Appendix 6A. Tables

Table 6-1. Engineered Safety Feature Materials

Valves	
Bodies	SA182 Type F316 or SA351 Gr CF8 or CF8M
Bonnets	SA182 Type F316 or SA351 Gr CF8 or CF8M
Discs	SA182 Type F316 or SA564 Gr 630 or SA351 Gr CF8 or CF8M
Pressure Retaining Bolting	SA453 Gr 660
Pressure Retaining Nuts	SA453 Gr 660 or SA194 Gr 6
Auxiliary Heat Exchangers	
Heads	SA240 Type 304, SA-515-65/70, SA285 GR C, SA-403 Type 304, SB-688 NO8367
Nozzle Necks & Flanges	SA182 GR F304, SA312 TP304, SA240 TP304, SA-106-5/B, SA-182 Type 316, SA-53-B, SA-105, SA-181-1, SB-688 NO8367, SB-564 NO8367
Tubes	SA213 TP304, SA249 TP304, SB-338 Gr.2
Tube Sheets	SA182 GR F304, SA240 TP304, SA-515 Gr 70, SA516 GR 70 with Stainless Steel Cladding A-7 Analysis, SB-688 NO8367, SB-265 Gr. 1
Shells	SA240 and SA312 Type 304, SA-285 GR C, SA-106-B, SA-53B
Closure Bolting Nuts	SA-193-B7, SA-194-2H
Main Body Flanges	SA-105 with SS-309L Cladding, SA-182 type 3, SA-105, SA-181-1, SB-564 NO8367
Auxiliary Pressure Vessels, Tanks, Filters, etc.	
Shells & Heads	SA351 Gr CF8A, SA240 Type 304, SA264 Clad Plate of SA537 GR B with SA240 Type 304 Clad and Stainless Steel Weld Overlay A-8 Analysis
Flanges & Nozzles	SA182 GR F304, SA350 GR LF2 with SA240 Type 304 and Stainless Steel Weld Overlay A-8 Analysis
Piping	SA312 and SA240 TP304 or TP316 Seamless
Pipe Fittings	SA403 WP304 Seamless
Closure Bolting & Nuts	SA193 Gr B7 and SA194 Gr 2H
Auxiliary Pumps	
Pump Casing & Heads	SA351 Gr CF8 or CF8M, SA182 Gr F304 or F316
Flanges & Nozzles	SA182 Gr F304 or F316, SA403 Gr WP316L Seamless

Piping	SA312 TP304 or TP316 Seamless, SB-690/SB-675 N08367 Smls/EFW HDPE, PE 4710
Stuffing or Packing Box Cover	SA351 Gr CF8 or CF8M, SA240 TP304 or TP316
Pipe Fittings	SA403 Gr WP316L Seamless
Closure Bolting & Nuts	SA193 Gr B6, B7 or B8M and SA194 Gr2H or Gr 8M, SA193 Gr B6, B7 or B8M; SA453 Gr 660; and Nuts, SA194 Gr 2H, Gr 8M, and Gr 6

Table 6-2. Parameters of Final Post-Accident Chemistry

	Parameters	Value
1)	RHR Pump Flow Rate, 2 Trains	6,600 GPM
2)	SI Pump Flow Rate, 2 Trains	800 GPM
3)	HPI Pump Flow Rate, 2 Trains	825 GPM
Deleted Per 2012 Update		
4)	RWST Boron Concentration	3,075 PPM
5)	RWST Volume	379,366 Gallons
6)	Cold Leg Accumulator Boron Concentration	3,075 PPM
7)	Volume of 4 Cold Leg Accumulators	32,016 Gallons
8)	RCS Boron Concentration	3,075 PPM
9)	RCS Volume	12,167 cu. Ft.
10)	RWST Volume for ECCS Switchover	46,903 Gallons
11)	Ice Boron Concentration	1,800 PPM
12)	Ice Melt vs Time	Figure 6-10
13)	Amount of Cable Insulation	16,662 lbm
14)	Integrated Radiation Dose	$1x10^8$ Rads
Deleted Per 2006 Update		

Table 6-3. Protective Coatings on Westinghouse-supplied Equipment Inside Containment

Component	Painted Surface Area (ft^2)
Reactor Coolant Pump Motors	1600
Accumulator Tanks	5400
Manipulator Crane	2600
Other Refueling Equipment	2125
Intermediate Equipment (seismic platform and tie rods, reactor internals lifting rig, head lifting rig, electrical cabinets)	3450
Remaining Equipment (such as valves, auxiliary tanks and heat exchanger supports, transmitters, alarm horns, small instruments)	<1300

Table 6-4. Organic Materials Inside Containment

Coatings and Paint	**Mass, lbs (Per Unit)**
Carbon Steel Epoxy Topcoat[1]	4,075

Concrete
  Epoxy Surfacer
  Epoxy Topcoat
	
	17,560
	10,857

Electrical Cable Insulation	
Chlorosulphonated Polyethylene Ethylene Propylene Rubber Flame Retardant Cross Linked Polyethylene Flame Retardant Ethylene Propylene	 16,662
Motors (Duke Scope Only)	
D439 Zinc Chromate Alkyd Enamel Nomex Insulation	22.6 lbs. 27 lbs.
Ice Condenser Equipment	**Amount per Unit**
E P T Sponge Rubber Foam	100 lbs.
Scotch Grip 34, 3M Co. Adhesive	55 gal.
R T V Sealant, G. E. 1200 Silicone Sealant	400 lbs.
Mylar	100 lbs.
Oils	
Reactor Coolant Pump Motors	1260 gal.
Electric Motor Operators (Valves)	70 gal.

Note:

1. Steel surfaces are primed with 2 mils of a coating that is 83% zinc in a silicate binder.

Table 6-5. Potential Water Traps Inside Containment

(4)	RCP Oil Drain Tank Enclosures	1540 Gallons
	Operating Floor	3564 Gallons
(4)	Steam Generator Support Steel	3042 Gallons
		8146 Gallons

Table 6-6. Catawba Ice Condenser Design Parameters

Reactor Containment Volume (Net free volume, ft^3)	
Upper Compartment	670,101
Ice Condenser Upper Plenum	47,000
Ice Condenser Ice Bed	86,280
Ice Condenser Lower Plenum	24,242
Lower Compartment (Active)	273,218
Lower Compartment (Dead Ended)	71,779
Total Containment Volume	1,172,620
Reactor Power, MWt	3,427

Table 6-7. Catawba Nuclear Station ECCS Flow Rates

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 37.0	3280	1805	0	0.0	0.0	0	0
37.01 to 555.0	680	255	0	1465	1490	0	0
555.0 to $t_{Lo\ Lo}$[1]	0.0	0.0	0	1465	1490	3323	0
t_{Lo-Lo}[1] to end	0.0	0.0	0	2190	1750	3323	0

ECCS Flow Rate During Cold Leg Recirculation (CLR) – with No Spilling Simulation

Time from Beginning 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)
0.0 to 37.0	4580	0	0.0	0	0
37.01 to 555.0	880	0	2950	0	0
555.0 to t_{Lo-Lo}[1]	0.0	0	2950	3323	0
t_{Lo-Lo}[1] to end	0.0	0	3916	3323	0

Note:

1. t_{Lo-Lo} may occur prior to t_{clr} & 555, in which case spray flow alignment is delayed until after t_{Lo-Lo}.

Table 6-8. Structural Heat Sinks

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	1179	0.04165	Stainless Steel
10. Polar Crane	6000	0.00059 0.04917	Paint Carbon Steel
11. Platforms	9000	0.00059 0.00917	Paint Carbon Steel
12. Equipment Hatch Guide	310 190	0.00059 0.02417	Paint Carbon Steel
13. Dead-Ended Compartments	3941.4	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	1709.9	0.001167 1.25	Paint Concrete
2. Crane Wall	10979.1	0.001167 1.5	Paint Concrete
3. Refueling Canal Wall	411.4	0.001167 8.0	Paint Concrete

4. Refueling Canal Wall	6316.1	0.001167 3.0	Paint Concrete
5. Refueling Canal Floor	4110.4	0.001167 2.0	Paint Concrete
6. Lower S/G Support	1700	0.00059 0.101	Paint Carbon Steel
7. Upper S/G Support	3972	0.00059 0.066	Paint Carbon Steel
8. RCP Support Columns	768.8	0.00059 0.0833	Paint Carbon Steel
9. Platforms	3000	0.00059 8.7E-3	Paint Carbon Steel
10. S/G Enclosure Walls, Dome Slab, Pressurizer Doghouse	4038	0.001167 1.0	Paint Concrete
11. S/G Enclosure Walls, Dome Slab	2262	0.001167 1.384	Paint Concrete
12. S/G Dome, Shell	3878	0.00059 0.031	Paint Carbon Steel
13. Lower SM Line Restraints	627	0.00059 0.0108	Paint Carbon Steel
14. Upper SM Line Restraints	2399	0.00059 0.116	Paint Carbon Steel
15. RX Vessel Support	284	0.00059 0.166	Paint Carbon Steel
16. Lower PRZ Support	1220	0.00059 0.038	Paint Carbon Steel
17. Dead-Ended Compartments Slabs	39,715	0.001167	Paint
	12272.4	1.0	Concrete
	1196	1.25	Concrete
	11092	1.5	Concrete
	8671.6	2.0	Concrete
	4165.2	2.5	Concrete
	2317.8	3.0	Concrete
18. Dead-Ended Compartments Slabs	17,913.7	0.00059	Paint
	14161.7	0.0625	Carbon Steel
	2454.9	0.0417	Carbon Steel
	1297.1	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 6-9. Deleted Per 1997 Update

Table 6-10. Deleted Per 1997 Update

Table 6-11. 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.	74,072.
2.	52,769.	29,384,776.	1,200.	71,268.
3.	45,106.	26,213,749.	1,159.	68,845.
4.	41,675.	24,112,360.	1,122.	66,647.
5.	38,687.	23,089,906.	1,088.	64,627.
6.	33,982.	20,897,219.	1,057.	62,815.
7.	31,240.	19,440,588.	1,030.	61,183.
8.	25,628.	16,783,231.	1,004.	59,638.
9.	19,552.	14,038,088.	980.	58,236.
10.	15,183.	12,003,759.	958.	56,935.
12.	11,403.	9,291,704.	919.	54,589.
14.	8,957.	6,897,938.	884.	52,510.
16.	4,748.	3,569,112.	853.	50,668.
18.	5,302.	3,719,017.	825.	49,005.
20.	4,500.	2,185,549.	800.	47,520.
22.	3,518.	1,684,524.	778.	46,213.
24.	3,125.	1,405,670.	757.	44,966.
26.	3,335.	1,379,978.	737.	43,778.
28.	3,518.	1,439,306.	719.	42,709.
30.	3,551.	1,457,023.	703.	41,758.
35.	5,696.	1,699,314.	666.	39,560.
40.	2,059.	497,881.	634.	37,660.
45.	0.	0.	607.	36,056.
50.	0.	0.	582.	34,571.
55.	0.	0.	561.	33,323.
60.	0.	0.	541.	32,135.
65.	0.	0.	523.	31,066.
70.	3,900.	863,783.	507.	30,116.
75.	4,657.	1,066,886.	492.	29,225.
80.	4,079.	1,028,210.	479.	28,453.

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.	27,680.
90.	5,287.	1,377,635.	454.	26,968.
93.5(1)	–	–	447.	26,552.
95.	5,445.	1,378,187.	–	–
99.	5,344.	1,378,742.	–	–
100.(2)	0.	0.	211.	3,789.
110.	0.	0.	211.	3,789.
124.	15.	19,681.	211.	3,789.
136.	12.	14,953.	211.	3,789.
153.	11.	13,930.	211.	3,789.
177.	17.	21,240.	211.	3,789.
213.	25.	32,142.	211.	3,789.
260.	444.	112,347.	211.	3,789.
333.	460.	108,733.	211.	3,789.

Notes:

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

Table 6-12. Allowance Leakage Area for Various Reactor Coolant System Break Sizes

Break Size	5 ft^2 Deck Leak Air Compression Peak (psig)	Deck Leakage Area (ft^2)	Resultant Peak Containment Pressure (psig)
Double-ended	7.7	50	11.9
0.6 Double-ended	6.6	50	12.5
3 ft^2	6.25	50	12.2
0.5 ft^2	5.75	50	14.5
0.5 ft^2 (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 ½ inch diameter	4.0	50	13.4
½ 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 2010 Update.

Table 6-13. 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	27770.	0	0	.3	14.7	120.
2	34665.1	0	0	.3	14.7	120.
3	46291.	0	0	.3	14.7	120.
4	32337.	0	0	.3	14.7	120.
5	34665.	0	0	.3	14.7	120.
6	26337.	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.	11343.	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	4195.	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	10795.	0	0	.3	14.7	120.
27	12687.	0	0	.3	14.7	120.
28	10323.	0	0	.3	14.7	120.
29	16940.	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)
30	10220.	0	0	.3	14.7	120.
31	13302.	0	0	.3	14.7	120.
32	9107.	0	0	.3	14.7	120.
33	15378.	0	0	.3	14.7	120.
34	3797.	0	0	.3	14.7	120.
35	3693.	0	0	.3	14.7	120.
36	3693.	0	0	.3	14.7	120.
37	3211.	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.	59549.	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	16776.	0	0	.3	14.7	120.
52	7399.	0	0	.3	14.7	120.
53	4533.	0.	0	.3	14.7	120.

Table 6-14. TMD Flow Path Input Data

Flow Path Element to Element	Flow Path Length (ft)	Flow Area (ft^2)	Loss Coefficient K	Flow Resistance f(L/D)	Contraction a/Au	Expansion Ad/a
1 to 2	15.6	614.2	0.19	0.04	0.67	1.45
2 to 3	22.2	614.2	0.31	0.065	0.69	1.51
3 to 4	20.9	511.0	0.12	0.050	0.57	1.32
4 to 5	20.3	614.2	0.18	0.05	0.91	1.45
5 to 6	15.6	614.2	0.19	0.04	0.67	1.45
6 to 1	29.1	98.4	1.30	0	0.10	9.54
26 to 32	30.08	26.3	1.59	0.012	0.196	5.11
27 to 1	6.4	26.0	2.42	0	0.10	20.66
28 to 26	79.26	133.0	0	0.21	0.99	1.01
29 to 28	2.82	9.0	3.32	—	.009	28.66
30 to 28	58.74	81.55	1.1	0.081	0.61	1.65
31 to 4	6.67	26.0	2.42	0.	0.066	9.54
32 to 30	79.26	133.0	0	0.21	0.99	1.01
33 to 2	5.96	33.87	2.15	0	0.084	19.23
34 to 27	4.21	16.00	2.64	0.001	0.076	19.54
37 to 31	4.31	16.0	2.64	0.001	0.10	21.13
40 to 1	10.36	121.9	1.16	0	0.225	
41 to 2	10.36	144.0	1.16	0	0.225	
42 to 3	10.36	288.0	1.16	0	0.225	
43 to 4	10.36	199.4	1.16	0	0.225	
44 to 5	10.36	155.1	1.16	0	0.225	
45 to 6	10.36	155.1	1.16	0	0.225	
1 to 33	5.16	19.64	2.15	0	0.036	26.25
2 to 27	—	0.0	—	—	—	—
3 to 33	6.23	56.6	2.15	0	0.052	9.47
4 to 33	5.86	39.8	2.15	0.	0.052	12.95
6 to 33	4.96	14.0	2.15	0.	0.03	36.62
26 to 27	7.29	17.5	3.08	0.006	0.024	7.67
27 to 3	6.25	26.0	2.42	—	0.10	38.30
28 to 27	7.29	17.5	3.08	0.006	0.024	7.67

Flow Path Element to Element	Flow Path Length (ft)	Flow Area (ft^2)	Loss Coefficient K	Flow Resistance f(L/D)	Contraction a/Au	Expansion Ad/a
30 to 31	7.29	17.5	3.08	0.006	0.024	7.67
31 to 6	6.50	26.0	2.42	—	0.10	18.10
32 to 31	6.38	17.5	3.08	0.006	0.024	7.67
5 to 33	5.96	33.87	2.15	—	0.084	19.29
34 to 26	6.50	12.0	3.60	—	0.073	11.52
35 to 28	3.69	12.0	5.56	—	0.10	80.24
36 to 30	3.69	12.0	5.56	—	0.10	80.24
37 to 32	6.14	12.0	3.61	—	0.085	11.52
29 to 28	2.82	9.0	3.32	—	0.009	28.66
30 to 50	2.55	5.0	1.87	0.	0.034	15.40
34 to 52	3.68	16.0	2.57	0.	0.072	15.17
52 to 53	20.57	40.25	1.58	0.	0.17	8.17
53 to 37	3.33	16.0	2.58	0.	0.049	9.61
53 to 32	5.36	7.5	3.40	0.	0.039	18.43
52 to 26	14.40	35.0	3.90	0.	0.148	4.40
51 to 3	32.62	40.0	1.62	0.	0.10	33.83
3 to 30	3.04	0.79	1.59	—	0.002	1219.4
4 to 30	4.06	5.93	2.30	—	0.053	162.44
5 to 30	3.48	1.57	1.98	—	0.024	613.57
5 to 32	3.66	2.18	1.83	—	0.033	441.88
6 to 32	3.05	0.79	1.77	—	0.002	1227.0
1 to 26	3.19	3.40	2.25	—	0.009	283.32
2 to 26	4.06	3.49	2.18	—	0.053	276.02
2 to 28	3.58	1.92	1.87	—	0.029	501.72
3 to 28	3.22	5.24	2.34	—	0.011	183.84
7 to 8	12.278	112.80	0.	0.5165	0.33	
8 to 9	12.278	112.80	0.	0.5165	0.33	
9 to 38	8.8558	112.80	0.812	0.2582	0.33	
10 to 11	12.278	131.31	0.	0.5165	0.33	
11 to 12	12.278	131.31	0.	0.5165	0.33	
12 to 39	8.8558	131.31	.812	0.2582	0.33	

Flow Path Element to Element	Flow Path Length (ft)	Flow Area (ft^2)	Loss Coefficient K	Flow Resistance f(L/D)	Contraction a/Au	Expansion Ad/a
13 to 14	12.278	266.63	0.	0.5165	0.33	
14 to 15	12.278	266.63	0.	0.5165	0.33	
15 to 46	8.8558	266.63	0.812	0.2582	0.33	
16 to 17	12.278	184.59	0.	0.5165	0.33	
17 to 18	12.278	184.59	0.	0.5165	0.33	
18 to 47	8.8558	184.59	0.812	0.2582	0.33	
19 to 20	12.278	143.57	0.	0.5165	0.33	
20 to 21	12.278	143.57	0.	0.5165	0.33	
21 to 48	8.8558	143.57	0.812	0.2582	0.33	
22 to 23	12.278	143.57	0.	0.5165	0.33	
23 to 24	12.278	143.57	0.	0.5165	0.33	
24 to 49	8.8558	143.57	0.812	0.2582	0.33	
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	
38 to 25	2.80	233.80	1.45	0.	0.659	
39 to 25	2.80	267.60	1.43	0.	0.65	
40 to 7	8.222	106.7	0.227	0.1419	0.230	
40 to 10	8.222	126.1	0.227	0.1419	0.230	
42 to 13	8.222	252.6	0.227	0.1419	0.230	
43 to 16	8.222	174.6	0.227	0.1419	0.230	
44 to 19	8.222	135.8	0.227	0.1419	0.230	
45 to 22	8.222	135.8	0.227	0.1419	0.230	
46 to 25	2.80	539.5	1.43	0.	0.625	
47 to 25	2.80	376.5	1.41	0.	0.636	
48 to 25	2.80	289.4	1.44	0.	0.646	
49 to 25	2.80	296.3	1.43	0.	0.646	
40 to 41	13.8	24.7	7.5	0.	0.075	
41 to 42	22.4	24.7	12.5	0.	0.046	

Flow Path Element to Element	Flow Path Length (ft)	Flow Area (ft^2)	Loss Coefficient K	Flow Resistance f(L/D)	Contraction a/Au	Expansion Ad/a
42 to 43	25.3	24.7	12.5	0.	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	
37 to 31	4.31	16.0	2.64	0.001	0.010	

Table 6-15. Calculated Maximum Peak Pressures In Lower Compartment Elements Assuming Unaugmented Flow

Element	1	2	3	4	5	6
Peak Pressure (psig) DECL-100% ENT	18.2	15.2	13.8	13.9	14.8	17.5
Peak Pressure (psig) DEHL-100% ENT	15.8	13.4	11.2	11.2	13.6	15.5

Table 6-16. Calculated Maximum Peak Pressures In The Ice Condenser Compartment Assuming Unaugmented Flow

Element	40	41	42	43	44	45
Peak Pressure (psig) DECL-100% ENT	12.5	10.4	9.3	9.4	10.1	12.1
Peak Pressure (psig) DEHL-100% ENT	10.2	8.9	7.7	8.0	9.1	10.1

Table 6-17. Calculated Maximum Differential Pressures Across The Operating Deck Assuming Unaugmented Flow

Element	1	2	3	4	5	6
Peak ΔP (PSI) DECL-100% ENT	16.4	11.9	9.7	10.1	11.7	15.9
Peak ΔP (PSI) DEHL-100% ENT	15.5	13.1	9.6	9.8	13.3	15.2

Table 6-18. Calculated Maximum Differential Pressures Across The Upper Crane Wall Assuming Unaugmented Flow

Element	7-8-9	10-11-12	13-14-15	16-17-18	19-20-21	22-23-24
Peak ΔP (PSI) DECL-100% ENT	7.5	6.4	5.7	5.6	6.6	7.6
Peak ΔP (PSI) DEHL-100% ENT	8.5	7.5	6.7	6.6	7.7	8.6

Table 6-19. Containment Sump Volume Vs. Time Peak Containment Pressure Transient

Time (sec)	Volume (ft^3)
25	1680
45	12400
60	19300
75	20000
90	20400
160	21800
230	23300
300	24900
600	29400
1400	42100
1900	49600
2400	56800
2900	64000
3400	70400
4200	74300
4800	76700
5400	78600
6000	80400
6800	81000
7200	81000
8400	81100
9600	81000
10800	81000

Note: The maximum post-LOCA flood volume is not determined by the peak containment pressure transient results. (See Table 6-20).

