759	1.3193226E+04	7.3427924E+06	556.56
.46001	1.3173256E+04	7.3314588E+06	556.54
.46261	1.3154015E+04	7.3205435E+06	556.53

Time (Seconds)	Mass Flow (lbm/sec)	Energy Flow (BTU/sec)	Average Enthalpy (BTU/lbm)
.46506	1.3134486E+04	7.3094675E+06	556.51
.46758	1.3116041E+04	7.2990155E+06	556.50
.47006	1.3098461E+04	7.2890550E+06	556.48
.47253	1.3083494E+04	7.2805790E+06	556.47
.47504	1.3071598E+04	7.2738479E+06	556.46
.47756	1.3064785E+04	7.2700011E+06	556.46
.48006	1.3064114E+04	7.2696348E+06	556.46
.48261	1.3070026E+04	7.2729994E+06	556.46
.48513	1.3081483E+04	7.2795042E+06	556.47
.48764	1.3097708E+04	7.2887069E+06	556.49
.49003	1.3115613E+04	7.2989594E+06	556.50
.49273	1.3136190E+04	7.3105130E+06	556.52
.49502	1.3154001E+04	7.3206055E+06	556.53
.49762	1.3170745E+04	7.3300750E+06	556.54
.50008	1.3183757E+04	7.3374291E+06	556.55
.51005	1.3226674E+04	7.3616658E+06	556.58
.52010	1.3233878E+04	7.3656266E+06	556.57
.53007	1.3217416E+04	7.3562190E+06	556.56
.54003	1.3198213E+04	7.3452957E+06	556.54
.55004	1.3182668E+04	7.3364868E+06	556.53
.56009	1.3168598E+04	7.3285223E+06	556.51
.57007	1.3168051E+04	7.3282356E+06	556.52
.58001	1.3180356E+04	7.3352264E+06	556.53
.59010	1.3193314E+04	7.3425795E+06	556.54
.60005	1.3195553E+04	7.3438478E+06	556.54
.61011	1.3172129E+04	7.3305811E+06	556.52
.62006	1.3144174E+04	7.3147858E+06	556.50
.63008	1.3141082E+04	7.3131040E+06	556.51
.64004	1.3165075E+04	7.3267526E+06	556.53
.65016	1.3197334E+04	7.3450531E+06	556.56
.66000	1.3224737E+04	7.3605803E+06	556.58

Time (Seconds)	Mass Flow (lbm/sec)	Energy Flow (BTU/sec)	Average Enthalpy (BTU/lbm)
.67016	1.3237563E+04	7.3678351E+06	556.59
.68023	1.3235448E+04	7.3666327E+06	556.58
.69014	1.3231651E+04	7.3644964E+06	556.58
.70001	1.3236967E+04	7.3675383E+06	556.59
.71006	1.3253690E+04	7.3770420E+06	556.60
.72003	1.3269938E+04	7.3862620E+06	556.62
.73012	1.3268935E+04	7.3856990E+06	556.62
.74005	1.3251762E+04	7.3759850E+06	556.60
.75012	1.3235463E+04	7.3667942E+06	556.60
.76014	1.3229606E+04	7.3635323E+06	556.59
.77001	1.3231916E+04	7.3648971E+06	556.60
.78005	1.3239365E+04	7.3691663E+06	556.61
.79007	1.3249703E+04	7.3790611E+06	556.62
.80001	1.3261283E+04	7.3816490E+06	556.63
.81001	1.3269949E+04	7.3865782E+06	556.64
.82003	1.3274774E+04	7.3893292E+06	556.64
.83003	1.3279948E+04	7.3922798E+06	556.65
.84000	1.3289797E+04	7.3978749E+06	556.66
.85009	1.3302617E+04	7.4051571E+06	556.67
.86007	1.3310739E+04	7.4097668E+06	556.68
.87012	1.3311205E+04	7.4100371E+06	556.68
.88011	1.3305550E+04	7.4068440E+06	556.67
.89013	1.3298692E+04	7.4029805E+06	556.67
.90017	1.3295550E+04	7.4012311E+06	556.67
.91002	1.3297412E+04	7.4023198E+06	556.67
.92004	1.3302328E+04	7.4051354E+06	556.68
.93005	1.3307600E+04	7.4081473E+06	556.69
.94008	1.3311662E+04	7.4104688E+06	556.69
.95005	1.3314827E+04	7.4122815E+06	556.69
.96008	1.3317484E+04	7.4138059E+06	556.70
.97009	1.3320822E+04	7.4157167E+06	556.70

Time (Seconds)	Mass Flow (lbm/sec)	Energy Flow (BTU/sec)	Average Enthalpy (BTU/lbm)
.98018	1.3326430E+04	7.4189146E+06	556.71
.99009	1.3334734E+04	7.4236377E+06	556.71
1.00006	1.3340908E+04	7.4271479E+06	556.72
1.05007	1.3343822E+04	7.4288927E+06	556.73
1.10001	1.3350103E+04	7.4325496E+06	556.74
1.15002	1.3367946E+04	7.4427634E+06	556.76
1.20006	1.3367315E+04	7.4425294E+06	556.77
1.25015	1.3383433E+04	7.4517960E+06	556.79
1.30019	1.3376401E+04	7.4479560E+06	556.80
1.35012	1.3384968E+04	7.4530020E+06	556.82
1.40017	1.3380523E+04	7.4506854E+06	556.83
1.45005	1.3380580E+04	7.4509864E+06	556.85
1.50011	1.3376567E+04	7.4490034E+06	556.87
1.55004	1.3371069E+04	7.4462331E+06	556.89
1.60005	1.3363161E+04	7.4421416E+06	556.91
1.65012	1.3356066E+04	7.4385612E+06	556.94
1.70002	1.3354740E+04	7.4382710E+06	556.98
1.75005	1.3345130E+04	7.4333487E+06	557.01
1.80009	1.3347552E+04	7.4352553E+06	557.05
1.85010	1.3346323E+04	7.4351216E+06	557.09
1.90015	1.3344521E+04	7.4346886E+06	557.13
1.95011	1.3341966E+04	7.4338614E+06	557.18
2.00004	1.3341645E+04	7.4343247E+06	557.23
2.05000	1.3332756E+04	7.4299736E+06	557.27
2.10012	1.3324666E+04	7.4261107E+06	557.32
2.15023	1.3314938E+04	7.4213497E+06	557.37
2.20010	1.3303028E+04	7.4153657E+06	557.42
2.25007	1.3293004E+04	7.4104684E+06	557.47
2.30014	1.3282276E+04	7.4061657E+06	557.52
2.35004	1.3273646E+04	7.4010396E+06	557.57
2.40002	1.3263256E+04	7.3959085E+06	557.62

Time (Seconds)	Mass Flow (lbm/sec)	Energy Flow (BTU/sec)	Average Enthalpy (BTU/lbm)
2.45003	1.3253098E+04	7.3909159E+06	557.67
2.50011	1.3241323E+04	7.3850205E+06	557.73
2.55008	1.3227662E+04	7.3780849E+06	557.78
2.60015	1.3213094E+04	7.3706674E+06	557.83
2.65006	1.3197609E+04	7.3627673E+06	557.89
2.70004	1.3181293E+04	7.3544163E+06	557.94
2.75008	1.3165287E+04	7.3462591E+06	558.00
2.80003	1.3148613E+04	7.3377212E+06	558.06
2.85013	1.3131770E+04	7.3290894E+06	558.12
2.90009	1.3114320E+04	7.3201075E+06	558.18
2.95006	1.3095600E+04	7.3104162E+06	558.23
3.00010	1.3076081E+04	7.3002988E+06	558.29

Table 6-53. Reactor Cavity Design Pressures

Volume	Design Pressure (psig)	Calculated Peak Pressure(2) (psig)
Upper Reactor Cavity (Element 47)	10.6	5.3
Lower Reactor Cavity (Element 2)	32	3.2
Reactor Annulus (Elements 5 thru 20 and 36 thru 44)	140	55.8
Reactor Pipe Sleeve (Element 54)	1120	221.2
Inspection Shaft (Element 53)	400(1)	226.1
Inspection Cavity (Element 1)	400(1)	256.7

Note:

1. Based on ultimate strength design method.
2. Based on inspection port covers being removed in modes 1-4. There is an insignificant effect on calculated peak pressures if covers remain (unrestrained) in modes 1-4. (Reference 88)

Table 6-54. Mass and Energy Release Rates for Steam Line Rupture. 2.4 ft^2 Double Ended Break at 3479 MWt (rated thermal power plus measurement uncertainty)

Time (sec)	Break Flow Rate (lbm/sec)	Break Enthalpy (Btu/lbm)
0	0	1191.99
0.1	4654.93	1162.62
0.2	4595.92	1168.41
0.3	4925.25	1178.21
0.4	5194.74	1183.08
0.5	5051.86	1180.23
0.6	4897.54	1177.93
0.7	4901.68	1179.53
0.8	4941.07	1181.27
0.9	4950.07	1182.00
1	4927.24	1181.74
1.1	4921.82	1181.65
1.2	4925.84	1181.60
1.3	4919.42	1181.22
1.4	4906.32	1180.71
1.5	4892.6	1180.26
1.6	4876.82	1179.87
1.7	4859.24	1179.58
1.8	4843.2	1179.45
1.9	4829.9	1179.46
2	4818.34	1179.55
2.2	4796.32	1179.76
2.4	4772.63	1179.91
2.6	4749.96	1180.09
2.8	4728.61	1180.30
3	4706.03	1180.51
3.2	4683.36	1180.75
3.4	4662.69	1181.07
3.6	4642.56	1181.40
3.8	4645.81	1182.27

Time (sec)	Break Flow Rate (lbm/sec)	Break Enthalpy (Btu/lbm)
4	4782.57	1184.70
4.2	4774.29	1183.38
4.4	4771.05	1182.31
4.6	4756.2	1181.32
4.8	4755.39	1181.13
5	4772.23	1181.61
5.2	4792.85	1182.07
5.4	4786.19	1181.87
5.6	4703.02	1180.69
5.8	4610.08	1180.58
6	4464.01	1181.17
6.2	4173.67	1180.78
6.4	3669.66	1178.76
6.6	3309.93	1181.93
6.8	3071.46	1185.88
7	2909.6	1188.84
7.2	2803.86	1191.49
7.4	2727.74	1193.97
7.6	2668.97	1195.99
7.8	2624.36	1197.62
8	2591.14	1198.91
9	2484.23	1201.76
10	2408.57	1202.72
15	2109.47	1205.45
20	1859.16	1207.45
25	1702.26	1208.93
30	1605.91	1209.46
35	1525.97	1209.91
40	1486.94	1210.16
45	1438.79	1210.17
50	1405.6	1210.43
55	1364.39	1210.66

Time (sec)	Break Flow Rate (lbm/sec)	Break Enthalpy (Btu/lbm)
60	1315.26	1210.59
65	1220.07	1210.04
66	1162.28	1267.88
67	1106.62	1267.76
68	1051.28	1270.87
69	1004.89	1271.31
70	1005.14	1266.03
72	1168.9	1265.38
73	1176.51	1267.00
75	1051.74	1265.43
76	1046.54	1265.71
77	999.04	1270.40
78	997.47	1266.06
80	897.43	1270.26
85	631.86	1277.39
91	460.21	1279.05
93	411.09	1290.25
95	351.93	1290.51
100	235.98	1293.83
105	176.39	1296.54
110	137.36	1299.18
125	142.47	1299.87
150	164.73	1300.25
175	163.55	1300.26
200	163.41	1299.77
250	163.53	1298.40
300	163.59	1296.70
350	163.6	1295.00
400	163.5	1293.82
450	163.66	1293.36
495	163.59	1294.15
600	163.59	1294.15

Table 6-55. Deleted Per 1998 Update

Table 6-56. Deleted Per 1998 Update

Table 6-57. Deleted Per 1998 Update

Table 6-58. Deleted Per 1998 Update

Table 5-59. Deleted Per 1998 Update

Table 6-60. Deleted Per 1998 Update

Table 6-61. Deleted Per 1998 Update

Table 6-62. Mass and Energy Release Rates for Minimum Post-LOCA Containment Pressure

Time (sec)	Mass Flowrate (lbm/sec)	Energy Flowrate (BTU/sec)
0.00	59790.0	31729000.
1.00	62690.0	33611000.
2.00	55960.0	30359000.
3.00	43930.0	24289500.
4.00	37140.0	21232000.
5.00	32570.0	19212500.
6.00	30120.0	17969500.
7.00	28530.0	17070000.
8.00	26810.0	16071000.
9.00	24840.0	14890000.
10.00	22380.0	13533000.
12.00	16520.0	10548000.
14.00	13190.0	8020000.
16.00	11510.0	5791000.
18.00	9000.0	3657000.
20.00	6540.0	2272000.
22.00	5640.0	1771000.
24.00	4750.0	1135500.
26.00	3660.0	776300.
28.00	5320.0	1013000.
30.00	4580.0	793050.
32.00	2580.0	418050.
34.00	1800.0	279150.
36.00	2797.3	414300.
40.00	3104.3	456530.
46.00	2920.3	571680.
52.00	1780.3	627880.
58.00	1540.3	558380.
64.00	1210.3	429430.
72.00	790.3	314930.
80.00	710.3	281850.

Time (sec)	Mass Flowrate (lbm/sec)	Energy Flowrate (BTU/sec)
90.00	750.3	295300.
100.00	880.3	325400.
120.00	1090.3	360250.
140.00	1160.3	366380.
160.00	1090.3	325550.
180.00	820.3	247400.
200.00	480.3	156400.
220.00	370.3	107780.
260.00	360.3	111750.
350.00	360.3	111750.

Note:

1. Includes Broken Loop Accumulator Flow

Table 6-63. Deleted Per 1998 Update.

Table 6-64. Volume and Temperature Data For Minimum Post-LOCA Containment Pressure McGuire and Catawba

I.	**Containment NET FREE Volume (ft^3)**	
	Upper Compartment (ft^3) As part of the standard Westinghouse LOTIC2 modeling, this upper containment volume is increased by 59,000. This 59,000 is reassigned from the ice condenser volume and represents ice bed upper plenum volume (47,000) and ice bed cooling duct volume (12,000).	676,255
	Lower Compartment (ft^3)	201,700
	Ice Condenser (ft^3) As part of the standard Westinghouse LOTIC2 modeling, this ice containment volume is decreased by 59,000. This 59,000 is reassigned to the upper containment volume and represents ice bed upper plenum volume (47,000) and ice bed cooling duct volume (12,000).	182,813
	Dead Ended Compartments (ft^3)	148,573
II.	**Initial Conditions**	
	Containment Pressure(psia)	14.7
	Upper Containment Temperature (°F)	105
	Lower containment Temperature (°F)	125
	Dead-Ended Compartment Temperature (°F)	125
	Ice Condenser Temperature (°F)	27
	Refueling Water Storage Tank Temperature (°F)	
	Catawba	63.9[(1)]
	McGuire	65.0
	Service Water Temperature (°F)	32
	Initial Spray Temperature (°F)	70
	Lowest Temperature Outside Containment (°F)	NA[(2)]

[(1)]Analysis used 65.0 °F since the effect of lower ice mass for McGuire (more free volume) offset the effect of slightly lower RWST water temperature for Catawba

[(2)]Temperature outside containment not modeled

Table 6-65. Active Heat Sink Data For Minimum Post-LOCA Containment Pressure

I.	**Containment Spray System Parameters**	
	1. Maximum spray system flow, total	9600 gpm
	2. Maximum number of spray pumps operating	2
	3. Fastest post-LOCA initiation of spray system (assuming off-site power loss at start of LOCA)	25 sec
II.	**Containment Air Return Fan Parameters**	
	1. Maximum fan flow, total	80,000 cfm
	2. Maximum number of fans operating	2
	3. Fastest post-LOCA initiation	480 sec

Table 6-66. Structural Heat Sink Data For Minimum Post-LOCA Containment Pressure

Structure	Area (ft^2)	Thickness (feet)	Material
1. Upper Compartment			
a. Operating Floor, Crane Wall, Refueling Canal, Miscellaneous Concrete			
Slab 1	21,142	0.000833	Coating 2
		1.34	Concrete
Slab 2	5,017	0.0156	Stainless Steel
		1.5	Concrete
b. Containment Vessel Dome, Containment Shell, Polar Crane, Miscellaneous Steel			
Slab 3	24,391	0.00059	Coating 1
		0.058	Carbon Steel
Slab 4	31,035	0.00059	Coating 1
		0.0290	Carbon Steel
Slab 5	801	0.0625	Stainless Steel
2. Lower and Dead Ended Compartments			
a. Operating Floor, Crane Wall, Refueling Canal, Miscellaneous Concrete			
Slab 1	57,387	0.000833	Coating 2
		1.97	Concrete
Slab 2	9,019	0.00133	Coating 3
		2.04	Concrete
Slab 3	3,541	0.00133	Coating 3
		2.50	Concrete
Slab 4	2,361	0.0156	Stainless Steel
		1.50	Concrete
Slab 5	768	0.00059	Coating 1
		0.04207	Carbon Steel
		1.50	Concrete
b. Containment Shell, Reactor Coolant Pumps, Supports, and Miscellaneous Steel			
Slab 6	56,551	0.00059	Coating 1
		0.0565	Carbon Steel

Structure	Area (ft^2)	Thickness (feet)	Material
Slab 7	14,445	0.00059	Coating 1
		0.0625	Carbon Steel
Slab 8	9,040	0.00059	Coating 1
		0.0625	Carbon Steel
Slab 9	32,640	0.0026	Stainless Steel
c. Cooling Coils			
Slab 10	51,000	0.00042	Copper
3. Ice Condenser			
a. Ice Baskets			
Slab 1	180,628	0.00663	Steel
b. Lattice Frames			
Slab 2	76,650	0.0217	Steel
c. Lower Support Structure			
Slab 3	28,670	0.0267	Steel
d. Ice Condenser Floor			
Slab 4	3,336	0.000833	Coating
		0.333	Concrete
e. Containment Wall Panels and Containment Shell			
Slab 5	19,100	1.0	Steel and Insulation
		0.0625	Steel Shell
f. Crane Wall Panels and Crane Wall			
Slab 6	13,055	1.0	Steel and Insulation
		1.0	Concrete

Structure	Area (ft^2)	Thickness (feet)	Material
Note: Coatings (Btu/ft hr °F)			
1. 2 mils organic, 5 mils inorganic - 0.6			
2. 10 mils organic - 0.29			
3. 16 mils organic - 0.29			
Volumetric Heat Capacity (BTU/ft^3 - F)			
Concrete 31.95			
Carbon Steel 58.8			
Stainless Steel 55.11			
Inorganic Coating 28.8			
Organic Coating 18.2			

Table 6-67. Deleted Per 1998 Update.

Table 6-68. Air Return Fans and Hydrogen Skimmer Fans Failure Analysis

Component	Malfunction	Comments and Consequences
Air Return Fan	Fan fails to start or stops running and cannot be restarted.	Redundant, full capacity fan is provided.
Air Return Fan	Inadvertent actuation during normal operation	Containment Pressure Control System precludes inadvertent actuation of fan
Air Return Fan Isolation Damper	Damper fails to open	Redundant, full capacity fan and isolation damper are provided.
Hydrogen Skimmer Fan	Fan fails to start or stops running and cannot be restarted	Redundant, full percent capacity fan is provided
Hydrogen Skimmer Fan	Inadvertent actuation during normal operation	Containment Pressure Control System precludes inadvertent actuation of fan.
Hydrogen Skimmer Fan Isolation Valve	Valve fails to open	Redundant, full capacity fan and isolation valve are provided

Table 6-69. Wall Panel Design Loads[1]

1. Service Loads	
Weight of Panels on Containment and End Wall (58 ft length)	100 lbs/linear ft
Weight of Panels on Crane Wall (48 ft length)	60 lbs/linear ft
Pressure (Wall panel internal)	0 to 0.5 psig
2. 1/2 SSE Lattice Frame Column Loads[2] (Maximum at 45 ft elevation)	
Radial at 90° (acting alone)	± 7920 lbs
Tangential at 0° (acting alone)	± 9600 lbs
Combined Load at 45°	
Radial	± 6190 lbs
Tangential	± 6190 lbs
3. SSE Lattice Frame Column Loads[2] (Maximum at 45 ft elevation)	
Radial at 90° (acting alone)	± 8800 lbs
Tangential at 0° (acting alone)	± 11200 lbs
Combined Load at 45°	
Radial	± 7070 lbs/ea
Tangential	± 7070 lbs/ea
4. DBA[2] (Maximum at 15 ft elevation)	
Lattice Frame Column Load	
Radial	± 6210 lbs
Tangential	± 8259 lbs
Pressure (D.L.F. = 1.5; M = 1.4)[3]	18.9 psig
5. SSE plus DBA[2] 15 ft Elevation	
Lattice Frame Column Load @ 0°	
Radial	± 6211 lbs
Tangential	± 13260 lbs
Lattice Frame Column Load @ 45°	
Radial	± 10701 lbs
Tangential	± 12750 lbs

Lattice Frame Column Load @ 90°	
Radial	± 13911 lbs
Tangential	± 8260 lbs
Pressure (D.L.F. = 1.5; Margin = 1.4)[3]	18.9 psig
33 ft Elevation	
Lattice Frame Column Load @ 0°	
Radial	0
Tangential	± 14920 lbs
Lattice Frame Column Load @ 45°	
Radial	± 6916 lbs
Tangential	± 13336 lbs
Lattice Frame Column Load @ 90°	
Radial	± 11060 lbs
Tangential	± 6420 lbs
Pressure (D.L.F. = 1.5; Margin = 1.4)[3]	18.9 psig

Note:

1. Design pressure loads, as stated, are applied uniformly to the wall panel transverse beams. Radial and Tangential loads are applied at lattice frame column to wall panel attachment. These are maximum load combinations.
2. Vertical seismic loads (0.35 and 0.55 times dead load for 1/2 SSE and SSE, respectively) and vertical Design Basis Accident loads are neglected in the analyses because they are small in comparison to the radial and tangential loads.
3. DLF = Dynamic Load Factor
   M = Margin

Table 6-70. Lattice Frame Loads Horizontial 1/2 Safe Shutdown Earthquake[2]

Elevation above Floor Slab, ft	1/2 SSE at 0° and 90° from Reference Direction of Excitation (kips)				1/2 SSE 45°[1] of Excitation (kips)	
	0°		90°			
	Tang	Radial	Tang	Radial	Tang	Radial
15	4.0	0	0	5.5	3.36	3.36
21	4.96	0	0	6.3	3.98	3.98
27	6.0	0	0	7.1	4.63	4.63
33	6.8	0	0	7.9	5.20	5.20
39	6.96	0	0	7.6	5.15	5.15
45	7.04	0	0	8.0	5.32	5.32
51	6.56	0	0	7.7	5.04	5.04
57	6.4	0	0	7.4	4.88	4.88

Note:

1. $\left(\frac{Tang + Radial}{2}\right)$ Cos 45°
2. Refer to Figure 6-120 for direction of excitation.

Table 6-71. Local Seismic Loads on Lattice Frames Due to Single Ice Basket

Elevation above Floor Slab, ft	Ice Basket Load, lbs	
	1/2 SSE	SSE
15	550	770
21	630	882
27	750	1050
33	850	1190
39	870	1218
45	880	1232
51	820	1148
57	800	1120

Table 6-72. Ice Condenser Lattice Frame Loads[1] Blowdown Pressure Loads for Design Basis Earthquake (SSE) And Design Basis Accident (DBA)

Elevation Above Floor Slab, ft	SEISMIC LOADS (LBS)		Ice Column Horizontal-Tangential lbs/ft	Ice Column Horizontal-Radial lbs/ft	Lattice Frame[2] Horizontal-Tangential lbs	Lattice Frame[2] Horizontal-Radial lbs	TOTAL SSE + DBA (LBS)	
	SSE Tangential	SSE Radial					Tangential	Radial
15	5000	7,700	23.8	17.9	8259	6211	13,260	13,911
21	6200	8,820	22.5	8.95	7808	3106	14,008	11,926
27	7500	9,940	19.8	0	6871	0	14,371	9,940
33	8500	11,060	18.5	0	6420	0	14,920	11,060
39	8700	10,640	16.8	0	5830	0	14,530	10,640
45	8800	11,200	14.0	0	4858	0	13,563	11,200
51	8200	10,780	11.8	0	4095	0	12,295	10,780
57	8000	10,360	10.8	0	3748	0	11,745	10,360

Note:

1. A design margin (M) of 40% and a dynamic load factor (DLF) of 1.53 are used where applicable.
2. (lb/ft) x (DLF) x (M) x (6) x (27) -- There are 27 baskets per lattice frame, and blowdown pressure loads are applied over 6 ft of each basket.

Table 6-73. Vertical DBA Loads On Lattice Frames

Elevation above Floor Slab, ft	Vertical Blowdown Drag Forces, lbs, lattice frame	Vertical Load lbs/column	
		Crane Side	Cont. Side
15	7572	3030	4543
21	7572	3030	4543
27	3726	1490	2236
33	1754	1490	2236
39	1754	702	1052
45	1619	648	970
51	1619	648	970
57	1792	716	1075
TOTALS:	27,408	10,966	16,443

Note:

1. A design margin of 40% and a dynamic load factor of 1.10 should be used with the above values.

Table 6-74. Vertical Friction Loads On Lattice Frames

El Above Floor Slab	(From Table 6-73) Horiz. Tang. DBA lbs/lattice frame	Vert. Friction Load μ = .5 lbs/lattice frame	Vertical Friction lbs/crane col. (40%)	Vertical Friction lbs/contain col. (60%)
15	8259	4129	1652	2477
21	7808	3904	1562	2342
27	6871	3435	1374	2061
33	6420	3210	1284	1926
39	5830	2915	1166	1749
45	4858	2429	972	1457
51	4095	2047	819	1228
57	3748	1874	750	1124
TOTALS:	47,889	23,945	9,578	14,367

Note:

A design margin of 40% and a dynamic load factor of 1.53 is used in the above values.

Table 6-75. Lattice Frames Summary of Maximum Stresses

Criteria	D + 1/2 SSE	D + DBA	D + SSE	D + DBA + SSE
Bending Allowable Stress[1] (psi)	37,500	49,875	49,875	61,875
Max Calculated Stress (psi)				
Member No./stress	71/33,360	71/25,640	71/36,850	71/49,330
	63/30,590	72/22,900	63/33,770	63/43,720
	79/28,360	80/22,300	79/31,320	72/42,870
	72/28,160	63/22,040	72/31,110	79/42,160
	78/27,780	79/22,030	78/30,690	75/41,600
Interaction Factor				
Calculated Member No./value	71/.92	71/.81	71/1.02	78/1.46
Allowable	1.0	1.33[2]	1.33[2]	1.65[2]

Note: Bending stress about strong axes, shear and axial are insignificant and are not summarized in this table.

1. Based upon ASTM A-441 steel not normalized. Y.S. = 50,000 psi.
2. The interaction factor considers the combined effect of vertical and horizontal stresses. It is the product of the increase in allowable stresses and the limit for S, per AISC-69.