Table 6-20. Containment Sump Volume Vs. Elevation

Bldg. Elev.	Sump Volume (Gal)	Active Volume (Gal)	Inactive Volume (Gal)
552'0"	800	0	800
553'0"	48500	47700	800
554'0"	99900	99100	800
555'0"	152400	151600	800
556'0"	203200	202400	800
557'0"	253800	253000	800
558'0"	304200	303600	800
559'0"	360300	359500	800
560'0"	411000	410200	800
561'0"	458900	458100	800
562'0"	511300	510500	800
563'0"	556600	555800	800
564'0"	582500	581700	800
565'0"	603800	603000	800
566'0"	783500	654665	128835(1)
567'0"	842400	713565	128835

Notes:

1. In Core Instrumentation Sump
2. The maximum post-LOCA flood level is 566.96 ft (flood volume = 112, 334 ft^3) for Unit 1. The maximum post-LOCA flood level is 566.81 ft (flood volume = 111,113 ft^3) for Unit 2.

Table 6-21. 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 in Lower Plenum	low estimate of resistance	0	- 7%
Cross Flow in Lower Plenum	high estimate of resistance	0	- 3%
Ice Condenser Flow Area	+ 10%	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	+ 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%

Note:

1. All values shown are to the nearest percent.

Table 6-22. 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 6-23. TMD Input Data - 2 Node Steam Generator Enclosure

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

Flow Path	K	f(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 6-24. Peak Differential Pressures - 2 Node Steam Generator Enclosure

Nodes	Differential Pressure (psi)	Time (sec)
Across Enclosure Walls		
1 to Upper Compartment	13.8	3.37
2 to Upper Compartment	12.0	3.38

Table 6-25. 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(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	0.429
5-2	0.286	----	15.14	49.25	0.841
6-7	0.313	----	10.49	46.67	0.561
7-8	0.129	----	10.57	43.3	0.928

Flow Path (Element to Element)	K	f(L/D)	Inertia Length (ft)	Flow Area (ft^2)	Contraction a_t/A_u
8-9	0.407	----	8.74	43.3	0.4402
9-6	0.169	----	15.19	83.19	0.845
2-Adjacent 2	0.366	----	10.0	112.0	0.75
6-Adjacent 6	0.99	----	6.763	112.0	0.471

Table 6-26. Peak Differential Pressure - 9 Node Steam Generator Enclosure

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 6-27. 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 6-28. TMD Input Data - 2 Node Pressurizer Enclosure

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

Flow Path	K	f(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 6-29. 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(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	0.333
4-2	0.531	----	7.51	61.7	0.681

Table 6-30. 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 6-31. 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 6-32. Reactor Cavity Analysis Flow Paths - Cold Leg Break

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	16.87	40.0	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
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

Flow Path Between Compartments		K	fl/d	Inertia Length (ft)	Minimum Flow Area (ft^2)	Area Ratio (For 'y' factor)
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
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

Flow Path Between Compartments		K	fl/d	Inertia Length (ft)	Minimum Flow Area (ft^2)	Area Ratio (For 'y' factor)
26	9	1.2	0.0	5.16	1.06	0.22
26	47	1.43	0.0	2.81	2.60	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
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
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

Flow Path Between Compartments		K	fl/d	Inertia Length (ft)	Minimum Flow Area (ft^2)	Area Ratio (For 'y' factor)
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
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

Flow Path Between Compartments		K	fl/d	Inertia Length (ft)	Minimum Flow Area (ft^2)	Area Ratio (For 'y' factor)
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 6-33. Reactor Cavity Design Pressures

Volume	Design Pressure (psig)	Calculated Peak Pressure (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.

Table 6-34. Deleted Per 2010 Update

Table 6-35. Deleted Per 2010 Update

Table 6-36. Deleted Per 2010 Update

Table 6-37. Deleted Per 2010 Update

Table 6-38. Deleted Per 2010 Update

Table 6-39. Deleted Per 2010 Update

Table 6-40. Deleted Per 1997 Update

Table 6-41. Deleted Per 1997 Update

Table 6-42. Deleted Per 1997 Update

Table 6-43. Deleted Per 1997 Update

Table 6-44. Deleted Per 1997 Update

Table 6-45. Deleted Per 1997 Update

Table 6-46. Deleted Per 1997 Update

Table 6-47. Mass and Energy Release Rates for Steam Line Rupture. 2.4 ft2 Double-Ended Break at 3479 MWt (rated thermal power plus measurement uncertainty)

Time (sec)	Break Flow Rate (1bm/sec)	Break Enthalpy (Btu/1bm)
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
4	4782.57	1184.70

Time (sec)	Break Flow Rate (1bm/sec)	Break Enthalpy (Btu/1bm)
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
60	1315.26	1210.59

Time (sec)	Break Flow Rate (1bm/sec)	Break Enthalpy (Btu/1bm)
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 6-48. Deleted Per 1997 Update

Table 6-49. Deleted Per 1997 Update

Table 6-50. Deleted Per 1997 Update

Table 6-51. Deleted Per 1997 Update

Table 6-52. Deleted Per 1997 Update

Table 6-53. Deleted Per 1997 Update

Table 6-54. Deleted Per 1997 Update

Table 6-55. Deleted Per 1997 Update

Table 6-56. Deleted Per 1997 Update

Table 6-57. Deleted Per 1997 Update

Table 6-58. Double Ended Pump Suction Guillotine Max SI

	Flooding						Injection			
Time Seconds	Temp Degree F	Rate In/Sec	Carryover Fraction	Core Height Ft	Downcomer Height Ft	Flow Fraction	Total	Accumulator (Pounds Mass Per Second)	Spill	Enthalpy BTU/lbm
25.2	220.1	0.000	0.000	0.00	0.00	0.250	0.0	0.0	0.0	0.00
25.7	217.3	24.187	0.000	0.64	0.38	1.000	8902.1	7389.3	0.0	88.00
25.9	215.9	20.452	0.000	1.02	0.40	1.000	8846.7	7333.7	0.0	88.00
26.3	215.1	0.990	0.076	1.25	0.90	1.000	8720.3	7206.7	0.0	88.00
26.6	215.1	3.604	0.130	1.33	1.54	1.000	8630.8	7116.8	0.0	88.00
27.6	215.2	2.295	0.318	1.50	3.22	0.669	8389.1	6874.1	0.0	88.00
30.3	215.9	1.940	0.533	1.76	8.00	0.540	7836.6	6319.5	0.0	88.00
34.0	217.0	2.035	0.643	2.00	14.05	0.489	7256.9	5737.8	0.0	88.00
36.3	217.4	3.555	0.684	2.18	15.98	0.638	6116.8	4701.9	0.0	88.00
39.4	217.6	3.321	0.717	2.44	16.00	0.636	5807.9	4388.9	0.0	88.00
40.2	217.7	3.266	0.722	2.51	16.00	0.635	5742.7	4321.4	0.0	88.00
47.6	219.3	2.919	0.746	3.00	16.00	0.626	5237.1	3797.7	0.0	88.00
56.3	221.7	2.671	0.757	3.51	16.00	0.616	4790.1	3335.3	0.0	88.00
65.5	224.7	1.598	0.759	3.97	16.00	0.465	1524.7	0.0	0.0	88.00
66.6	225.0	1.595	0.760	4.00	16.00	0.465	1524.7	0.0	0.0	88.00
83.5	231.1	1.548	0.765	4.53	16.00	0.466	1524.6	0.0	0.0	88.00
99.5	237.0	1.507	0.770	5.00	16.00	0.468	1524.6	0.0	0.0	88.00
118.5	243.0	1.464	0.776	5.53	16.00	0.471	1524.5	0.0	0.0	88.00

Time Seconds	Flooding Temp Degree F	Flooding Rate In/Sec	Carryover Fraction	Core Height Ft	Downcomer Height Ft	Flow Fraction	Injection Total	Injection Accumulator (Pounds Mass Per Second)	Injection Spill	Enthalpy BTU/lbm
136.0	247.5	1.427	0.781	6.00	16.00	0.473	1524.4	0.0	0.0	88.00
156.5	251.8	1.386	0.787	6.52	16.00	0.475	1524.4	0.0	0.0	88.00
176.6	255.3	1.348	0.792	7.00	16.00	0.478	1524.3	0.0	0.0	88.00
200.5	258.7	1.304	0.799	7.54	16.00	0.481	1524.2	0.0	0.0	88.00
222.1	261.3	1.265	0.805	8.00	16.00	0.484	1524.2	0.0	0.0	88.00
248.5	263.9	1.218	0.813	8.52	16.00	0.488	1524.1	0.0	0.0	88.00
274.7	265.3	1.177	0.819	9.00	16.00	0.492	1524.1	0.0	0.0	88.00
304.5	263.9	1.149	0.812	9.53	16.00	0.497	1524.0	0.0	0.0	88.00
330.6	263.5	1.118	0.810	10.00	16.00	0.501	1524.0	0.0	0.0	88.00

Table 6-59. DCP/Double Ended Pump Suction Guillotine Min SI

	Flooding						Injection			
							Total	Accumulator	Spill	
Time Seconds	Temp Degree F	Rate In/Sec	Carryover Fraction	Core Height Ft	Downcomer Height Ft	Flow Fraction	(Pounds Mass Per Second)			Enthalpy BTU/lbm
25.2	220.4	0.000	0.000	0.00	0.00	0.250	0.0	0.0	0.0	0.00
25.7	217.9	21.570	0.000	0.56	0.37	1.000	8128.5	7570.2	0.0	88.00
26.0	216.1	15.366	0.000	1.04	0.44	1.000	8045.5	7487.0	0.0	88.00
26.4	215.6	1.107	0.062	1.25	0.96	1.000	7913.3	7354.5	0.0	88.00
26.8	215.7	3.112	0.131	1.32	1.64	0.847	7793.9	7234.9	0.0	88.00
28.0	215.9	1.934	0.325	1.50	3.52	0.628	7518.9	6959.5	0.0	88.00
31.3	217.2	1.667	0.544	1.76	8.66	0.512	6895.3	6334.8	0.0	88.00
35.6	218.9	1.770	0.655	2.00	14.95	0.470	6271.1	5709.7	0.0	88.00
37.3	219.3	2.966	0.678	2.11	15.96	0.610	5491.6	4970.9	0.0	88.00
40.3	219.8	2.808	0.713	2.34	16.00	0.610	5165.0	4644.8	0.0	88.00
42.9	220.5	2.659	0.729	2.50	16.00	0.606	4965.3	4441.8	0.0	88.00
52.4	223.5	2.328	0.756	3.00	16.00	0.592	4398.8	3866.5	0.0	88.00
60.3	226.2	2.151	0.766	3.35	16.00	0.583	4050.1	3512.7	0.0	88.00
61.3	226.5	2.387	0.767	3.39	15.99	0.611	532.9	0.0	0.0	88.00
62.3	226.9	2.499	0.764	3.44	15.93	0.615	522.4	0.0	0.0	88.00
63.6	227.4	2.467	0.765	3.50	15.85	0.614	523.3	0.0	0.0	88.00
74.6	231.9	2.247	0.773	4.00	15.31	0.611	529.7	0.0	0.0	88.00
88.3	237.4	2.053	0.779	4.55	14.90	0.607	535.1	0.0	0.0	88.00

	Flooding						Injection			
							Total	Accumulator	Spill	
Time Seconds	Temp Degree F	Rate In/Sec	Carryover Fraction	Core Height Ft	Downcomer Height Ft	Flow Fraction	(Pounds Mass Per Second)			Enthalpy BTU/lbm
100.9	241.4	1.928	0.784	5.00	14.69	0.605	538.5	0.0	0.0	88.00
116.3	245.2	1.815	0.790	5.51	14.61	0.602	541.4	0.0	0.0	88.00
132.2	248.4	1.733	0.795	6.00	14.66	0.599	543.5	0.0	0.0	88.00
150.3	250.4	1.670	0.799	6.52	14.84	0.597	545.0	0.0	0.0	88.00
167.6	249.4	1.638	0.796	7.00	15.08	0.596	545.9	0.0	0.0	88.00
186.3	249.5	1.623	0.798	7.51	15.36	0.598	546.1	0.0	0.0	88.00
204.3	250.4	1.615	0.799	8.00	15.59	0.602	545.9	0.0	0.0	88.00
224.3	249.7	1.599	0.798	8.54	15.78	0.607	545.9	0.0	0.0	88.00
241.5	250.1	1.569	0.798	9.00	15.88	0.611	546.2	0.0	0.0	88.00
262.3	250.2	1.517	0.798	9.54	15.95	0.614	547.0	0.0	0.0	88.00
280.7	249.9	1.460	0.798	10.00	15.98	0.616	548.2	0.0	0.0	88.00

Table 6-60. Deleted Per 2000 Update.

Table 6-61. 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 6-62. Minimum Post-LOCA Containment Pressure Broken Loop Accumulator Flow to Containment

Time (sec)	Mass Flowrate (lbm/sec)
0	0
1	2790
2	2560
3	2380
4	2240
5	2120
6	2020
7	1930
8	1860
9	1790
10	1730
11	1670
12	1620
13	1580
14	1540
15	1500
16	1460
17	1430
18	1400
19	1370
20	1340
22	1290
24	1250
26	1210
28	1170
30	1130
32	1100
34	1070
36	1047
41	984
45.38	940

Table 6-63. Containment and Active Heat Sink Data for Peak Reverse Differential Pressure

I	Containment Net Free Volume (in 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, pipe tunnel)	125,400
	Total	1,217,900
II	Initial Conditions	
	Containment Pressure	15.0 psia
	Upper Compartment Temperature	75°F
	Lower Compartment Temperature	100°F
	Dead-Ended Compartment Temperature	100°F
	Ice Condenser Temperature	5°F
	Refueling Water Storage Tank Temperature	100°F
	Service Water Temperature	76°F
	Temperature Outside Containment	10°F
	Initial Spray Temperature	100°F
III	Active Heat Sink Data	
	Runout Flow per Containment Spray Pump	4800 gpm
	Number of Containment Spray Pumps Operating	2
	Fastest post-LOCA Initiation of Spray Flow (assuming loss of offsite power at start of LOCA)	25 seconds
	Conservatively High Flow Rate per Air Return Fan	40,000 cfm
	Number of Air Return Fans Operating	2
	Fastest post-LOCA Initiation of Air Return Fans	600 seconds
	Conservatively Low Hydrogen Skimmer Fan Flow Rate	3,000 cfm

Table 6-64. Structural Heat Sink Data For Minimum Post-LOCA Containment Pressure

		Area (ft^2)	Thickness and Material (ft)	
A.	Upper Compartment			
1.	Operating Floor, Crane Wall, Refueling Canal, Miscellaneous Concrete			
	Slab 1	21142	0.000833	Coating 2
			1.34	Concrete
	Slab 2	5017	0.0156	Stainless Steel
			1.5	Concrete
2.	Containment Vessel Dome, Containment Shell, Polar Crane, Miscellaneous Steel			
	Slab 3	24391	0.00059	Coating 1
			0.058	Carbon Steel
	Slab 4	31035	0.00059	Coating 1
			0.0290	Carbon Steel
	Slab 5	801	0.0625	Stainless Steel
B.	Lower and Dead Ended Compartments			
1.	Operating Floor, Crane Wall, Refueling Canal, Miscellaneous Concrete			
	Slab 1	57387	0.000833	Coating 2
			1.97	Concrete
	Slab 2	9019	0.00133	Coating 3
			2.04	Concrete
	Slab 3	3541	0.00133	Coating 3
			2.50	Concrete
	Slab 4	2361	0.0156	Stainless Steel
			1.50	Concrete
	Slab 5	768	0.00059	Coating 1
			0.04207	Carbon Steel
			1.50	Concrete
2.	Containment Shell, Reactor Coolant Pumps, Supports, and Miscellaneous Steel			
	Slab 6	56551	0.00059	Coating 1
			0.0535	Carbon Steel
	Slab 7	14445	0.00059	Coating 1
			0.0625	Carbon Steel

		Area (ft^2)	Thickness and Material (ft)	
	Slab 8	9040	0.00059	Coating 1
			0.0625	Carbon Steel
	Slab 9	32640	0.0026	Stainless Steel
3.	Cooling Coils			
	Slab 10	51000	0.00042	Copper
C.	Ice Condenser			
1.	Ice Baskets			
	Slab 1	180628	0.00663	Steel
2.	Lattice Frames			
	Slab 2	76650	0.0217	Steel
3.	Lower Support Structure			
	Slab 3	28670	0.0267	Steel
4.	Ice Condenser Floor			
	Slab 4	3336	0.000833	Coating
			0.333	Concrete
5.	Containment Wall Panels and Containment Shell			
	Slab 5	19100	1.0	Steel and Insulation
			0.0625	Steel Shell
6.	Crane Wall Panels and Crane Wall			
	Slab 6	13055	1.0	Steel and Insulation
			1.0	Concrete

Notes:

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 6-65. Structural 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 ($BTU/ft^3/°F$)
A.	***Upper Compartment***				
	Containment Dome and Shell	25473	0.58 in Carbon Steel	32.0	58.8
	Structural Crane Walls, Doghouse	28686	1.34 ft. Concrete	1.05	31.95
	Miscellaneous equipment, crane, platforms, electrical equipment	34364	0.02 in. Carbon Steel	32.0	58.8
	Refueling Canal	6531	0.016/1.5 in. Stainless Steel/Concrete	9.4/1.05	55.11/31.95
	Reactor Vessel Head Stand, Internals Storage Stand	1218	0.028 in. Stainless Steel	9.4	55.11
B.	***Lower Compartment***				
	Floors and slabs	8789	2.04 ft. Concrete	1.05	31.95
	Mechanical equipment	1785	0.003 Stainless Steel	9.4	55.1
	Refueling Canal	2615	0.016/1.5 ft. Stainless Steel/Concrete	9.4/1.05	55.11/31.95
	Containment Shell	19037	0.063 Carbon Steel	32.0	58.8
	Structural Concrete (operating deck, walls, doghouses, refueling canal)	71873	1.5 ft. Concrete	1.05	31.95
	Structural Steel (SG supports, pump supports, platforms, steel columns)	23147	0.063 ft. Carbon Steel	32.0	58.8

Structure	Heat Transfer Area (ft^2)	Thickness And Material	Thermal Conductivity (BTU/ft/Hr/°F)	Volumetric Heat Capacity ($BTU/ft^3/°F$)
Cooling Coils	71400	0.004 Copper	224	51.4
Steam Generator Doghouse	5964	0.063 ft. Carbon Steel	32.0	58.8

Table 6-66. Containment and Active Heat Sink Data for Minimum Post-LOCA Containment Pressure McGuire and Catawba

I	**CONTAINMENT NET FREE VOLUME (FT^3)**		
	Upper Compartment (ft^3)		676,255
	As part of the standard Westinghouse LOTIC2 modeling, this upper compartment 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).		
	Lower Compartment (ft^3)		201,700
	Ice Condenser (ft^3)		182,813
	As part of the standard Westinghouse LOTIC2 modeling, this upper compartment 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).		
	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		
III	**ACTIVE HEAT SINK DATA**		
	Runout Flow per Containment Spray Pump		4800 gpm
	Number of Containment Spray Pumps Operating		2
	Fastest post-LOCA Initiation of Spray Flow (sec) (assuming loss of offsite power at start of LOCA)		25

Maximum Air Return Fan Flow (cfm)	80,000
Fastest post-LOCA Initiation of Air Return Fans (sec)	480

Table 6-67. Deleted Per 2000 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 during normal operation	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	System control design 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. Deleted Per 1990 Update

Table 6-70. Containment Spray Pump Design Parameters

Characteristic	Data
Quantity Per Unit	2
Design Pressure, psig	250
Design Temperature Degree, F	190
Design Flow Rate, gpm	3400
Design Head, ft	390
Maximum Calculated Runout Flow, gpm	4000
NPSH Required at 4000 gpm, ft.	20
NPSH Available at 4000 gpm, ft. NPSH available reported does not include the losses associated with the ECCS Sump Strainer. NPSH available will increase throughout the event as the containment sump pool temperature decreases.	30

Table 6-71. Containment Spray Heat Exchanger Operating Parameters

Characteristic	
Quantity Per Unit	2
Type	Shell and U Tube
Heat Transfer Per Unit, BTU Per Hour	124.8×10^6
Flow Shell Side, 1b/hr	1.9×10^6
Flow Tube Side, 1b/hr	2.5×10^6
Tube Side Inlet Temperature, °F	100ºF
Shell Side Inlet Temperature, °F	190
Tube Side Outlet Temperature, °F	141.5
Shell Side Outlet Temperature, °F	124.3
Design Pressure Shell/Tube, psig	275/150
Design Temperature Shell/Tube, °F	200/200

Table 6-72. Containment Spray System Single Failure Analyses

Component	Malfunction	Comments and Consequences
Spray Nozzles	Clogged	The large number of nozzles 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

Table 6-73. Failure Mode and Effects Analysis - Containment Spray System - Active Components

COMPONENT	FAILURE MODE	CS OPERATION PHASE	EFFECT ON SYSTEM OPERATION[1]	FAILURE DETECTION METHOD[2]	REMARKS
1. Motor operated gate valve NS29A or NS32A	a. Fails to open	a. Containment Spray - recirculation phase LOCA)	a. Failure blocks flow of spray coolant to nozzles of one spray header of train "A" of Containment Spray System, which reduces redundancy of spray system. No safety effect on system operation. Minimum containment spray requirements will be met by the flow of coolant through open spray header of train "A" and the flow of containment spray coolant from the operation of train "B".	a. Valve position indication (closed to open position change) at CB. Valve monitor light alarm (closed position) for group monitoring of components at CB. CS pump discharge flow indication (NSP5020) at CB.	1. Valve is normally closed during power and load follow plant operations. Valve opens manually from the CB with CPCS signal.
2. Motor operated gate valve NS12B or NS15B	a. Fails to open	Containment Spray - recirculation phase LOCA	a. Same effect on system operation as that stated above for item #1 except applied to train "B" of Containment Spray System.	a. Same methods of detection as those stated above for item #1	1. Same remark as that stated for item #1.

COMPONENT	FAILURE MODE	CS OPERATION PHASE	EFFECT ON SYSTEM OPERATION[1]	FAILURE DETECTION METHOD[2]	REMARKS
3. Containment spray pump A (pump B analogous)	a. Fails to deliver working fluid	a. Containment Spray - recirculation phase LOCA	a. Failure reduces the redundancy of providing coolant spray to the containment which removes thermal energy released by an accident (LOCA). Fluid flow from CS pump A will be lost. Minimum flow requirements for containment spray will be met by CS pump B delivering working fluid to spray header in train "B"	a. Open pump switchgear circuit breaker indication at CB. Circuit breaker close position monitor light and alarm for group monitoring of components at CB common breaker trip alarm at CB. Pump discharge flow indication (NSP5020) at CB. Local pump discharge pressure indication (NSPG5080)	1. Pump circuit breaker is aligned to close by manual actuation with CPCS signal.