Table 6-76. Summary of Fatigue Analysis[1] For Lattice Frames

Member Number/ Joint Number	Calculated Stress Range, psi (in welded location)	Allowable Stress Range[2], psi
127/67	2000	22,500
128/68	2300	22,500
130/130	2000	22,500
131/72	2200	22,500
133/92	2200	22,500
134/73	2300	22,500

Note:

1. Based on 400 1/2 SSE cycles.
2. AISC-69 specification, Appendix B.

Table 6-77. Ice Basket Load Summary - Minimum Test Loads

Elevation[1] (ft.)	Case I D + 1/2 SSE		Case II D + DBA		Case III D + SSE		Case IV D + SSE + DBA	
	H	V	H	V	H	V	H	V
0	463	4933	429	-2283	496	4330	841	-3473
6	1131	4316	423	-1998	1211	3789	1486	-3039
12	1296	3698	414	-1713	1387	3248	1638	-2605
18	1543	3083	357	-1427	1652	2707	1826	-2171
24	1748	2466	333	-1142	1872	2164	2005	-1736
30	1790	1849	303	-856	1916	1623	2017	-1301
36	1810	1232	252	-531	1938	1082	1991	-831
42	1687	617	213	-285	1806	541	1835	-434
48	823	0	192	0	881	0	976	0

Note:

1. Above lower support structure

Table 6-78. Ice Basket Load Summary - Basic Design Loads

Elevation [1] (ft.)	D		1/2 SSE		SSE		DBA	
	H	V	H	V	H	V	H	V
0	0	1776	225	622	315	977	143	-2536
6	0	1554	550	544	770	855	141	-2219
12	0	1332	630	466	882	733	138	-1902
18	0	1110	750	389	1050	611	119	-1585
24	0	888	850	311	1190	488	111	-1268
30	0	666	870	233	1218	366	101	-951
36	0	444	880	155	1232	244	84	-614
42	0	222	820	78	1148	122	71	-317
48	0	0	400	0	560	0	64	0

Note:

1. Above lower support structure

Table 6-79. Summary of Stresses in Basket Due to Design Loads

Elevation from Lower Support Structure, ft.	Design Load, lb[1]		Maximum Stress, psi	Allowable Stresses, psi
	H	V		
0	304(3)	3029	11,508	25,536[2]
12	650(3)	2271	17,100	25,536[2]
24	761(3)	1514	17,976	25,536[2]
36	835(3)	378	17,435	25,536[2]
12	1017(4)	-2003	23,988	31,104[5]

Note:

1. With 10% margin
2. Allowable stress = 0.6 x S_y x 1.33 per Section 6.2.2.16
3. Design load, D + SSE
4. Design load, D + SSE + DBA, 10% margin on weight, 40% margin on pressure and 1.5 dynamic load factor.
5. Allowable stress = 0.6 x S_y x 1.65

Table 6-80. Ice Basket Material Minimum Yield Stress

Item	Material	Minimum Yield Stress (KSI)
Clevis Pin and U-Bolts	SAE-J 429 Grade 8	130
Basket End Coupling and Stiffener	ASTM A-622	32
Nut	AISI-431	125 (Min. Shear)
Mounting Bracket Assembly	ASTM A-588 Grade A	50
Plate	ASTM A-36	36
Grid Bars	ASTM A-570 Grade 13	
Wire Mesh	ASTM A-641	40
Perforated Basket	ASTM A-569	32
C-1022 Heat Treated to C52 (Couple Screw)		130
Swivel Bracket	ASTM A-747 Type CB7CU-2	75
Swivel Assy Clevis Pin & Cap Screws	ASTM A-193 Grade B8	60

Table 6-81. Allowable Stress Limits (D + 1/2 SSE) For Ice Basket Materials

Material	Specified Minimum Yield KSI	ALLOWABLE LIMITS			
		Tension $F_t = .6F_y$ (KSI)	Shear $F_v = .4F_y$ (KSI)	Bearing $F_p = .9F_y$ (KSI)	Bending $F_b = .66F_y$ (KSI)
Carbon Steel					
130 KSI					
Minimum Yield	130	78	52	117	85.8
ASTM-A588	50	30	20	45	33
ASTM-A570	30	18	12	27	19.8
ASTM-A622	32	19.2	12.8	28.8	21.1
ASTM-A36	36	21.6	14.4	32.4	23.8
ASTM-A641	40	24	16	36	26.4
ASTM-A569	32	19.2	12.8	28.8	21.1

Table 6-82. Allowable Stress Limits (D + SSE), (D + DBA) For Ice Basket Materials

Material	Specified Minimum Yield KSI	ALLOWABLE LIMITS			
		Tension $S_t = 1.33F_t$ (KSI)	Shear $S_v = 1.33F_v$ (KSI)	Bearing $S_p = 1.33F_p$ (KSI)	Bending $S_b = 1.33F_b$ (KSI)
Carbon Steel					
130 KSI					
Minimum	130	103.7	69.2	155.6	114.1
ASTM-A588	50	39.9	26.6	59.8	43.9
ASTM-A570 Grade B	30	23.9	16.0	35.9	26.3
ASTM-A622	32	25.5	17.0	38.3	28.1
ASTM-A36	36	28.7	19.1	43.0	31.6
ASTM-A641	40	31.9	21.3	47.9	35.1
ASTM-A569	32	25.5	17.0	38.3	28.1

Table 6-83. Allowable Stress Limits (D + SSE + DBA) For Ice Basket Materials

		ALLOWABLE LIMITS			
		Tension	Shear	Bearing	Bending
Material	Specified Minimum Yield KSI	$S' = 1.65F_t$ (KSI)	$S' = 1.65F_v$ (KSI)	$S' = 1.65F_p$ (KSI)	$S' = 1.65F_b$ (KSI)
Carbon Steel					
130 KSI					
Minimum	130	128.7	85.8	193.1	141.6
ASTM-A588	50	49.5	33.0	74.2	54.4
ASTM-A570 Grade B	30	29.7	19.8	44.6	32.7
ASTM-A622	32	31.7	21.1	47.5	34.8
ASTM-A36	36	35.6	23.8	53.5	39.2
ASTM-A641	40	39.6	26.4	59.4	43.6
ASTM-A569	32	31.7	21.1	47.5	34.8

Table 6-84. Ice Basket Clevis Pin Stress Summary

Load Case No.	Horiz. Load H (LBF)	Vert. Load V (LBF)	Pin Bending Stress f_b (10^3 psi)	Pin Shear Stress f_v (10^3 psi)	Pin-Lug Bearing Stress f_p (10^3 psi)
I	251	2638	67.3	13.5	10.6
			(97.5)[1]	(52)	(45.0)
II	300	-1596	41.2	8.3	6.5
			(129.7)	(69.2)	(59.8)
III	251	3028	77.1	15.5	12.1
			(129.7)	(69.2)	(59.8)
IV	551	-2671	69.3	13.9	10.9
			(160.9)	(85.8)	(74.2)

Note:

1. Parenthetical values are stress allowables.

Table 6-85. Ice Basket Mounting Bracket Assembly Stress Summary

Load Case No.	Horiz. Load H (LBF)	Vert. Load V (LBF)	Load Case Factor N	Point 1 Interaction Formula Value[1] X	Washer Bearing Stress f_p (psi x 10^3)	Shear Tear Out Stress f_v (psi x 10^3)	Weld Shear Stress f_v (psi x 10^3)
I	251	2638	1.0	0.90	34.6	-	7.8
					(45.0)[2]	(20.0)	(20.0)
II	300	-1596	1.33	0.57	36.6	5.3	5.4
					(59.8)	(26.6)	(26.6)
III	251	3028	1.33	1.02	34.6	-	8.7
					(59.8)	(26.6)	(26.6)
IV	551	-2671	1.65	0.96	53.0	8.9	9.2
					(74.2)	(33.0)	(33.0)

Note:

1. $X \leq N$ indicates safe condition.
2. Parenthetical values are stress allowables.

Table 6-86. Ice Basket Plate Stress Summary

Load Case No.	Horiz. Load H (LBF)	Vert. Load V (LBF)	Load Case Factor N	Point 1 Interaction Formula Value[1] X	Point 2 Interaction Formula Value[1] X
I	251	2638	1.0	0.25	0.27
II	300	-1596	1.33	0.23	0.29
III	251	3028	1.33	0.28	0.27
IV	551	-2671	1.65	0.42	0.53

Note:

1. $X \leq N$ indicates safe condition.

Table 6-87. Ice Basket U-Bolt Stress Summary

Load Case No.	Horiz. Load H LBF	Vert. Load V LBF	Tensile Stress F_b (10^3 psi)
I	251	2638	42.8
			(78.0)[1]
II	300	-1596	55.1
			(103.7)
III	251	3028	42.8
			(103.7)
IV	551	-2671	65.6
			(128.7)

Note:

1. Parenthetical Values are Stress Allowables

Table 6-88. Ice Basket - Basket End Stress Summary

Load Case No.	Horiz. Load H (LBF)	Vert. Load H (LBF)	Load Case Factor N	Point 1 Interaction Formula Value X[1]	Point 2 Interaction Formula Value X[1]
I	251	2638	1.0	0.74	0.97
II	300	-1596	1.33	0.85	0.63
III	251	3028	1.33	0.76	1.10
IV	551	2671	1.65	1.56	1.08

Note:

1. $X \leq N$ indicates safe condition.

Table 6-89. Ice Bucket Coupling Screw Stress Summary 3 Inch Elevation[1]

Load Case No.	Horiz. Load H (lbs.)	Vert. Load V (lbs.)	Screw Bending Stress f_b (ksi)	Screw Shear Stress f_v (ksi)	Basket Bearing Stress f_p (ksi)	Basket Tear-Out Stress f_{vt} (ksi)
I	251	2638	65.8	12.0	16.8	4.3
			(85.8)[2]	(52.0)	(28.8)	(12.8)
II	300	-1596	43.1	7.8	11.0	2.8
			(114.1)	(69.2)	(38.3)	(17.0)
III	251	3028	74.7	13.6	19.1	4.8
			(114.1)	(69.2)	(38.3)	(17.0)
IV	551	-2671	73.1	13.3	18.7	4.7
			(141.6)	(85.8)	(47.5)	(21.1)

Note:

1. Above top of lower support structure.
2. Parenthetical values are stress allowables.

Table 6-90. Ice Bucket Coupling Screw Stress Summary 12 Foot Elevation[1]

Load Case No.	Horiz. Load H (lbs.)	Vert. Load V (lbs.)	Screw Bending Stress f_b (ksi)	Screw Shear Stress f_v (ksi)	Basket Bearing Stress f_p (ksi)	Basket Tear-Out Stress f_{vt} (ksi)
I	818	1977	81.8	14.9	20.9	5.3
			(85.8)[2]	(52.0)	(28.8)	(12.8)
II	289	-1198	40.2	7.3	10.3	2.6
			(114.1)	(64.2)	(38.3)	(17.0)
III	818	2271	88.5	16.1	22.6	5.7
			(114.1)	(64.2)	(38.3)	(17.0)
IV	1108	-2004	95.3	17.4	24.4	6.2
			(141.6)	(85.8)	(47.5)	(21.1)

Note:

1. Above top of lower support structure.
2. Parenthetical values are stress allowables.

Table 6-91. Ice Bucket Coupling Screw Stress Summary 24 Foot Elevation[1]

Load Case No.	Horiz. Load H (lbs.)	Vert. Load V (lbs.)	Screw Bending Stress f_b (ksi)	Screw Shear Stress f_v (ksi)	Basket Bearing Stress f_p (ksi)	Basket Tear-Out Stress f_{vt} (ksi)
I	1122	1319	82.1	15.0	21.0	5.3
			(85.8)[2]	(52.0)	(28.8)	(12.8)
II	233	-799	29.0	5.3	7.4	1.9
			(114.1)	(64.2)	(38.3)	(17.0)
III	1122	1513	86.5	15.8	22.1	5.6
			(114.1)	(69.2)	(38.3)	(17.0)
IV	1355	-1335	93.2	17.0	23.9	6.0
			(141.6)	(85.8)	(47.5)	(21.1)

Note:

1. Above top of lower support structure.
2. Parenthetical values are stress allowables.

Table 6-92. Ice Bucket Coupling Screw Stress Summary 36 Foot Elevation[1]

Load Case No.	Horiz. Load H (lbs.)	Vert. Load V (lbs.)	Screw Bending Stress f_b (ksi)	Screw Shear Stress f_v (ksi)	Basket Bearing Stress f_p (ksi)	Basket Tear-Out Stress f_{vt} (ksi)
I	1161	658	66.9	12.2	17.1	4.32
			(85.8)[2]	(52.0)	(28.8)	(12.8)
II	176	-371	16.4	3.0	4.2	1.1
			(114.1)	(64.2)	(38.3)	(17.0)
III	1161	757	69.1	12.6	17.7	4.5
			(114.1)	(69.2)	(38.3)	(17.0)
IV	1338	-639	74.4	13.6	19.0	4.8
			(141.6)	(85.8)	(47.5)	(21.1)

Note:

1. Above top of lower support structure.
2. Parenthetical values are stress allowables.

Table 6-93. Crane and Rail Assembly Design Loads

1.	Normal Operation	
a.	Crane Weight (excluding rails)	7200 lbs
b.	Maximum Capacity During Plant Erection	6000 lbs (each of two cranes)
c.	Maximum Capacity	6000 lbs (one crane)
d.	Maximum Load Expected	2400 lbs

Table 6-94. Refrigeration System Parameters

1.	General - per twin Containment station		
a.	Cooling Water Temperature, maximum design	(A through H) (I and J)	85°F 95°F
b.	Number of ice condenser units		2
2.	Refrigeration - per twin Containment station		
a.	Glycol Chilling Machines - 4 dual packages and 2 stand-alone (25 ton each) installed		
	Refrigeration capacity per chiller (half pkg), nominal		25 tons[1]
	Total plant capacity, nominal, 10 x 25		250 tons[1]
	Glycol design flow per evaporator, normal		~127 gpm
	Glycol flow per evaporator at max. ΔP		200 gpm
	Glycol pressure, maximum design		180 psig
	Pressure drop through evaporator, normal		16 feet
	Maximum allowable ΔP through evaporator		40 feet
	Glycol entering temperature, estimated		~2°F
	Glycol exit temperature		minus 5°F
	Cooling water flow per condenser, normal		~88 gpm[1]
	Total cooling water flow, 5 x 2 x 88		~880 gpm[1]
	Cooling water pressure, maximum design		150 psig
	Pressure drop through condenser		3.6 feet
	Approximate refrigerant charge per chiller	(A through H) (I and J)	90 lbs 150 lbs.
	Refrigerant		R-502
b.	Glycol Circulation Pumps - 6 installed; 4 required		
	Design flow per pump		240 gpm
	Total design flow to containment (2 pump operation), 2 x 240		480 gpm
	TDH at design flow		297 feet

	Shut-off head				328 feet
	NPSH required at design point				11.2 feet
c.	Pressure Relief Valves				
	1) External Headers 2 - installed				
	Set pressure (for thermal expansion of glycol)				180 psig
	Capacity at set pressure (each)				75 gpm
	2) Floor Cooling System Heater (1 per containment)				
	Set pressure, Floor Cooling Relief Valve				180 psig
d.	Refrigeration Medium (glycol) - UCAR Thermofluid 17 or equal				
	Design Concentration, ethylene glycol in water 50 weight % or 47.8 volume %.				
	At temperature:	-5°F	0°F	100°F	
	Specific gravity	1.083	1.082	1.056	
	Absolute viscosity centipoises	25.0	20.5	2.3	
	Kinematic-viscosity, centistokes	23.1	18.9	2.18	
3.	Ice Condenser - per one Containment unit				
a.	Ice Bed				
	Amount of ice initially stored per unit, nominal				3.0×10^6 lbs
	Minimum amount of ice in storage (per Tech Spec)				1.89×10^6 lbs
	Ice displacement per year, design objective				2%
	Design predicted ice displacement per year, to wall panels for normal operation				<0.3%
	Ice melt during maximum LOCA, during blowdown period calculated, approx.				0.5×10^6 lbs.
	Average Temperature of ice & static air				15°F nominal
	Pressure at lower doors due to cold head, nominal				0.68 psf
	Inlet opening pressure, design				1 psf

b. Air Handling Units - 30 dual packages installed per Containment	
AHU Refrigeration requirements per containment, calculated	67.5 tons nominal
Gross capacity per dual package rated	2.5 tons
Glycol entering temperature, approx.	-5°F
Glycol exit temperature, approx.	1°F
Glycol flow per air handler (1/2 package)	6 gpm
Total AHU glycol flow, 30 x 2 x 6	360 gpm
Glycol pressure drop, estimated	50 feet
Air blower head	2" H_2O
Air entering temperature, nominal	19°F
Air exit temperature	10°F

Note:

1. Nominal refrigeration rating based on 85°F (design) cooling water.

Table 6-95. Lower Inlet Door Design Parameters and Loads

1. Normal Operation	
Temperature, Lower Compartment, °F	120 Maximum
Temperature, Ice Bed, °F	10 Minimum
Pressure across Doors, psf	1.0 Nominal
2. Seismic	
Response of Crane Wall at Door Elevation	
Horizontal, 1/2 SSE, g	0.20 g
Vertical, 1/2 SSE, g	0.05 g
Horizontal, SSE, g	0.40 g
Vertical, SSE, g	0.10 g
3. Accident Conditions	
Temperature, Lower Compartment, °F	250 Maximum
1) Pressure across doors as shown in Figure _____. For design purposes a 40% margin shall be applied to differential pressure given in this figure.	

Table 6-96. Design Loads Three Pier Lower Support Structure. (See Figure 6-142)

LOAD DESCRIPTION	BASIC VALUE
1. Gravity	
a. Structural and Ice Weight (2000 lbs/Ice Basket)	1.0 g
b. Wall Panel Weight (lbs/Lattice Frame Bay[1]	4000
c. Lattice Frames (for eight/Lattice Frame Bay) in lbs	9600
d. Intermediate Deck (lbs/LSS[2] Bay)	2200
e. Lattice Frame Columns each in lbs	989
2. Thermal Loads	
a. Normal Operating	70°F to 10°F
b. DBA Thermal Loading	70°F to 250°F
3.	
a. Seismic Vertical SSE	
1) Vertical Seismic Load	0.55 g
b. Seismic Vertical 1/2 SSE	
1) Vertical Seismic Load	0.35 g
4.	
a. Radial Horizontal SSE Seismic	
1) Radial Direction - Structural Acceleration	1.22 g
2) Seismic Load on Ice Basket (lbs/Lattice Frame Bay)	14000
b. Radial 1/2 SSE Seismic	
1) Radial Direction Structural Acceleration	0.61 g
2) Seismic Ice Basket Loads (lbs/Lattice Frame Bay)	10000
5.	
a. Tangential Horizontal DBE Seismic	
1) Tangential Direction Structural Acceleration	1.55 g
2) Seismic Load on Ice Basket (lbs/Lattice Frame Bay)	11500
b. Tangential 1/2 SSE Seismic	
1) Tangential Direction Structural Acceleration	0.78 g
2) Seismic Load on Ice Basket (lbs/Lattice Frame Bay)	9500
6.	
a. Vertical Blowdown	
1) Drag on Inner Radial Beam (kips/ft)	0.0567

LOAD DESCRIPTION	BASIC VALUE
2) Drag on Outer Radial Beam (kips/ft)	0.0885
3) Drag on Ice Basket (kips/Basket)	2.354
4) Drag on Horizontal Platform Inner and Outer Bracing (kips/LSS Bay)	2.192
5) Drag on Lattice Frame - Eight Frames (kips/Lattice Frame Bay)	31.727
6) Drag on Intermediate Deck (kips/LSS Bay)	116
b. Horizontal Blowdown	
1) Horizontal Load on Middle Circumferential Beam (kips/LSS Bay) at 45° Angle	31.114
2) Floor Turning Vane on Middle Column (kips/LSS Bay)	9.911
3) Upper Turning Vanes each (kips/LSS Bay)	15.221
4) Slotted Plate (kips/LSS Bay)	36.391
5) Outer Circumferential Beam Load (kips/ft)	1.728
6) Radial Load on Ice Basket (kips/Basket)	0.054
c. Impact Loading of Inner Portal	
1) Tangential (kips/Column Line)	60
2) Radial (kips/Column Line)	48.2
d. Tangential Blowdown Force	
1) Tangential Drag Force (kips/Basket)	0.071

Note:

1. One Lattice Frame Bay in Plan is equivalent to 1/3 of the Lower Support Structure bay or three radial beams.
2. Lower Support Structure.

Table 6-97. Design Loads and Parameters Top Deck

Plant Parameters	
Ambient temperature before cooldown, maximum, °F	100
Ambient temperature, upper surface and hinge bar, range, °F	75-100
Ambient temperature, lower surface, minimum, °F	15
Post-LOCA temperature, lower surface, minimum, °F	15
Post-LOCA temperature (no ΔP applied), maximum, °F	190
Dead Weight	
Air handling unit and support structure, lbs/bay	2500
Grating, lbs per ft^2	7.7
Blanket panel, lbs per ft^2	1.33
Hinge bar, lbs per ft	53
Static design equivalent of live load (personnel traffic), psf	100
LOCA Loading	
Maximum drag load on horizontal beam surfaces, lbs/ft^2	177
Maximum drag load on grating, lbs/ft^2	25.7
Maximum back pressure following LOCA, psi	0.28
Maximum drag load on AHU, lbs	1,250

Note:

1. Margin and dynamic load factor are to be applied to tabulated values as appropriate.

Table 6-98. Summary of Results Upper Blanket Door Structural Analysis - LOCA

Item	Area	Code Allowable Stress Max. Calculated Stress	Design[1] Basis
1	Skin and bands, direct tension	4.17	Note 2
2	Hinge bar - bending	6.30	Note 1
3	Anchor bolts - tension	6.50	Note 3
4	Floor grating - bending	4.55	Note 4
5	Insulation tip stress - tear	2.01	Note 4
	Insulation tip stress - tensile	16.70	

Note:

1. Allowable value per AISC-69 limits
2. ASTM-177 minimum tensile with AISC allowable
3. ASTM-A325 minimum tensile with AISC allowable
4. Strength values per Manufacturer's literature

Table 6-99. Design Loads and Parameters Intermediate Deck

1. Normal Operations	
a. Ambient temperature before cooldown, maximum, °F	100
b. Ambient temperature, minimum, °F	15
c. Temperature differential across deck, estimated, °F	±1
2. Dead Weight	
a. Panel, lbs per ft^2, maximum	5.5
b. Static design equivalent of live load (personnel traffic), psf	100
3. Accident Conditions	
a. Post-LOCA temperature (No ΔP applied), max. °F	190
b. Pressure across intermediate deck	Figure _____

Note:

1. For design purposes a 40% margin is applied to the differential pressure given in Figure _____.

Table 6-100. Summary of Waltz Mill Tests

Compaction Tests

One foot diameter wire mesh baskets, loaded with flake ice to various heights, lead weights added to simulate additional weight of ice.

Test	Started	Terminated	Length of Test (months)	Equivalent Height of Bed (feet)	Compaction (& Volume In First Year)
D'	2/21/69	8/28/70	18.0	22	24.5
E'	2/21/69	8/28/70	18.0	7.5	5.5

Shear Tests

One foot diamter wire mesh baskets, loaded with flake ice to various heights, temporarily supported between two wooden discs by pegs which are removed after one month.

Test	Started	Terminated	Length of Test (months)	Actual Height of Bed (feet)	Shear Rate[1] (Inches/year)
G'	9/16/69	8/28/70	11.4	5	0.9
H'	9/16/69	8/28/70	11.4	3	0.9
I'	9/16/69	8/28/70	11.4	1	0.4

Note:

1. Shear rate approximated, based on 6 months of data; not applicable for greater than 6 months.

Table 6-101. Ice Condenser Allowable Limits[1]

Load Combination	Mechanical[2]	Elastic Analysis Mechanical and Thermal	Fatigue	Limit Analysis[3] (Load Factors)	Test (Load Factors)
D + 1/2 SSE	S	3S	AISC Part 1	1.43	1.87
D + DBA	1.33 S	N.A.	N.A.	1.3	1.43
D + SSE	1.33 S	N.A.	N.A.	1.3	1.43
D + SSE ± DBA	1.65 S	N.A.	N.A.	1.18	1.3

Note:

1. For particular components that do not meet these limits specific justification shall be provided on a case by case basis.
2. Membrane (direct) stresses shall no larger than 0.7 Su (70 percent of ultimate stress).
3. For mechanical loads only Mechanical plus thermal expansion, combination and fatigue shall satisfy the elastic analysis limits.

S = Allowable stresses as defined in Sections 1.5 and 1.6 of the AISC Part I Specification.

Table 6-102. Summary of Duke-McGuire Loads-Tangential Case Obtained Using the Two-Mass Dynamic Model

Earthquake Condition and Direction	Wall Panel Load-kips	Impact Loads-lbs	Design Values	
			Wall Panel Load-kips	Impact Load-lbs
1/2 SSE, N-S	4.4	298	8.0	1000
1/2 SSE, E-W	5.2	382	8.0	1000
SSE, N-S	7.0	652	10.0	1400
SSE, E-W	8.0	701	10.0	1400

Table 6-103. Summary of Duke-McGuire Loads-Radial Case Obtained Using the Two-Mass Dynamic Model

Earthquake Condition and Direction	Wall Panel Load-kips	Impact Loads-lbs	Design Values	
			Wall Panel Load-kips	Impact Load-lbs
1/2 SSE, N-S	6.75	250	10.0	1000
1/2 SSE, E-W	7.1	273	10.0	1000
SSE, N-S	10.0	417	14.0	1400
SSE, E-W	10.3	424	14.0	1400

Table 6-104. Summary of Load Results of Five Non-Linear Dynamic Models (Loads Are For East-West SSE Earthquake)

Maximum Load Average of 4 Earthquakes	2 Mass Model	3 Mass Model	9 Mass Model	48 Foot Beam Model[2]	Phasing Mass Model[1]	Design Load
Tangential Impact Load	701	604		526	570	1400
Tangential Wall Panel Load	8000	7308		6300	7825	10000
Radial Impact Load	424		688	376		1400
Radial Wall Panel Load	10300		8496	11000		14000

Note:

1. Case shown represents 75 percent freezeover (75 percent of the ice baskets are assumed to be frozen in the lattice frames and 25 percent of the ice baskets are assumed to be free to move within the gap). This was the case producing the highest load, 11432 lbs, in the link between the lattice frames.
2. 48 foot beam model results are for earthquake #4 only. This is the earthquake which produced the highest loads using the two-mass model.

Table 6-105. Summary of Parameters Used in the Seismic Analysis

Item	Description	McGuire Parameters
1	Lower Support Structure Stiffness	
	Radial Direction	430,000 lbs/in
	Tangential Direction	670,000 lbs/in
2	Lattice Frame Wall Panels Combined Stiffness	
	Radial Direction	50,000 lbs/in
	Tangential Direction	23,900 lbs/in
3	Local Impact Stiffness	
	Radial Direction	4.8 to 9.2 kip/in
	Tangential Direction	4.8 to 11.8 kip/in
4	Ice Basket Weight with ice	41.7 lbs/ft
5	Gap Size	0.5 in
6	Ice Basket Stiffness	
	Bending Rigidity (EI) where: E = modulus of elasticity, I = moment of inertia,	330×10^6 lbs/in^2

Table 6-106. Selection of Steels in Relation to Prevention of Non-Ductile Fracture of Ice Condenser Components

	Section Thickness	
Properties	**5/8-inch thick and under**	**over 5/8-inch thickness**
Energy Absorption Level	None required	1. 20 ft-lb CVN at -20°F for steel over 36,000 psi yield strength 2. 15 ft-lb CVN at -20°F for steel under 36,000 psi yield strength
Heat Treatment	None required Steel can be used in the hot rolled condition	1. Normalizing 2. Quench and Temper
Type of Steel	1. Rimed (a) 2. Semi-killed (b) 3. Killed (b,c) 4. Killed – fine grain practice	1. Killed 2. Killed-fine grain practice

Note:

1. Hot rolled, normalized or quenched and tempered steels are used where applicable.
2. Charpy-V Notch (CVN) impact testing shall be performed in accordance with the requirements of ASTM-A370.
   a. Rimmed steel shall be used only for carbon steel sheet products.
   b. These type steels shall be applied for components which remains within AISC code stress limits for all load conditions.
   c. Killed steels for above AISC Code stress limits shall be upgraded by heat treatment, e.g., bolting.

Table 6-107. Deleted Per 1999 Update

Table 6-108. Annulus Ventilation System Malfunction Analysis

Component	Malfunction	Comments and Consequences
1. Annulus ventilation fan	Fan fails to start or stops running and cannot be restarted.	Two full capacity fans are provided.
2. Annulus ventilation filter train	Filter failure	Two full capacity trains are provided.
3. Annulus ventilation moisture eliminator	Eliminator failure	Two full capacity eliminators are provided.
4. Damper	Fails to open	Parallel dampers providing two 100 percent flow paths are provided in suction header. Redundant dampers open. Each fan train, including discharge isolation damper, is a 100 percent flow path.
5. Carbon Filter	Carbon ignition due to excessive localized radioiodine deposition.	Dispersion of the radioiodine throughout the filter influent and uniform filter flow distribution assures uniform filter loading therein precluding carbon ignition.
6. Annulus ventilation fan	LOCA coincident with loss of offsite power and with a single failure.	Power supplied to redundant annulus ventilation fans from the emergency diesel generators.
7. Pressure Transmitter	Fails to terminate exhaust and start re-circ mode at -3.5 inwg.	Lo-Lo pressure transmitter (-7.0 inwg.) trips fan if dampers are in exhaust alignment to prevent underpressurization.

Table 6-109. Annulus Ventilation Discharge. (Pressure setpoint range -4.2 inwg to -1.2 inwg)

Discharge Sequence Number	Initiation of Discharge (sec)	Initiation of Recirc. (sec)	Time of Discharge (sec)	Volumetric Flow Rate (CFM)	Quantity Discharged (ft^3)
1	34	175	141	See Note 1	18467
2	222	265	43	8000	5733
3	327	363	36	8000	4800
4	449	481	32	8000	4267
5	591	620	29	8000	3867
6	820	846	26	8000	3467
7	1095	1127	32	See Note 2	3627
8	1367	1399	32	6800	3627
9	1633	1665	32	6800	3627
10	1901	1932	31	6800	3513
11	2231	2262	31	6800	3513
12	2511	2543	32	6800	3627
13	2279	2811	32	6800	3627
14	3041	3073	32	6800	3627
15	3263	3296	33	6800	3740
16	3460	3494	34	6800	3853
17	3660	3694	34	6800	3853
18	3880	3913	33	6800	3740
19	4107	4140	33	6800	3740
20	4340	4373	33	6800	3740
21	4577	4610	33	6800	3740
22	4817	4849	32	6800	3627
23	5058	5090	32	6800	3627
24	5301	5333	32	6800	3627
25	5545	5577	32	6800	3627
26	5790	5822	32	6800	3627
27	6035	6067	32	6800	3627
28	6281	6313	32	6800	3627
29	6526	6558	32	6800	3627
30	6771	6803	32	6800	3627

Discharge Sequence Number	Initiation of Discharge (sec)	Initiation of Recirc. (sec)	Time of Discharge (sec)	Volumetric Flow Rate (CFM)	Quantity Discharged (ft^3)
31	7017	7049	32	6800	3627
32	7262	7294	32	6800	3627
33	7507	7539	32	6800	3627
34	7752	7784	32	6800	3627
35	7997	8029	32	6800	3627
36	8242	8274	32	6800	3627
37	8488	8520	32	6800	3627
38	8734	8766	32	6800	3627
39	8980	9012	32	6800	3627
40	9226	9258	32	6800	3627
41	9473	9505	32	6800	3627
42	9720	9752	32	6800	3627
43	9967	9999	32	6800	3627
44	10214	10246	32	6800	3627
45	10461	10493	32	6800	3627
46	10708	10740	32	6800	3627
47	10955	10987	32	6800	3627
48	11203	11235	32	6800	3627
49	11450	11482	32	6800	3627
50	11697	11729	32	6800	3627
51	11944	11976	32	6800	3627
52	12191	12223	32	6800	3627
53	12437	12469	32	6800	3627
54	12684	12716	32	6800	3627
55	12931	12963	32	6800	3627
56	13178	13210	32	6800	3627
57	13426	13458	32	6800	3627
58	13673	13705	32	6800	3627
59	13921	13953	32	6800	3627
60	14168	14200	32	6800	3627

Discharge Sequence Number	Initiation of Discharge (sec)	Initiation of Recirc. (sec)	Time of Discharge (sec)	Volumetric Flow Rate (CFM)	Quantity Discharged (ft^3)

Note:

1. Fan has a 5 second acceleration time to full speed. During this 5 second period, (34-39 seconds), one fan is assumed to average half speed flow rate, or 4000 CFM. From 39 seconds up, the fan is at full speed, 8000 CFM.
2. The annulus ventilation filter train loads at 900 seconds and flow is reduced 15% to 6800 CFM.
3. From sequence 60 to 700,000 seconds add 247 seconds to the previous discharge value to obtain a new time for discharge. Each discharge will always be 32 seconds at a rate of 6800 CFM.
4. From 700,000 seconds to 30 days following the accident, the long term Annulus inleakage rate is 810 CFM.