COMPONENT	FAILURE MODE	CS OPERATION PHASE	EFFECT ON SYSTEM OPERATION[1]	FAILURE DETECTION METHOD[2]	REMARKS
4. Motor operated gate valve NS43A (NS38B analogous)	a. Fails to open on demand	a. Containment Spray - recirculation Phase LOCA	a. Failure blocks flow of coolant from RHRS train "A" to nozzles of supplemental spray header A reduces the redundancy of the supplemental spray used after all ice has melted and steam generation from the accident continues. Note that adequate cooling is obtained by using supplemental spray header B coolant flow from RHRS train "B"	a. Valve position indication (closed to open position change) at CB. Monitor light and alarm (valve open) for group monitoring of components at CB.	1. One spray system is defined as one spray pump with spray heat exchanger and flow from a RHR pump (through a RHR heat exchanger). 2. Valve is electrically interlocked with isolation valves ND2A, ND1B, FW27A and NI185A. The valve may not be remotely opened from CB unless isolation valve 1ND2A or ND1B is closed and valve NI185A is open. Valve FW27A cannot be opened unless NS43A is closed.

COMPONENT	FAILURE MODE	CS OPERATION PHASE	EFFECT ON SYSTEM OPERATION[1]	FAILURE DETECTION METHOD[2]	REMARKS
5. Motor operated gate valve NS18A (NS1B analogous)	a. Fails to open on demand	a. Containment Spray - recirculation phase LOCA	a. Failure blocks flow of coolant from the containment sump to the suction of CS pump A causing a loss of NPSH to the pump. Coolant flow from CS pump A will be lost which reduces the redundancy of spray system. No safety effect on system operation. Minimum flow requirements for containment spray will be met by CS train "B"	a. Valve position indication (closed to open position change) at CB. CS pump A discharge flow indication (NS5020) at CB. Monitor light and alarm (valve open) for group monitoring of components at CB.	1. Valve is electrically interlocked with isolation valves NI185A, NS20A, and FW27A. The valve may not be remotely opened from CB unless isolation valve NS20A is fully closed and valve NI185A is at full open position Valve FW27A cannot be opened unless NS18A is closed.
6. Motor operated gate valve NS20A (NS3B analogous)	a. Fails to close on demand	a. Containment Spray - recirculation phase LOCA	a. Failure prevents NS18A from opening, the consequences of which are described in number 5 above.	a. Valve position indication (open to closed position change) at CB. Monitor light and alarm (valve closed) for group monitoring of components at CB.	1. Valve is electrically interlocked with isolation valve NS18A. The valve may not be opened remotely from the CB unless isolation valve NS18A is at full closed position.

List of abbreviations and acronyms

CB-Control Board

CS-Containment Spray

ECCS-Emergency Core Cooling System

COMPONENT	FAILURE MODE	CS OPERATION PHASE	EFFECT ON SYSTEM OPERATION[1]	FAILURE DETECTION METHOD[2]	REMARKS

LOCA-Loss of Coolant Accident

NPSH-Net Positive Suction Head

RHR-Residual Heat Removal

RHRS-Residual Heat Removal System

RWST-Refueling Water Storage Tank

Notes:

1. See list at end of table for definition of acronyms and abbreviations used.
2. As part of plant operation, periodic tests, surveillance inspections and instrument calibrations are made to monitor equipment and performance. Failures may be detected during such monitoring of equipment in addition to detection methods noted.

Table 6-74. Potential Bypass Leakage Paths through Containment Isolation Valves

TABLE 6-74
POTENTIAL BYPASS LEAKAGE PATHS THROUGH CONTAINMENT ISOLATION VALVES

NO.	REVISIONS	DRN	DATE	CHKD	DATE	APPR	DATE
ORIG.	RELEASED FOR 2003 FSAR UPDATE EFFECT. DATE 3-27-03	VDC	5-2 03	PWB	5-12 03	JCB	5-14 03

INSPECTED: CIVIL — WAIVED; ELEC. — WAIVED; MECH. — WAIVED

ERN: CN009AA8

DWG: CN-FSAR-674.00-00 REV: 0

ITEM NUMBER	SERVICE (NOTE 1)	PROCESS FLUID	ESSENTIAL (NOTE 7)	PRESENTS A SEISMIC CATEGORY 1 CLOSED PRESSURE BOUNDRAY TO CONTAINMENT ATMOSPHERE FOLLOWING A LOCA (NOTE 2)	PRESENTS A SEISMIC CATEGORY 1 CLOSED PRESSURE BOUNDRAY TO ENVIROMENT FOLLOWING A LOCA (NOTE 2)	DESIGNED TO QUALITY GROUP B OR C STANDARDS (DUKE CLASS B OR C) (NOTE 2)	DESIGN PRESSURE EQUALS OR EXCEEDS CONTAINMENT DESIGN PRESSURE (NOTE 4) (NOTE 2)	DESIGN TEMPERATURE EQUALS OR EXCEEDS CONTAINMENT DESIGN TEMPERATURE (NOTE 4) (NOTE 2)	PROTECTS FROM THE EFFECTS OF PIPE WHIP, MISSILES AND JET FORCES RESULTING FROM A LOCA (NOTE 2)	PRESSURE BOUNDARY MAINTAINED DURING NORMAL PLANT OPERATION (NOTE 2)	BOTH VALVES SERVED BY SEAL WATER SYSTEM	LEAKAGE PATH TERMINATED IN ANNULUS	REMARKS	POTENTIAL BYPASS LEAKAGE PATH (NOTE 2)
1	PZR RELIEF TANK MAKEUP	WATER	NO				X	X		X				YES
2	NITROGEN TO PZR RELEIF TANK	N_2	NO				X	X		X				YES
3	NC PUMP MOTOR DRAIN TANK PUMP DISCHARGE	OIL	NO		X		X	X		X				YES
4	NV LETDOWN LINE	WATER	NO		X	B	X	X	X	X				NO
5	PZR AUX SPRAY TRANSIENT LINE	WATER	NO		X	B	X	X	X	X				NO
6	NV CHARGING LINE	WATER	NOTE 8		X	B	X	X	X	X				NO
7	NC PUMP SEAL WATER RETURN	WATER	NO		X	B	X	X	X	X				YES
8	NC PUMP SEAL INJ WATER A SUPPLY	WATER	YES		X	B	X	X	X	X			NOTE 6	NO
9	NC PUMP SEAL INJ WATER B SUPPLY	WATER	YES		X	B	X	X	X	X			NOTE 6	NO
10	NC PUMP SEAL INJ WATER C SUPPLY	WATER	YES		X	B	X	X	X	X			NOTE 6	NO
11	NC PUMP SEAL INJ WATER D SUPPLY	WATER	YES		X	B	X	X	X	X			NOTE 6	NO
12	REACTOR MAKEUP WATER FLUSH HDR	WATER	NO				X			X				YES
13	ICE COND ICE BLOWING AIR	AIR	NO									X	NOTE 5	NO
14	ICE COND ICE BLOWING AIR	AIR	NO									X	NOTE 5	NO
15	ICE COND GLYCOL PMPS DISCH LINE	GLYCOL	NO				X			X				YES
16	ICE COND GLYCOL PUMPS SUCT LINE	GLYCOL	NO				X			X				YES
17	CONT HYDROGEN PURGE INLET BLOWER DISH LINE	AIR	NO		X		X	X	X	X			NOTE 6	YES
18	CONT HYDROGEN PURGE OUTLET LINE	AIR	NO		X		X	X	X	X		X	NOTE 6	NO
19	ND PUMP SUCT A FROM LOOP	WATER	NOTE 9		X	B	X	X	X	X			NOTE 6	NO
20	ND PUMP SUCT B FROM LOOP	WATER	NOTE 9		X	B	X	X	X	X			NOTE 6	NO
21	NV PUMP INJ LINE TO COLD LEG	WATER	YES		X	B	X	X	X	X			ISOLATION VALVES OPEN DURING LOCA TO ALLOW BORON INJECTION (NOTE 6)	NO
22	NITROGEN TO ACCUMULATOR	N_2	NO				X	X		X				YES
23	NI TEST LINE	WATER	NO				X	X		X				YES

TABLE 6-74
POTENTIAL BYPASS LEAKAGE PATHS
THROUGH CONTAINMENT ISOLATION VALVES

ERN: CN009AA9

DWG: CN-FSAR-674.00-01 REV: 0

ITEM NUMBER	SERVICE (NOTE 1)	PROCESS FLUID	ESSENTIAL (NOTE 7)	PRESENTS A SEISMIC CATEGORY 1 CLOSED PRESSURE BOUNDRAY TO CONTAINMENT ATMOSPHERE FOLLOWING A LOCA (NOTE 2)	PRESENTS A SEISMIC CATEGORY 1 CLOSED PRESSURE BOUNDRAY TO ENVIROMENT FOLLOWING A LOCA (NOTE 2)	DESIGNED TO QUALITY GROUP B OR C STANDARDS (DUKE CLASS B OR C) (NOTE 2)	DESIGN PRESSURE EQUALS OR EXCEEDS CONTAINMENT DESIGN PRESSURE (NOTE 4) (NOTE 2)	DESIGN TEMPERATURE EQUALS OR EXCEEDS CONTAINMENT DESIGN TEMPERATURE (NOTE 4) (NOTE 2)	PROTECTS FROM THE EFFECTS OF PIPE WHIP, MISSILES AND JET FORCES RESULTING FROM A LOCA (NOTE 2)	PRESSURE BOUNDARY MAINTAINED DURING NORMAL PLANT OPERATION (NOTE 2)	BOTH VALVES SERVED BY SEAL WATER SYSTEM	LEAKAGE PATH TERMINATED IN ANNULUS	REMARKS	POTENTIAL BYPASS LEAKAGE PATH (NOTE 2)
24	ND CROSSOVER DISCHG TO HOT LEG	WATER	YES		X	B	X	X	X	X			ISOLATION VALVES OPEN DURING LOCA TO ALLOW HOT LEG RECIRCULATION (NOTE 6)	NO
25	NI PUMP B DISCHG TO HOT LEGS	WATER	YES		X	B	X	X	X	X			ISOLATION VALVES OPEN DURING LOCA TO ALLOW HOT LEG RECIRCULATION (NOTE 6)	NO
26	NI PUMP A DISCHG TO HOT LEGS	WATER	YES		X	B	X	X	X	X			ISOLATION VALVES OPEN DURING LOCA TO ALLOW HOT LEG RECIRCULATION (NOTE 6)	NO
27	ND HX A DISCHG TO COLD LEGS	WATER	YES		X	B	X	X	X	X			ISOLATION VALVES OPEN DURING LOCA TO ALLOW COLD LEG RECIRCULATION (NOTE 6)	NO
28	ND HX B DISCHG TO COLD LEGS	WATER	YES		X	B	X	X	X	X			ISOLATION VALVES OPEN DURING LOCA TO ALLOW COLD LEG RECIRCULATION (NOTE 6)	NO
29	NI PUMPS A & B DISCHG TO COLD LEGS	WATER	YES		X	B	X	X	X	X			ISOLATION VALVES OPEN DURING LOCA TO ALLOW COLD LEG RECIRCULATION (NOTE 6)	NO
30	CONTAINMENT SUMP RECIRC LINE A	WATER	YES		X	B	X	X	X	X			ISOLATION VALVES AND PENETRATION LOCATED BELOW LOCA RECIRCULATION WATER LEVEL (NOTE 6)	NO
31	CONTAINMENT SUMP RECIRC LINE B	WATER	YES		X	B	X	X	X	X			ISOLATION VALVES AND PENETRATION LOCATED BELOW LOCA RECIRCULATION WATER LEVEL (NOTE 6)	NO
32	SPARE	AIR	NO	NO		B				X		X	(NOTE 5)	NO
33	SPARE (UNIT 1 ONLY)	AIR	NO	NO		B				X		X	(NOTE 5)	NO
34	SPARE	AIR	NO	NO		B				X		X	(NOTE 5)	NO
35	CONTAINMENT SPRAY LINE	WATER	YES	NO	X	B	X		X	X			ISOLATION VALVES OPEN DURING LOCA TO ALLOW CONTAINMENT SPRAY FLOW (NOTE 6)	NO
36	CONTAINMENT SPRAY LINE	WATER	YES		X	B	X		X	X			ISOLATION VALVES OPEN DURING LOCA TO ALLOW CONTAINMENT SPRAY FLOW (NOTE 6)	NO
37	CONTAINMENT SPRAY LINE	WATER	YES		X	B	X		X	X			ISOLATION VALVES OPEN DURING LOCA TO ALLOW CONTAINMENT SPRAY FLOW (NOTE 6)	NO
38	CONTAINMENT SPRAY LINE	WATER	YES		X	B	X		X	X			ISOLATION VALVES OPEN DURING LOCA TO ALLOW CONTAINMENT SPRAY FLOW (NOTE 6)	NO
39	ND CONTAINMENT SPRAY LINE A	WATER	YES		X	B	X		X	X			ISOLATION VALVES OPEN DURING LOCA TO ALLOW CONTAINMENT SPRAY FLOW (NOTE 6)	NO
40	ND CONTAINMENT SPRAY LINE B	WATER	YES		X	B	X		X	X			ISOLATION VALVES OPEN DURING LOCA TO ALLOW CONTAINMENT SPRAY FLOW (NOTE 6)	NO
41	REACTOR COOLANT DRAIN TANK GAS SPACE TO WG SYSTEM	H_2	NO				X			X				YES
42	REACTOR COOLANT DRAIN TANK HX DISCHG	WATER	NO				X			X				YES
43	VENT UNIT CONDENSATE DRAIN HEADER	WATER	NOTE 10				X			X			3 PSI LOOP SEAL ALLOWS VALVES TO REMAIN OPEN DURING SMALL LEAKS INSIDE CONTAINMENT	YES

TABLE 6-74
POTENTIAL BYPASS LEAKAGE PATHS
THROUGH CONTAINMENT ISOLATION VALVES

ERN: CN009AAA

DWG: CN-FSAR-674.00-02 REV: 0

ITEM NUMBER	SERVICE (NOTE 1)	PROCESS FLUID	ESSENTIAL (NOTE 7)	PRESENTS A SEISMIC CATEGORY 1 CLOSED PRESSURE BOUNDRAY TO CONTAINMENT ATMOSPHERE FOLLOWING A LOCA (NOTE 2)	PRESENTS A SEISMIC CATEGORY 1 CLOSED PRESSURE BOUNDRAY TO ENVIROMENT FOLLOWING A LOCA (NOTE 2)	DESIGNED TO QUALITY GROUP B OR C STANDARDS (DUKE CLASS B OR C) (NOTE 2)	DESIGN PRESSURE EQUALS OR EXCEEDS CONTAINMENT DESIGN PRESSURE (NOTE 4) (NOTE 2)	DESIGN TEMPERATURE EQUALS OR EXCEEDS CONTAINMENT DESIGN TEMPERATURE (NOTE 4) (NOTE 2)	PROTECTS FROM THE EFFECTS OF PIPE WHIP, MISSILES AND JET FORCES RESULTING FROM A LOCA (NOTE 2)	PRESSURE BOUNDARY MAINTAINED DURING NORMAL PLANT OPERATION (NOTE 2)	BOTH VALVES SERVED BY SEAL WATER SYSTEM	LEAKAGE PATH TERMINATED IN ANNULUS	REMARKS	POTENTIAL BYPASS LEAKAGE PATH (NOTE 2)
44	CONT FLOOR SUMP & INCORE INST SUMP PUMP DISCHG	WATER	NO				X			X				YES
45	SG DRAIN PUMP DISCHG	WATER	NO				X			X				YES
46	EQUIP DECON LINE	WATER	NO				X			X				YES
47	FUEL TRANSFER TANK	WATER	NO				X	X		X			PENETRATION TERMINATES 30 FT BELOW WATER LEVEL IN FUEL POOL REFUELING CANAL	NO
48	REFUELING WATER PUMP SUCT	WATER	NO				X			X				YES
49	REFUELING CAVITY FILL LINE	WATER	NO				X			X				YES
50	PZR SAMPLE	WATER	NO				X	X		X				YES
51	REACTOR COOLANT HOT LEG SAMPLE	WATER	NO				X	X		X				YES
52	NI ACCUMULATOR SAMPLE	WATER	NO	X		B	X	X	X	X				NO
53	SG A SAMPLE	WATER	NO	X		B	X	X	X	X				NO
54	SG B SAMPLE	WATER	NO	X		B	X	X	X	X				NO
55	SG C SAMPLE	WATER	NO	X		B	X	X	X	X				NO
56	SG D SAMPLE	WATER	NO	X		B	X	X	X	X				NO
57	COMP COOLING TO RC DRAIN TANK HX	WATER	NO	X	X	C/C	X		X	X				NO
58	COMP COOLING FROM DRAIN TANK HX	WATER	NO	X	X	C/C	X	X NOTE 13	X	X				NO
59	KC TO RX VESSEL SUPP & RCP COOLERS	WATER	NOTE 10	X	X	C/C	X			X				YES
60	KC FROM RX VESSEL SUPP & RCP COOLERS VENT UNITS	WATER	NOTE 10	X	X	C/C	X			X				YES
61	COMP COOLING TO EXCESS LETDOWN HX	WATER	NO	X	X	B/C	X		X	X				NO
62	COMP COOLING FROM EXCESS LETDOWN HX	WATER	NO	X	X	B/C	X		X	X				NO
63	COMP COOLING TO COMP COOLING DRAIN SUMP	WATER	NO				X			X				YES
64	RN TO NC PUMP & LWR CONT VENT UNITS	WATER	NOTE 10				X			X				YES
65	RN FROM NC PUMP & LWR CONT VENT UNITS	WATER	NOTE 10				X			X				YES
66	RN TO UPPER CONT VENT UNITS	WATER	NOTE 10				X			X				YES

TABLE 6-74
POTENTIAL BYPASS LEAKAGE PATHS
THROUGH CONTAINMENT ISOLATION VALVES

ERN: CN009AAB

DWG: CN-FSAR-674.00-03 REV: 0

ITEM NUMBER	SERVICE (NOTE 1)	PROCESS FLUID	ESSENTIAL (NOTE 7)	PRESENTS A SEISMIC CATEGORY 1 CLOSED PRESSURE BOUNDRAY TO CONTAINMENT ATMOSPHERE FOLLOWING A LOCA (NOTE 2)	PRESENTS A SEISMIC CATEGORY 1 CLOSED PRESSURE BOUNDRAY TO ENVIROMENT FOLLOWING A LOCA (NOTE 2)	DESIGNED TO QUALITY GROUP B OR C STANDARDS (DUKE CLASS B OR C) (NOTE 2)	DESIGN PRESSURE EQUALS OR EXCEEDS CONTAINMENT DESIGN PRESSURE (NOTE 4) (NOTE 2)	DESIGN TEMPERATURE EQUALS OR EXCEEDS CONTAINMENT DESIGN TEMPERATURE (NOTE 4) (NOTE 2)	PROTECTS FROM THE EFFECTS OF PIPE WHIP, MISSILES AND JET FORCES RESULTING FROM A LOCA (NOTE 2)	PRESSURE BOUNDARY MAINTAINED DURING NORMAL PLANT OPERATION (NOTE 2)	BOTH VALVES SERVED BY SEAL WATER SYSTEM	LEAKAGE PATH TERMINATED IN ANNULUS	REMARKS	POTENTIAL BYPASS LEAKAGE PATH (NOTE 2)
67	SPARE	AIR	NO			B	X					X	NOTE 5	NO
68	INCORE INST ROOM PURGE IN	AIR	NO				X	X		X				YES
69	INCORE INST ROOM PURGE OUT	AIR	NO				X	X		X			DUCTING EXTENDS THROUGH INCORE INSTRUMENT ROOM FILTER TRAIN	YES
70	UPPER COMPARTMENT PURGE INLET	AIR	NO				X	X		X				YES
71	UPPER COMPARTMENT PURGE INLET	AIR	NO				X	X		X				YES
72	LOWER COMPARTMENT PURGE INLET	AIR	NO				X	X		X				YES
73	LOWER COMPARTMENT PURGE INLET	AIR	NO				X	X		X				YES
74	CONT PURGE EXHAUST	AIR	NO				X	X		X				YES
75	CONT PURGE EXHAUST	AIR	NO				X	X		X				YES
76	CONT PURGE EXHAUST	AIR	NO				X	X		X				YES
77	SG D BLOWDOWN	WATER	NO	X		B	X	X	X	X				NO
78	SG A BLOWDOWN	WATER	NO	X		B	X	X	X	X				NO
79	SG C BLOWDOWN	WATER	NO	X		B	X	X	X	X				NO
80	SG B BLOWDOWN	WATER	NO	X		B	X	X	X	X				NO
81	CONT AIR RELEASE	AIR	NO				X			X				YES
82	CONT AIR ADDITION	AIR	NO					X		X				YES
83	FEEDWATER A	WATER	NOTE 11	X		B	X	X	X	X				NO
84	FEEDWATER B	WATER	NOTE 11	X		B	X	X	X	X				NO
85	FEEDWATER C	WATER	NOTE 11	X		B	X	X	X	X				NO
86	FEEDWATER D	WATER	NOTE 11	X		B	X	X	X	X				NO
87	AUX FEEDWATER A	WATER	YES	X		B	X	X	X	X				NO
88	AUX FEEDWATER B	WATER	YES	X		B	X	X	X	X				NO
89	AUX FEEDWATER C	WATER	YES	X		B	X	X	X	X				NO
90	AUX FEEDWATER D	WATER	YES	X		B	X	X	X	X				NO
91	MAIN STEAM A	STEAM	YES	X		B	X	X	X	X				NO
92	MAIN STEAM B	STEAM	YES	X		B	X	X	X	X				NO
93	MAIN STEAM C	STEAM	YES	X		B	X	X	X	X				NO
94	MAIN STEAM D	STEAM	YES	X		B	X	X	X	X				NO
95	INTERIOR FIRE PROTECTION	WATER	NO				X			X				YES
96	DEMIN WATER	WATER	NO				X			X				YES
97	INSTRUMENT AIR	AIR	NO				X			X				YES
98	STATION AIR	AIR	NO				X			X				YES
99	BREATHING AIR	AIR	NO				X			X				YES
100	CONT PRESS SENSING CHII	AIR	NO										NOTE 6	YES

TABLE 6-74
POTENTIAL BYPASS LEAKAGE PATHS
THROUGH CONTAINMENT ISOLATION VALVES

ERN: CN009AAC

DWG: CN-FSAR-674.00-04 REV: 0

ITEM NUMBER	SERVICE (NOTE 1)	PROCESS FLUID	ESSENTIAL (NOTE 7)	PRESENTS A SEISMIC CATEGORY 1 CLOSED PRESSURE BOUNDRAY TO CONTAINMENT ATMOSPHERE FOLLOWING A LOCA (NOTE 2)	PRESENTS A SEISMIC CATEGORY 1 CLOSED PRESSURE BOUNDRAY TO ENVIROMENT FOLLOWING A LOCA (NOTE 2)	DESIGNED TO QUALITY GROUP B OR C STANDARDS (DUKE CLASS B OR C) (NOTE 2)	DESIGN PRESSURE EQUALS OR EXCEEDS CONTAINMENT DESIGN PRESSURE (NOTE 4) (NOTE 2)	DESIGN TEMPERATURE EQUALS OR EXCEEDS CONTAINMENT DESIGN TEMPERATURE (NOTE 4) (NOTE 2)	PROTECTS FROM THE EFFECTS OF PIPE WHIP, MISSILES AND JET FORCES RESULTING FROM A LOCA (NOTE 2)	PRESSURE BOUNDARY MAINTAINED DURING NORMAL PLANT OPERATION (NOTE 2)	BOTH VALVES SERVED BY SEAL WATER SYSTEM	LEAKAGE PATH TERMINATED IN ANNULUS	REMARKS	POTENTIAL BYPASS LEAKAGE PATH (NOTE 2)
101	CONT PRESS SENSING CHI	AIR	NO										NOTE 6	YES
102	CONT PRESS SENSING CHIII	AIR	NO										NOTE 6	YES
103	CONT PRESS SENSING CHIV	AIR	NO										NOTE 6	YES
104	EQPT HATCH	AIR												YES
105	PSL HATCH	AIR												NO
106	REACTOR COOLANT PUMP MTR OIL FILL	OIL	NO				X	X		X				YES
107	REACTOR BUILDING SPRINKLERS	WATER	NO				X			X				YES
108	CONT VALVE INJ WTR A TRAIN	WATER	YES		X	B	X		X	X			NOTE 6	NO
109	CONT VALVE INJ WTR B TRAIN	WATER	YES		X	B	X		X	X			NOTE 6	NO
110	STBY MAKEUP PUMP DISCHARGE LINE	WATER	NO				X	X		X		X	PENETRATION TERMINATES 30 FT. BELOW WATER LEVEL IN FUEL POOL REFUELING CANAL	NO
111	CON RADIATION MONITOR	AIR	NO											YES
112	CON RADIATION MONITOR	AIR	NO											YES
113	ILRT PRESS LINE LOWER CONTAIN	AIR	NO											YES
114	ILRT PRESS LINE ICE COND	AIR	NO											YES
115	ILRT PRESS LINE UPPER CONTAIN	AIR	NO											YES
116	CON ATMOS H2 CONC LEVEL XMITTER (IN) TRAIN A	AIR												YES
117	CON ATMOS H2 CONC LEVEL XMITTER (OUT) TRAIN A	AIR												YES
118	CON ATMOS H2 CONC LEVEL XMITTER (IN) TRAIN B	AIR												YES
119	CON ATMOS H2 CONC LEVEL XMITTER (OUT) TRAIN B	AIR												YES
120	LOWER PERSONNEL AIR LOCK	AIR												NO
121	UPPER PERSONNEL AIR LOCK	AIR												NO
122	LOWER PAL AIR SUPPLY	AIR	YES				X			X			IASV-5160	YES
122A	LOWER PAL LEAK TEST	AIR												YES
123	LOWER PAL EQUALIZATION LINE	AIR										X		NO
124	UPPER PAL AIR SUPPLY	AIR	YES				X			X			IASV-5080	YES

TABLE 6-74
POTENTIAL BYPASS LEAKAGE PATHS
THROUGH CONTAINMENT ISOLATION VALVES

ERN: CN009AAD DWG: CN-FSAR-674.00-05 REV: 0

ITEM NUMBER	SERVICE (NOTE 1)	PROCESS FLUID	ESSENTIAL (NOTE 7)	PRESENTS A SEISMIC CATEGORY 1 CLOSED PRESSURE BOUNDRAY TO CONTAINMENT ATMOSPHERE FOLLOWING A LOCA (NOTE 2)	PRESENTS A SEISMIC CATEGORY 1 CLOSED PRESSURE BOUNDRAY TO ENVIROMENT FOLLOWING A LOCA (NOTE 2)	DESIGNED TO QUALITY GROUP B OR C STANDARDS (DUKE CLASS B OR C) (NOTE 2)	DESIGN PRESSURE EQUALS OR EXCEEDS CONTAINMENT DESIGN PRESSURE (NOTE 4) (NOTE 2)	DESIGN TEMPERATURE EQUALS OR EXCEEDS CONTAINMENT DESIGN TEMPERATURE (NOTE 4) (NOTE 2)	PROTECTS FROM THE EFFECTS OF PIPE WHIP, MISSILES AND JET FORCES RESULTING FROM A LOCA (NOTE 2)	PRESSURE BOUNDARY MAINTAINED DURING NORMAL PLANT OPERATION (NOTE 2)	BOTH VALVES SERVED BY SEAL WATER SYSTEM	LEAKAGE PATH TERMINATED IN ANNULUS	REMARKS	POTENTIAL BYPASS LEAKAGE PATH (NOTE 2)
124A	UPPER PAL LEAK TEST	AIR												YES
125	UPPER PAL EQUALIZATION LINE	AIR										X		NO
126	SPARE	AIR	NO			B				X		X	M451 PENETRATION IS FLANGED IN & OUTSIDE	NO
127	SPARE	AIR	NO			B				X		X	E251 (ELECTRICAL DESIGNATION) MECH PENETRATION FLANGED IN & CAPPED ANNULAS	NO

NOTES:

1. REFERENCE TABLE 6-77 AND FIGURES 6-112, 113, 114 AND 115 FOR PENETRATION LISTING AND ASSOCIATED CONTAINMENT ISOLATION DESIGN DETAILS. UNIT 1 AND UNIT 2 USE THE SAME ITEM NUMBER.
2. AN ATTACHED CLOSED SYSTEM IS CONSIDERED AS A BOUNDARY WHICH PRECLUDES BYPASS LEAKAGE IF THE SYSTEM:
   A. EITHER (1) DOES NOT DIRECTLY COMMUNICATE, I.E., PRESENT A CLOSED PRESSURE BOUNDARY, WITH THE CONTAINMENT ATMOSPHERE, OR (2) DOES NOT DIRECTLY COMMUNICATE, I.E., PRESENT A CLOSED PRESSURE BOUNDARY WITH THE ENVIROMENT, FOLLOWING A LOCA.
   B. CLOSED PRESSURE BOUNDARY IS DESIGNED TO QUALITY GROUP B OR C STANDARDS.
   C. SYSTEM CLOSED PRESSURE BOUNDARY IS SEISMIC CATEGORY 1.
   D. IF THE SYSTEM CLOSED PRESSURE BOUNDARY IS INSIDE CONTAINMENT, ITS DESIGN PRESSURE AND TEMPERATURE EXCEEDS OR IS EQUAL TO CONTAINMENT DESIGN PRESSURE AND TEMPERATURE. IF THE SYSTEM CLOSED PRESSURE BOUNDARY IS OUTSIDE CONTAINMENT, ITS DESIGN PRESSURE EXCEEDS OR IS EQUAL TO CONTAINMENT DESIGN PRESSURE.
   E. SYSTEM CLOSED PRESSURE BOUNDARY IS DESIGNED FOR PROTECTION FROM THE EFFECTS OF PIPE WHIP, MISSILES, AND ANY JET FORCES RESULTING FROM THE LOCA.
   F. SYSTEM CLOSED PRESSURE BOUNDARY IS MAINTAINED DURING NORMAL PLANT OPERATION.
3. DELETED
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. CONNECTED PIPING IS TEMPORARY AND IS REMOVED PRIOR TO STARTUP. PENETRATIONS ARE THEN FLANGED CLOSED INSIDE AND OUTSIDE.
6. ALTHOUGH THE CONTAINMENT ISOLATION SYSTEM IS ITSELF AN ENGINEERED-SAFETY-FEATURE, THESE LINES BELONG TO SYSTEMS WHICH PERFORM AS ENGINEERED-SAFETY-FEATURE AFTER LOCA.
7. PENETRATIONS LISTED AS NON-ESSENTIAL ARE AUTOMATICALLY ISOLATED BY CLOSURE OF THEIR CONTAINMENT ISOLATION VALVE(S) ON RECEIPT OF A "T" SIGNAL (I.E. PHASE A CONTAINMENT ISOLATION) OR ARE NORMALLY LOCKED OR SEALED CLOSED.
8. YES, CHARGING LINE IS ISOLATED ON RECEIPT OF "S" SIGNAL (I.E., SAFETY INJECTION INITIATION).
9. YES, THESE VALVES ARE CLOSED DURING POWER OPERATION. AUTOMATIC CLOSURE VIA CONTAINMENT ISOLATION SIGNALS IS UNACCEPTABLE SINCE SPURIOUS SIGNAL COULD DEGRADE CORE COOLING.
10. YES, VALVES CLOSE ON RECIEPT OF A "P" (I.E., PHASE B CONTAINMENT ISOLATION).
11. YES, VALVES CLOSE ON FEEDWATER ISOLATION SIGNAL WHICH IS GENERATED BY HI-HI STEAM LEVEL, SAFETY INJECTION SIGNAL, OR REACTOR TRIP WITH LOW T AVERAGE. THE ONLY TIME A FEEDWATER ISOLATION SIGNAL IS NOT GENERATED IS WHEN A "T" SIGNAL IS GENERATED ON MANUAL ACTUATION OF "T" SIGNAL FROM CONTROL ROOM.
12. NSM'S CN-10911 (UNIT 1) AND CN-20300 (UNIT 2) MOVED THE AUTOVOLUMETRICS UNIT ON EACH AIRLOCK (UPPER & LOWER) TO A POINT OUTSIDE THE AIRLOCK. THE CONTAINMENT ISOLATION VALVES IN EACH OF THESE LINES (1,2 IASV5400 AND 1,2 IASV5410) ARE INCLUDED IN THE CALCULATION OF SECONDARY CONTAINMENT BYPASS LEAKAGE.
13. PIPING HAS BEEN ANALYZED FOR CONTAINMENT DESIGN TEMPERATURE, REFERENCE PIP 0-C95-1319, AND SHOWN TO BE ADEQUATE FOR CLOSED LOOP INSIDE CONTAINMENT.

TABLE 6-74
POTENTIAL BYPASS LEAKAGE PATHS
THROUGH CONTAINMENT ISOLATION VALVES

ERN: CN009AAE

DWG: CN-FSAR-674. 00-06 REV: 0

Table 6-75. Annulus Ventilation System Post Accident Respose

Design Basis LOCA with Failure of One AVS Train (part of the Minimum Safeguards Scenario)

Time Interval (sec)		AVS Airflow Rates (cfm)	
Start	**End**	**Exhaust**	**Recirculation**
0	23	0.0	0.0
23	41.4	8100.0	0.0
41.4	54	8100.0	0.0
54	60	5577.6	2522.4
60	75	6005.7	2094.3
75	90	6336.1	1763.9
90	105	6579.9	1520.1
105	120	6734.5	1365.5
120	135	6841.4	1258.6
135	150	6920.2	1179.8
150	300	7092.0	1008.0
300	400	6901.2	1198.8
400	500	6387.5	1712.5
500	600	5754.5	2345.5
600	700	5247.7	2852.3
700	800	4865.8	3234.2
800	900	4590.9	3509.1
900	1000	4396.5	3703.5
1000	1800	4261.7	3838.3
1800	3000	3542.8	4557.2
3000	3600	3236.9	4863.1
3600	7200	3307.4	4792.6
7200	9000	3274.9	4825.1
9000	12000	3166.9	4933.1
12000	18000	3345.9	4754.1
18000	28800	3189.1	4910.9
28800	54000	3190.1	4909.9
54000	2592000	3176.7	4923.3

Event	**Time after LOCA (sec)**
AVS draws the annulus pressure to – 1.0 in. w.g. everywhere inside.	41.4
AVS draws the annulus pressure to the AVS setpoint.	54.0

Design Basic LOCA with Failure of an AVS Pressure Transmitter

Time Interval (sec)		AVS Airflow Rates (cfm)	
Start	**End**	**Exhaust**	**Recirculation**
0	23	0.0	0.0
23	30.5	16200.0	0.0
30.5	34	16200.0	0.0
34	7200	8100.0	8100.0
7200	9000	8100.0	8100.0
9000	9084	0.0	8100.0
9084	9600	3188.6	4911.4
9600	12000	3192.5	4907.5
12000	18000	3345.2	4754.8
18000	28800	3188.4	4911.6
28800	54000	3189.6	4910.4
54000	2592000	3176.4	4923.6

Event	Time after LOCA (sec)
AVS draws the annulus pressure to – 1.0 in.w.g. everywhere inside.	30.5
AVS draws the annulus pressure to the AVS setpoint.	34.0
Operators secure the fan associated with the failed AVS pressure transmitter	9000.0

Design Basis LOCA with Both AVS Trains in Operation

Time Interval (sec)		AVS Airflow Rates (cfm)	
Start	**End**	**Exhaust**	**Recirculation**
0	23	0.0	0.0
23	30.5	16200.0	0.0
30.5	34	16200.0	0.0
34	35	3974.3	12225.7
35	45	5038.5	11161.5
45	60	5578.0	10622.0
60	75	6006.2	10193.8
75	90	6336.6	9863.4
90	105	6580.4	9619.6
105	120	6735.0	9465.8
120	135	6841.4	9358.1
135	150	6920.6	9279.4
150	180	7025.2	9174.8
180	210	7056.1	9143.9
210	300	7092.4	9107.6
300	360	6901.5	9298.5
360	400	6621.1	9578.9
400	500	6387.8	9812.2
500	600	5754.7	10445.3
600	700	5247.8	10952.2
700	800	4865.9	11334.1
800	900	4591.0	11609.0
900	1000	4396.6	11803.4
1000	1800	4261.8	11938.2
1800	3000	3542.8	12657.2
3000	7200	3307.4	12892.6
7200	9000	3274.9	12925.1
9000	12000	3166.9	13033.1
12000	18000	3345.9	12854.1
18000	28800	3189.1	13010.9
28800	54000	3190.1	13009.9
54000	2592000	3176.7	13023.3

Event	**Time after LOCA (sec)**
AVS draws the annulus pressure to – 1.0 in.w.g. everywhere inside.	30.5
AVS draws the annulus pressure to the AVS setpoint.	34.0

Table 6-76. Dual Containment Characteristics

1.	Secondary Containment Design Information		
	a.	Free Volume, ft^3	484,090
	b.	Pressure, inches of water, gauge	
		1) Normal Operation	0.0
		2) Post accident negative pressure anywhere in the annulus	-0.25
		3) Post Accident at the Annulus Ventilation Pressure Transmitters	-0.88
		4) Annulus Ventilation Pressure Transmitter Setpoint	-1.66
	c.	Primary Containment Design Leak Rate, % volume per day	0.3
	d.	Annulus Ventilation Fans	See Figure 9-135
	e.	Annulus Ventilation Filters	See Figure 9-135
2.	Transient Analysis		
	a.	Initial Conditions	
		1) Annulus Initial Temperature, °F	45
		2) Outside Air Temperature, °F	18
		3) Thickness of the Secondary Containment Wall, in	36
		4) Thickness of Secondary Containment, Dome, in	31.3
		5) Thickness of Primary Containment, Wall at the Ice Condenser, inin	0.75
		6) Thickness of the Primary Containment Wall at the Lower Compartment, in	0.8224
		7) Thickness of the Primary Contaimment Dome, in	0.6875
	b.	Primary Containment Expansion Characterisitics	
		1) Thermal Expansion Coefficient, 1/°F	8.4E-06
		2) Young's Modulus of Elasticity, psi	2.9E+07
	c.	Primary Containment Thermal Characterisitcs	
		1) Thermal Conductivity, Btu/(hr-ft-°F)	25
		2) Specific Heat Capacity, Btu/(lbm-°F)	0.113
		3) Emissivity, Btu/(hr-sq.ft.-°F)	0.94
		4) Maximum Condensing Heat Transfer Coefficient, Btu/(hr-sq.ft.-°F)	125.
		5) Stagnant Condensing Heat Transfer Coefficient, Btu/(hr-sq.ft.-°F)	72.
	d)	Annulus Thermal Characteristic	
		1) Atmospheric Emissivity, Btu/(hr-sq.ft.-°F)	0.33
	e)	Secondary Containment Thermal Characteristics	

1)	Thermal Conductivity, Btu/(hr-ft-°F)	0.75
2)	Specific Heat Capacity, Btu/(lbm-°F)	0.17
3)	Emissivity, Btu/(hr-sq.ft.-°F)	0.89

Table 6-77. Containment Isolation Valve Data

NOTES TO TABLE 6-77

CONTAINMENT ISOLATION VALVE AND ACTUATION DATA

NOTES:

1. VALVE ARRANGEMENTS ARE SHOWN IN FIGURE 6-112, 6-113, 6-114, 6-115.
2. DEFINITION OF ACTUATION SIGNALS
   S - SAFETY INJECTION SIGNAL (T SIGNAL ALSO ACTIVATED BY S SIGNAL)
   T - CONTAINMENT ISOLATION SIGNAL (PHASE A CONTAINMENT ISOLATION)
   P - CONTAINMENT HIGH-HIGH PRESSURE SIGNAL (CAUSES MAIN STEAM LINE ISOLATION AND PHASE B CONT. ISOL.)
3. VALVE TYPE ABBREVIATIONS
   FIGURE 1-22, 1-23, 1-24: DS= DUAL SEAL, FG= FLANGE
4. SYMBOLS, VALVE POSITION ABBREVIATIONS, ACTUATOR TYPE :
   FIGURE 1-22, 1-23, 1-24
5. EACH PERSONNEL LOCK WILL HAVE DOUBLE DOORS WITH AN INTERLOCKING SYSTEM TO PREVENT BOTH DOORS BEING OPENED SIMULTANEOUSLY.
6. SYSTEM IDENTIFICATION FROM VALVE NUMBER.
   FIGURE 1-22, 1-23, 1-24
7. THE GIVEN RESPONSE INDICATES WHETHER OR NOT THE PENETRATION IS CONNECTED TO SEISMIC CATEGORY 1 EQUIPMENT INSIDE AND/OR OUTSIDE CONTAINMENT.
8. DELETED
9. CONNECTED PIPING IS TEMPORARY AND IS REMOVED BEFORE STARTUP. PENETRATIONS ARE CLOSED WITH BLIND FLANGES DURING ALL MODES CONTAINMENT INTEGRITY IS REQUIRED. A TYPE B TEST WILL BE PERFORMED ON THESE PENETRATIONS PER 10CFR50, APPENDIX J.
10. SEE UFSAR SECTION 6.3 FOR AUTOMATIC ACTUATION SIGNALS FOR THESE VALVES.
11. DELETED
12. UNIT 1 - OPEN FOR STARTUP, CLOSED WHEN PLANT REACHES 15-17% POWER.
    UNIT 2 - OPEN ALL THE TIME.
13. AS DOCUMENTED IN ENGINEERING JUSTIFICATION REPORT SES-JR-10, THE ONE INCH CONTAINMENT ISOLATION VALVES FOR THIS SYSTEM WERE PURCHASED AS DUKE CLASS F INSTEAD OF DUKE CLASS B. THIS WAS NECESSARY DUE TO THE HIGH SYSTEM DESIGN PRESSURE (8000 PSIG) WHICH EXCEEDED THE PRESSURE/TEMPERATURE RATINGS OF THE ASME SECTION III CODE.
14. VALVE CLOSES UPON RECEIPT OF A HIGH RADIATION SIGNAL.

ERN: CN0097S8

NOTES TO TABLE 6-77

15. FLOW DIRECTION RELATIVE TO CONTAINMENT: I - IN; O - OUT.
16. DELETED
17. DELETED
18. ALL POTENTIAL BYPASS LEAKAGE PATHS IN DUAL CONTAINMENT PLANTS ARE REQUIRED A TYPE C TEST PER POSITION NO.7, SECTION B. OF BRANCH TECHNICAL POSITION CSB 6-3, DETERMINATION OF BYPASS LEAKAGE PATHS IN DUAL CONTAINMENT PLANTS." TABLE 3.6-1 (SECONDARY CONTAINMENT BYPASS LEAKAGE PATHS).
19. I - INSIDE CONTAINMENT; O - OUTSIDE CONTAINMENT. PIPING, ISOLATION VALVES, AND ACTUATORS IN THE CONTAINMENT ISOLATION SYSTEM OUTSIDE CONTAINMENT ARE LOCATED INSIDE A SEISMIC CATEGORY I ENCLOSURE COMPLEX, AND ARE LOCATED AS CLOSE AS PRACTICAL TO THE CONTAINMENT WALL; I.E., IN ALMOST ALL CASES, ISOLATION VALVES WILL BE LOCATED IMMEDIATELY AFTER THE PENETRATION ASSEMBLY. THERE WILL, HOWEVER, BE EXCEPTIONS, SUCH AS THE CASE OF THE MAIN STEAM LINES WHICH REQUIRE A SERIES OF SAFETY VALVES BEFORE THE ISOLATION VALVE. ALSO, THERE WILL BE SOME EXCEPTIONS DUE TO NORMAL STRUCTURAL DESIGN ARRANGEMENTS. ACTUAL LENGTHS OF PIPE FROM PENETRATIONS TO THE ISOLATION VALVES OUTSIDE CONTAINMENT HAVE BEEN KEPT TO A MINIMUM.
20. DELETED
21. DELETED
22. DURING THE INJECTION PHASE OF SAFETY INJECTION, THESE VALVES ARE CLOSED. WATER FROM THE REFUELING WATER STORAGE TANK (FWST) PROVIDES APPROXIMATELY 48 FEET OF HEAD ON THESE VALVES (AT 20.8 PSIG). THIS HEAD WILL PRECLUDE ANY LEAKAGE THROUGH THIS PENETRATION. DURING THE RECIRCULATION PHASE OF SAFETY INJECTION, THESE VALVES ARE OPEN TO PROVIDE FLOW TO ND PUMP SUCTION. SATISFIES GDC 55 THROUGH ANS 56.2/ANSI N271-1976, SECTION 3.6 OTHER DEFINED BASIS (SUBSECTION 3.6.3).
23. THE MAIN STEAM, FEEDWATER, AUXILIARY FEEDWATER, SAMPLE AND BLOWDOWN LINES ARE ALL CONNECTED TO THE SECONDARY SIDE OF THE STEAM GENERATOR WHICH IS KEPT AT A HIGHER PRESSURE THAN THE PRIMARY SIDE SOON AFTER A LOCA OCCURS. ANY LEAKAGE BETWEEN THE PRIMARY AND SECONDARY SIDES OF THE STEAM GENERATOR IS DIRECTED INWARD TO THE CONTAINMENT.
24. DELETED
25. DELETED
26. THESE VALVES ARE SEALED AGAINST LEAKAGE BY THE CONTAINMENT VALVE INJECTION WATER SYSTEM AS DISCUSSED IN SECTION 6.2.4.4.
27. TYPE B TEST PERFORMED PER 10 CFR 50, APPENDIX J.
28. DELETED
29. PENETRATION REQUIRED TO BE OPEN DURING TYPE A TEST FOR PRESSURE INSTRUMENTATION.