Table 6-110. Comparison of Engineered Safety Feature Ventilation Systems With Regulatory Guide 1.52 (Rev. 0)

Paragraph	Control Area HVAC Pressurizing System (VC)	Annulus Ventilation System (VE)
Compliance Status With Regulatory Guide 1.52		
C-1-a	In compliance	In compliance
C-1-b	In compliance	In compliance
C-1-c	In compliance	In compliance
C-1-d	In compliance	In compliance
C-1-e	In compliance	In compliance
C-2-a	See Exceptions and Comments section of this table	In compliance
C-2-b	In compliance	See Exceptions and Comments section of this table
C-2-c	In compliance	In compliance
C-2-d	See Exceptions and Comments section of this table	See Exceptions and Comments section of this table
C-2-e	In compliance	In compliance
C-2-f	In compliance	In compliance
C-2-g	In compliance	In compliance
C-2-h	In compliance	In compliance
C-2-i	See Exceptions and Comments section of this table	In compliance
C-2-j	See Exceptions and Comments section of this table	See Exceptions and Comments section of this table
C-2-k	In compliance	In compliance

Paragraph	Control Area HVAC Pressurizing System (VC)	Annulus Ventilation System (VE)
Compliance Status with Regulatory Guide 1.52		
C-2-l	See Exceptions and Comments section of this table	See Exceptions and Comments section of this table
C-2-m	See Exceptions and Comments section of this table	See Exceptions and Comments section of this table
C-3-a	In compliance	In compliance
C-3-b	In compliance	In compliance
C-3-c	In compliance	In compliance
C-3-d	In compliance	In compliance
C-3-e	In compliance	In compliance
C-3-f	In compliance	In compliance
C-3-g	In compliance	In compliance
C-3-h	In compliance	In compliance
C-3-i	In compliance	In compliance
C-3-j	In compliance	In compliance
C-3-k	In compliance	In compliance
C-3-l	In compliance	In compliance
C-3-m	In compliance	In compliance
C-3-n	In compliance	In compliance
C-4-a	In compliance	In compliance
C-4-b	In compliance	In compliance
C-4-c	See Exceptions and Comments section of this table	See Exceptions and Comments section of this list

Paragraph	Control Area HVAC Pressurizing System (VC)	Annulus Ventilation System (VE)
Compliance Status with Regulatory Guide 1.52		
C-4-d	See Exceptions and Comments section of this table	See Exceptions and Comments section of this list
C-4-e	In compliance	In compliance
C-4-f	In compliance	In compliance
C-4-g	In compliance	In compliance
C-4-h	In compliance	In compliance
C-4-i	In compliance	In compliance
C-4-j	In compliance	In compliance
C-4-k	In compliance	In compliance
C-4-l	In compliance	In compliance
C-4-m	In compliance	In compliance
C-5-a	See Exceptions and Comments section of this table	See Exceptions and Comments section of this table
C-5-b	In compliance	In compliance
C-5-c	See Exceptions and Comments section of this table	See Exceptions and Comments section of this table
C-5-d	See Exceptions and Comments section of this table	See Exceptions and Comments section of this table
C-6-a	See Exceptions and Comments section of this table	See Exceptions and Comments section of this table
C-6-b	See Exceptions and Comments section of this table	See Exceptions and Comments section of this table
Exceptions and Comments for Control Area HVAC Pressurizing System (VC)		

Paragraph	Control Area HVAC Pressurizing System (VC)	Annulus Ventilation System (VE)
Compliance Status with Regulatory Guide 1.52		
C-2-a	There is compliance with this paragraph with the exception of item 5, i.e., HEPA after-filters. Compliance with this item is not practical because the engineering and design of the system was at an irreversible state of completion prior to issuance of Reg. Guide 1.52.	
C-2-d	There are no ESF filters that would be subjected to containment pressure surge.	
C-2-i	When a high radiation signal is received by either Control Room Outside Air Intake radiation monitor, the intake which is the source of contamination is manually closed. In the event the high radiation signal is sensed at both intakes, the least contaminated intake is selected.	
C-2-j	Filter trains <u>will not</u> be removable as intact units. Gasketless filter adsorbers will be used - the design of which permits the fluidizing of carbon for external filling and removal which will permit a minimum of exposure to operating personnel. All other high activity accumulating elements can decay safely in place prior to removal as safe radwaste.	
C-2-l	No ESF filter units, primary or secondary, will be located in high radiation zones, or where there will be any DBA pressure surges.	
C-2-m	The design of non-engineered safety clean-up systems is to the same level of quality required for that of ESF filter trains including seismic qualification.	
C-4-c	The cross-sectional physical dimensions of control area units are too small for an individual to enter. The entire side panel of the HEPA compartment is removable providing reach-in type service. Also, vacuum breakers are not required since redundant units are supplied.	
C-4-d	It is recognized that 5'-0” is needed upstream of carbon tray design; however, this design is based on the gasketless, adsorbers which does not require 5'-0” linear feet upstream for servicing. A space of 23” is provided between the HEPA and the nearest upstream obstacle. Since the trains are too small physically for an individual to enter and the HEPA filters are serviced by an individual standing outside the housing, we do not feel that the 5'-0” is necessary for servicing. Also, the entire side panel of the HEPA filter compartment is removable and there is only one HEPA to be removed, thus providing easy access.	
C-5-a	The ANSI N510-1975, Appendix "A", "check list for visual inspection" was used as a guideline to develop the visual inspection checklist used at MNS. Applicability to all items is impractical because the design of the filter train was established prior to the issuance of Regulatory Guide 1.52.	

Paragraph	Control Area HVAC Pressurizing System (VC)	Annulus Ventilation System (VE)
Compliance Status with Regulatory Guide 1.52		
C-5-c	The need to conduct in-place DOP testing of HEPA filters following the effects of welding, painting, fire, and chemical release are defined in the MNS, "Ventilation Filter Testing Program." The penetration criteria is defined in the MNS "Standardized Technical Specifications." Silicone sealants are used as gasket material for bolted/flanged joints as found in ductwork to eqiupment (i.e., dampers, fans, etc.) joints.	
C-5-d	The need to conduct in-place DOP testing of HEPA filters following the effects of welding, painting, fire, and chemical release are defined in the MNS, "Ventilation Filter Testing Program." The penetration criteria is defined in the MNS "Standardized Technical Specifications." After the adsorber bypass leakage test is complete, the filtration system will be operated for approximately 8 hours to purge the filter media of refrigerant gas.	
C-6-a	Testing of the activated carbon is in accordance with the MNS "Standardized Technical Specifications."	
C-6-b	In lieu of the sample canister method, carbon test samples will be extracted by deep bed sampling, using a grain theft method. Also, testing of the activated carbon is in accordance with the MNS "Standardized Technical Specifications."	
Exceptions and Comments for Annulus Ventilation System (VE)		
C-2-b		The Annulus Ventilation Systems are separated by 3.5 feet. The two trains (per unit) are confined within a space bordered on one side by the Reactor Building wall and on another side by a missile wall. The only rotating machinery in the immediate vicinity is the fans serving the filters themselves. Due to the physical arrangement of the fans relative to the filters the inertial energy of the wheel would cause any missile generated by the wheel itself to move in a direction away from the filters. The only other piece of rotating machinery is 25 feet from the filters which is a centrifugal fan. Its inertial energy would cause it to move at right angles to the filters. Further, the centrifugal wheel is contained in the fan scroll itself and further shielded from the Annulus Ventilation filter trains by the Reactor Building Purge Exhaust filter train. In essence, the generation of missiles has been considered in the design arrangement.
C-2-d		There are no ESF filters that would be subjected to containment pressure surge.
C-2-j		Filter trains <u>will not</u> be removable as intact units. Gasketless filter adsorbers will be used - the design of which permits the fluidizing of carbon for external filling and removal which will permit a minimum of exposure to operating personnel. All other high activity accumulating elements can decay safely in place prior to removal as safe radwaste.
C-2-l		No ESF filter units, primary or secondary, will be located in high radiation zones, or where there will be any DBA pressure surges.
C-2-m		The design of non-engineered safety clean-up systems is to the same level of quality required for that of ESF filter trains including seismic qualification.

Paragraph	Control Area HVAC Pressurizing System (VC)	Annulus Ventilation System (VE)
Compliance Stauts with Regulatory Guide 1.52		
C-4-c	There will be a minimum door size of 20”x50” in filter trains. Also, vacuum breakers are not required since redundant units are supplied.	
C-4-d	It is recognized that 5'-0” is needed upstream of carbon tray designs; however, this design is based on the gasketless, adsorbers which does not require 5'-0” linear feet upstream for servicing. There is a distance of 2'-8” from the HEPA mounting frame to the nearest obstacle. Compliance with the 5'-0” separation requirement is not practical because space at locations for this filter train were established prior to the issuance of Regulatory Guide 1.52.	
C-5-a	The ANSI N510-1975, Appendix "A", "check list for visual inspection" was used as a guideline to develop the visual inspection checklist used at MNS. Applicability to all items is impractical because the design of the filter train was established prior to the issuance of Regulatory Guide 1.52.	
C-5-c	The need to conduct in-place DOP testing of HEPA filters following the effects of welding, painting, fire, and chemical release are defined in the MNS, "Ventilation Filter Testing Program." The penetration criteria is defined in the MNS "Standardized Technical Specifications." Silicone sealants are used as gasket material for bolted/flanged joints as found in ductwork to eqiupment (i.e., dampers, fans, etc.) joints.	
C-5-d	The need to conduct in-place DOP testing of HEPA filters following the effects of welding, painting, fire, and chemical release are defined in the MNS, "Ventilation Filter Testing Program." The penetration criteria is defined in the MNS "Standardized Technical Specifications." After the adsorber bypass leakage test is complete, the filtration system will be operated for approximately 8 hours to purge the filter media of refrigerant gas.	
C-6-a	Testing of the activated carbon is in accordance with the MNS "Standardized Technical Specifications."	
C-6-b	In lieu of the sample canister method, carbon test samples will be extracted by deep bed sampling, using a grain theft method. Also, testing of the activated carbon is in accordance with the MNS "Standardized Technical Specifications."	

Table 6-111. Containment Piping Penetration Data. (See Table 6-114 for description of notes.)

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
M216	PRESSURIZER RELIEF TANK MAKEUP	NC	B1	3	5-1	NC57
	PRESSURIZER RELIEF TANK MAKEUP				5-1	NC56B
M212	NITROGEN TO PRESSURIZER RELIEF TANK	NC	A1	1	5-1	NC54A
	NITROGEN TO PRESSURIZER RELIEF TANK				5-1	NC53B
M274	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT	NC	B3	4	5-1	NC59
	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT	NS		1.5	6-194	NS2
	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT	NS		1.5	6-194	NS19
	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT	ND		1.5	5-28	ND56
	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT	ND		1.5	5-28	ND64
	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT	ND		1	5-28	ND61
	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT	ND		1	5-28	1ND120
	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT	NI		1	6-177	NI151
	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT	NI		1	6-177	NI102
	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT	NI		1	6-177	NI119
	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT	NI		1	6-177	NI161
	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT	NV		1.5	9-96	NV229
M339	REACTOR COOLANT PUMP SEAL WATER SUPPLY	NV	D6	2	9-96	NV45
M343	REACTOR COOLANT PUMP SEAL WATER SUPPLY	NV	D6	2	9-96	NV77
M344	REACTOR COOLANT PUMP SEAL WATER SUPPLY	NV	D6	2	9-96	NV61

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
M350	REACTOR COOLANT PUMP SEAL WATER SUPPLY	NV	D6	2	9-96	NV29
M256	REACTOR COOLANT PUMP SEAL WATER SUPPLY	NV	A7	4	9-96	NV94A,C
	REACTOR COOLANT PUMP SEAL WATER RETURN			0.75	9-96	NV96
	REACTOR COOLANT PUMP SEAL WATER RETURN			4	9-96	NV95B
M329	CHARGING LINE	NV	B1	3	9-98	NV12
	CHARGING LINE			3	9-98	NV245B
M347	LETDOWN LINE	NV	A6	2	9-98	NV458A
	LETDOWN LINE			2	9-98	NV35A
	LETDOWN LINE			2	9-98	NV457A
	LETDOWN LINE			2	9-98	NV6
	LETDOWN LINE			3	9-98	NV7B
M259	REACTOR MAKEUP WATER TANK TO NV SYSTEM	NB	B1	1	9-110	NB262
	REACTOR MAKEUP WATER TANK TO NV SYSTEM			1	9-110	NB260B
M394	ICE CONDENSER ICE BLOWING AIR IN	NF	C3	5		
	ICE CONDENSER ICE BLOWING AIR IN			5		
M371	ICE CONDENSER ICE BLOWING AIR OUT	NF	C3	6		
	ICE CONDENSER ICE BLOWING AIR OUT					
M373	ICE CONDENSER GLYCOL IN	NF	B1	4		NF229

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
	ICE CONDENSER GLYCOL IN			4		NF228A
Deleted Per 2012 Update						
M372	ICE CONDENSER GLYCOL OUT	NF	A7	4		NF234A
	ICE CONDENSER GLYCOL OUT			4		NF233B
	ICE CONDENSER GLYCOL OUT			0.5		NF1464
M300	STEAM GENERATOR BLOWDOWN	BB	A1	2	10-51	BB5A
	STEAM GENERATOR BLOWDOWN			2	10-51	BB1B
M301	STEAM GENERATOR BLOWDOWN	BB	A1	2	10-51	BB6A
	STEAM GENERATOR BLOWDOWN			2	10-51	BB2B
M304	STEAM GENERATOR BLOWDOWN	BB	A1	2	10-51	BB8A
	STEAM GENERATOR BLOWDOWN			2	10-51	BB4B
M303	STEAM GENERATOR BLOWDOWN	BB	A1	2	10-51	BB7A
	STEAM GENERATOR BLOWDOWN			2	10-51	BB3B
M314	RHR OUT FROM LOOPS	ND	D5	14	5-28	ND2A,C
	RHR OUT FROM LOOPS			4	5-28	ND3
M351	BORON INJECTION	NI	B4	3	6-176	NI-12
	BORON INJECTION			0.75	6-176	2NI-11
	BORON INJECTION			4	6-176	NI-9A
	BORON INJECTION			4	6-176	NI-10B
Deleted per 2015 Update						
M330	NITROGEN TO ACCUMULATORS	NI	B1	1	6-176	NI48
	NITROGEN TO ACCUMULATORS			1	6-176	NI47A

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
M321	SAFETY INJECTION TEST LINE	NI	A7	0.75	6-176	NI95A
	SAFETY INJECTION TEST LINE			0.75	6-176	NI96B
	SAFETY INJECTION TEST LINE			0.75	6-176	NI120B
	SAFETY INJECTION TEST LINE			1	6-176	NI436
M316	SAFETY INJECTION PUMP TO HOT LEG	NI	B5	2	6-177	NI-124
	SAFETY INJECTION PUMP TO HOT LEG			2	6-177	NI-128
	SAFETY INJECTION PUMP TO HOT LEG			4	6-177	NI-121A
	SAFETY INJECTION PUMP TO HOT LEG			0.75		NI-122B
M319	SAFETY INJECTION PUMP TO HOT LEG	NI	B5	2	6-177	NI-156
	SAFETY INJECTION PUMP TO HOT LEG			2	6-177	NI-159
	SAFETY INJECTION PUMP TO HOT LEG			4	6-177	NI-152B
	SAFETY INJECTION PUMP TO HOT LEG			0.75		NI-153
M352	SAFETY INJECTION PUMP TO COLD LEG	NI	B5	2	6-176	NI-165
	SAFETY INJECTION PUMP TO COLD LEG			2	6-176	NI-167
	SAFETY INJECTION PUMP TO COLD LEG			2	6-176	NI-169
	SAFETY INJECTION PUMP TO COLD LEG			2	6-176	NI-171
	SAFETY INJECTION PUMP TO COLD LEG			4	6-177	NI-162A
	SAFETY INJECTION PUMP TO COLD LEG			1		NI-163
M336	RHR PUMP TO COLD LEG	NI	B5	6	6-177	NI180
	RHR PUMP TO COLD LEG			6	6-177	NI181
	RHR PUMP TO COLD LEG			1		NI179
	RHR PUMP TO COLD LEG			8	6-177	NI178B

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
M306	RHR PUMP TO COLD LEG	NI	B4	6	6-177	NI175
	RHR PUMP TO COLD LEG			6	6-177	NI176
	RHR PUMP TO COLD LEG			1		NI174
	RHR PUMP TO COLD LEG			8	6-177	NI173A
M277	RHR PUMP TO HOT LEG	NI	B5	8	6-177	NI125
	RHR PUMP TO HOT LEG			8	6-177	NI129
	RHR PUMP TO HOT LEG			12	6-177	NI183B
	RHR PUMP TO HOT LEG			1		NI154
M278	RHR OUT FROM SUMP	NI	C1	18	6-176	NI184B
	RHR OUT FROM SUMP	NI	C1	1	6-176	NI861
	RHR OUT FROM SUMP	NI	C1	1	6-176	NI862
	RHR OUT FROM SUMP	NI	C1	3/4	6-176	NI863
	RHR OUT FROM SUMP	NI	C1	3/4	6-176	NI864
	RHR OUT FROM SUMP	NI	C1	1	6-176	NI869
	RHR OUT FROM SUMP	NI	C1	1	6-176	NI870
	RHR OUT FROM SUMP	NI	C1	1/2	6-176	NI871
	RHR OUT FROM SUMP	NI	C1	1/2	6-176	NI872
M302	RHR OUT FROM SUMP	NI	C1	18	6-176	NI185A
	RHR OUT FROM SUMP	NI	C1	1	6-176	NI865
	RHR OUT FROM SUMP	NI	C1	1	6-176	NI866
	RHR OUT FROM SUMP	NI	C1	3/4	6-176	NI867
	RHR OUT FROM SUMP	NI	C1	3/4	6-176	NI868

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
	RHR OUT FROM SUMP	NI	C1	1	6-176	NI873
	RHR OUT FROM SUMP	NI	C1	1	6-176	NI874
	RHR OUT FROM SUMP	NI	C1	1/2	6-176	NI875
	RHR OUT FROM SUMP	NI	C1	1/2	6-176	NI876
M348	PALS DISCHARGE	WL	A6	2		WL1302A
	PALS DISCHARGE			2		WL1301B
M362	CONTAINMENT SPRAY IN	NS	B1	8	6-194	NS33
	CONTAINMENT SPRAY IN			8	6-194	NS32A
M370	CONTAINMENT SPRAY IN	NS	B1	8	6-194	NS30
	CONTAINMENT SPRAY IN			8	6-194	NS29A
M380	CONTAINMENT SPRAY IN	NS	B1	8	6-194	NS16
	CONTAINMENT SPRAY IN			8	6-194	NS15B
M387	CONTAINMENT SPRAY IN	NS	B1	8	6-194	NS13
	CONTAINMENT SPRAY IN			8	6-194	NS12B
M369	RHR TO CONTAINMENT SPRAY	NS	B1	8	6-194	NS46
	RHR TO CONTAINMENT SPRAY			8	6-194	NS43A
M381	RHR TO CONTAINMENT SPRAY	NS	B1	8	6-194	NS41
	RHR TO CONTAINMENT SPRAY			8	6-194	NS-38B
M374	CONT FLOOR SUMP INCORE INST. SUMP DISCHARGE	WL	A6	4	11-1	WL-64A

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
	CONT FLOOR SUMP INCORE INST. SUMP DISCHARGE			4	11-1	WL-65B
	CONT FLOOR SUMP INCORE INST. SUMP DISCHARGE			0.75	11-1	WL-264
M360	RCDT GAS SPACE TO WASTE GAS SYSTEM	WL	A1	0.75	11-1	WL-39A
	RCDT GAS SPACE TO WASTE GAS SYSTEM			0.75	11-1	WL-41B
M375	RCDT HEAT EXCHANGER DISCHARGE	WL	A7	3	11-1	WL-2A
	RCDT HEAT EXCHANGER DISCHARGE			0.5	11-1	WL-24
	RCDT HEAT EXCHANGER DISCHARGE			3	11-1	WL1B
M235	PRESSURIZER SAMPLE	NM	A6	1	9-90	NM3A,C
	PRESSURIZER SAMPLE			1	9-90	NM6A,C
	PRESSURIZER SAMPLE			0.75	9-90	NM420
	PRESSURIZER SAMPLE			1	9-90	NM7B
M309	REACTOR COOLANT HOT LEG SAMPLE	NM	A7	1	9-90	NM-22A,C
	REACTOR COOLANT HOT LEG SAMPLE			1	9-90	NM-25A,C
	REACTOR COOLANT HOT LEG SAMPLE			0.75	9-90	NM-421
	REACTOR COOLANT HOT LEG SAMPLE			1	9-90	NM-26B
M280	SAFETY INJECTION SAMPLE	NM	A6	1	9-90	NM-72B
	SAFETY INJECTION SAMPLE			1	9-90	NM-75B
	SAFETY INJECTION SAMPLE			1	9-90	NM-78B

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
	SAFETY INJECTION SAMPLE			1	9-90	NM-81B
	SAFETY INJECTION SAMPLE			0.75	9-90	NM-69
	SAFETY INJECTION SAMPLE			1	9-90	NM-82A
M335	STEAM GENERATOR BLOWDOWN SAMPLE	NM	A7	1	9-91	NM-190A
	STEAM GENERATOR BLOWDOWN SAMPLE			1	9-91	NM-187A
	STEAM GENERATOR BLOWDOWN SAMPLE			1	9-91	NM-424
	STEAM GENERATOR BLOWDOWN SAMPLE			1	9-91	NM-191B
M338	STEAM GENERATOR BLOWDOWN SAMPLE	NM	A7	1	9-91	NM-200B
	STEAM GENERATOR BLOWDOWN SAMPLE			1	9-91	NM-197B
	STEAM GENERATOR BLOWDOWN SAMPLE			1	9-91	NM-425
	STEAM GENERATOR BLOWDOWN SAMPLE			1	9-91	NM-201A
M340	STEAM GENERATOR BLOWDOWN SAMPLE	NM	A7	1	9-91	NM-210A
	STEAM GENERATOR BLOWDOWN SAMPLE			1	9-91	NM-207A
	STEAM GENERATOR BLOWDOWN SAMPLE			1	9-91	NM-426
	STEAM GENERATOR BLOWDOWN SAMPLE			1	9-91	NM-211B
M341	STEAM GENERATOR BLOWDOWN SAMPLE	NM	A7	1	9-91	NM-220B
	STEAM GENERATOR BLOWDOWN SAMPLE			1	9-91	NM-217B
	STEAM GENERATOR BLOWDOWN SAMPLE			1	9-91	NM-427
	STEAM GENERATOR BLOWDOWN SAMPLE			1	9-91	NM-221A
M376	COMPONENT COOLING TO RCDT HX	KC	B1	4	9-57	KC322
	COMPONENT COOLING TO RCDT HX			3	9-57	KC320A
M355	COMPONENT COOLING FROM RCDT HX	KC	A7	3	9-57	KC332B

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
	COMPONENT COOLING FROM RCDT HX			1	9-57	KC280
	COMPONENT COOLING FROM RCDT HX			3	9-57	KC333A
M327	KC TO RX VESSEL SUPPORT COOLERS + RCP COOLERS	KC	B1	8	9-57	KC340
	KC TO RX VESSEL SUPPORT COOLERS + RCP COOLERS			8	9-57	KC338B
M320	KC FROM RX VESSEL SUPPORT COOLERS + RCP COOLERS	KC	A7	8	9-57	KC424B
	KC FROM RX VESSEL SUPPORT COOLERS + RCP COOLERS			1	9-57	KC279
	KC FROM RX VESSEL SUPPORT COOLERS + RCP COOLERS			8	9-57	KC425A
M218	COMPONENT COOLING TO EXCESS LETDOWN HX	KC	D1	3	9-57	KC305B
M217	COMPONENT COOLING FROM EXCESS LETDOWN HX	KC	D1	3	9-57	KC315B
M322	COMP COOLING TO COMP COOLING DRAIN TRAIN	KC	A7	2	9-57	KC429B
	COMP COOLING TO COMP COOLING DRAIN TRAIN			0.75	9-57	KC47
	COMP COOLING TO COMP COOLING DRAIN TRAIN			2	9-57	KC430A
M307	NUCLEAR SERVICE WATER TO REACTOR COOLANT PUMP	RN	A1	6	9-31	RN253A
	NUCLEAR SERVICE WATER TO REACTOR COOLANT PUMP			6	9-31	RN252B

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
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	NUCLEAR SERVICE WATER TO REACTOR COOLANT PUMP			0.75		RN1102
M315	NUCLEAR SERVICE WATER FROM REACTOR COOLANT PUMP	RN	A6	6	9-31	RN276A
	NUCLEAR SERVICE WATER FROM REACTOR COOLANT PUMP			6	9-31	RN277B
	NUCLEAR SERVICE WATER FROM REACTOR COOLANT PUMP			0.75	9-31	RN1103
M213	INCORE INSTRUMENTATION ROOM PURGE IN	VP	A5	12	9-121	VP17A
	INCORE INSTRUMENTATION ROOM PURGE IN				9-121	VP18B
M138	INCORE INSTRUMENTATION ROOM PURGE OUT	VP	A5	24	9-121	VP19A
	INCORE INSTRUMENTATION ROOM PURGE OUT				9-121	VP20B
M367	UPPER COMPARTMENT PURGE INLET	VP	A5	24	9-121	VP2A
	UPPER COMPARTMENT PURGE INLET				9-121	VP1B
M454	UPPER COMPARTMENT PURGE INLET	VP	A5	24	9-121	VP4A
	UPPER COMPARTMENT PURGE INLET				9-121	VP3B
M357	LOWER COMPARTMENT PURGE INLET	VP	A5	24	9-121	VP7A
	LOWER COMPARTMENT PURGE INLET				9-121	VP6B
M456	LOWER COMPARTMENT PURGE INLET	VP	A5	24	9-121	VP9A
	LOWER COMPARTMENT PURGE INLET				9-121	VP8B
M368	CONTAINMENT PURGE EXHAUST	VP	A5	24	9-121	VP10A

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
	CONTAINMENT PURGE EXHAUST				9-121	VP11B
M455	CONTAINMENT PURGE EXHAUST	VP	A5	24	9-121	VP12A
	CONTAINMENT PURGE EXHAUST			24	9-121	VP13B
M119	CONTAINMENT PURGE	VP	A5	24	9-121	VP15A
	CONTAINMENT PURGE			24	9-121	VP16B
M440	FEEDWATER	CF	D1	18	10-45	CF26A,B
	FEEDWATER	CF		2	10-45	CF-137
M308	FEEDWATER	CF	D1	18	10-45	CF28A,B
	FEEDWATER	CF		2	10-45	CF-136
M262	FEEDWATER	CF	D1	18	10-45	CF30A,B
	FEEDWATER	CF		2	10-45	CF-135
M153	FEEDWATER	CF	D1	18	10-45	CF-35AB
	FEEDWATER	CF		2	10-45	CF-134
M441	MAIN STEAM	SM	D3	34	10-11	SM-1AB
	MAIN STEAM			6	10-11	SV-2
	MAIN STEAM			6	10-11	SV-3
	MAIN STEAM			6	10-11	SV-4
	MAIN STEAM			6	10-11	SV-5
	MAIN STEAM			6	10-11	SV-6
	MAIN STEAM			6	10-11	SV-1AB
	MAIN STEAM			3	10-11	SM-9AB
	Deleted Per 2003 Update					

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
	MAIN STEAM			2	10-11	SM-101
	Deleted Per 2005 Update					
M393	MAIN STEAM	SM	D3	6	10-11	SA-1
	MAIN STEAM			.75	10-11	SA-77
	MAIN STEAM			34	10-11	SM-3AB
	MAIN STEAM			6	10-11	SV-8
	MAIN STEAM			6	10-11	SV-9
	MAIN STEAM			6	10-11	SV-10
	MAIN STEAM			6	10-11	SV-11
	MAIN STEAM			6	10-11	SV-12
	MAIN STEAM			6	10-11	SV-7ABC
	MAIN STEAM			3	10-11	SM10AB
	Deleted Per 2003 Update					
	MAIN STEAM			2	10-11	SM-95
	Deleted Per 2005 Update					
M261	MAIN STEAM	SM	D3	6	10-11	SA-2
	MAIN STEAM			.75	10-11	SA-78
	MAIN STEAM			34	10-11	SM-5AB
	MAIN STEAM			6	10-11	SV-14
	MAIN STEAM			6	10-11	SV-15
	MAIN STEAM			6	10-11	SV-16
	MAIN STEAM			6	10-11	SV-17

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
	MAIN STEAM			6	10-11	SV-18
	MAIN STEAM			6	10-11	SV13AB
	MAIN STEAM			3	10-11	SM11AB
	Deleted Per 2003 Update					
	MAIN STEAM			2	10-11	SM89
	Deleted Per 2005 Update					
M154	MAIN STEAM	SM	D3	34	10-11	SM-7AB
	MAIN STEAM			6	10-11	SV-20
	MAIN STEAM			6	10-11	SV-21
	MAIN STEAM			6	10-11	SV-22
	MAIN STEAM			6	10-11	SV-23
	MAIN STEAM			6	10-11	SV-24
	MAIN STEAM			6	10-11	SV-19AB
	MAIN STEAM			3	10-11	SM12AB
	Deleted Per 2003 Update					
	MAIN STEAM			2	10-11	SM-83
	Deleted Per 2005 Update					
M337	DEMINERALIZED WATER	YM	B1	2	9-73	YM-116
	DEMINERALIZED WATER			2	9-73	YM-115B
M240	CONTAINMENT VENTILATION COOLING WATER IN	RV	A6	12	10-29	RV33B

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
	CONTAINMENT VENTILATION COOLING WATER IN			12	10-29	RV32A
	CONTAINMENT VENTILATION COOLING WATER IN			.75	10-29	RV445
1M385	CONTAINMENT VENTILATION COOLING WATER IN	RV	A6	6	10-29	1RV80B
	CONTAINMENT VENTILATION COOLING WATER IN			6	10-29	1RV79A
1M385	CONTAINMENT VENTILATION COOLING WATER IN	RV	A6	.75	10-29	1RV481
2M385	CONTAINMENT VENTILATION COOLING WATER IN	RV	A6	.75	10-29	2RV480
2M385	CONTAINMENT VENTILATION COOLING WATER IN	RV	A6	6	10-29	2RV80B
	CONTAINMENT VENTILATION COOLING WATER IN			6	10-29	2RV79A
	CONTAINMENT VENTILATION COOLING WATER IN			.75	10-29	2RV480
M390	CONTAINMENT VENTILATION COOLING WATER OUT	RV	A6	6	10-29	RV101A
	CONTAINMENT VENTILATION COOLING WATER OUT			6	10-29	RV102B
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				.75	10-29	RV484