DWG: CN-FSAR-677.00-00 REV: 9

NOTES TO TABLE 6-77

30. THIS PENETRATION IS A PART OF A CLOSED SYSTEM INSIDE CONTAINMENT. ALL PIPING INSIDE CONTAINMENT IS SEISMIC CATEGORY 1 AND THEREFORE NOT SUBJECT TO RUPTURE AS A RESULT OF A LOCA. THIS PENETRATION WILL NOT BE DRAINED AND VENTED FOR THE TYPE A TEST.

31. DELETED

32. THIS PENETRATION IS EFFECTIVELY WATER SEALED AGAINST ANY LEAKAGE DIRECTED OUT OF CONTAINMENT BY THE RESIDUAL HEAT REMOVAL PUMPS DISCHARGE PRESSURE.

33. THIS PENETRATION IS EFFECTIVELY WATER SEALED AGAINST ANY LEAKAGE DIRECTED OUT OF CONTAINMENT BY THE CENTRIFUGAL CHARGING PUMPS DISCHARGE PRESSURE.

34. AN EFFECTIVE FLUID SEAL ON THESE PENETRATIONS, PROVIDED BY THE SUCTION SOURCES TO THE RESIDUAL HEAT REMOVAL PUMPS DURING AND FOLLOWING AN ACCIDENT, SATISFIES GDC55 THROUGH ANS 56.2/ ANSI N271 1976, SECTION 3.6 OTHER DEFINED BASIS (SUBSECTION 3.6.3).

35. THIS PENETRATION IS LEFT OPEN DURING AN ACCIDENT TO PROVIDE FLOW FROM THE CENTRIFUGAL CHARGING PUMPS TO THE REACTOR VESSEL.

36. DELETED

37. SYSTEM PRESENTS A SEISMIC CATEGORY I CLOSED PRESSURE BOUNDARY TO THE CONTAINMENT ATMOSPHERE FOLLOWING A LOCA AND IS NOT A PART OF THE REACTOR COOLANT SYSTEM PRESSURE BOUNDARY. IN ADDITION, THE OUTSIDE CONTAINMENT ISOLATION VALVE FOR EACH PENETRATION IS SUPPLIED BY THE CONTAINMENT VALVE INJECTION WATER SYSTEM AS DISCUSSED IN SECTION 6.2.4.4, WHICH PROVIDES A SEAL AGAINST ANY LEAKAGE THROUGH THE VALVE.

38. THESE PENETRATIONS ARE IN USE DURING AND FOLLOWING AN ACCIDENT TO PROVIDE CONTAINMENT VALVE INJECTION WATER SYSTEM FLOW TO CERTAIN CONTAINMENT ISOLATION VALVES. IN THE EVENT THAT THE CONTAINMENT ISOLATION VALVE ON THESE PENETRATIONS SHOULD FAIL TO OPEN (NW-105B OR NW-35A), AN EFFECTIVE WATER SEAL WOULD BE MAINTAINED ON THE PENETRATION AT A PRESSURE > PA BY THE CONTAINMENT VALVE INJECTION WATER SURGE CHAMBER.

39. THESE PENETRATIONS WILL EITHER BE IN USE FOLLOWING AN ACCIDENT, OR WILL BE SEALED AGAINST LEAKAGE BY A WATER SEAL AGAINST THE OUTSIDE OF THE PENETRATIONS. IN ADDITION, THE FOLLOWING STEPS ARE TAKEN TO PROVIDE ADDITIONAL ASSURANCE OF PENETRATION INTEGRITY:

    A. THE OUTSIDE CONTAINMENT ISOLATION VALVES ARE SUPPLIED BY THE CONTAINMENT VALVE INJECTION WATER SYSTEMS, AS DISCUSSED IN SECTION 6.2.4.4, WHICH PROVIDES A SEAL AGAINST LEAKAGE.

    B. THE CHECK VALVES WHICH PROVIDE THE INSIDE ISOLATION, ARE TESTED PER CATAWBA ITS 3.4.14, WHICH REQUIRES A WATER LEAK TEST FOR REACTOR COOLANT SYSTEM PRESSURE ISOLATION VALVES.

    THE USE OF THE ABOVE FEATURES TO ASSURE THE INTEGRITY OF THESE PENETRATIONS AVOIDS THE NECESSITY OF INSTALLING BLOCK VALVES IN THE INJECTION FLOW PATH. SUCH VALVES WOULD ADD AN INCREASED PROBABILITY OF FLOW PATH BLOCKAGE DURING AN ACCIDENT.

40. THE LEAKAGE THROUGH THESE LINES WILL BE INCLUDED IN THE RESULTS OF THE TYPE A TEST.

41. CONT PRESS SENSING VALVES REMAIN OPEN AND CONT H2 ANALYZER VALVES ARE OPENED DURING ACCIDENT. TYPE C TEST IS PERFORMED TO VERIFY INTEGRITY OF TUBING AND INSTRUMENTATION.

42. THE CONTAINMENT ISOLATION VALVES IN THIS PENETRATION WHICH RECEIVED A SEALING FLUID FROM THE NW SYSTEM WILL NOT BE TESTED AS A PART OF THE TYPE C LEAK RATE TEST PROGRAM. THE OTHER CONTAINMENT ISOLATION VALVE(S) WILL BE TYPE C TESTED.

ERN: CN0097S9

NOTES TO TABLE 6-77

43. AT LEAST ONE OF THE CONTAINMENT ISOLATION VALVES IN THIS PENETRATION RECEIVES SEALING FLUID FROM THE NW SYSTEM. DURING THE TYPE A TEST, HOWEVER, THE NW SYSTEM IS DEPRESSURIZED DUE TO ITS POTENTIAL TO ADD WATER VOLUME (PRESSURE SOURCE) TO CONTAINMENT. RATHER THAN RISK EXCESSIVE AIR LEAKAGE BY THE VALVE SEAT WITHOUT NW PRESENT, THE PENETRATION IS NOT VENTED FOR THE TYPE A TEST. SINCE THE MINIMUM PATHWAY LEAKAGE THROUGH THIS PENETRATION IS KNOWN TO BE ZERO, THERE IS NO LEAKAGE PENALTY TO BE ADDED TO THE TYPE A TEST RESULTS.

44. THESE PENETRATIONS ARE LEFT OPEN DURING AN ACCIDENT IN ORDER TO PROVIDE REACTOR COOLANT PUMP SEAL WATER FLOW FROM THE CENTRIFUGAL CHARGING PUMPS.

45. THE OUTSIDE CONTAINMENT ISOLATION GATE VALVE RECEIVES A SEALING FLUID FROM THE NW SYSTEM IF IT IS CLOSED AFTER A PHASE A ISOLATION SIGNAL. WHEN THE ISOLATION VALVE OPENS IN THE COURSE OF PERFORMING ITS SAFETY FUNCTION A SOLENOID IN THE SEALING FLUID SUPPLY LINES CLOSES.

46. NO LEAK TESTING NECESSARY AS PENETRATION PENETRATES REACTOR BUILDING ONLY.

47. ISOLATION VALVE STROKE TIMES ARE NOMINAL VALUES AND PRIMARILY BASED ON ANSI N271-1976. THESE TIMES ARE FOR VALVE OPERATION ONLY AND DO NOT INCLUDE ANY SENSOR RESPONSE OR CIRCUIT DELAY TIMES.

48. THIS PENETRATION IS NOT ACCURATELY DESCRIBED BY CATAWBA ITS 3.6.3 CONDITIONS A, B, OR C.

49. THIS LLRT TEST INCLUDES THE H2 ANALYZER AND CONT. PRESSURE SENSING CH.I, CH.II, CH.III AND CH.IV (INCLUDES INSTRUMENT TUBING, FITTINGS AND VALVES).

50. STROKE TIME IS NA SINCE VALVES ARE LOCKED CLOSED PER CATAWBA ITS SURVEILLANCE 3.6.3.1 DURING MODES 1,2,3, AND 4. DURING SHUTDOWN MODES VP SYSTEM ISOLATIONS VALVES CLOSURE TIMES ARE INSIGNIFICANT SINCE THE DOSE ANALYSIS ASSUMES THEY ARE OPEN.

51. THESE PENETRATIONS WILL EITHER BE IN USE FOLLOWING AN ACCIDENT, OR WILL BE EFFECTIVELY WATER SEALED AGAINST ANY LEAKAGE DIRECTED OUT OF CONTAINMENT BY SYSTEM PRESSURE. ALSO, THE PENETRATIONS AND CONNECTED PIPING OUTSIDE CONTAINMENT PRESENT A CLOSED SEISMIC PRESSURE BOUNDARY TO THE ENVIRONMENT FOLLOWING A LOCA. IN ADDITION, THE CHECK VALVES WHICH PROVIDE THE INSIDE ISOLATION ARE TESTED PER TECHNICAL SPECIFICATION 3.4.14, WHICH REQUIRES A WATER LEAK TEST FOR REACTOR COOLANT SYSTEM PRESSURE ISOLATION VALVES. BECAUSE OF THESE FEATURES WHICH ASSURE THE INTEGRITY OF THESE PENETRATIONS, THE NECESSITY OF INSTALLING BLOCK VALVES IN THE INJECTION FLOW PATH IS AVOIDED. SUCH VALVES WOULD ADD AN INCREASED PROBABILITY OF FLOW PATH BLOCKAGE DURING AN ACCIDENT.

52. NEI 94-01 AND ANSI/ANS-56.8-2002 ALLOW THE LICENSEE TO CHOOSE NOT TO VENT AND DRAIN RECENTLY TESTED (WITHIN THE LAST 30 MONTHS) TYPE B AND C PATHWAYS DURING PERFORMANCE OF THE TYPE A TEST.

53. TO ACCOUNT FOR VALVE/ACTUATOR DESIGN AND HISTORICALLY SLOWER STROKE TIME TEST RESULTS, THE 1(2)VB-83B AND 1(2)VI-77B MAXIMUM ISOLATION TIME (i.e., STROKE TIME) IS ≤11 SECONDS, WHICH IS ADEQUATE FOR LIMITING RELEASE OF RADIOACTIVITY FROM THE CONTAINMENT ON A LOCA OR DESIGN ACCIDENT.

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APPENDIX A
FROM TABLE 6-77,
(PAGES Ø1 THRU 23 WITH NOTES)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

NO.	REVISIONS
12	RELEASED FOR 2018 FSAR UPDATE EFFECT. DATE 10-03-18
11	RELEASED FOR 2016 FSAR UPDATE EFFECT. DATE 3-6-17
10	RELEASED FOR 2016 FSAR UPDATE EFFECT. DATE 08-29-16
9	RELEASED FOR 2015 FSAR UPDATE EFFECT. DATE 5-18-15
8	RELEASED FOR 2014 FSAR UPDATE EFFECT. DATE 3-3-14
7	RELEASED FOR 2012 FSAR UPDATE EFFECT. DATE 7-9-12
6	RELEASED FOR 2011 FSAR UPDATE EFFECT. DATE 2-28-11
5	RELEASED FOR 2009 FSAR UPDATE EFFECT. DATE 4-18-09
4	RELEASED FOR 2007 FSAR UPDATE EFFECT. DATE 11-15-07
3	RELEASED FOR 2006 FSAR UPDATE EFFECT. DATE 5-31-06

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APPENDIX A
FROM TABLE 6-77.
(PAGE 01 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47) (6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
1	PZR RELIEF	YES	M216	A,B	55	B6	3	I	N/N	1NC-57	NA	NA	C	I	CK	3	N/A	N/A	C	N/A	C	C	5-3	YES	YES (42)	AB	NONE
	TANK MAKEUP									1NC-56B	T	≤ 10	NW	O	GT	3	E	ARM	C	FAI	C	C					
										1NC-105 (V)	NA	NA		I													
										1NC-215 (D)	NA	NA		O													
2	NITROGEN TO PZR	YES	M212	A,B	55	A5	1	I/O	N/Y	1NC-54A	T	≤ 10	C	I	GL	1	E	ARM	C	FAI	C	C	5-3	YES	YES	AB	NONE
	RELIEF TANK									1NC-53B	T	≤ 10	C	O	GL	1	E	ARM	C	FAI	C	C					
3	NC PUMP MOTOR	YES	M327	A,B	56	A4	2	O	N/Y	1NC-141	NA	NA	C	I	GT	2	HW	M	LC	FAI	C	C	5-6	YES	YES	AB	NONE
	DRAIN TANK PUMP									1NC-142	NA	NA	C	O	GT	2	HW	M	LC	FAI	C	C					
	DISCHARGE									1NC-210 (V)	NA	NA		O													
4	NV LETDOWN	YES	M347	A,B	55	A6	2	O	Y/Y	1NV-10A	T	≤ 10	NW	I	GT	2	P	AR	O	C	O	C	9-89	YES	YES (42)	NONE	NONE
	LINE									1NV-11A	T	≤ 10	NW	I	GT	2	P	AR	C	C	C	C					
										1NV-13A	T	≤ 10	NW	I	GT	2	P	AR	C	C	C	C					
										1NV-15B	T	≤ 10	C	O	GL	3	E	ARM	O	FAI	O	C					
										1NV-14	600 PSIG	NA	C	I	RV	3	N/A	N/A	C	FAI	C	C					
										1NV-901 (V)	NA	NA		I													
										1NV-886 (V)	NA	NA		I													
										1NV-920 (V)	NA	NA		I													
										1NV-889 (D)	NA	NA		I													
										1NV-836 (V)	NA	NA		I													
5	PZR AUX SPRAY	NO	M273	A,B	55	B2	3	I	Y/Y	1NV-861	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	C	9-89	NO	NO	NONE	32
	TRANSIENT LINE									1NV-862	NA	NA	NONE	O	GL	3	HW	M	LC	N/A	O	C					
										1NV-863 (D)	NA	NA		I													
6	NV CHARGING	NO	M330	NA	55	B1	3	I	Y/Y	1NV-22	NA	NA	NONE	I	CK	3	N/A	N/A	C	N/A	C	C	9-89	NO	NO	NONE	33
	LINE									1NV-314B	S	≤ 10	NONE	O	GT	3	E	ARM	O	FAI	O	C					
										1NV-21 (V)	NA	NA		I													
7	NC PUMP SEAL	YES	M256	A,B	55	A9	4	O	Y/Y	1NV-89A	T	≤ 10	NW	I	GT	4	E	ARM	O	FAI	O	C	9-89	NO	YES (42)	AB	NONE
	WATER RETURN									1NV-90	NA	NA	C	I	CK	3/4	N/A	N/A	C	N/A	N/A	N/A					
										1NV-91B	T	≤ 10	NW	O	GT	4	E	ARM	O	FAI	O	C					
8	NC PUMP SEAL INJ	NO	M343	NA	55	B1	2	I	Y/Y	1NV-46	NA	NA	NONE	I	CK	2	N/A	N/A	O	N/A	O	O	9-94	NO	NO	NONE	44
	WATER A SUPPLY									1NV-44A	NA	NA	NONE	O	GL	2	E	N/A	O	FAI	O	O					
										1NV-45 (V)	NA	NA		I													

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APPENDIX A
FROM TABLE 6-77.
(PAGE 02 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
9	NC PUMP SEAL	NO	M339	NA	55	B1	2	I	Y/Y	1NV-57	NA	NA	NONE	I	CK	2	N/A	N/A	O	N/A	O	O	9-94	NO	NO	NONE	44
	INJ WATER B SUPPLY									1NV-55A	NA	NA	NONE	O	GL	2	E	N/A	O	FAI	O	O					
										1NV-56 (V)	NA	NA		I													
10	NC PUMP SEAL	NO	M344	NA	55	B1	2	I	Y/Y	1NV-68	NA	NA	NONE	I	CK	2	N/A	N/A	O	N/A	O	O	9-94	NO	NO	NONE	44
	INJ WATER C SUPPLY									1NV-66A	NA	NA	NONE	O	GL	2	E	N/A	O	FAI	O	O					
										1NV-67 (V)	NA	NA		I													
										1NV-830 (D)	NA	NA		I													
11	NC PUMP SEAL	NO	M350	NA	55	B1	2	I	Y/Y	1NV-79	NA	NA	NONE	I	CK	2	N/A	N/A	O	N/A	O	O	9-94	NO	NO	NONE	44
	INJ WATER D SUPPLY									1NV-77A	NA	NA	NONE	O	GL	2	E	N/A	O	FAI	O	O					
										1NV-78 (V)	NA	NA		I													
12	REACTOR MAKEUP	YES	M259	A,B	56	B1	1	I	N/N	1NB-262	NA	NA	C	I	CK	3/4	N/A	N/A	C	N/A	N/A	N/A	9-104	YES	YES	AB	NONE
	WATER FLUSH HDR									1NB-260B	T	≤ 10	C	O	GL	1	E	ARM	C	FAI	C	C					
										1NB-261 (V)	NA	NA		I													
13	ICE COND ICE	YES	M394	48	53	C4	5	I	(9)	FLANGE	NA	NA	B	N/A	FLANGE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NONE	NO	(9)	NONE	NONE
	BLOWING AIR																										
14	ICE COND ICE	YES	M371	48	53	C4	6	O	(9)	FLANGE	NA	NA	B	N/A	FLANGE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NONE	NO	(9)	NONE	NONE
	BLOWING AIR																										
15	ICE COND GLYCOL	YES	M373	A,B	56	B1	4	I	N/N	1NF-228A	T	≤ 10	C	O	GT	4	P	AR	O	C	O	C	NONE	N(29)	YES	AB	NONE
	PMPS DISCH LINE									1NF-229	NA	NA	C	I	CK	4	N/A	N/A	O	N/A	O	C					
										1NF-284 (V)	NA	NA		I													
										1NF-959 (D)	NA	NA		I													
										1NF-283 (D)	NA	NA		I													
										1NF-955 (V)	NA	NA		O													

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APPENDIX A
FROM TABLE 6-77.
(PAGE 03 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47) (6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
16	ICE COND GLYCOL	YES	M372	A,B	56	A7	4	O	N/N	1NF-233B	T	≤ 10	C	I	GT	4	E	ARM	O	FAI	O	C	NONE	N(29)	YES	AB	NONE
	PUMPS SUCT LINE									1NF-234A	T	≤ 10	C	O	GT	4	P	AR	O	C	O	C					
										1NF-235	NA	NA	C	I	CK	1	N/A	N/A	C	N/A	C	C					
										1NF-261 (V)	NA	NA		I													
										1NF-957 (V)	NA	NA		I													
										1NF-953 (D)	NA	NA		O													
										1NF-954 (V)	NA	NA		O													
17	CONT HYDROGEN	YES	M332	A,B,E	56	B7	4	I	Y/N	1VY-15B		NOTE 50	C	O	GT	4	E	ARM	LC	FAI	C	C	6-120	YES	YES	AB	NONE
	PURGE INLET									1VY-16	NA	NA	C	I	CK	4	N/A	N/A	C	N/A	C	C					
	BLOWER DISCH LINE									1VY-21 (V)	NA	NA		I													
18	CONT HYDROGEN	YES	M346	A,B,E	56	A5	4	I	Y/Y	1VY-17A		NOTE 50	C	I	GT	4	E	ARM	LC	FAI	C	C	6-120	YES	YES	NONE	NONE
	PURGE OUTLET LINE									1VY-18B		NOTE 50	C	O	GT	4	E	ARM	LC	FAI	C	C					
19	ND PUMP SUCT A	NO	M276	48	55	D5	12	O	Y/Y	1ND-2A	(10)	NA	NONE	I	GT	12	E	ARM	C	FAI	O	C	5-17	NO	NO	NONE	34
	FROM LOOP									1ND-3	450 PSIG	NA	NONE	I	RV	4	N/A	N/A	C	N/A	C	C					
										1ND-5 (V)	NA	NA		I													
										1ND-81 (V)	NA	NA		O													
										1NS-18A	NA	NA		O		12											
										1ND-6 (V)	NA	NA		O													
										1NI-185A	NA	NA		O		18											
										1ND-25A	NA	NA		O		2											
										1ND-7	NA	NA		O		3/4											
										1ND-144	NA	NA		O	GL	3/4											
										1ND-146	NA	NA		O	GL	3/4											
										1FW-27A	NA	NA		O		12											
										1FW-94	NA	NA		O	GL	3/4											
										1FW-96	NA	NA		O	CK	3/4											
										1FW-98	NA	NA		O	GL	3/4											
										1FW-28	NA	NA		O		12											
										1FW-29	NA	NA		O		3/4											
										1ND-88 (V)	NA	NA		O													
										1ND-12	NA	NA		O		3/4											
										1ND-8	NA	NA		O		3/4											
										1ND-10	NA	NA		O	CK	8											
										1ND-67	NA	NA		O		8											
										1NS114	NA	NA		O		1/2											
										1NI488	NA	NA		O		1/2											
										1NDPG5200	NA	NA		O													
										1NDPG5201	NA	NA		O													
										1NDPG5101	NA	NA		O													
										1NDPX5150	NA	NA		O													
										1NDPS5200	NA	NA		O													
										1NDPT5090	NA	NA		O													
										1NDPG5100	NA	NA		O													
										ND SEAL WATER HX FLEX HOSE	NA	NA		O		3/4											
										ND SEAL WATER HX FLEX HOSE	NA	NA		O		3/4											