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
M279	CONTAINMENT VENTILATION COOLING WATER OUT	RV	A6	12	10-29	RV76A
	CONTAINMENT VENTILATION COOLING WATER OUT			12	10-29	RV77B
	CONTAINMENT VENTILATION COOLING WATER OUT			.75		RV446
M220	INSTRUMENT AIR	VI	B1	2	9-79	VI40
	INSTRUMENT AIR			2	9-79	VI129B
M219	STATION AIR	VS	B1	2	9-83	VS13
	STATION AIR			2	9-83	VS12B
M215	BREATHING AIR	VB	B1	2		VB50
	BREATHING AIR			2		VB49B
M118	CONTAINMENT PRESSURE SENSOR	NS		0.5		NSSV5560
M239	CONTAINMENT PRESSURE SENSOR	NS		0.5		NSSV5570
M402	CONTAINMENT PRESSURE SENSOR	NS		0.5		NSSV5590
M313	CONTAINMENT PRESSURE SENSOR	NS		0.5		NSSV5580
M402A	NARROW RANGE CONTAINMENT PRESSURE	NS		1		NSSV5550
				1		NSSV5551
M378	CONTAINMENT SAMPLE OUT	VX	A2	1	6-107	VX33B
	CONTAINMENT SAMPLE OUT			1	6-107	VX31A
	CONTAINMENT SAMPLE OUT			1	6-107	VX34
M325	CONTAINMENT SAMPLE IN	VX	B1	1	6-107	VX30
	CONTAINMENT SAMPLE IN			1	6-107	VX40

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
M156	AUXILIARY FEEDWATER	CA/CF	D1	4	10-47	CA62A
	AUXILIARY FEEDWATER			4	10-47	CA66A,C
	AUXILIARY FEEDWATER			6	10-45	CF126B
	AUXILIARY FEEDWATER			2	10-45	CF-183
	AUXILIARY FEEDWATER			2		BW-3
	AUXILIARY FEEDWATER			0.75		YA-47
M286	AUXILIARY FEEDWATER	CA/CF	D1	4	10-47	CA54AC
	AUXILIARY FEEDWATER			4	10-47	CA58A
	AUXILIARY FEEDWATER			6	10-45	CF127B
	AUXILIARY FEEDWATER			2	10-45	CF-184
	AUXILIARY FEEDWATER			2		BW-12
				0.75		YA-48
M3100	AUXILIARY FEEDWATER	CA/CF	D1	4	10-47	CA46B
	AUXILIARY FEEDWATER			4	10-47	CA50B
	AUXILIARY FEEDWATER			6	10-45	CF128B
	AUXILIARY FEEDWATER			2	10-45	CF-185
	AUXILIARY FEEDWATER			2		BW-21
	AUXILIARY FEEDWATER			0.75		YA-49
M465	AUXILIARY FEEDWATER	CA/CF	D1	4	10-47	CA38B
	AUXILIARY FEEDWATER			4	10-47	CA42B
	AUXILIARY FEEDWATER			6	10-45	CF129B
	AUXILIARY FEEDWATER			2	10-45	CF-186

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
	AUXILIARY FEEDWATER			2		BW-30
	AUXILIARY FEEDWATER			0.75		YA-50
M358	REFUELING CAVITY TO RW PUMP	FW	A4	4	9-65	FW11
	REFUELING CAVITY TO RW PUMP			4	9-65	FW13
	REFUELING CAVITY TO RW PUMP			0.75	9-65	1FW67/ 2FW63
M377	REFUELING CAVITY FROM TW TANK	FW	B2	6	9-65	FW5
	REFUELING CAVITY FROM TW TANK			6	9-65	FW4
M331	HYDROGEN PURGE IN	VE	B1	4		VE11
	HYDROGEN PURGE IN			4		VE10A
M346	HYDROGEN PURGE OUT	VE	A5	4		VE-5A
	HYDROGEN PURGE OUT			4		VE-6B
M354	FUEL TRANSFER CANAL	KF	C2	24		
M326	RCP MOTOR DRAIN TANK TO WASTE OIL STORAGE	NC	A4	2		NC-141
	RCP MOTOR DRAIN TANK TO WASTE OIL STORAGE			2		NC-142
	RCP MOTOR DRAIN TANK TO WASTE OIL STORAGE			0.75		NC261
M221	CONT VENT UNITS COND. DRAINS TO DRAIN TANK	WL	A7	6	11-1	WL321A
	CONT VENT UNITS COND. DRAINS TO DRAIN TANK			6	11-1	WL322B

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
	CONT VENT UNITS COND. DRAINS TO DRAIN TANK			1	11-1	WL385
M359	INSTRUMENT AIR	VI	B1	2	9-79	VI161
	INSTRUMENT AIR			2	9-79	VI160B
M386	INSTRUMENT AIR	VI	B1	2	9-79	VI149
	INSTRUMENT AIR			2	9-79	VI148B
	INSTRUMENT AIR			2	9-79	VI362A
M317	INSTRUMENT AIR	VI	B1	2	9-79	VI124
	INSTRUMENT AIR			2	9-79	VI150B
M243	CONTAINMENT AIR RELEASE	VQ	A5	6	9-150	VQ-1A
	CONTAINMENT AIR RELEASE				9-150	VQ-2B
M384	CONTAINMENT AIR ADDITION	VQ	A5	6	9-150	VQ-6A
	CONTAINMENT AIR ADDITION				9-150	VQ-5B
M361	REACTOR COOLANT PUMP MOTOR OIL SUPPLY	NC	A7	2		NC-196A
	REACTOR COOLANT PUMP MOTOR OIL SUPPLY			2		NC-195B
	REACTOR COOLANT PUMP MOTOR OIL SUPPLY			0.75		NC259
1M353	FIRE PROTECTION HEADER	RF	B2	4	9-124	1RF823
	FIRE PROTECTION HEADER			4	9-124	1RF821A
2M353	FIRE PROTECTION HEADER	RF	B2	4	9-124	1RF834
	FIRE PROTECTION HEADER			4	9-124	1RF832A
M228	AUXILIARY SPRAY TO PRESSURIZER	NV	B2	2	9-98	NV841
1M228	AUXILIARY SPRAY TO PRESSURIZER	NV	B2	2	9-98	1NV840

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
2M228	AUXILIARY SPRAY TO PRESSURIZER	NV	B2	2	9-98	2NV1053
M342	STANDBY MAKEUP PUMP TO RCS SEALS	NV	B1	2	9-96	NV1002
	STANDBY MAKEUP PUMP TO RCS SEALS			2	9-96	NV849A,C
M383	ICE BASKET WATER ADDITION	NF	C3	8		
	ICE BASKET WATER ADDITION					
1M255A/ 2E118A	ILRT TEST CONNECTION	MI	A4	0.5		MIMV6980
	ILRT TEST CONNECTION			0.5		MIMV7010
1M255B/ 2E118B	ILRT TEST CONNECTION	MI	A4	0.5		MIMV6990
	ILRT TEST CONNECTION			0.5		MIMV7020
1M255C/ 2E118C	ILRT TEST CONNECTION	MI	A4	0.5		MIMV7000
	ILRT TEST CONNECTION			0.5		MIMV7030
M239A	CONTAINMENT HYDROGEN SAMPLE	MI	A1	0.5		MISV6870
	CONTAINMENT HYDROGEN SAMPLE			0.5		MISV6890
M239B	CONTAINMENT HYDROGEN SAMPLE	MI	A1	0.5		MISV6880
	CONTAINMENT HYDROGEN SAMPLE			0.5		MISV6900
M239C	CONTAINMENT HYDROGEN SAMPLE	MI	A1	0.5		MISV6910
	CONTAINMENT HYDROGEN SAMPLE			0.5		MISV6930
M239D	CONTAINMENT HYDROGEN SAMPLE	MI	A1	0.5		MISV6920
	CONTAINMENT HYDROGEN SAMPLE			0.5		MISV6940

Pen No.	Penetration Name	System Note 2	Pen Class Note 5	Line Size Note 6	FSAR Figure No.	Valve Number
M323A	RADIATION MONITORING	MI	A1	0.75		MISV5581
	RADIATION MONITORING			0.75		MISV5580
M323B	RADIATION MONITORING	MI	A1	0.75		MISV5583
	RADIATION MONITORING			0.75		MISV5582
C152	LOWER PERSONNEL LOCK RX DOOR RELIEF (CONT SIDE)	IAE	NA	2	3-67	IAECV5370
C152	LOWER PERSONNEL LOCK RX DOOR RELIEF (PAL SIDE)	IAE	NA	2	3-67	IAECV5390
C392	UPPER PERSONNEL LOCK RX DOOR RELIEF (CONT SIDE)	IAE	NA	2	3-67	IAECV5360
C392	UPPER PERSONNEL LOCK RX DOOR RELIEF (PAL SIDE)	IAE	NA	2	3-67	IAECV5380

Table 6-112. Containment Isolation Valve Test Data. (See Table 6-114 for description of notes.)

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
NC57	PRESSURIZER RELIEF TANK MAKEUP	M216	INSIDE	CHECK	NORMAL	2		C
1NC56B	PRESSURIZER RELIEF TANK MAKEUP		OUTSIDE	GATE	NORMAL			C
2NC56B	PRESSURIZER RELIEF TANK MAKE UP		OUTSIDE	DIAPHRAGM	NORMAL			C
NC54A	NITROGEN TO PRESSURIZER RELIEF TANK	M212	INSIDE	GLOBE	NORMAL	2		C
NC53B	NITROGEN TO PRESSURIZER RELIEF TANK		OUTSIDE	GLOBE	NORMAL			C
NC59	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT	M274	INSIDE	CHECK		1	A	N
NS2	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT		OUTSIDE	RELIEF				N
NS19	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT		OUTSIDE	RELIEF				N
ND56	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT		OUTSIDE	RELIEF				N
ND64	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT		OUTSIDE	RELIEF				N
ND61	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT		OUTSIDE	RELIEF				N
1ND120	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT		OUTSIDE	RELIEF				N

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
NI151	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT		OUTSIDE	RELIEF				N
NI102	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT		OUTSIDE	RELIEF				N
NI119	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT		OUTSIDE	RELIEF				N
NI161	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT		OUTSIDE	RELIEF				N
NV229	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT		OUTSIDE	RELIEF				N
NV45	REACTOR COOLANT PUMP SEAL WATER SUPPLY	M339	INSIDE	CHECK		1	A	N
NV77	REACTOR COOLANT PUMP SEAL WATER SUPPLY	M343	INSIDE	CHECK		1	A	N
NV61	REACTOR COOLANT PUMP SEAL WATER SUPPLY	M344	INSIDE	CHECK		1	A	N
NV29	REACTOR COOLANT PUMP SEAL WATER SUPPLY	M350	INSIDE	CHECK		1	A	N
NV94A,C	REACTOR COOLANT PUMP SEAL WATER RETURN	M256	INSIDE	GATE		1	A	N
NV96	REACTOR COOLANT PUMP SEAL WATER RETURN		INSIDE	CHECK				N
NV95B	REACTOR COOLANT PUMP SEAL WATER RETURN		OUTSIDE	GATE				N
NV12	CHARING LINE	M329	INSIDE	CHECK		1	A	N

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
NV245B	CHARING LINE		OUTSIDE	GATE				N
NV458A	LETDOWN LINE	M347	INSIDE	GATE		1	A	N
NV457A	LETDOWN LINE		INSIDE	GATE				N
NV35A	LETDOWN LINE		INSIDE	GATE				N
NV6	LETDOWN LINE		INSIDE	RELIEF				N
NV7B	LETDOWN LINE		OUTSIDE	GLOBE				N
NB262	REACTOR MAKEUP WATER TANK TO NV SYSTEM	M259	INSIDE	CHECK	NORMAL	2		C
NB260B	REACTOR MAKEUP WATER TANK TO NV SYSTEM		OUTSIDE	GLOBE	NORMAL			C
	ICE CONDENSER ICE BLOWING AIR IN	M394	INSIDE	BLANK FLANGE	NORMAL	2		B
	ICE CONDENSER ICE BLOWING AIR IN		OUTSIDE	BLANK FLANGE	NORMAL			B
	ICE CONDENSER ICE BLOWING AIR OUT	M371	INSIDE	BLANK FLANGE	NORMAL	1	H	B
	ICE CONDENSER ICE BLOWING AIR OUT		OUTSIDE	BLANK FLANGE	NORMAL			B
NF229	ICE CONDENSER GLYCOL IN	M373	INSIDE	CHECK	NORMAL	2		C
NF228A	ICE CONDENSER GLYCOL IN		OUTSIDE	DIAPHRAGM	NORMAL			C
NF234A	ICE CONDENSER GLYCOL OUT	M372	OUTSIDE	DIAPHRAGM	NORMAL	2		C
NF233B	ICE CONDENSER GLYCOL OUT		INSIDE	DIAPHRAGM	NORMAL			C

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
NF1464	ICE CONDENSER GLYCOL OUT		INSIDE	CHECK	NORMAL			C
BB5A	STEAM GENERATOR BLOWDOWN	M300	INSIDE	GATE		1	B	N
BB1B	STEAM GENERATOR BLOWDOWN		OUTSIDE	GATE				N
BB6A	STEAM GENERATOR BLOWDOWN	M301	INSIDE	GATE		1	B	N
BB2B	STEAM GENERATOR BLOWDOWN		OUTSIDE	GATE				N
BB8A	STEAM GENERATOR BLOWDOWN	M304	INSIDE	GATE		1	B	N
BB4B	STEAM GENERATOR BLOWDOWN		OUTSIDE	GATE				N
BB7A	STEAM GENERATOR BLOWDOWN	M303	INSIDE	GATE		1	B	N
BB3B	STEAM GENERATOR BLOWDOWN		OUTSIDE	GATE				N
ND2A,C	RHR OUT FROM LOOPS	M314	INSIDE	GATE		1	A	N
ND3	RHR OUT FROM LOOPS		INSIDE	RELIEF				N
NI-12	BORON INJECTION	M351	INSIDE	CHECK		1	A	N
2NI-11	BORON INJECTION		INSIDE	GLOBE				N
NI-9A	BORON INJECTION		OUTSIDE	GATE				N
NI-10B	BORON INJECTION		OUTSIDE	GATE				N
Deleted Per 2015 Update								
NI48	NITROGEN TO ACCUMULATORS	M330	INSIDE	CHECK	NORMAL	2		C
NI47A	NITROGEN TO ACCUMULATORS		OUTSIDE	GLOBE	NORMAL			C
NI95A	SAFETY INJECTION TEST LINE	M321	INSIDE	GLOBE	REVERSE	2		C
NI96B	SAFETY INJECTION TEST LINE		OUTSIDE	GLOBE	NORMAL			C

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
NI120B	SAFETY INJECTION TEST LINE		OUTSIDE	GLOBE	NORMAL			C
NI436	SAFETY INJECTION TEST LINE		INSIDE	CHECK	NORMAL			C
NI-124	SAFETY INJECTION PUMP TO HOT LEG	M316	INSIDE	CHECK		1	A	N
NI-128	SAFETY INJECTION PUMP TO HOT LEG		INSIDE	CHECK				N
NI-121A	SAFETY INJECTION PUMP TO HOT LEG		OUTSIDE	GATE				N
NI-122B	SAFETY INJECTION PUMP TO HOT LEG		INSIDE	GLOBE				N
NI-156	SAFETY INJECTION PUMP TO HOT LEG	M319	INSIDE	CHECK		1	A	N
NI-159	SAFETY INJECTION PUMP TO HOT LEG		INSIDE	CHECK				N
NI-152B	SAFETY INJECTION PUMP TO HOT LEG		OUTSIDE	GATE				N
NI-153	SAFETY INJECTION PUMP TO HOT LEG		INSIDE	GLOBE				N
NI-165	SAFETY INJECTION PUMP TO COLD LEG	M352	INSIDE	CHECK		1	A	N
NI-167	SAFETY INJECTION PUMP TO COLD LEG		INSIDE	CHECK				N
NI-169	SAFETY INJECTION PUMP TO COLD LEG		INSIDE	CHECK				N

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
NI-171	SAFETY INJECTION PUMP TO COLD LEG		INSIDE	CHECK				N
NI-162A	SAFETY INJECTION PUMP TO COLD LEG		OUTSIDE	GATE				N
NI-163	SAFETY INJECTION PUMP TO COLD LEG		INSIDE	GLOBE				N
NI180	RHR PUMP TO COLD LEG	M336	INSIDE	CHECK		1	A	N
NI181	RHR PUMP TO COLD LEG		INSIDE	CHECK				N
NI179	RHR PUMP TO COLD LEG		INSIDE	GLOBE				N
NI178B	RHR PUMP TO COLD LEG		OUTSIDE	GATE				N
NI175	RHR PUMP TO COLD LEG	M306	INSIDE	CHECK		1	A	N
NI176	RHR PUMP TO COLD LEG		INSIDE	CHECK				N
NI174	RHR PUMP TO COLD LEG		INSIDE	GLOBE				N
NI173A	RHR PUMP TO COLD LEG		OUTSIDE	GATE				N
NI125	RHR PUMP TO HOT LEG	M277	INSIDE	CHECK		1	A	N
NI129	RHR PUMP TO HOT LEG		INSIDE	CHECK				N
NI183B	RHR PUMP TO HOT LEG		OUTSIDE	GATE				N
NI154	RHR PUMP TO HOT LEG		INSIDE	GLOBE				N
NI184B	RHR OUT FROM SUMP	M278	OUTSIDE	GATE		1	A	N
NI861	RHR OUT FROM SUMP	M278	OUTSIDE	GLOBE	REVERSE	2		C
NI862	RHR OUT FROM SUMP	M278	OUTSIDE	GLOBE	REVERSE	2		C

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
NI863	RHR OUT FROM SUMP	M278	OUTSIDE	GLOBE	REVERSE	2		C
NI864	RHR OUT FROM SUMP	M278	OUTSIDE	GLOBE	REVERSE	2		C
NI869	RHR OUT FROM SUMP	M278	OUTSIDE	BALL	NORMAL	2		C
NI870	RHR OUT FROM SUMP	M278	OUTSIDE	BALL	NORMAL	2		C
NI871	RHR OUT FROM SUMP	M278	OUTSIDE	BALL	NORMAL	2		C
NI872	RHR OUT FROM SUMP	M278	OUTSIDE	BALL	NORMAL	2		C
NI185A	RHR OUT FROM SUMP	M302	OUTSIDE	GATE		1	A	N
NI865	RHR OUT FROM SUMP	M302	OUTSIDE	GLOBE	REVERSE	2		C
NI866	RHR OUT FROM SUMP	M302	OUTSIDE	GLOBE	REVERSE	2		C
NI867	RHR OUT FROM SUMP	M302	OUTSIDE	GLOBE	REVERSE	2		C
NI868	RHR OUT FROM SUMP	M302	OUTSIDE	GLOBE	REVERSE	2		C
NI873	RHR OUT FROM SUMP	M302	OUTSIDE	BALL	NORMAL	2		C
NI874	RHR OUT FROM SUMP	M302	OUTSIDE	BALL	NORMAL	2		C
NI875	RHR OUT FROM SUMP	M302	OUTSIDE	BALL	NORMAL	2		C
NI876	RHR OUT FROM SUMP	M302	OUTSIDE	BALL	NORMAL	2		C
WL1302A	PALS DISCHARGE	M348	INSIDE	GLOBE	REVERSE	2		C
WL1301B	PALS DISCHARGE		OUTSIDE	GLOBE	NORMAL			C
NS33	CONTAINMENT SPRAY IN	M362	INSIDE	CHECK		1	A	N
NS32A	CONTAINMENT SPRAY IN		OUTSIDE	GATE				N

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
NS30	CONTAINMENT SPRAY IN	M370	INSIDE	CHECK		1	A	N
NS29A	CONTAINMENT SPRAY IN		OUTSIDE	GATE				N
NS16	CONTAINMENT SPRAY IN	M380	INSIDE	CHECK		1	A	N
NS15B	CONTAINMENT SPRAY IN		OUTSIDE	GATE				N
NS13	CONTAINMENT SPRAY IN	M387	INSIDE	CHECK		1	A	N
NS12B	CONTAINMENT SPRAY IN		OUTSIDE	GATE				N
NS46	RHR TO CONTAINMENT SPRAY	M369	INSIDE	CHECK		1	A	N
NS43A	RHR TO CONTAINMENT SPRAY		OUTSIDE	GATE				N
NS41	RHR TO CONTAINMENT SPRAY	M381	INSIDE	CHECK		1	A	N
NS-38B	RHR TO CONTAINMENT SPRAY		OUTSIDE	GATE				N
WL-64A	CONT FLOOR SUMP INCORE INST. SUMP DISCHARGE	M374	INSIDE	DIAPHRAGM	REVERSE	2		C
WL-65B	CONT FLOOR SUMP INCORE INST. SUMP DISCHARGE		OUTSIDE	DIAPHRAGM	NORMAL			C
WL-264	CONT FLOOR SUMP INCORE INST. SUMP DISCHARGE		INSIDE	RELIEF	REVERSE			C
1WL-39A	RCDT GAS SPACE TO WASTE GAS SYSTEM	M360	INSIDE	GLOBE	REVERSE	2		C
1WL-41B	RCDT GAS SPACE TO WASTE GAS SYSTEM		OUTSIDE	GLOBE	NORMAL			C
2WL39A	RCDT GAS SPACE TO WASTE GAS SYSTEM	2M360	INSIDE	DIAPHRAGM	REVERSE	2		C

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
2WL41B	RCDT GAS SPACE TO WASTE GAS SYSTEM		OUTSIDE	DIAPHRAGM	NORMAL			C
WL-2A	RCDT HEAT EXCHANGER DISCHARGE	M375	INSIDE	DIAPHRAGM	NORMAL	2		C
WL-24	RCDT HEAT EXCHANGER DISCHARGE		INSIDE	CHECK	NORMAL			C
WL1B	RCDT HEAT EXCHANGER DISCHARGE		OUTSIDE	DIAPHRAGM	NORMAL			C
NM3A,C	PRESSURIZER SAMPLE	M235	INSIDE	GLOBE	NORMAL	2		C
NM6A,C	PRESSURIZER SAMPLE		INSIDE	GLOBE	NORMAL			C
NM420	PRESSURIZER SAMPLE		INSIDE	CHECK	NORMAL			C
NM7B	PRESSURIZER SAMPLE		OUTSIDE	GLOBE	NORMAL			C
NM-22A,C	REACTOR COOLANT HOT LEG SAMPLE	M309	INSIDE	GLOBE	NORMAL	2		C
NM-25A,C	REACTOR COOLANT HOT LEG SAMPLE		INSIDE	GLOBE	NORMAL			C
NM-421	REACTOR COOLANT HOT LEG SAMPLE		INSIDE	CHECK	NORMAL			C
NM-26B	REACTOR COOLANT HOT LEG SAMPLE		OUTSIDE	GLOBE	NORMAL			C
NM-72B	SAFETY INJECTION SAMPLE	M280	INSIDE	GLOBE	NORMAL	2		C

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
NM-75B	SAFETY INJECTION SAMPLE		INSIDE	GLOBE	NORMAL			C
NM-78B	SAFETY INJECTION SAMPLE		INSIDE	GLOBE	NORMAL			C
NM-81B	SAFETY INJECTION SAMPLE		INSIDE	GLOBE	NORMAL			C
NM-69	SAFETY INJECTION SAMPLE		INSIDE	RELIEF	REVERSE			C
NM-82A	SAFETY INJECTION SAMPLE		OUTSIDE	GLOBE	NORMAL			C
NM-190A	STEAM GENERATOR BLOWDOWN SAMPLE	M335	INSIDE	GLOBE		1	B	N
NM-187A	STEAM GENERATOR BLOWDOWN SAMPLE		INSIDE	GLOBE				N
NM-424	STEAM GENERATOR BLOWDOWN SAMPLE		INSIDE	CHECK				N
NM-191B	STEAM GENERATOR BLOWDOWN SAMPLE		OUTSIDE	GLOBE				N
NM-200B	STEAM GENERATOR BLOWDOWN SAMPLE	M338	INSIDE	GLOBE		1	B	N
NM-197B	STEAM GENERATOR BLOWDOWN SAMPLE		INSIDE	GLOBE				N
NM-425	STEAM GENERATOR BLOWDOWN SAMPLE		INSIDE	CHECK				N
NM-201A	STEAM GENERATOR BLOWDOWN SAMPLE		OUTSIDE	GLOBE				N
NM-210A	STEAM GENERATOR BLOWDOWN SAMPLE	M340	INSIDE	GLOBE		1	B	N

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
NM-207A	STEAM GENERATOR BLOWDOWN SAMPLE		INSIDE	GLOBE				N
NM-426	STEAM GENERATOR BLOWDOWN SAMPLE		INSIDE	CHECK				N
NM-211B	STEAM GENERATOR BLOWDOWN SAMPLE		OUTSIDE	GLOBE				N
NM-220B	STEAM GENERATOR BLOWDOWN SAMPLE	M341	INSIDE	GLOBE		1	B	N
NM-217B	STEAM GENERATOR BLOWDOWN SAMPLE		INSIDE	GLOBE				N
NM-427	STEAM GENERATOR BLOWDOWN SAMPLE		INSIDE	CHECK				N
NM-221A	STEAM GENERATOR BLOWDOWN SAMPLE		OUTSIDE	GLOBE				N
KC322	COMPONENT COOLING TO RCDT HX	M376	INSIDE	CHECK	NORMAL	2		C
KC320A	COMPONENT COOLING TO RCDT HX		OUTSIDE	DIAPHRAGM	NORMAL			C
KC332B	COMPONENT COOLING FROM RCDT HX	M355	INSIDE	DIAPHRAGM	NORMAL	2		C
KC280	COMPONENT COOLING FROM RCDT HX		INSIDE	CHECK	NORMAL			C
KC333A	COMPONENT COOLING FROM RCDT HX		OUTSIDE	DIAPHRAGM	NORMAL			C

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
KC340	KC TO RX VESSEL SUPPORT COOLERS + RCP COOLERS	M327	INSIDE	CHECK	NORMAL	2		C
KC338B	KC TO RX VESSEL SUPPORT COOLERS + RCP COOLERS		OUTSIDE	BUTTERFLY	NORMAL			C
KC424B	KC TO RX VESSEL SUPPORT COOLERS + RCP COOLERS	M320	INSIDE	BUTTERFLY	NORMAL	2		C
KC279	KC TO RX VESSEL SUPPORT COOLERS + RCP COOLERS		INSIDE	CHECK	NORMAL			C
KC425A	KC TO RX VESSEL SUPPORT COOLERS + RCP COOLERS		OUTSIDE	BUTTERFLY	NORMAL			C
KC305B	COMPONENT COOLING TO EXCESS LETDOWN HX	M218	OUTSIDE	GATE		1	B	N
KC315B	COMPONENT COOLING FROM EXCESS LETDOWN HX	M217	OUTSIDE	GATE		1	B	N
KC429B	COMP COOLING TO COMP COOLING DRAIN TRAIN	M322	INSIDE	GLOBE	NORMAL	2		C
KC47	COMP COOLING TO COMP COOLING DRAIN TRAIN		INSIDE	CHECK	NORMAL			C
KC430A	COMP COOLING TO COMP COOLING DRAIN TRAIN		OUTSIDE	GLOBE	NORMAL			C
RN253A	NUCLEAR SERVICE WATER TO REACTOR COOLANT PUMP	M307	INSIDE	DIAPHRAGM	REVERSE	2		C
RN252B	NUCLEAR SERVICE WATER TO REACTOR COOLANT PUMP		OUTSIDE	DIAPHRAGM	NORMAL			C
Deleted Per 2012 Update								

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
RN1102	NUCLEAR SERVICE WATER TO REACTOR COOLANT PUMP		INSIDE	RELIEF	REVERSE			C
RN276A	NUCLEAR SERVICE WATER FROM REACTOR COOLANT PUMP	M315	INSIDE	DIAPHRAGM	REVERSE	2		C
RN277B	NUCLEAR SERVICE WATER FROM REACTOR COOLANT PUMP		OUTSIDE	DIAPHRAGM	NORMAL			C
RN1103	NUCLEAR SERVICE WATER FROM REACTOR COOLANT PUMP	M315	INSIDE	RELIEF	REVERSE			C
VP17A	INCORE INSTRUMENTATION ROOM PURGE IN	M213	INSIDE	BUTTERFLY	REVERSE	2		C
VP18B	INCORE INSTRUMENTATION ROOM PURGE IN		OUTSIDE	BUTTERFLY	NORMAL			C
VP19A	INCORE INSTRUMENTATION ROOM PURGE OUT	M138	INSIDE	BUTTERFLY	REVERSE	2		C
VP20B	INCORE INSTRUMENTATION ROOM PURGE OUT		OUTSIDE	BUTTERFLY	NORMAL			C
VP2A	UPPER COMPARTMENT PURGE INLET	M367	INSIDE	BUTTERFLY	REVERSE	2		C
VP1B	UPPER COMPARTMENT PURGE INLET		OUTSIDE	BUTTERFLY	NORMAL			C
VP4A	UPPER COMPARTMENT PURGE INLET	M454	INSIDE	BUTTERFLY	REVERSE	2		C

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
VP3B	UPPER COMPARTMENT PURGE INLET		OUTSIDE	BUTTERFLY	NORMAL			C
VP7A	LOWER COMPARTMENT PURGE INLET	M357	INSIDE	BUTTERFLY	REVERSE	2		C
VP6B	LOWER COMPARTMENT PURGE INLET		OUTSIDE	BUTTERFLY	NORMAL			C
VP9A	LOWER COMPARTMENT PURGE INLET	M456	INSIDE	BUTTERFLY	REVERSE	2		C
VP8B	LOWER COMPARTMENT PURGE INLET		OUTSIDE	BUTTERFLY	NORMAL			C
VP10A	CONTAINMENT PURGE EXHAUST	M368	INSIDE	BUTTERFLY	REVERSE	2		C
VP11B	CONTAINMENT PURGE EXHAUST		OUTSIDE	BUTTERFLY	NORMAL			C
VP12A	CONTAINMENT PURGE EXHAUST	M455	INSIDE	BUTTERFLY	REVERSE	2		C
VP13B	CONTAINMENT PURGE EXHAUST		OUTSIDE	BUTTERFLY	NORMAL			C
VP15A	CONTAINMENT PURGE	M119	INSIDE	BUTTERFLY	REVERSE	2		C
VP16B	CONTAINMENT PURGE		OUTSIDE	BUTTERFLY	NORMAL			C
CF26AB	FEEDWATER	M440	OUTSIDE	GATE		1	B	N
CF-137	FEEDWATER		OUTSIDE	GLOBE				N
CF28AB	FEEDWATER	M308	OUTSIDE	GATE		1	B	N
CF-136	FEEDWATER		OUTSIDE	GLOBE				N

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
CF30A,B	FEEDWATER	M262	OUTSIDE	GATE		1	B	N
CF-135	FEEDWATER		OUTSIDE	GLOBE				N
CF-35AB	FEEDWATER	M153	OUTSIDE	GATE		1	B	N
CF-134	FEEDWATER		OUTSIDE	GLOBE				N
	Deleted Per 2005 Upate							
SM-1AB	MAIN STEAM		OUTSIDE	GATE				N
SV-2	MAIN STEAM		OUTSIDE	SAFETY				N
SV-3	MAIN STEAM		OUTSIDE	SAFETY				N
SV-4	MAIN STEAM		OUTSIDE	SAFETY				N
SV-5	MAIN STEAM		OUTSIDE	SAFETY				N
SV-6	MAIN STEAM		OUTSIDE	SAFETY				N
SV-1AB	MAIN STEAM		OUTSIDE	GATE				N
SM-9AB	MAIN STEAM		OUTSIDE	GATE				N
	Deleted Per 2003 Update							
SM-101	MAIN STEAM		OUTSIDE	GLOBE				N
	Deleted Per 2005 Update							
SA-1	MAIN STEAM	M393	OUTSIDE	GATE		1	B	N
SA-77	MAIN STEAM		OUTSIDE	GATE				N
SM-3AB	MAIN STEAM		OUTSIDE	GATE				N
SV-8	MAIN STEAM		OUTSIDE	SAFETY				N

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
SV-9	MAIN STEAM		OUTSIDE	SAFETY				N
SV-10	MAIN STEAM		OUTSIDE	SAFETY				N
SV-11	MAIN STEAM		OUTSIDE	SAFETY				N
SV-12	MAIN STEAM		OUTSIDE	SAFETY				N
SV-7ABC	MAIN STEAM		OUTSIDE	GATE				N
SM10AB	MAIN STEAM		OUTSIDE	GATE				N
	Deleted Per 2003 Update							
SM-95	MAIN STEAM		OUTSIDE	GLOBE				N
SA-2	MAIN STEAM	M261	OUTSIDE	GATE		1	B	N
SA-78	MAIN STEAM		OUTSIDE	GATE				N
	Deleted Per 2005 Update							
SM-5AB	MAIN STEAM		OUTSIDE	GATE				N
SV-14	MAIN STEAM		OUTSIDE	SAFETY				N
SV-15	MAIN STEAM		OUTSIDE	SAFETY				N
SV-16	MAIN STEAM		OUTSIDE	SAFETY				N
SV-17	MAIN STEAM		OUTSIDE	SAFETY				N
SV-18	MAIN STEAM		OUTSIDE	SAFETY				N
SV13AB	MAIN STEAM		OUTSIDE	GATE				N
SM11AB	MAIN STEAM		OUTSIDE	GATE				N
	Deleted Per 2003 Update							

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
SM89	MAIN STEAM		OUTSIDE	GLOBE				N
	Deleted Per 2005 Update							
SM-7AB	MAIN STEAM		OUTSIDE	GATE				N
SV-20	MAIN STEAM		OUTSIDE	SAFETY				N
SV-21	MAIN STEAM		OUTSIDE	SAFETY				N
SV-22	MAIN STEAM		OUTSIDE	SAFETY				N
SV-23	MAIN STEAM		OUTSIDE	SAFETY				N
SV-24	MAIN STEAM		OUTSIDE	SAFETY				N
SV-19AB	MAIN STEAM		OUTSIDE	GATE				N
SM12AB	MAIN STEAM		OUTSIDE	GATE				N
	Deleted Per 2003 Update							
SM-83	MAIN STEAM		OUTSIDE	GLOBE				N
YM-116	DEMINERALIZED WATER	M337	INSIDE	CHECK	NORMAL	2		C
YM-115B	DEMINERALIZED WATER		OUTSIDE	GLOBE	NORMAL			C
RV33B	CONTAINMENT VENTILATION COOLING WATER IN	M240	INSIDE	BUTTERFLY	REVERSE	2		C
RV32A	CONTAINMENT VENTILATION COOLING WATER IN		OUTSIDE	BUTTERFLY	NORMAL			C
RV445	CONTAINMENT VENTILATION COOLING WATER IN		INSIDE	RELIEF	REVERSE			C
1RV80B	CONTAINMENT VENTILATION COOLING WATER IN	1M385	INSIDE	DIAPHRAGM	REVERSE	2		C

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
1RV79A	CONTAINMENT VENTILATION COOLING WATER IN		OUTSIDE	DIAPHRAGM	NORMAL			C
2RV80B	CONTAINMENT VENTILATION COOLING WATER IN	2M385	INSIDE	DIAPHRAGM	REVERSE	2		C
2RV79A	CONTAINMENT VENTILATION COOLING WATER IN		OUTSIDE	DIAPHRAGM	NORMAL	2		C
2RV480	CONTAINMENT VENTILATION COOLING WATER IN		INSIDE	RELIEF	REVERSE			C
1RV481	CONTAINMENT VENTILATION COOLING WATER IN	1M385	INSIDE	RELIEF	REVERSE			C
2RV480	CONTAINMENT VENTILATION COOLING WATER IN	2M385	INSIDE	RELIEF	REVERSE			C
1RV101A	CONTAINMENT VENTILATION COOLING WATER OUT	1M390	INSIDE	DIAPHRAGM	REVERSE	2		C
1RV102B	CONTAINMENT VENTILATION COOLING WATER OUT		OUTSIDE	DIAPHRAGM	NORMAL			C
2RV101A	CONTAINMENT VENTILATION COOLING WATER OUT	2M390	INSIDE	DIAPHRAGM	REVERSE	2		C
2RV102B	CONTAINMENT VENTILATION COOLING WATER OUT		OUTSIDE	DIAPHRAGM	NORMAL			C
2RV484	CONTAINMENT VENTILATION COOLING WATER OUT		INSIDE	RELIEF	REVERSE			C
RV76A	CONTAINMENT VENTILATION COOLING WATER OUT	M279	INSIDE	BUTTERFLY	REVERSE	2		C

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
RV77B	CONTAINMENT VENTILATION COOLING WATER OUT		OUTSIDE	BUTTERFLY	NORMAL			C
RV446	CONTAINMENT VENTILATION COOLING WATER OUT		INSIDE	RELIEF	REVERSE			C
VI40	INSTRUMENT AIR	M220	INSIDE	CHECK	NORMAL	2		C
VI129B	INSTRUMENT AIR		OUTSIDE	GLOBE	NORMAL			C
VS13	STATION AIR	M219	INSIDE	CHECK	NORMAL	2		C
VS12B	STATION AIR		OUTSIDE	GLOBE	NORMAL			C
VB50	BREATHING AIR	M215	INSIDE	CHECK	NORMAL	2		C
VB49B	BREATHING AIR		OUTSIDE	GATE	NORMAL			C
NOTE 11	CONTAINMENT PRESSURE SENSOR	M118	OUTSIDE	GLOBE		1	G	C
NOTE 11	CONTAINMENT PRESSURE SENSOR	M239	OUTSIDE	GLOBE		1	G	C
NOTE 11	CONTAINMENT PRESSURE SENSOR	M402	OUTSIDE	GLOBE		1	G	C
NOTE 11	CONTAINMENT PRESSURE SENSOR	M313	OUTSIDE	GLOBE		1	G	C
VX33B	CONTAINMENT SAMPLE OUT	M378	INSIDE	DIAPHRAGM	REVERSE	2		C
VX31A	CONTAINMENT SAMPLE OUT		INSIDE	DIAPHRAGM	NORMAL			C
VX34	CONTAINMENT SAMPLE OUT		OUTSIDE	DIAPHRAGM	NORMAL			C
VX30	CONTAINMENT SAMPLE IN	M325	INSIDE	CHECK	NORMAL	2		C

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
VX40	CONTAINMENT SAMPLE IN		OUTSIDE	DIAPHRAGM	REVERSE			C
CA62A	AUXILIARY FEEDWATER	M156	OUTSIDE	GATE		1	B	N
CA66AC	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
CF126B	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
CF-183	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
BW-3	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
YA-47	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
NSSV5550	NARROW RANGE CONTAINMENT PRESSURE	M402A	INSIDE	GLOBE	NORMAL	2		C
NSSV5551	NARROW RANGE CONTAINMENT PRESSURE		OUTSIDE	GLOBE	NORMAL	2		C
CA54AC	AUXILIARY FEEDWATER	M286	OUTSIDE	GATE		1	B	N
CA58A	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
CF127B	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
CF184	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
BW12	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
YA48	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
CA46B	AUXILIARY FEEDWATER	M3100	OUTSIDE	GATE		1	B	N
CA50B	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
CF128B	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
CF185	AUXILIARY FEEDWATER		OUTSIDE	GATE				N

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
BW21	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
YA49	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
CA38B	AUXILIARY FEEDWATER	M465	OUTSIDE	GATE		1	B	N
CA42B	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
CF129B	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
CF186	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
BW30	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
YA50	AUXILIARY FEEDWATER		OUTSIDE	GATE				N
FW11	REFUELING CAVITY TO RW PUMP	M358	INSIDE	DIAPHRAGM	NORMAL	2		C
FW13	REFUELING CAVITY TO RW PUMP		OUTSIDE	DIAPHRAGM	NORMAL			C
1FW67/ 2FW63	REFUELING CAVITY TO RW PUMP		INSIDE	CHECK	NORMAL			C
FW5	REFUELING CAVITY FROM TW TANK	M377	INSIDE	CHECK	NORMAL	2		C
FW4	REFUELING CAVITY FROM TW TANK		OUTSIDE	GATE	NORMAL			C
VE11	HYDROGEN PURGE IN	M331	INSIDE	CHECK	NORMAL	2		C
VE10A	HYDROGEN PURGE IN		OUTSIDE	DIAPHRAGM	NORMAL			C
VE-5A	HYDROGEN PURGE OUT	M346	INSIDE	GATE	NORMAL	1	F	C
VE-6B	HYDROGEN PURGE OUT		OUTSIDE	GATE	NORMAL			C

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
	FUEL TRANSFER CANAL	M354	INSIDE	BLANK FLANGE		1	E	B
NC-141	RCP MOTOR DRAIN TANK TO WASTE OIL STORAGE	M326	INSIDE	DIAPHRAGM	NORMAL	2		C
NC-142	RCP MOTOR DRAIN TANK TO WASTE OIL STORAGE		OUTSIDE	DIAPHRAGM	NORMAL			C
NC261	RCP MOTOR DRAIN TANK TO WASTE OIL STORAGE		INSIDE	CHECK	NORMAL			C
WL321A	CONT VENT UNITS COND. DRAINS TO DRAIN TANK	M221	INSIDE	BUTTERFLY	NORMAL	2		C
WL322B	CONT VENT UNITS COND. DRAINS TO DRAIN TANK		OUTSIDE	BUTTERFLY	NORMAL			C
WL385	CONT VENT UNITS COND. DRAINS TO DRAIN TANK		INSIDE	CHECK	NORMAL			C
VI161	INSTRUMENT AIR	M359	INSIDE	CHECK	NORMAL	2		C
VI160B	INSTRUMENT AIR		OUTSIDE	GLOBE	NORMAL			C
VI149	INSTRUMENT AIR	M386	INSIDE	CHECK	NORMAL	2		C
VI148B	INSTRUMENT AIR		OUTSIDE	GLOBE	NORMAL			C
VI362A	INSTRUMENT AIR		OUTSIDE	GLOBE	NORMAL			C
VI124	INSTRUMENT AIR	M317	INSIDE	CHECK	NORMAL	2		C
VI150B	INSTRUMENT AIR		OUTSIDE	GLOBE	NORMAL			C
VQ1A	CONTAINMENT AIR RELEASE	M243	INSIDE	DIAPHRAGM	REVERSE	2		C

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
VQ2B	CONTAINMENT AIR RELEASE		OUTSIDE	DIAPHRAGM	NORMAL			C
VQ6A	CONTAINMENT AIR ADDITION	M384	INSIDE	DIAPHRAGM	REVERSE	2		C
VQ5B	CONTAINMENT AIR ADDITION		OUTSIDE	DIAPHRAGM	NORMAL			C
NC196A	REACTOR COOLANT PUMP MOTOR OIL SUPPLY	M361	INSIDE	GLOBE	NORMAL	2		C
NC195B	REACTOR COOLANT PUMP MOTOR OIL SUPPLY		OUTSIDE	GLOBE	NORMAL			C
NC259	REACTOR COOLANT PUMP MOTOR OIL SUPPLY		INSIDE	CHECK	NORMAL			C
1RF823	FIRE PROTECTION HEADER	1M353	INSIDE	CHECK	NORMAL	2		C
1RF821A	FIRE PROTECTION HEADER		OUTSIDE	DIAPHRAGM	NORMAL			C
1RF834	FIRE PROTECTION HEADER	2M353	INSIDE	CHECK	NORMAL	2		C
1RF832A	FIRE PROTECTION HEADER		OUTSIDE	DIAPHRAGM	NORMAL			C
NV841	AUXILIARY SPRAY TO PRESSURIZER	M228	INSIDE	CHECK		1	A	N
1NV840	AUXILIARY SPRAY TO PRESSURIZER	1M228	OUTSIDE	GLOBE		1	A	N
2NV1053	AUXILIARY SPRAY TO PRESSURIZER	2M228	OUTSIDE	GLOBE		1	A	N
NV1002	STANDBY MAKEUP PUMP TO RCS SEALS	M342	INSIDE	CHECK	NORMAL	2		C
NV849A,C	STANDBY MAKEUP PUMP TO RCS SEALS		OUTSIDE	GLOBE	NORMAL			C

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
	ICE BASKET WATER ADDITION	M383	INSIDE	BLANK FLANGE		1	H	C
	ICE BASKET WATER ADDITION		OUTSIDE	BLANK FLANGE				C
MIMV6980	ILRT TEST CONNECTION	1M255 A/ 2E118A	INSIDE	GLOBE	NORMAL	2		C
MIMV7010	ILRT TEST CONNECTION		OUTSIDE	GLOBE	NORMAL			C
MIMV6990	ILRT TEST CONNECTION	1M255B / 2E118B	INSIDE	GLOBE	NORMAL			C
MIMV7020	ILRT TEST CONNECTION		OUTSIDE	GLOBE	NORMAL			C
MIMV7000	ILRT TEST CONNECTION	1M255C / 2E118C	INSIDE	GLOBE	NORMAL			C
MIMV7030	ILRT TEST CONNECTION		OUTSIDE	GLOBE	NORMAL			C
MISV6870	CONTAINMENT HYDROGEN SAMPLE	M239A	INSIDE	GLOBE	NORMAL	2		C
MISV6890	CONTAINMENT HYDROGEN SAMPLE		OUTSIDE	GLOBE	NORMAL	2		C
MISV6880	CONTAINMENT HYDROGEN SAMPLE	M239B	INSIDE	GLOBE	NORMAL	2		C
MISV6900	CONTAINMENT HYDROGEN SAMPLE		OUTSIDE	GLOBE	NORMAL	2		C

Valve No.	Penetration Name	Pen Number	Valve Location	Valve Type	Test Pressure Direction Note 8	Leak Class Note 3	Leak Ref Note 3	Test Type Note 7
MISV6910	CONTAINMENT HYDROGEN SAMPLE	M239C	INSIDE	GLOBE	NORMAL	2		C
MISV6930	CONTAINMENT HYDROGEN SAMPLE		OUTSIDE	GLOBE	NORMAL	2		C
MISV6920	CONTAINMENT HYDROGEN SAMPLE	M239D	INSIDE	GLOBE	NORMAL	2		C
MISV6940	CONTAINMENT HYDROGEN SAMPLE		OUTSIDE	GLOBE	NORMAL	2		C
MISV5581	RADIATION MONITORING	M323A	INSIDE	GLOBE	NORMAL	2		C
MISV5580	RADIATION MONITORING		OUTSIDE	GLOBE	NORMAL	2		C
MISV5583	RADIATION MONITORING	M323B	INSIDE	GLOBE	NORMAL	2		C
MISV5582	RADIATION MONITORING		OUTSIDE	GLOBE	NORMAL	2		C
IAECV5360	UPPER PERSONNEL LOCK Rx DOOR RELIEF (CONT SIDE)	C392	INSIDE	CHECK	NORMAL	1	A	C
IAECV5370	LOWER PERSONNEL LOCK Rx DOOR RELIEF (CONT SIDE)	C152	INSIDE	CHECK	NORMAL	1	A	C
IAECV5380	UPPER PERSONNEL LOCK Rx DOOR RELIEF (PAL SIDE)	C392	OUTSIDE	CHECK	NORMAL	1	A	C
IAECV5390	LOWER PERSONNEL LOCK Rx DOOR RELIEF (PAL SIDE)	C152	OUTSIDE	CHECK	NORMAL	1	A	C

Table 6-113. Containment Isolation Valve Data. (See Table 6-114 for description of notes.)

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
NC57	PRESSURIZER RELIEF TANK MAKEUP	M216						
1NC56B	PRESSURIZER RELIEF TANK MAKEUP		MOTOR	T	OPEN	AS IS	CLOSED	15
2NC56B	PRESSURIZER RELIEF TANK MAKEUP		DIAPHRAGM	T	OPEN	CLOSED	CLOSED	15
NC54A	NITROGEN TO PRESSURIZER RELIEF TANK	M212	MOTOR	T	OPEN	AS IS	CLOSED	10
NC53B	NITROGEN TO PRESSURIZER RELIEF TANK		MOTOR	T	OPEN	AS IS	CLOSED	10
NC59	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT	M274						
NS2	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT							
NS19	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT							
ND56	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT							

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
ND64	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT							
ND61	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT							
1ND120	CONT, SPRAY, RHR, SI, + CVCS RELIEF TO PRT							
NI151	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT							
NI102	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT							
NI119	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT							
NI161	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT							
NV229	CONT. SPRAY, RHR, SI, + CVCS RELIEF TO PRT							
NV45	REACTOR COOLANT PUMP SEAL WATER SUPPLY	M339						

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
NV77	REACTOR COOLANT PUMP SEAL WATER SUPPLY	M343						
NV61	REACTOR COOLANT PUMP SEAL WATER SUPPLY	M344						
NV29	REACTOR COOLANT PUMP SEAL WATER SUPPLY	M350						
NV94A,C	REACTOR COOLANT PUMP SEAL WATER RETURN	M256	MOTOR	T	OPEN	AS IS	CLOSED	10
NV96	REACTOR COOLANT PUMP SEAL WATER RETURN							
NV95B	REACTOR COOLANT PUMP SEAL WATER RETURN		MOTOR	T	OPEN	AS IS	CLOSED	10
NV12	CHARGING LINE	M329						
NV245B	CHARGING LINE		MOTOR	S	OPEN	AS IS	CLOSED	10
NV458A	LETDOWN LINE	M347	DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	15
NV457A	LETDOWN LINE		DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	15
NV35A	LETDOWN LINE		PISTON	T	OPEN	CLOSED	CLOSED	15

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
NV6	LETDOWN LINE							
NV7B	LETDOWN LINE		MOTOR	T	OPEN	AS IS	CLOSED	10
NB262	REACTOR MAKEUP WATER TANK TO NV SYSTEM	M259						
NB260B	REACTOR MAKEUP WATER TANK TO NV SYSTEM		MOTOR	T	CLOSED	AS IS	CLOSED	
	ICE CONDENSER ICE BLOWING AIR IN	M394						
	ICE CONDENSER ICE BLOWING AIR IN							
	ICE CONDENSER ICE BLOWING AIR OUT	M371						
	ICE CONDENSER ICE BLOWING AIR OUT							
NF229	ICE CONDENSER GLYCOL IN	M373						
NF228A	ICE CONDENSER GLYCOL IN		DIAPHRAGM	T	OPEN	CLOSED	CLOSED	15
NF234A	ICE CONDENSER GLYCOL OUT	M372	DIAPHRAGM	T	OPEN	CLOSED	CLOSED	15

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
NF233B	ICE CONDENSER GLYCOL OUT		DIAPHRAGM	T	OPEN	CLOSED	CLOSED	15
NF1464	ICE CONDENSER GLYCOL OUT							
BB5A	STEAM GENERATOR BLOWDOWN	M300	PISTON	T	OPEN	CLOSED	CLOSED	10
BB1B	STEAM GENERATOR BLOWDOWN		PISTON	T	OPEN	CLOSED	CLOSED	10
BB6A	STEAM GENERATOR BLOWDOWN	M301	PISTON	T	OPEN	CLOSED	CLOSED	10
BB2B	STEAM GENERATOR BLOWDOWN		PISTON	T	OPEN	CLOSED	CLOSED	10
BB8A	STEAM GENERATOR BLOWDOWN	M304	PISTON	T	OPEN	CLOSED	CLOSED	10
BB4B	STEAM GENERATOR BLOWDOWN		PISTON	T	OPEN	CLOSED	CLOSED	10
BB7A	STEAM GENERATOR BLOWDOWN	M303	PISTON	T	OPEN	CLOSED	CLOSED	10
BB3B	STEAM GENERATOR BLOWDOWN		PISTON	T	OPEN	CLOSED	CLOSED	10

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
ND2A,C	RHR OUT FROM LOOPS	M314	MOTOR	MANUAL	CLOSED	AS IS	OPEN/ CLOSED	
ND3	RHR OUT FROM LOOPS							
NI-12	BORON INJECTION	M351						
2NI-11	BORON INJECTION		DIAPHRAGM	MANUAL	CLOSED	CLOSED		
NI-9A	BORON INJECTION		MOTOR	S	CLOSED	AS IS	OPEN	NOTE 13
NI-10B	BORON INJECTION		MOTOR	S	CLOSED	AS IS	OPEN	NOTE 13
Deleted per 2015 update.								
NI48	NITROGEN TO ACCUMULA-TORS	M330						
NI47A	NITROGEN TO ACCUMULA-TORS		MOTOR	T	CLOSED	AS IS	CLOSED	15
NI95A	SAFETY INJECTION TEST LINE	M321	MOTOR	T	CLOSED	AS IS	CLOSED	10
NI96B	SAFETY INJECTION TEST LINE		MOTOR	T	CLOSED	AS IS	CLOSED	10
NI120B	SAFETY INJECTION TEST LINE		MOTOR	T	CLOSED	AS IS	CLOSED	10

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
NI436	SAFETY INJECTION TEST LINE							
NI-124	SAFETY INJECTION PUMP TO HOT LEG	M316						
NI-128	SAFETY INJECTION PUMP TO HOT LEG							
NI-121A	SAFETY INJECTION PUMP TO HOT LEG		MOTOR	REMOTE/ MAN	CLOSED	AS IS	OPEN/ CLOSED	NOTE 13
NI-122B	SAFETY INJECTION PUMP TO HOT LEG		MOTOR	T	CLOSED	AS IS	CLOSED	
NI-156	SAFETY INJECTION PUMP TO HOT LEG	M319						
NI-159	SAFETY INJECTION PUMP TO HOT LEG							

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
NI-152B	SAFETY INJECTION PUMP TO HOT LEG		MOTOR	REMOTE	CLOSED	AS IS	OPEN/ CLOSED	NOTE 13
NI-153	SAFETY INJECTION PUMP TO HOT LEG		DIAPHRAGM	MANUAL	CLOSED	CLOSED		
NI-165	SAFETY INJECTION PUMP TO COLD LEG	M352						
NI-167	SAFETY INJECTION PUMP TO COLD LEG							
NI-169	SAFETY INJECTION PUMP TO COLD LEG							
NI-171	SAFETY INJECTION PUMP TO COLD LEG							
NI-162A	SAFETY INJECTION PUMP TO COLD LEG		MOTOR	REMOTE/ MAN	OPEN	AS IS	OPEN	NOTE 13

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
NI-163	SAFETY INJECTION PUMP TO COLD LEG		DIAPHRAGM	MANUAL	CLOSED	CLOSED		
NI180	RHR PUMP TO COLD LEG	M336						
NI181	RHR PUMP TO COLD LEG							
NI179	RHR PUMP TO COLD LEG		DIAPHRAGM	MANUAL/ REM	CLOSED	CLOSED		
NI178B	RHR PUMP TO COLD LEG		MOTOR	MANUAL	OPEN	AS IS	OPEN	NOTE 13
NI175	RHR PUMP TO COLD LEG	M306						
NI176	RHR PUMP TO COLD LEG							
NI174	RHR PUMP TO COLD LEG		DIAPHRAGM	MANUAL/ REM	CLOSED	CLOSED		
NI173A	RHR PUMP TO COLD LEG		MOTOR	MANUAL	OPEN	AS IS	OPEN	NOTE 13
NI125	RHR PUMP TO HOT LEG	M277						
NI129	RHR PUMP TO HOT LEG							
NI183B	RHR PUMP TO HOT LEG		MOTOR	REMOTE/ MAN	CLOSED	AS IS	OPEN/ CLOSED	NOTE 13

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
NI154	RHR PUMP TO HOT LEG		DIAPHRAGM	MANUAL	CLOSED	CLOSED		
NI184B	RHR OUT FROM SUMP	M278	MOTOR	REMOTE/ MAN	CLOSED	AS IS	OPEN/ CLOSED	NOTE 13
NI0861	RHR OUT FROM SUMP	M278						
NI0862	RHR OUT FROM SUMP	M278						
NI0863	RHR OUT FROM SUMP	M278						
NI0864	RHR OUT FROM SUMP	M278						
NI0869	RHR OUT FROM SUMP	M278						
NI0870	RHR OUT FROM SUMP	M278						
NI0871	RHR OUT FROM SUMP	M278						
NI0872	RHR OUT FROM SUMP	M278						
NI185A	RHR OUT FROM SUMP	M302	MOTOR	REMOTE/ MAN	CLOSED	AS IS	OPEN/ CLOSED	NOTE 13
NI0865	RHR OUT FROM SUMP	M302						
NI0866	RHR OUT FROM SUMP	M302						

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
NI0867	RHR OUT FROM SUMP	M302						
NI0868	RHR OUT FROM SUMP	M302						
NI0873	RHR OUT FROM SUMP	M302						
NI0874	RHR OUT FROM SUMP	M302						
NI0875	RHR OUT FROM SUMP	M302						
NI0876	RHR OUT FROM SUMP	M302						
WL1302A	PALS DISCHARGE	M348	MOTOR	T	CLOSED	AS IS	CLOSED	
WL1301B	PALS DISCHARGE		MOTOR	T	CLOSED	AS IS	CLOSED	
NS33	CONTAINMENT SPRAY IN	M362						
NS32A	CONTAINMENT SPRAY IN		MOTOR	REMOTE/MAN	CLOSED	AS IS	OPEN/ CLOSED	
NS30	CONTAINMENT SPRAY IN	M370						
NS29A	CONTAINMENT SPRAY IN		MOTOR	REMOTE/MAN	CLOSED	AS IS	OPEN CLOSED	
NS16	CONTAINMENT SPRAY IN	M380						

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
NS15B	CONTAINMENT SPRAY IN		MOTOR	REMOTE/MAN	CLOSED	AS IS	OPEN CLOSED	
NS13	CONTAINMENT SPRAY IN	M387						
NS12B	CONTAINMENT SPRAY IN		MOTOR	REMOTE/MAN	CLOSED	AS IS	OPEN CLOSED	
NS46	RHR TO CONTAINMENT SPRAY	M369						
NS43A	RHR TO CONTAINMENT SPRAY		MOTOR	REMOTE/ MAN	CLOSED	AS IS	OPEN/ CLOSED	
NS41	RHR TO CONTAINMENT SPRAY	M381						
NS-38B	RHR TO CONTAINMENT SPRAY		MOTOR	REMOTE/ MAN	CLOSED	AS IS	OPEN/ CLOSED	
WL-64A	CONT FLOOR SUMP INCORE INST. SUMP DISCHARGE	M374	MOTOR	T	OPEN	AS IS	CLOSED	15
WL-65B	CONT FLOOR SUMP INCORE INST. SUMP DISCHARGE		MOTOR	T	OPEN	AS IS	CLOSED	15

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
WL-264	CONT FLOOR SUMP INCORE INST. SUMP DISCHARGE				CLOSED	AUTO	AUTO	
WL-39A	RCDT GAS SPACE TO WASTE GAS SYSTEM	M360	MOTOR	T	OPEN	AS IS	CLOSED	10
WL-41B	RCDT GAS SPACE TO WASTE GAS SYSTEM		MOTOR	T	OPEN	AS IS	CLOSED	10
WL-2A	RCDT HEAT EXCHANGER DISCHARGE	M375	MOTOR	T	OPEN	AS IS	CLOSED	10
WL-24	RCDT HEAT EXCHANGER DISCHARGE							
WL1B	RCDT HEAT EXCHANGER DISCHARGE		MOTOR	T	OPEN	AS IS	CLOSED	10
NM3A,C	PRESSURIZER SAMPLE	M235	MOTOR	T	OPEN	AS IS	CLOSED	15
NM6A,C	PRESSURIZER SAMPLE		MOTOR	T	CLOSED	AS IS	CLOSED	15
NM420	PRESSURIZER SAMPLE		SPRING		CLOSED	AUTO	AUTO	
NM7B	PRESSURIZER SAMPLE		MOTOR	T	OPEN	AS IS	CLOSED	15

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
NM-22A,C	REACTOR COOLANT HOT LEG SAMPLE	M309	MOTOR	T	OPEN	AS IS	CLOSED	15
NM-25A,C	REACTOR COOLANT HOT LEG SAMPLE		MOTOR	T	CLOSED	AS IS	CLOSED	15
NM-421	REACTOR COOLANT HOT LEG SAMPLE		SPRING		CLOSED	AUTO	AUTO	
NM-26B	REACTOR COOLANT HOT LEG SAMPLE		MOTOR	T	OPEN	AS IS	CLOSED	15
NM-72B	SAFETY INJECTION SAMPLE	M280	MOTOR	T	CLOSED	AS IS	CLOSED	15
NM-75B	SAFETY INJECTION SAMPLE		MOTOR	T	CLOSED	AS IS	CLOSED	15
NM-78B	SAFETY INJECTION SAMPLE		MOTOR	T	CLOSED	AS IS	CLOSED	15
NM-81B	SAFETY INJECTION SAMPLE		MOTOR	T	CLOSED	AS IS	CLOSED	15
NM-69	SAFETY INJECTION SAMPLE		SPRING		CLOSED	AUTO	AUTO	