ERN: CN0097QS

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APPENDIX A
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UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
20	ND PUMP SUCT B	NO	M315	48	55	D5	12	O	Y/Y	1ND-37A	(10)	NA	NONE	I	GT	12	E	ARM	C	FAI	O	C	5-18	NO	NO	NONE	34
	FROM LOOP									1ND-38	450 PSIG	NA	NONE	I	RV	4	N/A	N/A	C	N/A	C	C					
										1ND-40 (V)	NA	NA		I													
										1ND-86 (V)	NA	NA		O													
										1NS-1B	NA	NA		O		12											
										1NI-184B	NA	NA		O		18											
										1ND-41(V)	NA	NA		O													
										1ND-59B	NA	NA		O		2											
										1ND-68	NA	NA		O		8											
										1FW-56	NA	NA		O		12											
										1FW-57	NA	NA		O		3/4											
										1FW-55B	NA	NA		O		12											
										1FW-95	NA	NA		O	GL	3/4											
										1FW-97	NA	NA		O	CK	3/4											
										1FW-99	NA	NA		O	GL	3/4											
										1ND-89(V)	NA	NA		O													
										1ND-46	NA	NA		O		3/4											
										1ND-84	NA	NA		O		3/4											
										1ND-44	NA	NA		O	CK	8											
										1ND-66	NA	NA		O		1											
										1ND-145	NA	NA		O	GL	3/4											
										1ND-147	NA	NA		O	GL	3/4											
										1NS-113	NA	NA		O		1/2											
										1NI-487	NA	NA		O		1/2											
										1NDPG5110	NA	NA		O													
										1NDPG5111	NA	NA		O													
										1NDPX5160	NA	NA		O													
										1NDPS5210	NA	NA		O													
										1NDPT5080	NA	NA		O													
										1NDPG5210	NA	NA		O													
										1NDPG5211	NA	NA		O													
										ND SEAL WATER HX FLEX HOSE	NA	NA		O		3/4											
										ND SEAL WATER HX FLEX HOSE	NA	NA		O		3/4											
21	NV PUMP INJ	NO	M351	NA	55	B7	4	I	Y/Y	1NI-9A	S	NA	NONE	O	GT	4	E	ARM	C	FAI	C	O	6-128	NO	NO	NONE	35
	LINE TO COLD LEGS									1NI-10B	S	NA	NONE	O	GT	4	E	ARM	C	FAI	C	O					
										1NI-12	NA	NA	NONE	I	CK	3	N/A	N/A	C	N/A	C	C					
										1NI-3	NA	NA	NONE	O	GL	1	HW	M	C	C	C	C					
										1NI-194 (V)	NA	NA		I													
22	NITROGEN TO	YES	M331	A,B	56	B7	1	I	Y/Y	1NI-48	NA	NA	C	I	CK	1	N/A	N/A	C	N/A	C	C	6-129	YES	YES	AB	NONE
	ACCUMULATORS									1NI-47A	T	≤ 10	C	O	GT	1	E	ARM	C	FAI	C	C					
										1NI-107 (V)	NA	NA		I													

ERN: CN0097QV DWG: CN-FSAR-677.01-04 REV: 9

APPENDIX A
FROM TABLE 6-77,
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UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
23	NI TEST LINE	YES	M322	A,B	56	A10	3/4	I	N/N	1NI-95A	T	≤ 10	C	I	GT	3/4	E	ARM	C	FAI	C	C	6-129	YES	YES	AB	NONE
										1NI-96B	T	≤ 10	C	O	GL	3/4	E	ARM	C	FAI	C	C					
										1NI-120B	T	≤ 10	C	O	GL	3/4	E	ARM	C	FAI	C	C	6-130				
										1NI-471	NA	NA	C	I	CK	3/4	N/A	N/A									
										1NI-361 (V)	NA	NA		O													
										1NI-362 (D)	NA	NA		O													
										1NIPT5220	NA	NA		O													
										1NIPG5220	NA	NA		O													
24	ND CROSSOVER	NO	M207	A,B	55	B8	12	I	N/Y	1NI-154B	T	≤ 10	NONE	I	GL	3/4	E	ARM	C	FAI	C	C	6-130	NO	NO	NONE	39
	DISCHG TO HOT LEGS									1NI-183B	NA	NA	NW	O	GT	12	E	RM	C	FAI	C	C/O					
										1NI-125	NA	NA	NONE	I	CK	8	N/A	N/A	C	N/A	C	C/O					
										1NI-129	NA	NA	NONE	I	CK	8	N/A	N/A	C	N/A	C	C/O					
										1NI-216 (V)	NA	NA		O													
25	NI PUMP B	NO	M320	NA	55	B8	4	I	Y/Y	1NI-152B	NA	NA	NONE	O	GT	4	E	RM	C	FAI	C	C/O	6-130	NO	NO	NONE	51
	DISCHG TO HOT LEGS									1NI-153A	T	≤ 10	NONE	I	GL	3/4	E	ARM	C	FAI	C	C					
										1NI-156	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	C/O					
										1NI-159	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	C/O					
										1NI-211 (V)	NA	NA		O													
										1NI-400 (V)	NA	NA		I													
										1NI-401 (V)	NA	NA		I													
										1NI-429 (D)	NA	NA		I													
										1NI-430 (D)	NA	NA		I													
										1NI-402 (V)	NA	NA		I													
										1NI-155	NA	NA		I		1 1/2											
										1NI-158	NA	NA		I		1 1/2											
										1NIFE5530	NA	NA		I		2											
										1NIFE5480	NA	NA		I		2											
26	NI PUMP A	NO	M317	NA	55	B8	4	I	Y/Y	1NI-121A	NA	NA	NONE	O	GT	4	E	RM	C	FAI	C	C/O	6-130	NO	NO	NONE	51
	DISCHG TO HOT LEGS									1NI-122B	T	≤ 10	NONE	I	GL	3/4	E	ARM	C	FAI	C	C					
										1NI-124	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	C/O					
										1NI-128	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	C/O					
										1NI-209 (V)	NA	NA		O													
										1NI-123	NA	NA		I		1 1/2											
										1NI-127	NA	NA		I		1 1/2											
										1NIFE5460	NA	NA		I		2											
										1NIFE5470	NA	NA		I		2											

ERN: CN0097QY DWG: CN-FSAR-677.01-05 REV: 9

APPENDIX A
FROM TABLE 6-77.
(PAGE 06 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
27	ND HX A DISCHG	NO	M336	A,B	55	B5	8	I	Y/Y	1NI-173A	NA	NA	NW	O	GT	8	E	RM	O	FAI	O	O	6-131	NO	NO	NONE	39
	TO COLD LEGS									1NI-174	NA	NA	NONE	I	GL	3/4	D	RM	C	C	C	C					
										1NI-175	NA	NA	NONE	I	CK	6	N/A	N/A	C	N/A	O	O					
										1NI-176	NA	NA	NONE	I	CK	6	N/A	N/A	C	N/A	O	O					
										1NI-214 (D)	NA	NA		O													
										1NI-419 (V)	NA	NA		I													
										1NI-420 (V)	NA	NA		I													
										1NI-421 (V)	NA	NA		I													
										1NI-428 (D)	NA	NA		I													
										1NI-418 (V)	NA	NA		I													
										1NI-478	NA	NA		I		3/4											
										1NIFE5890	NA	NA		I		6											
										1NIFE5900	NA	NA		I		6											
										INI-499	NA	NA			GL	1/2											
										INI-500 (V)	NA	NA			GL	1/2											
										INI-501	NA	NA	C	I	CK	1/2	NA	NA	C/O	NA	C/O	C/O			YES		
										INI-502 (D)	NA	NA			GL	1/2											
										INI-531 (V)	NA	NA			GL												
										INI-532	NA	NA	C	I	CK	1/2	NA	NA	C/O	NA	C/O	C/O			YES		
										INI-533 (D)	NA	NA			GL												
28	ND HX B DISCHG	NO	M307	A,B	55	B5	8	I	Y/Y	1NI-178B	NA	NA	NW	O	GT	8	E	RM	O	FAI	O	O	6-131	NO	NO	NONE	39
	TO COLD LEGS									1NI-179	NA	NA	NONE	I	GL	3/4	D	RM	C	C	C	C					
										1NI-180	NA	NA	NONE	I	CK	6	N/A	N/A	C	N/A	O	O					
										1NI-181	NA	NA	NONE	I	CK	6	N/A	N/A	C	N/A	O	O					
										1NI-416	NA	NA		I													
										1NI-215 (D)	NA	NA		O													
										1NI-477	NA	NA		I		3/4											
										1NIFE5910	NA	NA		I		6											
										1NIFE5920	NA	NA		I		6											
										INI-494 (V)	NA	NA			GL	1/2											
										INI-495	NA	NA	C	I	CK	1/2	NA	NA	C/O	NA	C/O	C/O			YES		
										INI-496 (D)	NA	NA			GL	1/2											
										INI-536 (V)	NA	NA			GL												
										INI-537	NA	NA	C	I	CK	1/2	NA	NA	C/O	NA	C/O	C/O			YES		
										INI-538 (D)	NA	NA			GL												

ERN: CN0097R2 DWG: CN-FSAR-677.01-06 REV: 9

APPENDIX A
FROM TABLE 6-77.
(PAGE 07 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
29	NI PUMPS A & B	NO	M352	A,B	55	B5	4	1	Y/Y	INI-162A	NA	NA	NW	O	GT	4	E	RM	O	FAI	C	O	6-131	NO	NO	NONE	39
	DISCHG TO									INI-163	NA	NA	NONE	I	GL	3/4	O	RM	C	C	C	C					
	COLD LEGS									INI-165	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	O/C					
										INI-167	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	O/C					
										INI-169	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	O/C					
										INI-171	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	O/C					
										INI-485	NA	NA	C	I	CK	1	N/A	N/A	C	N/A	C	C			YES		
										1NI-424 (V)	NA	NA		I													
										1NI-483 (V)	NA	NA		I													
										1NI-422 (V)	NA	NA		I													
										1NI-437 (V)	NA	NA		I													
										1NI-213 (V)	NA	NA		O													
										INI-170	NA	NA		I		1 1/2											
										INI-168	NA	NA		I		1 1/2											
										INI-166	NA	NA		I		1 1/2											
										INI-164	NA	NA		I		1 1/2											
										INI-423	* NA	NA		I		1											
										INIFE5490	NA	NA		I													
										INIFE5500	NA	NA		I													
										INIFE5510	NA	NA		I													
										INIFE5520	NA	NA		I													
										* REFER TO	OP/1/A/6200/06																
30	CONTAINMENT	NO	M303	48	56	C1	18	O	Y/Y	INI-185A	NA	NA	NONE	O	GT	18	E	RM	C	FAI	C	C/O	6-131	NO	NO	NONE	22
	SUMP RECIRC LINE A				56	C1				INI-515	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C	6-131		YES		NONE
					56	C1				INI-516	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C	6-131		YES		NONE
					56	C1				INI-517	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C	6-131		YES		NONE
					56	C1				INI-518	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C	6-131		YES		NONE
					56	C1				1NI-519	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C	6-131		YES		NONE
					56	C1				INI-520	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C	6-131		YES		NONE
					56	C1				INI-521	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C	6-131		YES		NONE
					56	C1				INI-522	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C	6-131		YES		NONE
31	CONTAINMENT	NO	M210	48	56	C1	18	O	Y/Y	INI-184B	NA	NA	NONE	O	GT	18	E	RM	C	FAI	C	C/O	6-131	NO	NO	NONE	22
	SUMP RECIRC LINE B				56	C1				INI-523	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C	6-131		YES		NONE
					56	C1				INI-524	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C	6-131		YES		NONE
					56	C1				INI-525	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C	6-131		YES		NONE
					56	C1				INI-526	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C	6-131		YES		NONE
					56	C1				1NI-527	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C	6-131		YES		NONE
					56	C1				INI-528	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C	6-131		YES		NONE
					56	C1				1NI-529	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C	6-131		YES		NONE
					56	C1				INI-530	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C	6-131		YES		NONE
32	SPARE	YES	M301	48	50	C4	20	N/A	N/A	NONE	NA	NA	B	N/A	FLANGE	20	N/A	N/A	C	N/A	N/A	N/A	NONE	NO	NO	NONE	27
33	SPARE	YES	M141	48	50	C4	20	N/A	N/A	NONE	NA	NA	B	N/A	FLANGE	20	N/A	N/A	C	N/A	N/A	N/A	NONE	NO	NO	NONE	27
	(UNIT 1 ONLY)																										
34	SPARE	YES	M234	48	50	C4	20	N/A	N/A	NONE	NA	NA	B	N/A	FLANGE	20	N/A	N/A	C	N/A	N/A	N/A	NONE	NO	NO	NONE	27
35	CONTAINMENT	NO	M362	A,B	56	B9	8	1	Y/Y	INS-32A	P	NA	NW	O	GT	8	E	ARM	C	FAI	C	O	6-109	NO	NO	NONE	45
	SPRAY LINE									INS-33	NA	NA	NONE	I	CK	8	N/A	N/A	C	N/A	C	O					
										INS-110 (V)	NA	NA		I													
										INS-65 (V)	NA	NA		O													
										INS-64 (PX)	NA	NA		O		2											
36	CONTAINMENT	NO	M370	A,B	56	B9	8	1	Y/Y	INS-29A	P	NA	NW	O	GT	8	E	ARM	C	FAI	C	O	6-109	NO	NO	NONE	45
	SPRAY LINE									INS-30	NA	NA	NONE	I	CK	8	N/A	N/A	C	N/A	C	O					
										INS-109 (V)	NA	NA		I													
										INS-62 (V)	NA	NA		O													
										INS-61 (PX)	NA	NA		O		2											
37	CONTAINMENT	NO	M380	A,B	56	B9	8	1	Y/Y	INS-15B	P	NA	NW	O	GT	8	E	ARM	C	FAI	C	O	6-109	NO	NO	NONE	45
	SPRAY LINE									INS-16	NA	NA	NONE	I	CK	8	N/A	N/A	C	N/A	C	O					
										INS-108 (V)	NA	NA		I													
										INS-48 (V)	NA	NA		O													
										INS-45 (PX)	NA	NA		O		2											

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APPENDIX A
FROM TABLE 6-77,
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UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47) (6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
38	CONTAINMENT	NO	M387	A,B	56	B9	8	I	Y/Y	1NS-12B	P	NA	NW	O	GT	8	E	ARM	C	FAI	C	O	6-109	NO	NO	NONE	45
	SPRAY LINE									1NS-13	NA	NA	NONE	I	CK	8	N/A	N/A	C	N/A	C	O					
										1NS-107 (V)	NA	NA		I													
										1NS-37 (V)	NA	NA		O													
										1NS-36 (PX)	NA	NA		O		2											
39	ND CONTAINMENT	NO	M369	A,B	56	B9	8	I	Y/Y	1NS-43A	NA	NA	NW	O	GT	8	E	RM	C	FAI	C	C/O	6-109	NO	NO	NONE	45
	SPRAY LINE A									1NS-46	NA	NA	NONE	I	CK	8	N/A	N/A	C	N/A	C	C/O					
										1NS-112 (V)	NA	NA		I													
										1NS-71 (V)	NA	NA		O													
										1NS-74 (T)	NA	NA		O													
										1NS-44 (PX)	NA	NA		O		2											
40	ND CONTAINMENT	NO	M381	A,B	56	B9	8	I	Y/Y	1NS-38B	NA	NA	NW	O	GT	8	E	RM	C	FAI	C	C/O	6-109	NO	NO	NONE	45
	SPRAY LINE B									1NS-41	NA	NA	NONE	I	CK	8	N/A	N/A	C	N/A	C	C/O					
										1NS-111 (V)	NA	NA		I													
										1NS-68 (V)	NA	NA		O													
										1NS-39 (PX)	NA	NA		O		2											
										1NS-73 (T)	NA	NA		O													
41	REACTOR COOLANT	YES	M348	A,B	56	A1	3/4	I/O	N/N	1WL-450A	T	≤ 10	C	I	GL	3/4	E	ARM	O	FAI	O	C	11-11	YES	YES	AB	NONE
	DRAIN TANK GAS									1WL-451B	T	≤ 10	C	O	GL	3/4	E	ARM	O	FAI	O	C					
	SPACE TO WG SYS																										
42	REACTOR COOLANT	YES	M345	A,B	56	A9	3	O	N/Y	1WL-805A	T	≤ 10	NW	I	GT	3	E	ARM	O	FAI	O	C	11-11	NO (43)	YES (42)	AB	NONE
	DRAIN TANK HX									1WL-807B	T	≤ 10	NW	O	GT	3	E	ARM	O	FAI	O	C					
	DISCHG									1WL-806	NA	NA	C	I	CK	1/2	N/A	N/A	C	N/A	C	C					
43	VENT UNIT	YES	M221	A,B	56	A9	6	O	N/N	1WL-867A	(14) T	≤ 10	NW	I	GT	4	E	ARM	O	FAI	O	C	11-12	NO (43)	YES (42)	AB	NONE
	CONDENSATE									1WL-869B	(14) T	≤ 10	NW	O	GT	4	E	ARM	O	FAI	O	C					
	DRAIN HEADER									1WL-868	NA	NA	C	I	CK	1	N/A	N/A	C	N/A	C	C					
44	CONT FLOOR SUMP	YES	M374	A,B	56	A9	4	O	N/N	1WL-825A	(14) T	≤ 10	NW	I	GT	4	E	ARM	O	FAI	O	C	11-15	NO (43)	YES (42)	AB	NONE
	& INCORE INST									1WL-827B	(14) T	≤ 10	NW	O	GT	4	E	ARM	O	FAI	O	C					
	SUMP PUMP									1WL-321	NA	NA	C	I	CK	3/4	N/A	N/A	C	N/A	C	C					
	DISCHG									1WL-A82 (V)	NA	NA		O													
45	SG DRAIN	YES	M359	A,B	56	A9	3	O	N/N	1WL-A21	NA	NA	NW	I	GT	3	HW	M	LC	N/A	C	C	11-17	NO (43)	YES (42)	AB	NONE
	PUMP DISCHG									1WL-A22	NA	NA	C	I	CK	3/4	N/A	NA	C	N/A	C	C					
										1WL-A24	NA	NA	NW	O	GT	3	HW	M	LC	N/A	C	C					
										1WL-A23 (V)	NA	NA		I													
46	EQUIP DECON	YES	M356	A,B	56	A4	1	I	N/N	1WE-20	NA	NA	C	O	GL	1	HW	M	LC	N/A	C	C	NONE	YES	YES	AB	NONE
	LINE (13)									1WE-22	NA	NA	C	I	GL	1	HW	M	LC	N/A	C	C					
										1WE-56(V)	NA	NA		O													
47	FUEL TRANSFER	YES	C354	48	50	C2	20	NONE	Y/Y	FLANGED	NA	NA	B	I	DS/FG	N/A	N/A	NA	C	N/A	O	C	NONE	NO	NO	NONE	27
	TUBE																										

ERN: CN0097R6 DWG: CN-FSAR-677.01-08 REV: 9

APPENDIX A
FROM TABLE 6-77,
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UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
48	REFUELING WATER	YES	M358	A,B	56	A4	4	O	Y/N	1FW-11	NA	NA	C	I	PG	4	HW	M	LC	N/A	C	C	9-62	YES	YES	AB	NONE
	PUMP SUCT									1FW-13	NA	NA	C	O	PG	4	HW	M	LC	N/A	C	C					
										1FW-12 (V)	NA	NA		I													
49	REFUELING CAVITY	YES	M377	A,B	56	B2	6	I	Y/N	1FW-4	NA	NA	C	O	GT	6	HW	M	LC	N/A	C/O	C	9-62	YES	YES	AB	NONE
	FILL LINE									1FW-5	NA	NA	C	I	CK	6	N/A	N/A	C	N/A	C/O	C					
										1FW-30 (V)	NA	NA		I													
50	PZR SAMPLE	YES	M235	A,B	55	A7	1/2	O	Y/N	1NM-3A	T	≤ 10	C	I	GL	1/2	E	ARM	O	FAI	O	C	9-78	YES	YES	AB	NONE
										1NM-6A	T	≤ 10	C	I	GL	1/2	E	ARM	C	FAI	C	C					
										1NM-424	NA	NA	C	I	CK	3/4	N/A	N/A	C	N/A	C	C					
										1NM-7B	T	≤ 10	C	O	GL	1/2	E	ARM	C	FAI	C	C					
51	REACTOR COOLANT	YES	M310	A,B	55	A7	1/2	O	Y/N	1NM-22A	T	≤ 10	C	I	GL	1/2	E	ARM	O	FAI	O	C	9-78	YES	YES	AB	NONE
	HOT LEG SAMPLE									1NM-25A	T	≤ 10	C	I	GL	1/2	E	ARM	C	FAI	C	C					
										1NM-26B	T	≤ 10	C	O	GL	1/2	E	ARM	O	FAI	C	C					
										1NM-425	NA	NA	C	I	CK	3/4	N/A	N/A	C	N/A	C	C					
										1NM-489 (V)	NA	NA		I													
										*1NM-283 (V)	NA	NA		I													
										1NM-472 (O)	NA	NA		I													
52	NI ACCUMULATOR	YES	M236	A,B	56	A6	1/2	O	Y/N	1NM-72B	T	≤ 10	C	I	GL	1/2	E	ARM	C	FAI	C	C	9-79	YES	YES	NONE	NONE
	SAMPLE									1NM-75B	T	≤ 10	C	I	GL	1/2	E	ARM	C	FAI	C	C					
										1NM-78B	T	≤ 10	C	I	GL	1/2	E	ARM	C	FAI	C	C					
										1NM-81B	T	≤ 10	C	I	GL	1/2	E	ARM	C	FAI	C	C					
										1NM-69	700 PSIG	NA	C	I	RV	3/4	N/A	N/A	C	N/A	C	C					
										1NM-82A	T	≤ 10	C	O	GL	1/2	E	ARM	C	FAI	C	C					
53	SG A SAMPLE	NO	M335	A,B	57	A7	1/2	O	Y/N	1NM-187A	T	≤ 10	NONE	I	GL	1/2	E	ARM	C	FAI	C	C	9-82	NO	NO	NONE	23
										1NM-190A	T	≤ 10	NONE	I	GL	1/2	E	ARM	O	FAI	O	C					
										1NM-191B	T	≤ 10	NONE	O	GL	1/2	E	ARM	O	FAI	O	C					
										1NM-426	NA	NA	NONE	I	CK	3/4	N/A	N/A	C	N/A	C	C					
54	SG B SAMPLE	NO	M338	A,B	57	A7	1/2	O	Y/N	1NM-197B	T	≤ 10	NONE	I	GL	1/2	E	ARM	C	FAI	C	C	9-82	NO	NO	NONE	23
										1NM-200B	T	≤ 10	NONE	I	GL	1/2	E	ARM	O	FAI	O	C					
										1NM-201A	T	≤ 10	NONE	O	GL	1/2	E	ARM	O	FAI	O	C					
										1NM-427	NA	NA	NONE	I	CK	1"	N/A	N/A	C	N/A	C	C					

* 1NM283 ABANDONED IN PLACE PER EC 112660.