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
NM-82A	SAFETY INJECTION SAMPLE		MOTOR	T	CLOSED	AS IS	CLOSED	15
NM-190A	STEAM GENERATOR BLOWDOWN SAMPLE	M335	MOTOR	T	OPEN	AS IS	CLOSED	15
NM-187A	STEAM GENERATOR BLOWDOWN SAMPLE		MOTOR	T	CLOSED	AS IS	CLOSED	15
NM-424	STEAM GENERATOR BLOWDOWN SAMPLE		SPRING		CLOSED	AUTO	AUTO	
NM-191B	STEAM GENERATOR BLOWDOWN SAMPLE		MOTOR	T	OPEN	AS IS	CLOSED	15
NM-200B	STEAM GENERATOR BLOWDOWN SAMPLE	M338	MOTOR	T	OPEN	AS IS	CLOSED	15
NM-197B	STEAM GENERATOR BLOWDOWN SAMPLE		MOTOR	T	CLOSED	AS IS	CLOSED	15

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
NM-425	STEAM GENERATOR BLOWDOWN SAMPLE		SPRING		CLOSED	AUTO	AUTO	
NM-201A	STEAM GENERATOR BLOWDOWN SAMPLE		MOTOR	T	OPEN	AS IS	CLOSED	15
NM-210A	STEAM GENERATOR BLOWDOWN SAMPLE	M340	MOTOR	T	OPEN	AS IS	CLOSED	15
NM-207A	STEAM GENERATOR BLOWDOWN SAMPLE		MOTOR	T	CLOSED	AS IS	CLOSED	15
NM-426	STEAM GENERATOR BLOWDOWN SAMPLE		SPRING		CLOSED	AUTO	AUTO	
NM-211B	STEAM GENERATOR BLOWDOWN SAMPLE		MOTOR	T	OPEN	AS IS	CLOSED	15
NM-220B	STEAM GENERATOR BLOWDOWN SAMPLE	M341	MOTOR	T	OPEN	AS IS	CLOSED	15

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
NM-217B	STEAM GENERATOR BLOWDOWN SAMPLE		MOTOR	T	CLOSED	AS IS	CLOSED	15
NM-427	STEAM GENERATOR BLOWDOWN SAMPLE		SPRING		CLOSED	AUTO	AUTO	
NM-221A	STEAM GENERATOR BLOWDOWN SAMPLE		MOTOR	T	OPEN	AS IS	CLOSED	15
KC322	COMPONENT COOLING TO RCDT HX	M376						
KC320A	COMPONENT COOLING TO RCDT HX		DIAPHRAGM	T	OPEN	CLOSED	CLOSED	15
KC332B	COMPONENT COOLING FROM RCDT HX	M355	DIAPHRAGM	T	OPEN	CLOSED	CLOSED	15
KC280	COMPONENT COOLING FROM RCDT HX							
KC333A	COMPONENT COOLING FROM RCDT HX		DIAPHRAGM	T	OPEN	CLOSED	CLOSED	15

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
KC340	KC TO RX VESSEL SUPPORT COOLERS + RCP COOLERS	M327						
KC338B	KC TO RX VESSEL SUPPORT COOLERS + RCP COOLERS		MOTOR	P	OPEN	AS IS	CLOSED	40
KC424B	KC TO RX VESSEL SUPPORT COOLERS + RCP COOLERS	M320	MOTOR	P	OPEN	AS IS	CLOSED	40
KC279	KC TO RX VESSEL SUPPORT COOLERS + RCP COOLERS							
KC425A	KC TO RX VESSEL SUPPORT COOLERS + RCP COOLERS		MOTOR	P	OPEN	AS IS	CLOSED	40
KC305B	COMPONENT COOLING TO EXCESS LETDOWN HX	M218	MOTOR	T	CLOSED	AS IS	CLOSED	30

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
KC315B	COMPONENT COOLING FROM EXCESS LETDOWN HX	M217	MOTOR	T	CLOSED	AS IS	CLOSED	30
KC429B	COMP COOLING TO COMP COOLING DRAIN TRAIN	M322	MOTOR	T	OPEN	AS IS	CLOSED	15
KC47	COMP COOLING TO COMP COOLING DRAIN TRAIN							
KC430A	COMP COOLING TO COMP COOLING DRAIN TRAIN		MOTOR	T	OPEN	AS IS	CLOSED	15
RN253A	NUCLEAR SERVICE WATER TO REACTOR COOLANT PUMP	M307	MOTOR	P	OPEN	AS IS	CLOSED	30
RN252B	NUCLEAR SERVICE WATER TO REACTOR COOLANT PUMP		DIAPHRAGM	P	OPEN	CLOSED	CLOSED	30
Deleted Per 2012 Update								

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
RN1102	NUCLEAR SERVICE WATER FROM REACTOR COOLANT PUMP		SPRING		CLOSE	AUTO	AUTO	
RN276A	NUCLEAR SERVICE WATER FROM REACTOR COOLANT PUMP	M315	MOTOR	P	OPEN	AS IS	CLOSED	30
RN277B	NUCLEAR SERVICE WATER FROM REACTOR COOLANT PUMP		DIAPHRAGM	P	OPEN	CLOSED	CLOSED	30
RN1103	NUCLEAR SERVICE WATER FROM REACTOR COOLANT PUMP	M315	SPRING		CLOSED	AUTO	AUTO	
VP17A	INCORE INSTRUMENTA-TION ROOM PURGE IN	M213	DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	
VP18B	INCORE INSTRUMENTA-TION ROOM PURGE IN		DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
VP19A	INCORE INSTRUMENTA-TION ROOM PURGE OUT	M138	DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	
VP20B	INCORE INSTRUMENTA-TION ROOM PURGE OUT		DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	
VP2A	UPPER COMPARTMENT PURGE INLET	M367	DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	
VP1B	UPPER COMPARTMENT PURGE INLET		DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	
VP4A	UPPER COMPARTMENT PURGE INLET	M454	DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	
VP3B	UPPER COMPARTMENT PURGE INLET		DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	
VP7A	LOWER COMPARTMENT PURGE INLET	M357	DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	
VP6B	LOWER COMPARTMENT PURGE INLET		DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	
VP9A	LOWER COMPARTMENT PURGE INLET	M456	DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
VP8B	LOWER COMPARTMENT PURGE INLET		DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	
VP10A	CONTAINMENT PURGE EXHAUST	M368	DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	
VP11B	CONTAINMENT PURGE EXHAUST		DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	
VP12A	CONTAINMENT PURGE EXHAUST	M455	DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	
VP13B	CONTAINMENT PURGE EXHAUST		DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	
VP15A	CONTAINMENT PURGE	M119	DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	
VP16B	CONTAINMENT PURGE		DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	
CF26A,B	FEEDWATER	M440	PISTON	S	OPEN	AS IS	CLOSED	10
CF137	FEEDWATER		MANUAL	LOCKED CLOSED	CLOSED	AS IS	CLOSED	
CF28A,B	FEEDWATER	M308	PISTON	S	OPEN	AS IS	CLOSED	10
CF136	FEEDWATER		MANUAL	LOCKED CLOSED	CLOSED	AS IS	CLOSED	
CF30A,B	FEEDWATER	M262	PISTON	S	OPEN	AS IS	CLOSED	10

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
CF135	FEEDWATER		MANUAL	LOCKED CLOSED	CLOSED	AS IS	CLOSED	
CF-35A,B	FEEDWATER	M153	PISTON	S	OPEN	AS IS	CLOSED	10
CF134	FEEDWATER		MANUAL	LOCKED CLOSED	CLOSED	AS IS	CLOSED	
SM-1A,B	MAIN STEAM	M441	PISTON	P	OPEN	CLOSED	CLOSED	8
SV-2	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-3	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-4	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-5	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-6	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-1A,B	MAIN STEAM		PISTON		CLOSED	CLOSED	CLOSED	60
SM-9A,B	MAIN STEAM		DIAPHRAGM	P	CLOSED	CLOSED	CLOSED	8
	Deleted Per 2003 Update							
SM-101	MAIN STEAM		DIAPHRAGM		OPEN	CLOSED	CLOSED	Table 6-114 Note 10
	Deleted Per 2005 Update							
SA-1	MAIN STEAM	M393	MANUAL		OPEN	OPEN	OPEN	Table 6-114 Note 12
SA-77	MAIN STEAM		MANUAL		OPEN	OPEN	OPEN	Table 6-114 Note 12
SM-3A,B	MAIN STEAM		PISTON	P	OPEN	CLOSED	CLOSED	8
SV-8	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
SV-9	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-10	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-11	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-12	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-7A,B,C	MAIN STEAM		PISTON		CLOSED	CLOSED	CLOSED	60
SM10A,B	MAIN STEAM		DIAPHRAGM	P	CLOSED	CLOSED	CLOSED	8
	Deleted Per 2003 Update							
SM 95	MAIN STEAM		DIAPHRAGM		OPEN	CLOSED	CLOSED	Table 6-114 Note 10
	Deleted Per 2005 Update							
SA-2	MAIN STEAM	M261	MANUAL		OPEN	OPEN	OPEN	Table 6-114 Note 12
SA-78	MAIN STEAM		MANUAL		OPEN	OPEN	OPEN	Table 6-114 Note 12
SM-5A,B	MAIN STEAM		PISTON	P	OPEN	CLOSED	CLOSED	8
SV-14	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-15	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-16	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-17	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-18	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV13A,B	MAIN STEAM		PISTON		CLOSED	CLOSED	CLOSED	60
SM11A,B	MAIN STEAM		DIAPHRAGM	P	CLOSED	CLOSED	CLOSED	8

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
	Deleted Per 2003 Update							
SM89	MAIN STEAM		DIAPHRAGM		OPEN	CLOSED	CLOSED	Note 10
	Deleted Per 2005 Update							
SM-7A,B	MAIN STEAM	M154	PISTON	P	OPEN	CLOSED	CLOSED	8
SV-20	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-21	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-22	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-23	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-24	MAIN STEAM		SPRING		CLOSED	AUTO	AUTO	
SV-19A,B	MAIN STEAM		PISTON		CLOSED	CLOSED	CLOSED	60
SM12A,B	MAIN STEAM		DIAPHRAGM	P	CLOSED	CLOSED	CLOSED	8
	Deleted Per 2003 Update							
SM 83	MAIN STEAM		DIAPHRAGM		OPEN	CLOSED	CLOSED	Note 10 Table 6-114
	Deleted Per 2005 Update							
YM-116	DEMINERALIZ-ED WATER	M337						
YM-115B	DEMINERALIZ-ED WATER		MOTOR	T	OPEN	AS IS	CLOSED	15

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
RV33B	CONTAINMENT VENTILATION COOLING WATER IN	M240	MOTOR	P	OPEN	AS IS	CLOSED	60
RV32A	CONTAINMENT VENTILATION COOLING WATER IN		MOTOR	P	OPEN	AS IS	CLOSED	60
RV445	CONTAINMENT VENTILATION COOLING WATER IN		SPRING		CLOSED	AUTO	AUTO	
1RV481	CONTAINMENT VENTILATION COOLING WATER IN	1M385	SPRING		CLOSED	AUTO	AUTO	
2RV480	CONTAINMENT VENTILATION COOLING WATER IN	2M385	SPRING		CLOSED	AUTO	AUTO	
1RV80B	CONTAINMENT VENTILATION COOLING WATER IN	1M385	DIAPHRAGM	P	OPEN	CLOSED	CLOSED	30
1RV79A	CONTAINMENT VENTILATION COOLING WATER IN		DIAPHRAGM	P	OPEN	CLOSED	CLOSED	30

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
2RV80B	CONTAINMENT VENTILATION COOLING WATER IN	2M385	DIAPHRAGM	P	OPEN	CLOSED	CLOSED	30
2RV79A	CONTAINMENT VENTILATION COOLING WATER IN		DIAPHRAGM	P	OPEN	CLOSED	CLOSED	30
2RV480	CONTAINMENT VENTILATION COOLING WATER IN		SPRING		CLOSED	AUTO	AUTO	
RV101A	CONTAINMENT VENTILATION COOLING WATER OUT	M390	DIAPHRAGM	P	OPEN	CLOSED	CLOSED	30
RV102B	CONTAINMENT VENTILATION COOLING WATER OUT		DIAPHRAGM	P	OPEN	CLOSED	CLOSED	30
RV484	CONTAINMENT VENTILATION COOLING WATER OUT		SPRING		CLOSE	AUTO	AUTO	
RV76A	CONTAINMENT VENTILATION COOLING WATER OUT	M279	MOTOR	P	OPEN	AS IS	CLOSED	60

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
RV77B	CONTAINMENT VENTILATION COOLING WATER OUT		MOTOR	P	OPEN	AS IS	CLOSED	60
RV446	CONTAINMENT VENTILATION COOLING WATER OUT		SPRING		CLOSED	AUTO	AUTO	
VI40	INSTRUMENT AIR	M220						
VI129B	INSTRUMENT AIR		MOTOR	P	OPEN	AS IS	CLOSED	15
VS13	STATION AIR	M219						
VS12B	STATION AIR		MOTOR	T	CLOSED	AS IS	CLOSED	15
VB50	BREATHING AIR	M215						
VB49B	BREATHING AIR		MOTOR	T	CLOSED	AS IS	CLOSED	15
NSSV5560	CONTAINMENT PRESSURE SENSOR	M118	MOTOR		OPEN	AS IS	OPEN	
NSSV5570	CONTAINMENT PRESSURE SENSOR	M239	MOTOR		OPEN	AS IS	OPEN	
NSSV5590	CONTAINMENT PRESSURE SENSOR	M402	MOTOR		OPEN	AS IS	OPEN	
NSSV5580	CONTAINMENT PRESSURE SENSOR	M313	MOTOR		OPEN	AS IS	OPEN	

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
NSSV5550	NARROW RANGE CONTAINMENT PRESSURE	M402A	SOLENOID	T	OPEN	CLOSED	CLOSED	2
NSSV5551	NARROW RANGE CONTAINMENT PRESSURE		SOLENOID	T	OPEN	CLOSED	CLOSED	2
VX33B	CONTAINMENT SAMPLE OUT	M378	DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	5
VX31A	CONTAINMENT SAMPLE OUT		DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	5
VX34	CONTAINMENT SAMPLE OUT		MANUAL	LOCKED/ CLOSED	CLOSED	CLOSED	CLOSED	
VX30	CONTAINMENT SAMPLE IN	M325						
VX40	CONTAINMENT SAMPLE IN		MANUAL	LOCKED/ CLOSED	CLOSED	AS IS	CLOSED	
CA62A	AUXILIARY FEEDWATER	M156	MOTOR		OPEN	AS IS	OPEN	
CA66AC	AUXILIARY FEEDWATER		MOTOR		OPEN	AS IS	OPEN	
CF126B	AUXILIARY FEEDWATER		MOTOR	S	CLOSED	AS IS	CLOSED	10
CF-183	AUXILIARY FEEDWATER		MANUAL	LOCKED CLOSED	CLOSED	AS IS	CLOSED	
BW-3	AUXILIARY FEEDWATER		MANUAL:	LOCKED CLOSED	CLOSED	AS IS	CLOSED	

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
YA-47	AUXILIARY FEEDWATER		MANUAL	LOCKED CLOSED	CLOSED	AS IS	CLOSED	
CA54AC	AUXILIARY FEEDWATER	M286	MOTOR		OPEN	AS IS	OPEN	
CA58A	AUXILIARY FEEDWATER		MOTOR		OPEN	AS IS	OPEN	
CF127B	AUXILIARY FEEDWATER		MOTOR	S	CLOSED	AS IS	CLOSED	10
CF-184	AUXILIARY FEEDWATER		MANUAL	LOCKED CLOSED	CLOSED	AS IS	CLOSED	
BW-12	AUXILIARY FEEDWATER		MANUAL	LOCKED CLOSED	CLOSED	AS IS	CLOSED	
YA-48	AUXILIARY FEEDWATER		MANUAL	LOCKED CLOSED	CLOSED	AS IS	CLOSED	
CA46B	AUXILIARY FEEDWATER	M3100	MOTOR		OPEN	AS IS	OPEN	
CA50B	AUXILIARY FEEDWATER		MOTOR		OPEN	AS IS	OPEN	
CF128B	AUXILIARY FEEDWATER		MOTOR	S	CLOSED	AS IS	CLOSED	10
CF-185	AUXILIARY FEEDWATER		MANUAL	LOCKED CLOSED	CLOSED	AS IS	CLOSED	
BW-21	AUXILIARY FEEDWATER		MANUAL	LOCKED CLOSED	CLOSED	AS IS	CLOSED	
YA-49	AUXILIARY FEEDWATER		MANUAL	LOCKED CLOSED	CLOSED	AS IS	CLOSED	

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
CA38B	AUXILIARY FEEDWATER	M465	MOTOR		OPEN	AS IS	OPEN	
CA42B	AUXILIARY FEEDWATER		MOTOR		OPEN	AS IS	OPEN	
CF129B	AUXILIARY FEEDWATER		MOTOR	S	CLOSED	AS IS	CLOSED	10
CF-186	AUXILIARY FEEDWATER		MANUAL	LOCKED CLOSED	CLOSED	AS IS	CLOSED	
BW-30	AUXILIARY FEEDWATER		MANUAL	LOCKED CLOSED	CLOSED	AS IS	CLOSED	
YA-50			MANUAL	LOCKED CLOSED	CLOSED	AS IS	CLOSED	
FW11	REFUELING CAVITY TO RW PUMP	M358	MANUAL	LOCKED	CLOSED	AS IS	CLOSED	
FW13	REFUELING CAVITY TO RW PUMP		MANUAL	LOCKED	CLOSED	AS IS	CLOSED	
1FW67/ 2FW63	REFUELING CAVITY TO RW PUMP	M377						
FW5	REFUELING CAVITY FROM TW TANK							
FW4	REFUELING CAVITY FROM TW TANK		MANUAL	LOCKED	CLOSED			

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
VE11	HYDROGEN PURGE IN	M331						
VE10A	HYDROGEN PURGE IN		MOTOR	T	CLOSED	AS IS	CLOSED/ OPEN	15
VE-5A	HYDROGEN PURGE OUT	M346	MOTOR	T	CLOSED	AS IS	CLOSED/ OPEN	15
VE-6B	HYDROGEN PURGE OUT		MOTOR	T	CLOSED	AS IS	CLOSED/ OPEN	15
	FUEL TRANSFER CANAL	M354		BOLTED	CLOSED	AS IS	CLOSED	
NC-141	RCP MOTOR DRAIN TANK TO WASTE OIL STORAGE	M326	MANUAL	LOCKED	CLOSED	AS IS	CLOSED	
NC-142	RCP MOTOR DRAIN TANK TO WASTE OIL STORAGE		MANUAL	LOCKED	CLOSED	AS IS	CLOSED	
NC261	RCP MOTOR DRAIN TANK TO WASTE OIL STORAGE							
WL321A	CONT VENT UNITS COND. DRAINS TO DRAIN TANK	M221	MOTOR	T	OPEN	AS IS	CLOSED	15

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
WL322B	CONT VENT UNITS COND. DRAINS TO DRAIN TANK		MOTOR	T	OPEN	AS IS	CLOSED	15
WL385	CONT VENT UNITS COND. DRAINS TO DRAIN TANK							
VI161	INSTRUMENT AIR	M359						
VI160B	INSTRUMENT AIR		MOTOR	P	OPEN	AS IS	CLOSED	15
VI149	INSTRUMENT AIR	M386						
VI148B	INSTRUMENT AIR		MOTOR	T	OPEN	AS IS	CLOSED	15
VI362A	INSTRUMENT AIR		MOTOR	T	OPEN	AS IS	CLOSED	15
VI124	INSTRUMENT AIR	M317						
VI150B	INSTRUMENT AIR		MOTOR	P	OPEN	AS IS	CLOSED	15
VQ-1A	CONTAINMENT AIR RELEASE	M243	DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	3
VQ-2B	CONTAINMENT AIR RELEASE		DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	3
VQ-6A	CONTAINMENT AIR ADDITION	M384	DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	3

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
VQ-5B	CONTAINMENT AIR ADDITION		DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	3
NC-196A	REACTOR COOLANT PUMP MOTOR OIL SUPPLY	M361	MOTOR	T	CLOSED	AS IS	CLOSED	
NC-195B	REACTOR COOLANT PUMP MOTOR OIL SUPPLY		MOTOR	T	CLOSED	AS IS	CLOSED	
NC259	REACTOR COOLANT PUMP MOTOR OIL SUPPLY							
1RF823	FIRE PROTECTION HEADER	1M353						
1RF821A	FIRE PROTECTION HEADER		DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	15
1RF834	FIRE PROTECTION HEADER	2M353						
1RF832A	FIRE PROTECTION HEADER		DIAPHRAGM	T	CLOSED	CLOSED	CLOSED	15
1NV840	AUXILIARY SPRAY TO PRESSURIZER	1M228	DIAPHRAGM		CLOSED	CLOSED		

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
NV841	AUXILIARY SPRAY TO PRESSURIZER	M228						
2NV1053	AUXILIARY SPRAY TO PRESSURIZER	2M228	MANUAL	LOCKED/ CLOSED	CLOSED	AS IS	CLOSED	
NV1002	STANDBY MAKEUP PUMP TO RCS SEALS	M342			CLOSED	CLOSED		
NV849A,C	STANDBY MAKEUP PUMP TO RCS SEALS		MOTOR	T	CLOSED	AS IS	CLOSED	15
	ICE BASKET WATER ADDITION	M383						
	ICE BASKET WATER ADDITION							
MIMV6980	ILRT TEST CONNECTION	1M255A/ 2E118A	MANUAL		CLOSED	AS IS	CLOSED	
MIMV7010	ILRT TEST CONNECTION		MANUAL		CLOSED	AS IS	CLOSED	
MIMV6990	ILRT TEST CONNECTION	1M255B/ 2E118B	MANUAL		CLOSED	AS IS	CLOSED	
MIMV7020	ILRT TEST CONNECTION		MANUAL		CLOSED	AS IS	CLOSED	

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
MIMV7000	ILRT TEST CONNECTION	1M255C/ 2E118C	MANUAL		CLOSED	AS IS	CLOSED	
MIMV7030	ILRT TEST CONNECTION		MANUAL		CLOSED	AS IS	CLOSED	
MISV6870	CONTAINMENT HYDROGEN SAMPLE	M239A	SV		OPEN	CLOSED	OPEN	
MISV6890	CONTAINMENT HYDROGEN SAMPLE		SV		OPEN	CLOSED	OPEN	
MISV6880	CONTAINMENT HYDROGEN SAMPLE	M239B	SV		OPEN	CLOSED	OPEN	
MISV6900	CONTAINMENT HYDROGEN SAMPLE		SV		OPEN	CLOSED	OPEN	
MISV6910	CONTAINMENT HYDROGEN SAMPLE	M239C	SV		OPEN	CLOSED	OPEN	
MISV6930	CONTAINMENT HYDROGEN SAMPLE		SV		OPEN	CLOSED	OPEN	
MISV6920	CONTAINMENT HYDROGEN SAMPLE	M239D	SV		OPEN	CLOSED	OPEN	
MISV6940	CONTAINMENT HYDROGEN SAMPLE		SV		OPEN	CLOSED	OPEN	

Valve No	Penetration Name	Pen Number	Valve Operator	Actuation Signal Note 1	Valve Position			Isolation Time (Sec) Note 9
					Normal	Fail	Incident	
MISV5581	RADIATION MONITORING	M323A	SV	T	OPEN	CLOSED	CLOSED	
MISV5580	RADIATION MONITORING		SV	T	OPEN	CLOSED	CLOSED	
MISV5583	RADIATION MONITORING	M323B	SV	T	OPEN	CLOSED	CLOSED	
MISV5582	RADIATION MONITORING		SV	T	OPEN	CLOSED	CLOSED	
IAECV5360	UPPER PERSONNEL LOCK Rx DOOR RELIEF (CONT SIDE)	C392	NA	NA	CLOSED	CLOSED	CLOSED	NA
IAECV5370	LOWER PERSONNEL LOCK Rx DOOR RELIEF (CONT SIDE)	C152	NA	NA	CLOSED	CLOSED	CLOSED	NA
IAECV5380	UPPER PERSONNEL LOCK Rx DOOR RELIEF (PAL SIDE)	C392	NA	NA	CLOSED	CLOSED	CLOSED	NA
IAECV5390	LOWER PERSONNEL LOCK Rx DOOR RELIEF (PAL SIDE)	C152	NA	NA	CLOSED	CLOSED	CLOSED	NA

Table 6-114. Containment Piping Penetrations and Isolation Valve Data. (Notes to Table 6-111, Table 6-112 and Table 6-113.)

NOTES:

1. Definition of Actuation Signals
   a. S - Safety Injection Signals (T signals also activated by S signal)
   b. T - Containment Isolation Signal (Phase A containment isolation)
   c. P - Containment High-High Pressure Signal
2.

CA - Auxiliary Feedwater	MI - Miscellaneous Instrumentation
NB - Boron Recycle System	CF - Feedwater System
NC - Reactor Coolant System	BB - Steam Generator Blowdown Recycle System
NV - Chemical and Volume Control System	KF - Spent Fuel Cooling System
KC - Component Cooling System	VS - Station Air System
NI - Safety Injection System	VI - Instrument Air System
ND - Residual Heat Removal System	VB - Breathing Air System
IAE - Containment Personnel Air Lock	VE - Annulus Ventilation System
WL - Liquid Waste Recycle System	VP - Containment Purge Ventilation System
	VX - Containment Air Return Exchange and Hydrogen Skimmer System
NS - Containment Spray System	RV - Containment Ventilation Cooling Water System
	RN - Nuclear Service Water System
NM - Sampling System	YM - Demineralized Water System
SM - Main Steam System	NF - Ice Condenser System
RF - Fire Protection System	VQ - Containment Air Release and Addition System
FW - Refueling Water System	SV - Main Steam Vent to Atmosphere

3. Thru line leak class 1.

   Leak Ref:

   Thru line leak class 1 is characteristic of valves which would not release containment atmosphere during a LOCA if valve leakage did occur. Each valve was reviewed separately and was characteristic of one of the following:

   a. Piping and equipment external to the outer isolation valve are seismically designed, terminating in either normally closed seismic valve, seismic non-radioactive tank or a closed loop. The system is designed in accordance with Quality Group B standards and designed to at least the primary Containment pressure and temperature. The piping is protected from pipe whip, missiles, jet forces. The allowable protection types are documented in Section 3.6.5.2.

   b. Same as statement (3a) except the piping and equipment is internal to the outer isolation valve.

   c. deleted

   d. deleted

   e. The fuel transfer canal terminates at the bottom of the spent fuel pool. The minimum water level in the spent fuel pool is such that leakage from containment could only occur during the time that containment pressure exceeds 14.1 psig.

   f. The hydrogen purge out terminates in the Annulus and thus does not represent a bypass leakage path.

   g. Impulse line and transmitter are Type C leak rate tested with no detectable leakage allowed.

   h. The ice condenser, ice blowing out and ice basket water addition terminate in the annulus and thus do not represent a bypass leakage path.

   Thru line leak class 2.

Non-seismic external piping. These valves are a source of bypass leakage when a seismic event is postulated concurrent with a LOCA.

4. Containment isolation valves and operators will be designed to withstand internal conditions of the process piping and external conditions due to Post-LOCA temperature, pressure, humidity, and radiation.
5. Refer to Figure 6-172 for an explanation of penetration class.
6. Line size is nominal diameter.
7. Test type:

   B: Type B test as defined by 10CFR Part 50, Appendix J

   C: Type C test as defined by 10CFR Part 50, Appendix J

   N: No local test is required

8. Test Pressure Direction:

   Pressure Application Direction relative to expected pressure (Type C only)

9. Max Isolation Time (sec):

   The specified containment isolation valve closure times are nominal valves, and were primarily based on ANSI N271-1976.

10. The assured method of closing these valves is via local, manual operation. This valve does not have safety grade controls or an automatic signal.

11. Containment isolation valves NSSV5560, NSSV5570, NSSV5580 and NSSV5590 for penetrations M118, M239, M313 and M402, respectively, are open during type C leak test which challenges the closed loop pressure transmitters.

12. This value is manually closed as needed during certain accidents.

13. Refer to Table 6-123 for ECCS valve stroke times.

Table 6-115. Bi directional Leakage Test Results for Typical Diaphragm Value

TEST DESCRIPTION

A 2" diaphragm valve was flanged on both sides. Test connections were provided on both flanges. A leak was imposed by inserting a 26 gauge wire under the valve seat.

Twelve (12) test runs with different leak magnitudes (by changing the torque on the valve seat) were performed at 14.2 PSIG.

Run	A Left Direction Leak Rate (SCCM)	B Right Direction Leak Rate (SCCM)	C Right Direction Leak Rate Repeated (SCCM)	D % Leak Rate $D = \frac{B-A}{C} x100$ (%)	E Repeatability $E = \frac{C-B}{C} x100$ (%)
1	146	146		0.	
2	160	160		0.	
3	178	185		3.780	
4	195	197		1.011	
5	213	224		4.910	
6	239	241		0.829	
7	256	256		0.	
8	283	278	281	1.766	1.060
9	307	300	303	2.280	0.990
10	332	324	326	2.409	0.613
11	357	348	350	2.521	0.571
12	382	371	375	2.880	1.066

Table 6-116. Deleted Per 2008 Update

Table 6-117. Parameters Used to Determine Hydrogen Generation

Reactor Thermal Power	3,411 Mwt	
Reactor Operating Time	980 Days	
Containment Free Volume	1.170E+6	
Deleted Per 2009 Update		
Zirconium Weight	45,680 lbs	
Deleted Per 2009 Update		
Hydrogen Dissolved in Primary Coolant	483 scf	
Corrodable Metals	Aluminum, Zinc	
Deleted Per 2009 Update		
Zinc Corrosion Rate Design Curve	Figure 6-198	
Hydrogen Generated From Radiolysis		
	Core Radiolysis	Sump Radiolysis
1. Sources		
a. Percent of total halogens retained in solution	50	50
b. Percent of total noble gases retained in solution	0	0
c. Percent of other fission products retained in solution	99	1
2. Energy Distribution		
a. Percent of total decay energy - Gamma	50	50
b. Percent of total decay energy - Beta	50	50
3. Energy Absorption by the Solution		
a. Percent of gamma energy absorbed	7.4	100
b. Percent of beta energy absorbed	0	100
4. Molecules H_2 Produced per 100 ev Energy Absorbed	0.44	0.30
Corrodable Metal Inventory in Containment		
Aluminum Inventory in Containment		
Representative Sources of Aluminum		
Westinghouse NSSS Equipment		
Electrical Equipment		

Seismic Instrumentation
Fisher Control Valves
Cont. Floor Sump Pump Motor
Inc. Inst. Tunnel Sump Pump Motor
Lower Cont. Cooling Unit Motors
Aluminum Valve Tags
Welding Receptacle
Resemount Transmitters
DRPI Backshells
Welding Receptacle
Welding Machines
CRDM Cable Connectors
Ice Condenser Temp. switches
Lower Cont. Cooling Fans (VL)
Ice Condenser Receptacle Covers
* The exposed surface area of aluminum in Containment is assumed to be 1500 square feet and that value is used in the hydrogen generation analysis to account for any aluminum additions to Containment in the future.