ERN: CN0097R8

DWG: CN-FSAR-677.01-09 REV: 11

APPENDIX A
FROM TABLE 6-77.
(PAGE 10 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47) (6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
55	SG C SAMPLE	NO	M340	A,B	57	A7	1/2	O	Y/N	1NM-207A	T	≤ 10	NONE	I	GL	1/2	E	ARM	C	FAI	C	C	9-82	NO	NO	NONE	23
										1NM-210A	T	≤ 10	NONE	I	GL	1/2	E	ARM	O	FAI	O	C					
										1NM-211B	T	≤ 10	NONE	O	GL	1/2	E	ARM	O	FAI	O	C					
										1NM-428	NA	NA	NONE	I	CK	1/2	N/A	N/A	C	N/A	C	C					
56	SG D SAMPLE	NO	M341	A,B	57	A7	1/2	O	Y/N	1NM-217B	T	≤ 10	NONE	I	GL	1/2	E	ARM	C	FAI	C	C	9-82	NO	NO	NONE	23
										1NM-220B	T	≤ 10	NONE	I	GL	1/2	E	ARM	O	FAI	O	C					
										1NM-221A	T	≤ 10	NONE	O	GL	1/2	E	ARM	O	FAI	O	C					
										1NM-429	NA	NA	NONE	I	CK	1"	N/A	N/A	C	N/A	C	C					
57	COMP COOLING TO RC DRAIN TANK HX	NO	M376	A,B	57	B6	4	I	Y/Y	1KC-322	NA	NA	NONE	I	CK	4	N/A	N/A	O	N/A	O	C	9-38	NO	NO	NONE	37
										1KC-320A	T	≤ 20	NW	O	GT	4	E	ARM	O	FAI	O	C					
										1KC-321 (V)	NA	NA		I													
58	COMP COOLING FROM DRAIN TANK HX	NO	M355	A,B	57	A9	4	O	Y/Y	1KC-332B	T	≤ 20	NW	I	GT	4	E	ARM	O	FAI	O	C	9-38	NO	NO	NONE	37
										1KC-280	NA	NA	NONE	I	CK	1	N/A	N/A	C	N/A	C	C					
										1KC-333A	T	≤ 20	NW	O	GT	4	E	ARM	O	FAI	O	C					
										1KC-823 (D)	NA	NA		O													
										1KC-E58 (V)	NA	NA		I													
59	KC TO RX VESSEL SUPP & RCP COOLERS	YES	M328	A,B	56	B6	8	I	Y/Y	1KC-338B	P	≤ 40	NW	O	GT	8	E	ARM	O	FAI	O	C	9-38	NO (43)	YES	AB	NONE
										1KC-340	NA	NA	C	I	CK	8	N/A	N/A	O	N/A	O	C					
										1KC-339 (V)	NA	NA		I													
60	KC FROM RX VESSEL SUPP & RCP COOLERS VENT UNITS	YES	M321	A,B	56	A9	8	O	Y/Y	1KC-424B	P	≤ 40	NW	I	GT	8	E	ARM	O	FAI	O	C	9-38	NO (43)	YES	AB	NONE
										1KC-425A	P	≤ 40	NW	O	GT	8	E	ARM	O	FAI	O	C					
										1KC-279	NA	NA	C	I	CK	1	N/A	N/A	C	N/A	C	C					
										1KC-861 (V)	NA	NA		I													
										1KC-822 (V)	NA	NA		O													
										1KC-D20	NA	NA		I		1											

ERN: CN0097RA DWG: CN-FSAR-677.01-10 REV: 12

APPENDIX A
FROM TABLE 6-77.
(PAGE 11 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
61	COMP COOLING TO	NO	M218	C	57	D8	4	I	Y/Y	1KC-305B	T	≤ 20	NW	O	GT	4	E	ARM	C	FAI	C	C	9-38	NO (30)	NO	NONE	37
	EXCESS LETDOWN HX									1KC-306 (V)	NA	NA		I													
										1KC-895 (D)	NA	NA		I													
										1KC-310 (V)	NA	NA		I			D			FAI							
										1KC-311	NA	NA		I		3/4	D		C	FAI							
										1KC-312	NA	NA		I		3/4	D		C	FAI							
										1KC-307	NA	NA		I		4			LO								
										1KC-313	135 PSIG	NA		I	RV	3/4	N/A										
										1KC-309	NA	NA		I		4			LO								
										1KC-314 (D)	NA	NA		I													
										1KC-897 (V)	NA	NA		I													
62	COMP COOLING FROM	NO	M217	C	57	D8	4	O	Y/Y	1KC-315B	T	≤ 20	NW	O	GT	4	E	ARM	C	FAI	C	C	9-38	NO (30)	NO	NONE	37
	EXCESS LETDOWN HX									1KC-897 (V)	NA	NA		I													
										1KC-314 (D)	NA	NA		I													
										1KC-309	NA	NA		I		4			LO								
										1KC-313	135 PSIG	NA		I	RV	3/4	N/A										
										1KC-311	NA	NA		I		3/4	D		C	FAI							
										1KC-310 (V)	NA	NA		I			D		C	FAI							
										1KC-307	NA	NA		I		4			LO								
										1KC-895 (D)	NA	NA		I													
										1KC-306 (V)	NA	NA		I													
										1KC-312	NA	NA		I		3/4	D		C	FAI							
63	COMP COOLING TO	YES	M323	A,B	56	A7	2	O	N/N	1KC-47	NA	NA	C	I	CK	3/4	N/A	N/A	C	N/A	C	C	9-40	YES	YES	AB	NONE
	COMP COOLING DRAIN									1KC-429B	T	≤ 10	C	I	GL	2	E	ARM	O	FAI	O	C					
	SUMP									1KC-430A	T	≤ 10	C	O	GL	2	E	ARM	O	FAI	O	C					
										1KC-E60(V)	NA	NA		I													
64	RN TO NC PUMP	YES	M240	A,B	56	B6	12	I	N/Y	1RN-437B	P	≤ 60	NW	O	GT	12	E	ARM	O	FAI	O	C	NONE	NO (43)	YES (42)	AB	NONE
	& LWR CONT VENT									1RN-438	NA	NA	C	I	CK	12	N/A	N/A	O	N/A	O	C					
	UNITS									1RN-908 (D)	NA	NA		O													
										1RN-862 (V)	NA	NA		O													

ERN: CN0097RB

DWG: CN-FSAR-677.01-11 REV: 12

APPENDIX A
FROM TABLE 6-77.
(PAGE 12 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE. IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
65	RN FROM NC	YES	M230	A,B	56	A9	12	O	Y/Y	1RN-484A	P	≤ 60	NW	I	GT	12	E	ARM	O	FAI	O	C	9-28	NO (43)	YES (42)	AB	NONE
	PUMP & LWR CONT									1RN-487B	P	≤ 60	NW	O	GT	12	E	ARM	O	FAI	O	C					
	VENT UNITS									1RN-485	NA	NA	C	I	CK	3/4	N/A	N/A	C	N/A	C	C					
										1RN-907 (D)	NA	NA		I													
66	RN TO UPPER CONT	YES	M385	A,B	56	66	6	I	N/Y	1RN-404B	P	≤ 10	NW	O	GT	6	E	ARM	O	FAI	O	C	NONE	NO (43)	YES (42)	AB	NONE
	VENT UNITS									1RN-405	NA	NA	C	I	CK	6	N/A	N/A	O	N/A	O	C					
										1RN-860 (V)	NA	NA		I													
67	SPARE	YES	M308	48	50	C4	6	N/A	N/A	FLANGED	NA	NA	B	N/A	FLANGED	6	N/A	N/A	C	N/A	N/A	N/A	NONE	NO	NO	NONE	27
68	INCORE INST ROOM	YES	M213	A,B,E	56	A5	12	I	Y/N	1VP-17A	(14) T	NOTE 50	C	I	BF	12	D	AR	LC	C	C	C	9-129	YES	YES	AB	NONE
	PURGE IN									1VP-18B	(14) T	NOTE 50	C	O	BF	12	D	AR	LC	C	C	C					
										1VPPX5130	NA	NA		O													
69	INCORE INST ROOM	YES	M140	A,B,E	56	A5	12	O	Y/Y	1VP-19A	(14) T	NOTE 50	C	I	BF	12	D	AR	LC	C	C	C	9-129	YES	YES	AB	NONE
	PURGE OUT									1VP-20B	(14) T	NOTE 50	C	O	BF	12	D	AR	LC	C	C	C					
										1VPPX5140	NA	NA		O													
70	UPPER	YES	M456	A,B,E	56	A5	24	I	Y/N	1VP-1B	(14) T	NOTE 50	C	O	BF	24	D	AR	LC	C	O	C	9-129	YES	YES	AB	NONE
	COMPARTMENT									1VP-2A	(14) T	NOTE 50	C	I	BF	24	D	AR	LC	C	O	C					
	PURGE INLET									1VPPX5060	NA	NA		O													
71	UPPER	YES	M432	A,B,E	56	A5	24	I	Y/N	1VP-3B	(14) T	NOTE 50	C	O	BF	24	D	AR	LC	C	O	C	9-129	YES	YES	AB	NONE
	COMPARTMENT									1VP-4A	(14) T	NOTE 50	C	I	BF	24	D	AR	LC	C	O	C					
	PURGE INLET									1VPPX5070	NA	NA		O													
72	LOWER	YES	M357	A,B,E	56	A5	24	I	Y/N	1VP-6B	(14) T	NOTE 50	C	O	BF	24	D	AR	LC	C	O	C	9-129	YES	YES	AB	NONE
	COMPARTMENT									1VP-7A	(14) T	NOTE 50	C	I	BF	24	D	AR	LC	C	O	C					
	PURGE INLET									1VPPX5080	NA	NA		O													

ERN: CN0097RC

DWG: CN-FSAR-677.01-12 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 13 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
73	LOWER	YES	M434	A,B,E	56	A5	24	I	Y/N	1VP-8B	(14) T	NOTE 50	C	O	BF	24	D	AR	LC	C	O	C	9-129	YES	YES	AB	NONE
	COMPARTMENT									1VP-9A	(14) T	NOTE 50	C	I	BF	24	D	AR	LC	C	O	C					
	PURGE INLET									1VPPX5090	NA	NA		O													
74	CONT PURGE	YES	M368	A,B,E	56	A5	24	O	Y/Y	1VP-10A	(14) T	NOTE 50	C	I	BF	24	D	AR	LC	C	O	C	9-129	YES	YES	AB	NONE
	EXHAUST									1VP-11B	(14) T	NOTE 50	C	O	BF	24	D	AR	LC	C	O	C					
										1VPPX5100	NA	NA		O													
75	CONT PURGE	YES	M433	A,B,E	56	A5	24	O	Y/Y	1VP-12A	(14) T	NOTE 50	C	I	BF	24	D	AR	LC	C	O	C	9-129	YES	YES	AB	NONE
	EXHAUST									1VP-13B	(14) T	NOTE 50	C	O	BF	24	D	AR	LC	C	O	C					
										1VPPX5110	NA	NA		O													
76	CONT PURGE	YES	M119	A,B,E	56	A5	24	O	Y/Y	1VP-15A	(14) T	NOTE 50	C	I	BF	24	D	AR	LC	C	O	C	9-129	YES	YES	AB	NONE
	EXHAUST									1VP-16B	(14) T	NOTE 50	C	O	BF	24	D	AR	LC	C	O	C					
										1VPPX5120	NA	NA		O													
77	SG D BLOWDOWN	NO	M455	A,B	57	A7	4	O	Y/Y	1BB-8A	T	≤ 10	NONE	I	GT	4	E	ARM	O	FAI	C	C	10-29	NO	NO	NONE	23
										1BB-10B	T	≤ 10	NONE	O	GT	4	E	ARM	O	FAI	C	C					
										1BB-52	NA	NA	NONE	I	CK	3/4	N/A	N/A	C	N/A	C	C					
										1BB-147B	T	≤ 10	NONE	O	GL	1	E	ARM	C	FAI	C	C					
										1BB-122 (D)	NA	NA		I													
78	SG A BLOWDOWN	NO	M142	A,B	57	A7	4	O	Y/Y	1BB-56A	T	≤ 10	NONE	I	GT	4	E	ARM	O	FAI	C	C	10-29	NO	NO	NONE	23
										1BB-57B	T	≤ 10	NONE	O	GT	4	E	ARM	O	FAI	C	C					
										1BB-53	NA	NA	NONE	I	CK	3/4	N/A	N/A	C	N/A	C	C					
										1BB-148B	T	≤ 10	NONE	O	GL	1	E	ARM	C	FAI	C	C					
										1BB-123 (D)	NA	NA		I													
79	SG C BLOWDOWN	NO	M3105	A,B	57	A7	4	O	Y/Y	1BB-60A	T	≤ 10	NONE	I	GT	4	E	ARM	O	FAI	C	C	10-29	NO	NO	NONE	23
										1BB-61B	T	≤ 10	NONE	O	GT	4	E	ARM	O	FAI	C	C					
										1BB-54	NA	NA	NONE	I	CK	3/4	N/A	N/A	C	N/A	C	C					
										1BB-149B	T	≤ 10	NONE	O	GL	1	E	ARM	C	FAI	C	C					
										1BB-62 (V)	NA	NA		I													

ERN: CN0097RD DWG: CN-FSAR-677.01-13 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 14 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
80	SG B BLOWDOWN	NO	M277	A,B	57	A7	4	O	Y/Y	1BB-19A	T	≤ 10	NONE	I	GT	4	E	ARM	O	FAI	C	C	10-29	NO	NO	NONE	23
										1BB-21B	T	≤ 10	NONE	O	GT	4	E	ARM	O	FAI	C	C					
										1BB-55	NA	NA	NONE	I	CK	3/4	N/A	N/A	C	N/A	C	C					
										1BB-150B	T	≤ 10	NONE	O	GL	1	E	ARM	C	FAI	C	C					
										1BB-125 (V)	NA	NA		I													
										1BB-20 (D)	NA	NA		O													
81	CONT AIR RELEASE	YES	M386	A,B,E	56	A5	4	O	Y/N	1VQ-2A	(14) T	≤ 5	C	I	DP	4	E	ARM	C	FAI	C	C	9-194	YES	YES	AB	NONE
										1VQ-3B	(14) T	≤ 5	C	O	GT	4	E	ARM	C	FAI	C	C					
82	CONT AIR ADDITION	YES	M204	A,B,E	56	A5	4	I	Y/N	1VQ-15B	(14)T	≤ 5	C	O	GT	4	E	ARM	C	FAI	C	C	9-194	YES	YES	AB	NONE
										1VQ-16A	(14) T	≤ 5	C	I	DP	4	E	ARM	C	FAI	C	C					
83	FEEDWATER A	NO	M110	C	57	D1	18	I	Y/N	1CF-33	S	NA	NONE	O	GT	18	H	AR	O	C	C	C	10-28	NO	NO	NONE	23
										1CF-91	NA	NA	NONE	O	GL	3/4	HW	N/A	LC	N/A	C	C					
										1CF-90	S	NA	NONE	O	GT	2	D	AR	C	C	C	C					
										1CF-92	NA	NA		O	CK	3/4											
										1CFPX5830	NA	NA		I													
										1CFPX5840	NA	NA		I													
84	FEEDWATER B	NO	M262	C	57	D1	18	I	Y/N	1CF-42	S	NA	NONE	O	GT	18	H	AR	O	C	C	C	10-28	NO	NO	NONE	23
										1CF-93	NA	NA	NONE	O	GL	3/4	HW	N/A	LC	N/A	C	C					
										1CF-89	S	NA	NONE	O	GT	2	D	AR	C	C	C	C					
										1CF-94	NA	NA		O	CK	3/4											
										1CFPX5850	NA	NA		I													
										1CFPX5860	NA	NA		I													
85	FEEDWATER C	NO	M309	C	57	D1	18	I	Y/N	1CF-51	S	NA	NONE	O	GT	18	H	AR	O	C	C	C	10-28	NO	NO	NONE	23
										1CF-95	NA	NA	NONE	O	GL	3/4	HW	N/A	LC	N/A	C	C					
										1CF-88	S	NA	NONE	O	GT	2	D	AR	C	C	C	C					
										1CF-96	NA	NA		O	CK	3/4											
										1CFPX5870	NA	NA		I													
										1CFPX5880	NA	NA		I													
86	FEEDWATER D	NO	M422	C	57	D1	18	I	Y/N	1CF-60	S	NA	NONE	O	GT	18	H	AR	O	C	C	C	10-28	NO	NO	NONE	23
										1CF-97	NA	NA	NONE	O	GL	3/4	HW	N/A	LC	N/A	C	C					
										1CF-87	S	NA	NONE	O	GT	2	D	AR	C	C	C	C					
										1CF-98	NA	NA		O	CK	3/4											
										1CFPX5890	NA	NA		I													
										1CFPX5900	NA	NA		I													

ERN: CN0097RE

DWG: CN-FSAR-677.01-14 REV: 9

APPENDIX A
FROM TABLE 6-77.
(PAGE 15 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
87	AUX FEEDWATER A	NO	M143	C	57	D1	4	I	Y/Y	1CA-62A	NA	NA	NONE	O	GT	4	E	RM	O	FAI	O	O	10-34	NO	NO	NONE	23
										1CA-66B	NA	NA	NONE	O	GT	4	E	RM	O	FAI	O	O	10-34				
										1CA-121	NA	NA	NONE	O	GL	3/4	HW	N/A	LC	N/A	C	C	10-34				
										1CA-149	S	NA	NONE	O	GT	4	P	AR	C(12)	C	C	C	10-34				
										1BW-1	NA	NA	NONE	O	GT	2	HW	N/A	LC	N/A	C	C	NONE				
										1CA-185	S	NA	NONE	O	GT	2	P	AR	O	C	C	C	10-34				
										1CF-151	NA	NA	NONE	O	GT	2	HW	N/A	LC	C	C	C	10-28				
										1CF-90	S	NA	NONE	O	GT	2	D						10-28				
										1CA-197 (D)	NA	NA	NONE	I									10-34				
										1CA-165 (D)	NA	NA	NONE	I									10-34				
										1CA-219 (V)	NA	NA	NONE	O									10-34				
										1CA-200 (V)	NA	NA	NONE	O									10-34				
										1CA-208 (V)	NA	NA	NONE	O									10-34				
										1CF-147	NA	NA	NONE	O	CK	2											
										1CA-134	NA	NA	NONE	O	CK	3/4											
										1CA-157	NA	NA	NONE	O	CK	4											
										1CA-189	NA	NA	NONE	O	CK	2											
										1CA-223	NA	NA	NONE	O		2											
										1CAFE5090	NA	NA	NONE	O									10-34				
										1CAFT5090	NA	NA	NONE	O													
										1CAFT5091	NA	NA	NONE	O													
										1CAFT5092	NA	NA	NONE	O													
88	AUX FEEDWATER B	NO	M278	C	57	D1	4	I	Y/Y	1CA-54B	NA	NA	NONE	O	GT	4	E	RM	O	FAI	O	O	10-34	NO	NO	NONE	23
										1CA-58A	NA	NA	NONE	O	GT	4	E	RM	O	FAI	O	O	10-34				
										1CA-120	NA	NA	NONE	O	GL	3/4	HW	N/A	LC	N/A	C	C	10-34				
										1CA-150	S	NA	NONE	O	GT	4	P	AR	C(12)	C	C	C	10-34				
										1BW-26	NA	NA	NONE	O	GT	2	HW	N/A	LC	N/A	C	C	NONE				
										1CA-186	S	NA	NONE	O	GT	2	P	AR	O	C	C	C	10-34				
										1CF-152	NA	NA	NONE	O	GT	2	HW	N/A	LC	C	C	C	10-28				
										1CF-89	S	NA	NONE	O	GT	2	D						10-28				
										1CF-148	NA	NA	NONE	O	CK	2											
										1CA-198 (D)	NA	NA	NONE	I									10-34				
										1CA-217 (D)	NA	NA	NONE	I									10-34				
										1CA-166 (D)	NA	NA	NONE	O									10-34				
										1CA-220 (V)	NA	NA	NONE	O									10-34				
										1CA-207 (V)	NA	NA	NONE	O									10-34				
										1CA-201 (V)	NA	NA	NONE	O									10-34				
										1CA-133	NA	NA	NONE	O	CK	3/4											
										1CA-159	NA	NA	NONE	O	CK	4											
										1CA-190	NA	NA	NONE	O	CK	2											
										1CA-224	NA	NA	NONE	O		2											
										1CAFE5100	NA	NA	NONE	O									10-34				
										1CAFT5100	NA	NA	NONE	O													
										1CAFT5101	NA	NA	NONE	O													
										1CAFT5102	NA	NA	NONE	O													