Zinc Inventory in Containment
Representative Sources of Zinc
Ice Condenser Air Ducts
Ice Baskets, Lattice Frames, etc.
Miscellaneous Containment Zinc
* To account for any zinc additions to Containment in the future, it is assumed that the zinc exposed surface area is 1,000,000 ft^2 and that value is used in the hydrogen generation analysis.

* The Zinc and Aluminum inventories were used in the original post-LOCA Hydrogen generation analyses. The analyses is no longer part of the current licensing bases. Revision 3 of Regulatory Guide 1.7 does state that materials within containment that would yield hydrogen gas by corrosion from the ECCS or containment spray solutions should be identified, and their use should be limited, as much as practicable.

  Aluminum inventories must further be limited, due to the potential for ECCS strainer chemical effects and resultant potential headloss.

** Table contains "historical" documentation (Refer to 6.1.7)

Table 6-118. Total Hydrogen Generation [2]. (TID-14844 Release Model - 5.0 Percent Zirconium-Water Reaction)

Day	Sump		Core		Aluminum		Zinc		Total [(1)]		H_2
	Rate (scfm)	Total (scf)	Rate (scfm)	Total (scf)	Rate (scfm)	Total (scf)	Rate (scfm)	Total (scf)	Rate (scfm)	Total (scf)	Volume Perecent
0.5	1.74	2315	2.05	2060	0.17	121	1.79	1320	5.75	25241	2.22
1.0	1.04	3294	1.71	3390	0.17	243	1.84	2615	4.76	28967	2.53
2.0	0.66	4483	1.42	5605	0.17	485	1.76	5166	4.01	35163	3.03
5.0	0.35	6466	0.99	10658	0.17	1212	1.69	12626	3.21	50387	4.25
8.0	0.27	7771	0.82	14520	0.17	1940	1.63	19800	2.88	63455	5.27
10.0	0.23	8491	0.74	16770	0.17	2425	1.57	24423	2.71	71534	5.89
12.0	0.21	9130	0.70	18856	0.17	2909	1.54	28920	2.62	79241	6.47
14.0	0.19	9707	0.66	20817	0.17	3394	1.49	33288	2.52	86631	7.01
18.0	0.16	10708	0.60	24447	0.17	4364	1.41	41644	2.34	100587	8.03
24.0	0.13	11933	0.53	29320	0.17	5820	1.27	53222	2.10	119721	9.38
30.0	0.11	12929	0.49	33666	0.17	7278	1.34	63663	2.10	136961	10.56

Note:

1. Includes hydrogen generated by the zirconium-water reaction and dissolved in the primary coolant.
2. Table contains “historical” documentation (Refer to 6.1.7).

Table 6-119. Deleted Per 1991 Update

Table 6-120. Fission Product Decay Deposition in Sump Solution [1]

	50 PERCENT HALOGENS		1 PERCENT OTHER FISSION PRODUCTS		TOTAL	
Time After Reactor Trip days	Energy Release Rate watt/MWt	Integrated Energy Release watt-day/MWt x 10^{-2}	Energy Release Rate watts/MWt x 10^{-1}	Integrated Energy Release watt-day/MWt x 10^{-2}	Energy Release Rate watts/MWt x 10^{-1}	Integrated Energy Release watt-day/MWt x 10^{-2}
1	145	4.27	3.78	0.536	13.23	0.491
3	49.4	5.88	2.90	1.18	7.85	0.787
5	31.0	6.65	2.59	1.73	5.69	0.923
10	18.2	7.82	2.2	2.92	4.03	1.07
20	7.63	9.03	1.77	4.89	2.53	1.39
30	3.22	9.54	1.49	6.51	1.81	1.61
40	1.36	9.76	1.30	7.90	1.44	1.77
60	0.241	9.89	1.98	10.3	1.10	2.02
80	0.043	9.91	0.985	12.3	0.910	2.22
100	0.008	9.92	0.822	14.0	0.823	2.39

Note(s):

1. Table contains “historical” documentation for Section 6.2.6.4 (Refer to 6.1.7).

Table 6-121. Total Hydrogen Generation - Westinghouse Basis (TID Release Model - Noble Gas in Core; 0.5 Percent Zirconium-Water Reaction [2])

	Total Sump		Total Core		Total Corrosion		Grand Total[1]		
Day	Rate SCFMx10E+2	Total H_2 SCFMx10E-4	Rate SCFMx10	Total H_2 SCFx10E-4	Rate SCFMx10E+2	Total H_2 SCFx10E-3	Rate SCFMx10	Total H_2 SCFx10E-4	Vol. Pct
1	96.7	0.367	11.6	0.256	3.98	0.076	21.6	0.922	0.87
2	55.8	0.420	9.43	0.405	3.98	0.134	15.4	1.18	1.10
5	30.1	0.639	7.54	0.763	3.98	0.306	10.9	1.72	1.60
10	21.3	0.819	6.39	1.26	3.98	0.592	8.92	2.43	2.23
20	13.4	1.06	5.06	2.08	3.98	1.17	6.80	3.55	3.21
30	9.57	1.22	4.24	2.74	3.98	1.74	5.59	4.43	3.96
40	7.61	1.35	3.71	3.31	3.98	2.31	4.87	5.18	4.59
60	5.83	1.54	3.07	4.28	3.98	3.46	4.05	6.45	5.62
80	4.97	1.69	2.66	5.10	3.98	4.60	3.55	7.54	6.48
100	4.35	1.81	2.34	5.82	3.98	5.75	3.17	8.51	7.23

Note:

1. Include hydrogen generated by the zirconium-water reaction and primary coolant system.
2. Table contains “historical” documentation (Refer to 6.1.7).

Table 6-122. Total Hydrogen Generation - NRC Basis (TID-14844 Release Model - 1.5% Zirconium-Water Reaction [2])

	Total Sump		Total Core		Total Corrosion		Grand Total[1]		
Day	Rate SCFMx10E+2	Total H_2 SCFMx10E-4	Rate SCFMx10	Total H_2 SCFx10E-4	Rate SCFMx10E+2	Total H_2 SCFx10E-3	Rate SCFMx10	Total H_2 SCFx10E-4	Vol. Pct
1	181.0	0.612	17.1	0.371	5.22	0.0928	33.8	0.164	1.53
2	93.1	0.783	14.2	0.592	5.22	0.168	24.0	0.204	1.89
5	50.1	1.06	11.4	1.13	5.22	0.394	17.0	0.288	2.64
10	35.5	1.36	9.74	1.89	5.22	0.769	13.8	0.398	3.59
20	23.3	1.77	7.76	3.14	5.22	1.52	10.5	0.571	5.04
30	15.9	2.04	6.50	4.16	5.22	2.26	8.62	0.707	6.13
40	12.7	2.24	5.69	5.03	5.22	3.03	7.48	0.822	7.02
60	9.72	2.56	4.71	6.52	5.22	4.53	6.20	1.018	8.49
80	8.28	2.82	4.08	7.78	5.22	6.03	5.43	1.185	9.69
100	7.25	3.04	3.59	8.88	5.22	7.54	4.83	1.332	10.70

Note:

1. Include hydrogen generated by the zirconium-water reaction and primary coolant system.
2. Table contains “historical” documentation (Refer to 6.1.7).

Table 6-123. Emergency Core Cooling System Component Parameters

Component	Parameters	
Cold Leg Injection Accumulators	Number	4
	Design Pressure, psig	700
	Design Temperature, °F	300
	Operating Temperature, °F	60-150
	Normal Operating Pressure, psig	590-633
	Minimum Operating Pressure, psig	585
	Total Volume, ft^3	1363 each
	Minimum Water Volume, ft^3	918 each
	Maximum N_2 Gas Volume ft^3	445 each
	Boric Acid Concentration, Nominal, ppm	fuel cycle specific value given in Core Operating Limits Report
	Relief Valve Setpoint, psig	700
Centrifugal Charging Pumps	Number	2
	Design Pressure, psig	2800
	Design Temperature, °F	300
	Design Flow Rate, gpm[1]	150
	Design Head, ft.	5800
	Maximum Flow Rate, gpm	560
	Head at Maximum Flow Rate, ft.	1400
	Discharge Head at Shutoff, ft.	6000
	Motor Rating, bhp[3]	600
Safety Injection Pumps	Number	2
	Design Pressure, psig	1750
	Design Temperature, °F	300
	Design Flow Rate, gpm	400
	Design Head, ft.	2600
	Maximum Flow Rate, gpm	675
	Head at Maximum Flow Rate, ft.	1750
	Discharge Pressure at Shutoff, psig	1520

Component	Parameters	
	Motor Rating, bhp+	400
Residual Heat Removal Pumps & Heat Exchangers	Refer to Section 5.5.7 for parameter information	
Valves		
All Motor-Operated Valves which must Function on safety injection ("S") signal	Maximum Opening or Closing Time	
1. up to and including 8 inches	Time, sec	10[2]
2. over 8 inches	Time, sec.	Not Applicable[4]
All Other Motor-Operated Valves	Maximum Opening or Closing Time	
1. up to and including 8 inches	Time, sec.	10[2]
2. over 8 inches	Inches per minute	49[2]
Leakage		
1. Conventional Globe Valves	Disc Leakage, cc/hr/in of nominal pipe size	3
	Backseat Leakage cc/hr/in of stem diameter	10
2. Gate Valves	Disc Leakage, cc/hr/in of nominal pipe size	3
	Backseat Leakage cc/hr/in of stem diameter	10
3. Check Valves	Disc Leakage, cc/hr/in of nominal pipe size	3
4. Diaphragm Valves	Disc Leakage	None
5. Pressure Relief Valves	Disc Leakage, cc/hr/in of nominal pipe size	3
6. Accumulator Check Valves	Disc Leakage, cc/hr/in of nominal pipe size	3

Note:

1. Includes miniflow
2. Stroke times in excess of these valves are permissible as supported by formal design analyses
3. 1.15 Service factor not included
4. The Cold Leg Accumulator block valves are administratively controlled open prior to exceeding 1000 psig

Table 6-124. Normal Operating Status of Emergency Core Cooling System Components for Core Cooling

Number of Safety Injection Pumps Operable	2
Number of Charging Pumps Operable	2
Number of Residual Heat Removal Pumps Operable	2
Number of Residual Heat Exchangers Operable	2
Refueling Water Storage Tank Volume, Gal., minimum	383,146
Boron Concentration in Refueling Water Storage Tanks, minimum ppm	fuel cycle specific value given in Core Operating Limits Report
Boron Concentration in Cold Leg Accumulator, minimum ppm	fuel cycle specific value given in Core Operating Limits Report
Number of Accumulators	4
Minimum Indicated Cold Leg Accumulator Pressure, psig	585
Minimum Cold Leg Accumulator Water Volume, ft^3	918
System Valves, Interlocks, and Piping Required for the Above Components which are Operable	All

Table 6-125. Sequence of Operations: Injection to Cold Leg Recirculation

The following steps occur automatically when 2 out of 3 level instruments indicate an FWST level at or below the Low Level setpoint in conjunction with an "S" signal:

A1. The Containment Sump Isolation Valves (NI-185A and NI-184B) OPEN.

A2. Once the Containment Sump Isolation Valves are FULLY OPEN, the FWST Isolation Valves to the ND Pumps (ND-19A and ND-4B) CLOSE.

The following steps would be taken by the Operators when terminating the Injection Mode and starting the Cold Leg Recirculation Mode (at FWST Lo Level Alarm):

M1. Monitor Foldout Page.

M2. Operator verifies Containment Sump Level is adequate to supply suction to ND Pumps.

M3. Operator resets Safety Injection signal.

M4. Operator resets D/G Load Sequencers.

M5. Operator aligns the "A" and "B" Trains of ND for Recirc as follows:

a. Operator checks the Containment Sump valves to ND Pumps (NI-185A and NI-184B) are OPEN.

b. Operator enables the power disconnect and CLOSES the FWST Supply to ND Pumps (FW-27A).

c. Operator checks the ND Pumps Suction Valves from the FWST (ND-19A and ND-48) are CLOSED.

d. Operator verifies that any ND Pump is running.

The remaining manual actions to complete the switchover are delayed until the FWST Low-Low Level is reached. At that time, the Operator immediately resumes the Transfer Procedure to re-align the suctions for the medium head and high head injection pumps (the NI and NV Pumps) from the FWST to the suction supply from the ND Pumps ("Piggyback" alignment).When the "FWST Low-Low" alarm is received, completion of these steps must be performed without delay to prevent vortex-induced air entrapment into the suction piping of the medium and high head injection pumps. In the interim period (after the ND pumps are aligned to the Sump, but before the FWST Low-Low Level alarm being received), the Operators may perform the manual actions to align the Containment Spray (NS) System as follows (note: the procedure will align both trains of NS to the Containment Sump, *but only one train will be placed in service, and it will be placed in service ONLY if Containment Pressure is greater than 3psig):*

M6. Operator checks the NS Pumps are OFF.

M7. Operator CLOSES the NS Pump Suctions from the FWST (NS-20A and NS-3B)

M8. Operator verifies that Containment Pressure is greater than 3 psig.

M9. Operator verifies adequate Containment Sump Level exists to supply suction to the NS Pump.

Steps M11 through M19 are to align and start ONE NS Pump to take suction from the Containment Sump. The Operator checks to see if the "A" NS Pump is available to be started. If it is available, the "A" NS Pump is aligned and started; however, if, for any reason, the "A" Pump is unavailable to run, the Operator's actions are immediately diverted to align and start the "B" NS Pump starting back at M10, but using the valves/equipment shown in the {brackets}.

M10. Operator checks that the "A" NS Pump is AVAILABLE TO RUN

M11. Operator verifies that the "A" Train NS/ND Suction from the Containment Sump (NI-185A) is OPEN. {for "B" Train, NI-184B}

M12. Operator checks that the opposite train NS Pump is OFF.

M13. Operator checks the "A" Nuclear Service Water (RN) Pump is ON. {for "B" Train, check the "B" RN Pump is on}

M14. Operator OPENS the first "A" NS Heat Exchanger Outlet Containment Isolation Valve (NS-32A). {For "B" Train, NS-12B}.

M15. Operator OPENS the second "A" NS Heat Exchanger Outlet Containment Isolation Valve (NS-29A). {For "B" Train, NS-15B}.

M16. Operator verifies that the "A" NS Pump Suction Isolation from the FWST (NS-20A) is CLOSED. {For "B" Train, NS-3B}.

M17. Operator OPENS the "A" NS Pump Suction from the Containment Sump (NS-18A). {For "B" Train, NS-1B}.

M18. Operator starts NS Pump A. {N5 Pump B}.

M19. Operator aligns cooling water to the NS Heat Exchanger for the NS Pump that was started:

a. Operator OPENS the RN Inlet Isolation valve for the "A" NS HX. (RN-134A). {For "B" HX, RN-235B}.

b. Operator will THROTTLE OPEN the NS HX RN Outlet Isolation for "A" NS HX (RN-137A) to the desired flow. {For "B" HX, RN-238B}.

M20. Operator checks N5 Alignment and ensures both trains are aligned to the Containment Sump.

When it has been verified that the FWST LOW-LOW LEVEL setpoint has been reached (Annunciator Alarm), the Operator IMMEDIATELY resumes the procedure and aligns the medium and high head injection pumps (NI and NV) to receive suction from the ND Pumps as follows (However, after Containment Spray is aligned, if time allows prior to FWST Low-Low Level being reached, the Operators can perform steps M24, M25, and M26 early):

M21. Operator verifies that adequate Containment Sump Level exists.

M22. Operator verifies that both ND Pumps are ON.

M23. Operator CLOSES the train-related ND to Reactor Coolant System Hot Leg Isolation Valves (ND-30A and ND-15B).

M24. Operator verifies Reactor Coolant (NC) Pressure is LESS than the pressure at which the Safety Injection (NI) Pumps can inject (if not, the Operator is directed to STOP the NI Pumps).

M25. Operator CLOSES the NI Pump Miniflow Isolation valves (NI-115B and NI-144B).

M26. Operator restores power to and CLOSES the NI Pumps Miniflow Header Isolation (NI-147A).

M27. Operator checks that at least one of the Centrifugal Charging Pump Recirc Isolation Valves (NV-151A and/or NV-150B) is closed.

M28. Operator ensures that the NV and NI Pumps Suction Crossover Block valve is OPEN (NI-334B).

M29. Operator OPENS the train related NV & NI Pumps Suction Crossover Valves (NI-332A and NI-333B)

M30. Operator aligns the ND Discharge to the Suction of the NI and NV Pumps by opening the train related isolation valves (ND-58A and NI-136B).

M31. Operator verifies that at least one train of ND is aligned to provide suction to the NV and NI Pumps:

a. "A" ND Pump running AND ND-58A OPEN **AND/OR**

b. "B" ND Pump running AND NI-136B OPEN

M32. Operator isolates the NI Pumps from FWST by restoring power to and CLOSING the FWST to NI Pumps Isolation Valve (NI-100B).

M33. Operator isolates the NV Pumps from the FWST by closing BOTH of the FWST supply valves to the NV Pumps (NV-221A AND NV-222B).

Table 6-126. Deleted Per 2009 Update

Table 6-127. Failure Analysis for Switchover to Cold Leg Recirculation

Failure	Effect	Comment
Operator Error During Manual Switchover		
Skips Step M1	None	No credited actions on Foldout Page. Administrative step.
Skips Step M2	None	Operator would have secured ND pump at Pre-Low level alarm for inadequate sump level if needed.
Skips Step M3	Prohibits sequencer reset and operation of ESF valves.	Operator will discover omission in next step.
Skips Step M4	Prohibits NS pump start and NI pump stop	Opeator will discover when performing M18 or M24.
Skips Step M5.a	None	The automatic switchover system will open NI-185A and NI-185B with sufficient water remaining in FWST to complete switchover.
Skips Step M5.b	None	Valves ND-4B and ND-19A isolate the FWST from ND automatically.
Skips Step M5.c	None	Confirmation of automatic alignment.
Skips Step M5.d	None	Both RHR pumps are sequenced on via S/I signal.
Skips Step M21	None	Confirmation of expected condition.
Skips Step M22	None	Operator will discover omission in step M31.
Skips Step M23	None	Closing of redundant crossover isolation valve completes train separation.
Skips Step M24	If NC pressure < 1600 PSIG, then there is no effect. If NC pressure > than 1600 PSIG, then NI Pump miniflow will be isolated on running pumps.	If NC pressure greater than 1600 PSIG, then NV pumps will be able to maintain pressure.
Skips Step M25	None	NI pump miniflow will be isolated n Step M26.

Failure	Effect	Comment
Skips Step 26	None	NI pump miniflow was isolated in Steps M25. Miniflow will be single isolated rather than double isolated.
Skips Step M27	None	Redundant train valve will isolate Centrifugal Charging Pump Recirc isolation Valve.
Skips Step M28	None	Valve NI334B is normally open; thereforeshould not be closed. If it is closed, B Train ND will be aligned to supply both trains of NI.
Skips Step M29	None	B train ND will be aligned through one of the redundant, parallel valves (NI-332A/NI-333B).
Skips Step M30	None	Opposite Train ND (either ND-58A or NI-136B) will be aligned to both trains of NV and NI.
Skips Step M31	None	Confirmation of expected alignment.
Skips Step M32	None	Check valve NI-101 prevents flow back to the FWST.
Skips Step M33	None	Check valve NV-223 prevents flow back to the FWST.

Table 6-128. Sequence of Operations: Cold Leg Recirculation to Residual Containment Spray

The following steps would be taken for residual spray alignment (at approximately 50 minutes after initiation of the LOCA or following switchover to recirculation, whichever occurs later).

1. Close the valve between the A RHR pump discharge and two RCS cold legs (NI173A).
2. Open the valve between the discharge of the A RHR pump and the A residual spray header (NS43A).
   Note: The valve between the discharge of the A RHR pump and the A residual spray header is interlocked such that it cannot be opened unless the Containment sump valve to the A RHR pump is open.

OR

3. Close the valve between the B RHR pump discharge and two RCS cold legs (NI178B).
4. Open the valve between the discharge of the B RHR pump and the B residual spray header (NS38B).
   Note: The valve between the discharge of the B RHR pump and the B residual spray header is interlocked such that it cannot be opened unless the Containment sump valve to the B RHR pump is open.

After the containment pressure drops to an allowable level, the RHR pump discharge may be realigned to the RCS cold legs by the following procedure:

5. Close the valve between the discharge of the A RHR pump and the A residual spray header (NS43A).
6. Open the valve between the A RHR pump discharge and two RCS cold legs (NI173A).

OR

7. Close the valve between the discharge of the B RHR pump and the B residual spray header (NS38B).
8. Open the valve between the B RHR pump discharge and two RCS cold legs (NI178B).

Note: Residual Containment Spray is initiated manually when required by the operator and only if 1) the Emergency Core Cooling System is operating in the recirculation mode, 2) more than 50 minutes have passed since the initiation of the accident, and 3) containment pressure exceeds a setpoint. Residual Containment Spray is not required to maintain containment pressure within design values.

Table 6-129. Sequence of Operations: Cold Leg Recirculation to Hot Leg Recirculation

The following steps would be taken when re-aligning the ECCS from the cold leg recirculation mode to the hot leg recirculation mode.

Note: Prior to realigning the ECCS for hot leg recirculation, power must be restored (as applicable) to the following valves: NI173A, NI178B, NI183B, NI121A, NI162A, NI152B.

1. Stop A safety injection pump.
2. Close A safety injection pump crosstie isolation valve (NI118A).
3. Open A safety injection pump hot leg isolation valve (NI121A).
4. Start A safety injection pump.
5. Stop B safety injection pump.
6. Close B safety injection pump cold leg and crosstie isolation valves. (NI162A and NI150B)
7. Open B safety injection pump hot leg isolation valve (NI152B).
8. Start B safety injection pump.
9. Verify hotleg flow from at least one safety injection train, if not proceed with steps below to align one train RHR hotleg recirculation.
10. Check ND-1B, 2A, C, 30A and 15B are closed.
11. Open RHR hotleg isolation NI-183B.

    If residual containment spray is required from an operating RHR train, that train is not aligned to RHR hot leg injection in order to preserve residual containment spray flow. Align either train RHR as follows ('B' train in parenthesis).
12. Check NS-43A (NS-38B) closed.
13. Close RHR pump cold leg isolation NI-173A (NI-178B).
14. Open RHR discharge cross-tie isolation ND-30A (ND-15B).

Table 6-130. Maximum Potential Recirculation Loop Leakage External to Containment

	Items	Type of Leakage Control and Unit Leakage Rate Used in the Analysis	Leakage to Atmosphere cc/hr	Leakage to Drain Tank cc/hr
1.	Residual Heat Removal Pumps (Low Head Safety Injection)	Mechanical seal with leakoff - 10cc/hr/seal[1]	0	20
2.	Safety Injection Pumps	Same as residual heat removal pump	0	40
3.	Charging Pumps	Same as residual heat removal pump	0	40
4.	Flanges:			
	a. Pumps	Gasket - adjusted to zero leakage following any test 10 drops/min/gauge used (30cc/hr). Due to leak tight flanges on pumps, no leakage is assumed to atmosphere.	0	
	b. Valves Bonnet to Body (larger than 2")		2400	0
	c. Control Valves		480	0
	d. Heat Exchangers		240	0
5.	Valves - Stem Leakoffs	Back seated double packing with leakoff - 1cc/hr in. stem diameter used (see Table 6-123).	0	50
6.	Misc. Small Valves	Flanged boyd packed stems - 1 drop/min used (3cc/hr).	600	0
7.	Misc. Large Valves (Larger than 2")	Double packing 1cc/hr/in. stem diameter used	40	0

Note:

1. Seals are acceptance tested to essentially zero leakage. Due to the tandem double seal arrangement and the use of water from the refueling water storage tank as a buffer between the seals, no radioactive leakage from the pumps to the atmosphere is expected.

Table 6-131. Materials Employed for Emergency Core Cooling System Components

Component	Material
Cold Leg Accumulators	Carbon Steel, Clad with Austenitic Stainless Steel
Centrifugal Charging Pumps	Stainless Steel
Safety Injection Pumps	Stainless Steel
Residual Heat Removal Pumps	Stainless Steel
Residual Heat Exchangers	
Shell	Carbon Steel
Shell End Cap	Carbon Steel
Tubes	Austenitic Stainless Steel
Channel	Austenitic Stainless Steel
Channel Cover	Austenitic Stainless Steel
Tube Sheet	Forged Carbon Steel with Stainless Steel Weld Overlay Face
Valves	
Motor Operated Valves Containing Radioactive Fluids Pressure Containing Parts	Austenitic Stainless Steel or Equivalent
Body-to-bonnet Bolting & Nuts	Low Alloy Steel
Seating Surfaces	Stellite No. 6 or Equivalent
Stems	Austenitic Stainless Steel, 17-4PH Stainless, or Equivalent
Motor Operated Valves Containing Non-Radioactive, Boron-Free Fluids	Carbon Steel
Bonnet and Stem	Corrosion Resistant Steel
Diaphragm Valves	Austentic Stainless Steel
Accumulator Check Valves	
Parts Contacting Borated Water	Austentic Stainless Steel or Equivalent
Clapper Arm (Unit 2 Only)	Austenitic Stainless
Relief Valves	
Stainless Steel Bodies	Stainless Steel
Carbon Steel Bodies	Carbon Steel
All Nozzles, Discs, Spindles and Guides	Austenitic Stainless Steel or Equivalent
Bonnets for Stainless Steel Valves	Stainless Steel
All other Bonnets	Carbon Steel

Component	Material
Piping	
All Piping in Contact with Borated Water	Austenitic Stainless Steel

Table 6-132. ECCS Relief Valve Data

Description	Fluid Discharged	Normal Inlet Temp,°F	Relieving Temp, °F	Set Pressure, Psig	Back Pressure Constant, Psig	Build-up, Psig	Capacity
N_2 supply to cold leg injection accumulators	N_2	120	70	700	0	0	1500 scfm
SI Pump Discharge	Borated Water	100	190	1740	3	50	20 gpm
RHR Pumps SI Line	Borated Water	120	350	600	3	50	60 gpm
SI Pumps Suction Header	Borated Water	100	190	240	3	50	20 gpm
Cold leg accumulator to containment	N_2 Gas	120	120	700	0	0	1500 scfm
NC Check Valve Test Header & Penetration	Borated Water	120	250	2485	0	0	20 gpm

Table 6-133. Single Active Failure Analysis for Emergency Core Cooling System Components

Component	Malfunction	Comments
Short Term Phase		
1. Pumps		
a. Centrifugal Charging Pumps.	Fails to start	Two provided. Evaluation based on operation of one.
b. Safety Injection Pumps.	Fails to start	Two provided. Evaluation based on operation of one.
c. Residual Heat Removal Pumps.	Fails to start	Two provided. Evaluation based on operation of one.
2. Automatically Operated Valves in Charging System		
a. Suction line to Refueling Water Storage Tank	Fails to open	Two parallel lines; only one valve in either line is required to open.
b. Discharge line to normal charging path	Fails to close	Two valves in series; only one valve required to close.
c. Suction from Volume Control Tank	Fails to close	Two valves in series; only one valve required to close.
3. Valves Operated from Control Room - CCP minimum flow bypass line	Fails to close	Two valves in series; only one valve required to close.
Long Term Phase		
1. Valves Operated from Control Room for Recirculation		
a. Containment sump recirculation isolation	Fails to open	Two lines parallel; only one valve in either line is required to open.
b. Residual Heat Removal Pump suction line from Refueling Water Storage Tank	Fails to close	Check valve in series with one gate valve; operation of only one valve required.

Component	Malfunction	Comments
c. Safety Injection Pump suction line from Refueling Water Storage Tank	Fails to close	Check valve in series with gate valve; operation of only one valve required.
d. Centrifugal Charging Pump suction line from Refueling Water Storage Tank	Fails to close	Check valve in series with two parallel gate valves. Operation of either the check valve or both of the gate valves required.
e. High head pump suction line at discharge of Residual Heat Exchanger	Fails to open	Separate and independent high head injection path taking suction from discharge of Residual Heat Exchanger.
2. Pumps		
a. Residual Heat Removal Pump	Fails to start	Two provided. Evaluation based on operation of one.
b. Centgrifugal Charging Pump	Fails to operate	Same as phase.[1]
c. Safety Injection Pumps	Fails to operate	Same as short term phase.[1]

Note:

1. Either a Centrifugal Charging Pump or a Safety Injection Pump required.

Table 6-134. Emergency Core Cooling System Recirculation Piping Passive Failure Analysis - Long Term Phase

Flow Path	Indication of Loss of Flow Path	Alternate Flow Path
Low Head Recirculation		
From Containment sump to low head injection header via the Residual Heat Removal Pumps and the Residual Heat Exchangers	Accumulation of water in a Residual Heat Removal Pump compartment or Auxiliary Building sump	Via the independent, identical low head flow path utilizing the second Residual Heat Exchanger
High Head Recirculation		
From Containment sump to the high head injection header via Residual Heat Removal Pump, Residual Heat Exchanger and the high head injection pumps	Accumulation of water in a Residual Heat Removal Pump compartments or the Auxiliary Building sump	From Containment sump to the high head injection headers via alternate Residual Heat Exchanger and the alternate high head charging pump.

Table 6-135. Valves Required to Ensure Safe Shutdown of the Reactor

Qty.	Type of Valve	Size (in)	Actuation Type	Valve Number	Valve Name	Means of Controlling	Environmental Design Criteria
Reactor Coolant System							
3	Relief	6	ΔP	1/2NC1, 2, 3	Pressurizer #1 Safety Relief	----	Note 1
Chemical and Volume Control System							
2	Globe	2	Motor	1/2NV150B 1/2NV151A	Centrifugal Charging Pumps Recirc	H.W.	Note 2
2	Gate	4	Motor	1/2NV141A 1/2NV142B	Volume Control Tank #1 Outlet	H.W.	Note 2
2	Gate	3	Motor	1/2NV244A 1/2NV245B	Charging Line Containment Iso.	H.W.	Note 2
2	Gate	8	Motor	1/2NV222B 1/2NV221A	Cent. Charging Pumps Suction From FW System	H.W.	Note 2
1	Globe	2	Motor	1/2NV265B	Boric Acid to Charging Pumps	H.W.	Note 2
Residual Heat Removal System							
2	Gate	14	Motor	1/2ND1B 1/2ND2AC	ND Suction from NC Loop 3	H.W.	Note 1
2	Gate	8	Motor	1/2ND30A 1/2ND15B	ND Heat-exchangers Outlet Crossover Isolation	H.W.	Note 2
2	Gate	14	Motor	1/2ND4B	ND Pump 1B Suction from NC Loop 3 + RWST	H.W.	Note 2
				1/2ND19A	ND Pump 1A Suction from NC Loop 3 + RWST	H.W.	Note 2
Safety Injection System							

Qty.	Type of Valve	Size (in)	Actuation Type	Valve Number	Valve Name	Means of Controlling	Environmental Design Criteria
4	Gate	10	Motor	1/2NI54A, 65B, 76A, 88B	Accumulator Discharge Iso.	H.W.	Note 1
8	Check	10	ΔP	1/2NI59, 60, 70, 71, 81, 82, 93, 94	Accumulator Discharge to NC System Check	----	Note 1
4	Check	6	ΔP	1/2NI175, 176, 180, 181	ND to NC System Cold Legs Check	----	Note 1
4	Check	2	ΔP	1/2NI165, 167, 169, 171	NI Pumps to NC System Cold Legs Check	----	Note 1
4	Check	2	ΔP	1/2NI128, 124, 156, 159	NI Pumps to NC System Hot Legs Check	----	Note 1
2	Check	8	ΔP	1/2NI125, 129	ND Pumps to NC System Hot Legs Check	----	Note 1
4	Check	6	ΔP	1/2NI134, 126, 1NI-157, 160 (2NI-157, 160 were made 2")	NC System Hot Legs Inlet Check	----	Note 1
1	Gate	8	Motor	1/2NI100B	RWST to Safety Inj. Pumps	H.W.	Note 2
1	Check	8	ΔP	1/2NI101	RWST to Safety Inj. Pumps Check	----	Note 2
1	Gate	8	Motor	1/2NI136B	ND HX 1B to Safety Inj. Pump 1B	H.W.	Note 2
2	Gate	6	Motor	1/2NI135B, 103A	NI Pumps Suction from RWST	H.W.	Note 2
1	Gate	6	Motor	1/2NI334B	NI Pump Suction Crossover from NV Isolation	H.W.	Note 2
2	Gate	6	Motor	1/2NI332A, 333B	NI Pump Suction Crossover from NV Isolation	H.W.	Note 2

Qty.	Type of Valve	Size (in)	Actuation Type	Valve Number	Valve Name	Means of Controlling	Environmental Design Criteria
2	Check	4	ΔP	1/2NI116, 148	NI Pumps Discharge Check	----	Note 2
2	Gate	4	Motor	1/2NI118A, 150B	NI Pumps Cold Leg Inj. Lines Iso.	H.W.	Note 2
2	Gate	4	Motor	1/2NI121A, 152B	NI Pumps to NC Hot Leg Iso.	H.W.	Note 2
1	Gate	4	Motor	1/2NI162A	NI Pumps Cold Leg Inj. Hdr. Iso.	H.W.	Note 2
2	Gate	8	Motor	1/2NI173A, 178B	ND Hdr. to NC Cold Legs	H.W.	Note 2
1	Gate	12	Motor	1/2NI183B	ND Hdr. to NC Hot Legs Iso.	H.W.	Note 2
2	Gate	18	Motor	1/2NI184B, 185A	Cont. Recirculation Sump Line Iso.	H.W.	Note 2
Containment Spray System							
4	Check	8	ΔP	1/2NS13, 16, 30, 33	NS Pumps Discharge Lines Check	----	Note 1
2	Check	8	ΔP	1/2NS41, 46	ND Pumps Disch. to Aux. Spray Nozzles Check	----	Note 2
2	Gate	12	Motor	1/2NS3B, 20A	NS Pumps Suction from RWST	H.W.	Note 2
2	Gate	12	Motor	1/2NS18A, 1B	NS Pumps Suction from Cont. Recirc. Sump	H.W.	Note 2
4	Gate	8	Motor	1/2NS12B, 15B, 29A, 32A	NS Pumps Disch. Iso.	H.W.	Note 2
2	Gate	8	Motor	1/2NS38B, 43A	ND Pumps Disch. to Aux. Spray Nozzles	H.W.	Note 2
Containment Air Return Exchange and H_2 Skimmer System							
2	Butterfly	8	Motor	1/2VX1A, 2B	H_2 Skimmer Fan Inlet Iso.	H.W.	Note 1

Qty.	Type of Valve	Size (in)	Actuation Type	Valve Number	Valve Name	Means of Controlling	Environmental Design Criteria
2	Diaphragm	1	Air Diaphragm	1/2VX33B, 31A	Cont. Sample Blower Inlet	H.W.	Note 1
1	Check	1	ΔP	1/2VX30	Cont. Sample Blower Outlet	----	Note 1
Annulus Ventilation System							
1	Gate	4	Motor	1/2VE8A	H_2 Purge Inlet Blower Inlet	H.W.	Note 2
1	Check	4	ΔP	1/2VE7	H_2 Purge Inlet Blower Inlet Check	----	Note 2
1	Diaphragm	4	Motor	1/2VE10A	H_2 Purge Inlet Blower Outlet	H.W.	Note 2
1	Gate	4	Motor	1/2VE6B	H_2 Purge from Cont. to Annulus	H.W.	Note 2
1	Check	4	ΔP	1/2VE11	H_2 Purge Inlet Blower Outlet Check	----	Note 1
1	Gate	4	Motor	1/2VE5A	H_2 Purge from Cont. to Annulus	H.W.	Note 1
Component Cooling System							
2	Butterfly	16"	Motor	1/2KC56A 1/2KC81B	Cooling Water to RHR HX's A and B Auto Iso.	H.W.	Note 2
2	Gate	8"	Motor	1/2KC230A 1/2KC228B	Train A and B Cooling to Reactor Bldg. Non-Ess. Supply Hdr. Auto Isolation	H.W.	Note 2
2	Butterfly	20"	Motor	1/2KC50A 1/2KC53B	Train A and B Cooling to Aux. Bldg. Non-Ess. Supply Hdr. Auto Isolation	H.W.	Note 2
2	Butterfly	20"	Motor	1/2KC1A 1/2KC2B	Aux. Bldg. Non-Ess. Return Auto. Isolation to Train A and B Cooling Water HX's	H.W.	Note 2

Qty.	Type of Valve	Size (in)	Actuation Type	Valve Number	Valve Name	Means of Controlling	Environmental Design Criteria
2	Gate	10"	Motor	1/2KC3A 1/2KC18B	Reactor Bldg. Non-Ess. Return Auto. Iso. to Tran A and B Cooling Water HX's	H.W.	Note 2
Main Steam System							
4	Globe	34	Air Piston	1/2SM1AB	Main Steam 1D Isolation	----	Note 2
				1/2SM3AB	Main Steam 1/2C Isolation		
				1/2SM5AB	Main Steam 1B Isolation		
				1/2SM7AB	Main Steam 1A Isolation		
Feedwater System							
4	Gate	12	Hydraulic Piston	1/2CF26AB	Steam Gen. 1D Containment Isolation		Note 2
				1/2CF28AB	Steam Gen. 1/2C Containment Isolation		
				1/2CF30AB	Steam Gen. 1B Containment Isolation		
				1/2CF35AB	Steam Gen. 1A Containment Isolation		
Nuclear Service Water System							
4	Butterfly	36	Motor	0RN10AC 0RN11B 0RN12AC 0RN13A	Low Level Supply Shutoff	H.W.	Note 2
4	Butterfly	36	Motor	0RN2B 0RN3A 0RN4AC 0RN5B	Condenser Circulating Water Supply Shutoff	H.W.	Note 2

Qty.	Type of Valve	Size (in)	Actuation Type	Valve Number	Valve Name	Means of Controlling	Environmental Design Criteria
2	Butterfly	24	Motor	0RN301AC 0RN302B	Containment Ventilation System Supply Isolation	H.W.	Note 2
2	Butterfly	36	Motor	1/2RN16A 1/2RN18B	RN Supply Isolation	H.W.	Note 2
2	Butterfly	36	Motor	0RN14A 0RN15B	RN Supply Crossover Isolation	H.W.	Note 2
2	Butterfly	36	Motor	0RN7A 0RN9B	Standby Nuclear Service Water Pond Supply Shutoff	H.W.	Note 2
4	Butterfly	36	Motor	0RN147AC 0RN148AC 0RN283AC 0RN284B	Condenser Circulating Water Discharge Isolation	H.W.	Note 2
2	Butterfly	36	Motor	1/2RN296A 1/2RN297B	Essential Header Return	H.W.	Note 2
2	Butterfly	36	Motor	0RN149A 0RN152B	Standby Nuclear Service Water Pond Discharge Isolation	H.W.	Note 2
2	Butterfly	36	Motor	0RN150A 0RN151B	RN Discharge Crossover Isolation	H.W.	Note 2
Deleted per 2012 Update							
2	Diaphragm	6	Air Diaphragm	1/2RN21A 1/2RN25B	RN Strainer Backwash Inlet Isolation	---	Note 2
2	Butterfly	8	Motor	1/2RN70A 1/2RN171B	Diesel Gen. Heat Exchanger Supply Isolation	H.W.	Note 2

Qty.	Type of Valve	Size (in)	Actuation Type	Valve Number	Valve Name	Means of Controlling	Environmental Design Criteria
2	Butterfly	20	Motor	1/2RN86A 1/2RN187B	Component Cooling Heat Exchanger Supply Isolation	H.W.	Note 2
2	Diaphragm	1½	Air Diaphragm	1/2RN140A 1/2RN240B	Fuel Pool Cooling Pump Motor Ess. Cooler Supply Isolation	---	Note 2
2	Butterfly	18	Motor	1/2RN134A 1/2RN235B	Containment Spray Heat Exchanger Supply Isolation	H.W.	Note 2
2	Diaphragm	2	Air Diaphragm	1/2RN103A 1/2RN204B	Centrifugal Charging Pump Motor Cooler Complex Supply Isolation	---	Note 2
2	Diaphragm	2	Air Diaphragm	1/2RN126A 1/2RN227B	Containment Spray Pump Motor ES Cooler Supply Isolation	---	Note 2
2	Diaphragm	2	Air Diaphragm	1/2RN130A 1/2RN231B	Residual Heat Removal Pump Motor ES Cooler Supply Isolation	---	Note 2
2	Diaphragm	2	Air Diaphragm	1/2RN114A 1/2RN215B	Safety Injection Pump Cooler Complex Supply Isolation	---	Note 2
2	Gate	8	Motor	1/2RN69A 1/2RN162B	Assured Supply to Auxiliary Feedwater Pumps Isolation	H.W. Auxiliary Control Panel	Note 2
3	Butterfly	10	Motor	1/2RN40A 1/2RN41B 1/2RN43A	Nonessential Header Supply Isolation	H.W.	Note 2

Qty.	Type of Valve	Size (in)	Actuation Type	Valve Number	Valve Name	Means of Controlling	Environmental Design Criteria
1	Butterfly	10	Motor	1/2RN42A	Auxiliary Building Nonessential Supply Isolation	H.W.	Note 2
2	Butterfly	6	Motor	1/2RN299A 1/2RN279B	Auxiliary Building Ventilation Units Cooling Water Discharge Isolation	H.W.	Note 2
2	Butterfly	10	Motor	1/2RN64A 1/2RN63B	Auxiliary Building Nonessential Discharge Isolation	H.W.	Note 2
2	Diaphragm	2	Air Diaphragm	1/2RN166A 1/2RN170B	Auxiliary Feedwater Pump Motor Cooler RN Control	---	Note 2
4	Diaphragm	2	Air Diaphragm	1/2RN112A 1/2RN117A 1/2RN213B 1/2RN218B	Component Cooling Water Pump Motor Cooler RN Control	---	Note 2
2	Diaphragm	1 1/2	Air Diaphragm	1/2RN68A 1/2RN161B	Nuclear Service Water Pump Motor Cooler RN Control	---	Note 2
Refueling Water System							
2	Gate	8"	Motor	1/2FW1A 1/2FW32B	Refueling Water Loop Isolation	H.W.	Note 2

Note:

1. Temp, °F: 110 to 250
   Pressure, Psig: -1.5 to 19
   Humidity, %: 0 to 100
2. Temp, °F: 50 to 150
   Pressure, Psig: -0.3 to 0.3
   Humidity, %: 0 to 100

Table 6-136. Emergency Core Cooling System Shared Functions Evaluation

Component	Normal Operating Arrangement	Accident Arrangement During Injection
Refueling Water Storage Tank	Lined up to suction of Safety injection, containment spray, residual heat removal pumps.	Lined up to suction of centrifugal charging, safety injection and residual heat removal pumps.
Centrifugal Charging Pumps	Lined up for charging service. Suction from volume control tanks.	Lined up for injection from RWST. Valves for realignment meet single failure criteria.
Residual Heat Removal Pumps	Lined up to cold legs of reactor coolant piping.	Lined up to cold legs of reactor coolant piping.
Residual Heat Exchangers	Lined up for residual heat removal pump operation.	Lined up for residual heat removal pump operation.
Safety Injection Pumps	Lined up to cold legs of reactor coolant piping.(1)	Lined up to cold legs of reactor coolant piping.

Note(s):

1. With the exception of periodic cold-leg accumulator make-up.

Table 6-137. Parameters for Boron Precipitation Analysis

Reactor Core Power	3479 MWt
Total Inventory of Boric Acid Solution (Includes RCS, SI Accumulators, RWST and Ice Bed)	7.1×10^6 lbm
Boron Concentration Measurement Uncertainty	1.0%
Effective Vessel Volume (Core and Upper Plenum Volume to the bottom of hot leg nozzles)	972
Safety Injection Subcooling	55 BTU/lbm
Containment Pressure	14.7 psia
Ice Condenser Maximum Boron Concentration	2330 ppm

Table 6-138. Control Area Ventilation System Failure Analysis

Component	Failure	Comments and Consequences
Control Area AHU Fan	Fail	Redundant Fan Available
Control Area O.A.P.F.T. Fan	Fail	Redundant Fan Available
Control Area Cooling Coil Units	Fail	Redundant Unit Available
Outside Air Intake Isolation Valve	Fail in open position when activity is present	Redundant valve will close
Outside Air Intake Valve	Fail in closed position	Redundant intake supply line will supply pressurizing air
Deleted Per 2009 Update		
Outside Air Pressure Filter Train	Fail	Redundant train available
Outside Air Pressure Filter Train Isolation Dampers	Single Power Failure	Dampers spring return to the open position. Redundant filter train available.
Switchgear AHUs and switchgear outlet isolation dampers	Single Power Failure	AHU fails and the isolation dampers, by spring force, fail to the open position. Redundant Filter train air flow is degraded, but operable. Failed train damper can be closed if switchgear room temperature exceeds acceptable limits.

Table 6-139. Containment Spray System Component Parameters CSS Pump Data

Characteristics	Data
NS Pumps	
Quanity per Unit	Two
Type	Vertical, single-stage centrifugal
Pumped fluid	Borated water
Design pressure, psig	300
Design temperature, °F	200
Design flow rate, gpm	3400
Design head, ft	380
NPSH required at design flow rate, ft	15
Deleted per 2005 Update	
Shutoff head, ft	450
Materials of construction	
Casing	Stainless Steel, A351
Impeller	Stainless Steel, A296
Shaft	Stainless Steel, A276
Driver:	
Type	Solid shaft induction
Service factor	1.25
Nameplate rating, hp	400
Voltage	4000/3-phase
RPM	1790
NS Heat Exchangers	
Quantity per Unit	2
Type	Shell and Tube
Heat Transfer per Unit (BTU/hr)	82.3×10^6 (84.15×10^6)
Flow, tube side, gpm	3400 (3800)[2]
Flow, shell side, gpm	3800[2] (3400)
Shell Side Inlet Temperature, °F	84.3 (153.8)
Shell Side Outlet Temperature, °F	117.8 (105.3)
Tube Side Inlet Temperature, °F	153.8 (84.3)
Tube Side Outlet Temperature, °F	105.4 (128.6)

Characteristics	Data
Material Shell/Tube	Carbon Steel/Stainless Steel (Stainless Steel, Titanium)
Design Pressure, Shell/Tube, psig	200/230 (252/135)
Design Temperature, Shell/Tube, °F	200/200 (200/200)
NS Spray Nozzles	
Manufacturer	Spraco
Model Number	1713A
Pressure Drop, psi	40
Flow Rate, gpm	15.2
Median Spray Droplet Diameter, Microns	230
Mean Spray Droplet Diameter, Microns	355

Note:

1. NS Heat Exchanger parameters in parentheses ( ) are applicable to the Unit 2 B Train heat exchanger only.
2. Nominal value - reference MCC-1223.24-00-0076 "RN/NS Heat Exchanger Tube Plugging Analysis."

Table 6-140. Types and Location of Insulation Used in the Containment

Reflective (See Notes)	Mass
Steam Generators	Encapsulated Foam Glass
Pressurizer	Ice Condenser Air Handling Unit Drain Lines
R.C. Pumps	Ice Condenser Floor Drains
R.C. Loops	Ice Condenser Walls
Surge Line	Ice Condenser Glycol Supply and Return Lines
Spray Line and Bypass	Ice Condenser Top Deck
RHR Lines	
Accumulator Injection Lines	
Safety Injection Lines	
Boron Injection Lines	
CVCS Charging Lines	
CVCS Letdown Lines	
Feedwater Lines	
Main Steam Lines	
Reactor Vessel	

Note:

1. Reflective Insulation may be replaced with flexible blanket insulation at selective locations. These replacements are controlled by the modification process, and are documented in MCC-1552.08-00-0387, GSI-191 Debris Generation Calculation.
2. All mirror insulation on the steam generators from upper lateral support and above has been replaced with flexible blanket insulation.

Deleted Per 2012 Update.

Table 6-141. Single Failure Analysis-Containment Spray System

Component	Malfunction	Comments and Consequences
Spray	Clogged	The large number of nozzles (approximately 345 per Containment Spray train) plus the ECCS sump strainer, which removes debris during the recirculation phase of operation, makes the clogging of a significant number of nozzles incredible.
Spray Pump	Stops running or fails to start	Two 100 percent capacity pumps provide redundancy.
Heat Exchangers	Tube leak	Two 100 percent capacity heat exchangers provide redundancy.
Valve	Fails to open	Two 100 percent flow paths.
Check Valves (Pump Discharge)	Fails to Open Fails to Close Leakage	Two 100 percent flow paths Two 100 percent flow paths Two 100 percent flow paths

Table 6-142. Swivel Bracket Stress Summary. (Ref. 80, Section 6.2.8) Load Case IV

SIDE BRACKETS (Top Coupling Piece, IB1)	1222 lb Basket	Empty (250 lb) Basket
Combined bending + tension, side section	0.478	0.494
Shear stress, lip	0.099	0.107
CLEVIS (Bottom Lug, IB2)		
Shear at 5/16" neck	0.161	0.173
½ inch wide section tension	0.106	0.114
Bottom section, bending	0.383	0.412
½ inch wide side section, bending	0.089	0.056
1" round section	0.134	0.145
½ INCH DIAMETER ROD (Clevis Pin, IB4)		
Shear stress	0.504	0.542
3/8 INCH DIAMETER SCREWS (Part IB3)		
Tension	0.383	0.412
PLATFORM ASSEMBLIES 2		
Lug stress (combined uplift and moment)	*	0.307
Support bar bending	*	0.197
Support bar local stress at attachment point	*	0.383
Shear reaction support bar	*	0.064
OUTER PLATFORM ASSEMBLY 2		
Inner channel bending	*	0.600
Outer beam bending	*	0.269
INNER PLATFORM ASSEMBLY 2		
Outer channel bending	*	0.450
Inner beam bending	*	0.168
BASKET STRESSES 2		
Screw shear	*	0.423

Note:

1. only evaluated for the more critical empty basket case.
2. Lower Support Structure and Ice Bakset Loads increased to account for 5/8" gap in clevis assembly. The worst uplift load conservatively analyzed or 1222 lb (safety margin limit) and empty basket.

Table 6-143. Containment Coatings

Surface	Coating Systems		Dry Film Thickness	Manufacturer	Notes
1. Carbon Steel 0°F-200°F	Original System	DP-SP5 White Metal Blast Cleaning			1,2,3,4,5,6
	Prime Coat	DP#12-1 13-F-12KR-00 MZ#7	2.0 mils DFT	Mobil/Valspar	
	Finish Coat	DP#34-1 89-Series-00 High Build Epoxy	5.0 mils DFT	Mobil/Valspar	
			7.0 mils DFT		
	Maintenance System over Original System	DP-SP28 Power Tool Cleaning			1,2,3,4,5,6
	Maintenance Coat	DP#78-1 Carboline 890	2.0 to 7.0 mils DFT	Carboline	
	New System	DP-SP5 White Metal Blast Cleaning			1,2,3,4,5,6
	Prime Coat	DP#12-1 Carbo Zinc 11 SG	2.0 mils DFT	Carboline	
	Finish Coat	DP#78-1 Carboline 890	5.0 mils DFT	Carboline	
			7.0 mils DFT		
2. Carbon Steel 0°F-200°F	Original System	DP-SP10 Near White Metal Blast Cleaning			1,2,3,4,5,6
	Prime Coat	DP#17-1 89-R-10-00 High Build Epoxy	2.0 mils DFT	Mobil/Valspar	
		DP#34-1 76-Series-00-High Build Epoxy	5.0 mils DFT	Mobil/Valspar	
			7.0 mils DFT		

Surface	Coating Systems		Dry Film Thickness	Manufacturer	Notes
	Maintenance System				
	over Original System	DP-SP28 Power Tool Cleaning			1.2,3,4,5,6
	Maintenance Coat	DP#78-1 Carboline 890	2.0 to 7.0 mils DFT	Carboline	
	New System	DP-SP5 White Metal Blast Cleaning			1,2,3,4,5,6
	Prime Coat	DP#78-1 Carboline 890	2.0 mils DFT	Carboline	
	Finish Coat	DP#78-1 Carboline 890	5.0 mils DFT	Carboline	
3. Carbon Steel 0°F-200°F	Original System	DP-SP10 Near White Metal Blast Cleaning			1,2,3,4,5,6
	Prime Coat	DP#17-1 89-R-10--00 High Build Epoxy	2.0 mils DFT	Mobil/Valspar	
	Finish Coat	DP#69-1 76-Series-00 High Build Epoxy	5.0 mils DFT	Mobil/Valspar	
			7.0 mils DFT		
	Maintenance System				
	over Original System	DP-SP28 Power Tool Cleaning			1,2,3,4,5,6
	Maintenance Coat	DP#78-1 Carboline 890	2.0 to 7.0 mils DFT	Carboline	
	New System	DP-SP10 Near White Metal Blast Cleaning			1,2,3,4,5,6
	Prime Coat	DP#78-1 Carboline 890	3.0 mils DFT	Carboline	

Surface	Coating Systems		Dry Film Thickness	Manufacturer	Notes
	Finish Coat	DP#78-1 Carboline 890	4.0 mils DFT	Carboline	
			7.0 mils DFT		
4. Carbon Steel 0°F-750°F	Original System	DP-SP5 White Metal Blast Cleaning			1,2,3,4,5,6
	Prime Coat	DP#12-1 13-F-12KR-00-MZ#7	3.0 mils DFT	Mobil/Valspar	
	New System	DP-SP5 White Metal Blast Cleaning			1,2,3,4,5,6
	Prime Coat	DP#12-1 Carbo Zinc 11 SG	3.0-5.0 mils DFT	Carboline	
5. Carbon Steel 0°F-200°F	Original System	DP-SP10 Near White Metal Blast Cleaning			1,2,3,4,5,6
	Prime Coat	DP#34-1 89-Series-00 High Build Epoxy	2.0 mils DFT	Mobil/Valspar	
		DP#34-1 89-Series-00 High Build Epoxy	5.0 mils DFT	Mobil/Valspar	
			7.0 mils DFT		
	Maintenance System				
	over Original System	DP-SP28 Power Tool Cleaning			1,2,3,4,5,6
	Maintenance Coat	DP#78-1 Carboline 890	2.0 to 7.0 mils DFT	Carboline	
	New System	DP-SP5 White Metal Blast Cleaning			1,2,3,4,5,6
	Prime Coat	DP#78-1 Carboline 890	2.0 mils DFT	Carboline	

Surface	Coating Systems		Dry Film Thickness	Manufacturer	Notes
	Finish Coat	DP#78-1 Carboline 890	5.0 mils DFT	Carboline	
			7.0 mils DFT		
6. Carbon Steel 0°F-200°F	Original System	DP-SP10 Near White Metal Blast Cleaning			1,2,3,4,5,6
	Prime Coat	DP#69-1 76-Series-00 High Build Epoxy	2.0 mils DFT	Mobil/Valspar	
		DP#69-1 76-Series-00 High Build Epoxy	5.0 mils DFT	Mobil/Valspar	
			7.0 mils DFT		
	Maintenance System				
	over Original System	DP-SP28 Power Tool Cleaning			1,2,3,4,5,6
	Maintenance Coat	DP#78-1 Carboline 890	2.0 to 7.0 mils DFT	Carboline	
	New System	DP-SP5 White Metal Blast Cleaning			1,2,3,4,5,6
	Prime Coat	DP#78-1 Carboline 890	2.0 mils DFT	Carboline	
	Finish Coat	DP#78-1 Carboline 890	5.0 mils DFT	Carboline	
			7.0 mils DFT		
7. Carbon Steel 200°F-750°F	Original System	DP-SP10 Near White Metal Blast Cleaning			

Surface	Coating Systems		Dry Film Thickness	Manufacturer	Notes
	Prime Coat	DP#80 1 8674-00 Silicone Alkyd Stainless Steel	1.0 mils DFT	Keeler and Long	3,4,5,6
	Finish Coat	DP#80-1 8674-00 Silicone Alkyd Stainless Steel	1.0 mils DFT	Keeler and Long	
			2.0 mils DFT		
8. Carbon Steel	Original System	DP-SP5 White Metal Blast Cleaning			1,2,3,4,5,6
0°F-250°F	Prime Coat	DP#71-1 7155HHB Plasite Phenolic	4.0 mils DFT	Wisconsin	
Tank Lining	Intermediate Coat	DP#71-1 7155HHB Plasite Phenolic	4.0 mils DFT	Wisconsin	
	Finish Coat	DP#71-1 7155HHB Plasite Phenolic	4.0 mils DFT	Wisconsin	
			12.0 mils DFT		
9. Concrete Floors	Prime Coat	DP#36-1 46-X-29-00 Epoxy Surfacer	Seal Concrete	Mobil/Valspar	1,2,3,4,5,6
	Finish Coat	DP#69-1 76-Series-00 High Build Epoxy	8.0 mils DFT	Mobil/Valspar	
			8.0 mils DFT		
	Maintenance System				
	over Original System	DP-SP25			1,2,3,4,5,6
	Maintenance Coat	DP#78-1 Carboline 890	2.0 to 8.0 mils DFT	Carboline	
	New System	DP-SP25			1,2,3,4,5,6
	Prime Coat	DP#36-1 Starglaze 2011S	Seal Concrete	Carboline	
	Finish Coat	DP#78-1 Carboline 890	8.0 mils DFT	Carboline	

Surface	Coating Systems		Dry Film Thickness	Manufacturer	Notes
			8.0 mils DFT		
10. Concrete Walls	Original Systems	DP-SP17			1,2,3,4,5,6
	Prime Coat	DP#36-1 46-X-29-00 Epoxy Surfacer	Seal Concrete	Mobil/Valspar	
	Finish Coat	DP#69-1 76-Series-00 High Build Epoxy	5.0 mils DFT	Mobil/Valspar	
			5.0 mils DFT		
	Maintenance System				
	over Original System	DP-SP17			1,2,3,4,5,6
	Maintenance Coat	DP#78-1 Carboline 890	2.0 to 5.0 mils DFT	Carboline	
	New System	DP-SP17			1,2,3,4,5,6
	Prime Coat	DP#36-1 Starglaze 2011S	Seal Concrete	Carboline	
	Finish Coat	DP#78-1 Carboline 890	5.0 mils DFT	Carboline	
			8.0 mils DFT		

Surface	Coating Systems	Dry Film Thickness	Manufacturer	Notes

Note:

1. Original, Maintenance, and New Coating Systems for civil components meet Regulatory Guide 1.54. Mechanical and Electrical equipment was ordered prior to issuance of Regulatory Guide 1.54 therefore coatings on these components are documented as unqualified.
2. Coating Systems are qualified by Engineering in accordance with ANSI N101.2 AND ANSI N101.4 for (A)LOCA Conditions and (B) Radiation Tolerance.
3. Coating specifications for shop and field application include the following: Scope, Coating System, Approved Materials, Application Procedures, Touchup Procedures, Workmanship Guide, Inspection Requirements, Record Requirements, and Product Data Sheets.
4. A Materials Certification of each batch of coating material procured is provided by the Manufacturer and is in accordance with ANSI N101.4.
5. Calculation MNC-1167.01-00-0001 is maintained documenting the square feet of unqualified coatings in containment.
6. Containment Coating Specifications and Coating Schedules are distributed through Document Control.

Table 6-144. Deleted Per 1999 Update

Table 6-145. McGuire Cold Leg Pump Discharge Break - Sequence of Events

Event	Time (seconds)
Cold leg break occurs	0
S_s, S_p signals obtained	~ 1
End of blowdown	~ 30
Cold Leg Accumulators (CLAs) injection starts	54
Initiation of Containment Spray (NS)	120
Initiation of Containment Air Return Fan (VX)	600
FWST Lo-Level reached	1435
ND flow from sump starts	1530
NI + NV flow from sump starts	1650
NS flow from FWST stops	3000
Initiation of auxiliary containment spray (ND)	3000
NS flow from sump starts	3240
End of ice melting	~ 6000
Time of peak containment pressure	~ 6700
End of transient simulation	15000