ERN: CN0097RF **DWG:** CN-FSAR-677.01-15 **REV:** 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 16 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47) (6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
89	AUX FEEDWATER C	NO	M31Ø6	C	57	D1	4	I	Y/Y	1CA-46B	NA	NA	NONE	O	GT	4	E	RM	O	FAI	O	O	1Ø-34	NO	NO	NONE	23
										1CA-5ØA	NA	NA	NONE	O	GT	4	E	RM	O	FAI	O	O	1Ø-34				
										1CA-119	NA	NA	NONE	O	GL	3/4	HW	N/A	LC	N/A	C	C	1Ø-34				
										1CA-151	S	NA	NONE	O	GT	4	P	AR	C(12)	C	C	C	1Ø-34				
										1BW-17	NA	NA	NONE	O	GT	2	HW	N/A	LC	N/A	C	C	NONE				
										1CA-187	S	NA	NONE	O	GT	2	P	AR	O	C	C	C	1Ø-34				
										1CF-153	NA	NA	NONE	O	GT	2	HW	N/A	LC	C	C	C	1Ø-28				
										1CF-88	S	NA	NONE	O	GT	2	D						1Ø-28				
										1CF-149	NA	NA	NONE	O	CK	2											
										1CA-218 (D)	NA	NA	NONE	I									1Ø-34				
										1CA-168 (D)	NA	NA	NONE	O									1Ø-34				
										1CA-2Ø3 (D)	NA	NA	NONE	O									1Ø-34				
										1CA-216 (V)	NA	NA	NONE	O									1Ø-34				
										1CA-221 (V)	NA	NA	NONE	O									1Ø-34				
										1CA-2Ø2 (V)	NA	NA	NONE	O									1Ø-34				
										1CA-182 (D)	NA	NA	NONE	O									1Ø-34				
										1CA-2Ø6 (V)	NA	NA	NONE	O									1Ø-34				
										1CA-132	NA	NA	NONE	O	CK	3/4											
										1CA-161	NA	NA	NONE	O	CK	4											
										1CA-191	NA	NA	NONE	O	CK	2											
										1CA-225	NA	NA	NONE	O		2											
										1CAFE511Ø	NA	NA	NONE	O									1Ø-34				
										1CAFT511Ø	NA	NA	NONE	O													
										1CAFT5111	NA	NA	NONE	O													
										1CAFT5112	NA	NA	NONE	O													
9Ø	AUX FEEDWATER D	NO	M457	C	57	D1	4	I	Y/Y	1CA-38A	NA	NA	NONE	O	GT	4	E	RM	O	FAI	O	O	1Ø-34	NO	NO	NONE	23
										1CA-42B	NA	NA	NONE	O	GT	4	E	RM	O	FAI	O	O	1Ø-34				
										1CA-118	NA	NA	NONE	O	GL	3/4	HW	N/A	LC	N/A	C	C	1Ø-34				
										1CA-152	S	NA	NONE	O	GT	4	P	AR	C(12)	C	C	C	1Ø-34				
										1BW-1Ø	NA	NA	NONE	O	GT	2	HW	N/A	LC	N/A	C	C	NONE				
										1CA-188	S	NA	NONE	O	GT	2	P	AR	O	C	C	C	1Ø-34				
										1CF-154	NA	NA	NONE	O	GT	2	HW	N/A	LC	C	C	C	1Ø-28				
										1CF-87	S	NA	NONE	O	GT	2	D						1Ø-28				
										1CF-15Ø	NA	NA	NONE	O	CK	2											
										1CA-222 (V)	NA	NA	NONE	O									1Ø-34				
										1CA-199 (D)	NA	NA	NONE	I									1Ø-34				
										1CA-169 (D)	NA	NA	NONE	O									1Ø-34				
										1CA-2Ø4 (V)	NA	NA	NONE	O									1Ø-34				
										1CA-17Ø (V)	NA	NA	NONE	O									1Ø-34				
										1CA-2Ø5 (V)	NA	NA	NONE	O									1Ø-34				
										1CA-2Ø9 (V)	NA	NA	NONE	O									1Ø-34				
										1CA-135	NA	NA	NONE	O	CK	3/4											
										1CA-163	NA	NA	NONE	O	CK	4											
										1CA-192	NA	NA	NONE	O	CK	2											
										1CA-226	NA	NA	NONE	O		2											
										1CAFE512Ø	NA	NA	NONE	O									1Ø-34				
										1CAFT512Ø	NA	NA	NONE	O													
										1CAFT5121	NA	NA	NONE	O													
										1CAFT5122	NA	NA	NONE	O													

ERN: CNØØ97S2 **DWG:** CN-FSAR-677.Ø1-16 **REV:** 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 17 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
91	MAIN STEAM A	NO	M113	C	57	D3	34	O	Y/Y	1SM-7	P	NA	NONE	O	GL	34	P	AR	O	C	O	C	10-5	NO	NO	NONE	23
										1SV-20	1175 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-21	1190 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-22	1205 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-23	1220 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-24	1230 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-19	P	NA	NONE	O	GT	6	P	AR	C	C	C	C	10-5				
										1SM-12	P	NA	NONE	O	GL	3	D	AR	C	C	C	C	10-5				
										1SM-16 (D)	NA	NA	NONE	O			HW	N/A	LC	N/A	C	C	10-5				
										1SM-73	NA	NA	NONE	O	GL		HW	N/A	LC	N/A	C	C	10-5				
										1SM-77A	NA	NA	NONE	O	GT	2	E	R	O	N/A	O	C	10-5				
										1SM-105	NA	NA	NONE	O	GT	2	HW	N/A	LC	N/A	C	C	10-5				
										1SM-121 (V)	NA	NA	NONE	I			HW	N/A	LC	N/A	C	C	10-5				
										1SM-143 (S)	NA	NA	NONE	O			HW	N/A	LC	N/A	C	C	10-5				
										1SV-67 (V)	NA	NA	NONE	O			HW	N/A	C	N/A	C	C	10-5				
										1SV-27A	NA	NA	NONE	O	GT	6	E		O				10-5				
										1SV-74	NA	NA	NONE	O		3/4											
										1SMFE5000	NA	NA	NONE	I													
										1SMFE5790	NA	NA	NONE	O													
										1SMLS5710	NA	NA	NONE	O													
										1SMPT5080	NA	NA	NONE	O													
										1SMPT5081	NA	NA	NONE	O													
										1SMPT5090	NA	NA	NONE	O													
										1SMPT5100	NA	NA	NONE	O													
										1SMPT5520	NA	NA	NONE	O													
										1SVFE5200	NA	NA	NONE	O													
										1SMFT5000	NA	NA	NONE	O													
										1SMFT5010	NA	NA	NONE	O													
										PX TO 1SV-19	NA	NA	NONE	O													

ERN: CN0097RM

DWG: CN-FSAR-677.01-17 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 18 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47) (6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
92	MAIN STEAM B	NO	M261	C	57	D7	34	O	Y/Y	1SM-5	P	NA	NONE	O	GL	34	P	AR	O	C	O	C	10-5	NO	NO	NONE	23
										1SV-14	1175 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-15	1190 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-16	1205 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-17	1220 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-18	1230 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-13	P	NA	NONE	O	GT	6	P	AR	C	C	C	C	10-5				
										1SM-11	P	NA	NONE	O	GL	3	D	AR	C	C	C	C	10-5				
										1SM-72	NA	NA	NONE	O	GL	1	HW	N/A	LC	N/A	C	C	10-5				
										1SM-76B	NA	NA	NONE	O	GT	2	E	R	O	N/A	O	C	10-5				
										1SM-104	NA	NA	NONE	O	GT	2	HW	N/A	LC	N/A	C	C	10-5				
										1SM-120 (V)	NA	NA	NONE	I			HW	N/A	LC	N/A	C	C	10-5				
										1SM-142 (S)	NA	NA	NONE	O			HW	N/A	LC	N/A	C	C	10-5				
										1SA-1	NA	NA	NONE	O	GT	6	HW	N/A	LO*	N/A	O	O	10-6				
										1SM-17 (D)	NA	NA	NONE	O			HW	N/A	LC	N/A	C	C	10-5				
										1SV-66 (V)	NA	NA	NONE	O			HW	N/A	C	N/A	C	C	10-5				
										1SV-28A	NA	NA	NONE	O	GT	6	E		O				10-5				
										1SV-75	NA	NA	NONE	O		3/4											
										1SMFE5020	NA	NA	NONE	I													
										1SMFE5780	NA	NA	NONE	O													
										1SMFT5020	NA	NA	NONE	O													
										1SMFT5030	NA	NA	NONE	O													
										1SMLS5700	NA	NA	NONE	O													
										1SMPT5110	NA	NA	NONE	O													
										1SMPT5111	NA	NA	NONE	O													
										1SMPT5120	NA	NA	NONE	O													
										1SMPT5130	NA	NA	NONE	O													
										1SMPT5510	NA	NA	NONE	O													
										1SVFE5210	NA	NA	NONE	O													
										PX TO 1SV-13	NA	NA	NONE	O													

*VALVE IS ADMIN LOCKED OPENED PER ITS 3.7.5

ERN: CN0097R0 DWG: CN-FSAR-677.01-18 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 19 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47) (6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
93	MAIN STEAM C	NO	M393	C	57	07	34	O	Y/Y	1SM-3	P	NA	NONE	O	GL	34	P	AR	O	C	O	C	10-5	NO	NO	NONE	23
										1SV-8	1175 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-9	1190 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-10	1205 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-11	1220 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-12	1230 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-7	P	NA	NONE	O	GT	6	P	AR	C	C	C	C	10-5				
										1SM-10	P	NA	NONE	O	GL	3	D	AR	C	C	C	C	10-5				
										1SM-18 (D)	NA	NA	NONE	O			HW	N/A	LC	N/A	C	C	10-5				
										1SM-71	NA	NA	NONE	O	GL	1	HW	N/A	LC	N/A	C	C	10-5				
										1SM-75A	NA	NA	NONE	O	GT	2	E	R	O	N/A	O	C	10-5				
										1SM-103	NA	NA	NONE	O	GT	2	HW	N/A	LC	N/A	C	C	10-5				
										1SM-119 (V)	NA	NA	NONE	I			HW	N/A	LC	N/A	C	C	10-5				
										1SM-141 (S)	NA	NA	NONE	O			HW	N/A	LC	N/A	C	C	10-5				
										1SA-4	NA	NA	NONE	O	GT	6	HW	N/A	LO*	N/A	O	O	10-6				
										1SV-65 (V)	NA	NA	NONE	O			HW	N/A	C	N/A	C	C	10-5				
										1SV-26B	NA	NA	NONE	O	GT	6	E		O				10-5				
										1SV-73	NA	NA	NONE	O		3/4											
										1SMFE5040	NA	NA	NONE	I													
										1SMFE5770	NA	NA	NONE	O													
										1SMFT5040	NA	NA	NONE	O													
										1SMFT5050	NA	NA	NONE	O													
										1SMLS5690	NA	NA	NONE	O													
										1SMPT5500	NA	NA	NONE	O													
										1SMPT5160	NA	NA	NONE	O													
										1SMPT5150	NA	NA	NONE	O													
										1SMPT5141	NA	NA	NONE	O													
										1SMPT5140	NA	NA	NONE	O													
										1SVFE5220	NA	NA	NONE	O													
										PX TO 1SV-65	NA	NA	NONE	O													
													*VALVE IS ADMIN LOCKED OPENED PER ITS 3.7.5														

ERN: CN0097RR

DWG: CN-FSAR-677.01-19 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 20 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
94	MAIN STEAM D	NO	M423	C	57	D3	34	O	Y/Y	1SM-1	P	NA	NONE	O	GL	34	P	AR	O	C	O	C	10-5	NO	NO	NONE	23
										1SV-2	1175 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-3	1190 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-4	1205 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-5	1220 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-6	1230 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C	10-5				
										1SV-1	P	NA	NONE	O	GT	6	P	AR	C	C	C	C	10-5				
										1SM-9	P	NA	NONE	O	GL	3	D	AR	C	C	C	C	10-5				
										1SM-19 (D)	NA	NA	NONE	O			HW	N/A	LC	N/A	C	C	10-5				
										1SM-70	NA	NA	NONE	O	GL	1	HW	N/A	LC	N/A	C	C	10-5				
										1SM-74B	NA	NA	NONE	O	GT	2	E	R	O	N/A	O	C	10-5				
										1SM-102	NA	NA	NONE	O	GT	2	HW	N/A	LC	N/A	C	C	10-5				
										1SM-118 (V)	NA	NA	NONE	I			HW	N/A	LC	N/A	C	C	10-5				
										1SM-140 (S)	NA	NA	NONE	O			HW	N/A	LC	N/A	C	C	10-5				
										1SV-64 (V)	NA	NA	NONE	O			HW	N/A	C	N/A	C	C	10-5				
										1SV-25B	NA	NA	NONE	O	GT	6	E		O				10-5				
										1SV-72	NA	NA	NONE	O		3/4											
										1SMFE5060	NA	NA	NONE	I													
										1SMFE5760	NA	NA	NONE	O													
										1SMFT5070	NA	NA	NONE	O													
										1SMFT5060	NA	NA	NONE	O													
										1SMLS5680	NA	NA	NONE	O													
										1SMPT5170	NA	NA	NONE	O													
										1SMPT5171	NA	NA	NONE	O													
										1SMPT5180	NA	NA	NONE	O													
										1SMPT5190	NA	NA	NONE	O													
										1SMPT5490	NA	NA	NONE	O													
										1SVFE5230	NA	NA	NONE	O													
										PX TO 1SV-1	NA	NA	NONE	O													
95	INTERIOR FIRE PROTECTION	YES	M316	A,B	56	B6	6	I	N/N	1RF-389B	T	≤ 5	NW	O	GT	4	E	ARM	C	FAI	C	C	9-140	NO (43)	YES (42)	AB	NONE
										1RF-392	NA	NA	C	I	CK	4	N/A	N/A	C	N/A	C	C					
										1RF-410 (D)	NA	NA		I													
										1RF-390 (V)	NA	NA		O													
96	DEMIN WATER	YES	M337	A,B	56	B1	2	I	N/N	1YM-119B	T	≤ 10	C	O	GL	2	E	ARM	O	FAI	O	C	9-45	YES	YES	AB	NONE
										1YM-121	NA	NA	C	I	CK	2	N/A	N/A	O	N/A	O	C					
										1YM-317 (D)	NA	NA		I													
										1YM-120 (V)	NA	NA		O													
97	INSTRUMENT AIR	YES	M220	A,B	56	B1	2	I	N/N	1VI-77B	P	<11(53)	C	O	DP	2	E	ARM	O	FAI	O	C	9-71	YES	YES	AB	NONE
										1VI-79	NA	NA	C	I	CK	2	N/A	N/A	O	N/A	O	C					
										1VI-312A	T	≤ 10	C	O	GL	2	E	ARM	O	FAI	O	C					
										1VI-78 (V)	NA	NA		O													
98	STATION AIR	YES	M219	A,B	56	B7	3	I	N/N	1VS-54B	T	≤ 15	C	O	GT	3	E	ARM	C	FAI	O	C	9-74	YES	YES	AB	NONE
										1VS-56	NA	NA	C	I	CK	3	N/A	N/A	C	N/A	O	C					
										1VS-809 (V)	NA	NA		O													
										1VS-55 (V)	NA	NA		O													

ERN: CN0097RT DWG: CN-FSAR-677.01-20 REV: 9

APPENDIX A
FROM TABLE 6-77,
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UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
99	BREATHING AIR	YES	M215	A,B	56	B7	2	I	N/N	1VB-83B	T	<11(53)	C	O	DP	2	E	ARM	C	FAI	O	C	9-77	YES	YES	AB	NONE
										1VB-85	NA	NA	C	I	CK	2	N/A	N/A	C	N/A	O	C					
										1VB-84 (V)	NA	NA		O													
100	CONT PRESS	YES	CNIP-	48	56	C5	1/2	NONE	Y/Y	(41)			(49)														
	SENSING CHII		1NS9							1NSSV0020	NA	NA	C	O	GL	1/2	S	N/A	O	O	O	O	NONE	YES	YES	AB	NONE
										1NSLP5060	NA	NA	C	O													
										1NSLP5170	NA	NA	C	O													
										1NSLP5180	NA	NA	C	O													
										1VQLP5040	NA	NA	C	O													
101	CONT PRESS	YES	CNIP-	48	56	C5	1/2	NONE	Y/Y	(41)			(49)														
	SENSING CHI		1NS12							1NSSV0010	NA	NA	C	O	GL	1/2	S	N/A	O	O	O	O	NONE	YES	YES	AB	NONE
										1NSLP5070	NA	NA	C	O													
										1NSLP5160	NA	NA	C	O													
										1NSLP5190	NA	NA	C	O													
										1NSLP5370	NA	NA	C	O													
102	CONT PRESS	YES	CNIP-	48	56	C5	1/2	NONE	Y/Y	(41)			(49)														
	SENSING CHIII		1NS10							1NSSV0030	NA	NA	C	O	GL	1/2	S	N/A	O	O	O	O	NONE	YES	YES	AB	NONE
										1NSLP5050	NA	NA	C	O													
										1NSLP5250	NA	NA	C	O													
										1NSLP5260	NA	NA	C	O													
103	CONT PRESS	YES	CNIP-	48	56	C5	1/2	NONE	Y/Y	(41)			(49)														
	SENSING CHIV		1NS11							1NSSV0040	NA	NA	C	O	GL	1/2	S	N/A	O	O	O	O	NONE	YES	YES	AB	NONE
										1NSLP5040	NA	NA	C	O													
										1NSLP5240	NA	NA	C	O													
										1NSLP5270	NA	NA	C	O													
										1NSLP5380	NA	NA	C	O													
104	EQPT HATCH	YES	C400	48	50	C2	240	NONE	N/N	NONE	NA	NA	B	I	DS/FG				C		C	C	3-260	NO	NO	YRD	27
105	PSL HATCH (5)	YES	NONE	48	50	NA	115	NONE	N/N	NONE	NA	NA	B	I	DS				C		C	C	3-260	NO	NO	NONE	27
106	REACTOR COOLANT	YES	M329	A,B	56	A5	2	I	Y/Y	1NC-195B	T	≤ 10	C	O	GT	2	E	ARM	C	FAI	C	C	5-6	YES	YES	AB	NONE
	PUMP MTR OIL FILL									1NC-196A	T	≤ 10	C	I	GT	2	E	ARM	C	FAI	C	C					
107	REACTOR BUILDING	YES	M361	A,B	56	B6	6	I	N/N	1RF-447B	T	≤ 5	NW	O	GT	4	E	ARM	C	FAI	C	C	9-140	NO (43)	YES (42)	AB	NONE
	SPRINKLERS									1RF-448	NA	NA	C	I	CK	4	N/A	N/A	C	C	C	C					
										1RF-142 (V)	NA	NA		I													
108	CONT VALVE INJ	NO	M253	A,B	56	B7	1	I	Y/Y	1NW-35A	T	NA	NONE	O	GL	1	E	ARM	C	FAI	C	O	6-116	NO	NO	NONE	38
	WTR A TRAIN									1NW-37	NA	NA	NONE	I	CK	1	N/A	N/A	C	C	C	O					
										1NW-36 (V)	NA	NA		O													

ERN: CN0097RV **DWG:** CN-FSAR-677.01-21 **REV:** 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 22 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
109	CONT VALVE INJ	NO	M243	A,B	56	B7	1	I	Y/Y	1NW-105B	T	NA	NONE	O	GL	1	E	ARM	C	FAI	C	O	6-116	NO	NO	NONE	38
	WTR B TRAIN									1NW-107	NA	NA	NONE	I	CK	1	N/A	N/A	C	N/A	C	O					
										1NW-106 (V)	NA	NA		O													
110	STBY MAKEUP	YES	M228	A,B	56	B7	2	I	N/N	1NV-872A	T	≤ 10	C	O	GL	2	E	ARM	C	FAI	C	C	9-95	YES	YES	NONE	NONE
	PUMP DISCHARGE									1NV-874	NA	NA	C	I	CK	2	N/A	N/A	C	N/A	C	C					
	LINE									1NV-873 (V)	NA	NA		O													
111	CON RADIATION	YES	CNIP-	A,B	56	A1	3/4	O		1MISV5230	T	≤ 2	C	O	GL	1	S	A	O	C	O	C	NONE	YES	YES	AB	NONE
	MONITOR		EMF							1MISV5231	T	≤ 2	C	I	GL	1	S	A	O	C	O	C					
			(IN)																								
112	CON RADIATION	YES	CNIP-	A,B	56	A1	3/4	I		1MISV5232	T	≤ 2	C	O	GL	1	S	A	O	C	O	C	NONE	YES	YES	AB	NONE
	MONITOR		EMF							1MISV5233	T	≤ 2	C	I	GL	1	S	A	O	C	O	C					
			(OUT)																								
113	ILRT PRESS LINE	YES	CNIP-	A,B	56	A4	1/2	NONE		1MIMV6481	NA	NA	C	O	GL	1/2	HW	N/A	C		C	C	NONE	NO (29)	YES	YRD	NONE
	LOWER CONTAIN		MI 5							1MIMV6480	NA	NA	C	I	GL	1/2	HW	N/A	C		C	C					
114	ILRT PRESS LINE	YES	CNIP-	A,B	56	A4	1/2	NONE		1MIMV6491	NA	NA	C	O	GL	1/2	HW	N/A	C		C	C	NONE	NO (29)	YES	YRD	NONE
	ICE COND		MI 6							1MIMV6490	NA	NA	C	I	GL	1/2	HW	N/A	C		C	C					
115	ILRT PRESS LINE	YES	CNIP-	A,B	56	A4	1/2	NONE		1MIMV6471	NA	NA	C	O	GL	1/2	HW	N/A	C		C	C	NONE	NO (29)	YES	YRD	NONE
	UPPER CONTAIN		MI 7							1MIMV6470	NA	NA	C	I	GL	1/2	HW	N/A	C		C	C					
116	CON ATMOS H2	YES	CNIP-	48	56	A1	1/2	O		1MISV0070 (41)	NA	NA	C (49)	I	GL	1/2	S	N/A	C	C	C	C/O	NONE	YES	YES	AB	NONE
	CONC LEVEL		MI 1		RG1.11					1MISV0110 (41)	NA	NA	C (49)	O	GL	1/2	S	N/A	C	C	C	C/O					
	XMITTER (IN)		M274							1MISV0150	NA	NA	C (49)		GL	1/2	S	N/A	C	C	C	C					
	TRAIN A																										

ERN: CN0097RX

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APPENDIX A
FROM TABLE 6-77,
(PAGE 23 OF 23)
UNIT 1 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
117	CONT ATMOS H2	YES	CNIP-	48	56	A1	1/2	I		1MISV0090 (41)	NA	NA	C (49)	I	GL	1/2	S	N/A	C	C	C	C/O	NONE	YES	YES	AB	NONE
	CONC LEVEL		MI 3		RG1.11					1MISV0130 (41)	NA	NA	C (49)	O	GL	1/2	S	N/A	C	C	C	C/O					
	XMITTER (OUT)		M274							1MISV0170	NA	NA	C (49)		GL	1/2	S	N/A	C	C	C	C					
	TRAIN A																										
118	CONT ATMOS H2	YES	CNIP-	48	56	A1	1/2	O		1MISV0080 (41)	NA	NA	C (49)	I	GL	1/2	S	N/A	C	C	C	C/O	NONE	YES	YES	AB	NONE
	CONC LEVEL		IMI 2		RG1.11					1MISV0120 (41)	NA	NA	C (49)	O	GL	1/2	S	N/A	C	C	C	C/O					
	XMITTER (IN)		M274							1MISV0160	NA	NA	C (49)		GL	1/2	S	N/A	C	C	C	C					
	TRAIN B																										
119	CONT ATMOS H2	YES	CNIP-	48	56	A1	1/2	I		1MISV0100 (41)	NA	NA	C (49)	I	GL	1/2	S	N/A	C	C	C	C/O	NONE	YES	YES	AB	NONE
	CONC LEVEL		IMI 4		RG1.11					1MISV0140 (41)	NA	NA	C (49)	O	GL	1/2	S	N/A	C	C	C	C/O					
	XMITTER (OUT)		M274							1MISV0180	NA	NA	C (49)		GL	1/2	S	N/A	C	C	C	C					
	TRAIN B																										
120	LOWER PERSONNEL	YES	C100	48	50	NA	115	NONE	N/N	CONT DOOR	NA	NA	B	I	DS				C		C	C	3-260	NO	NO	NONE	27
	AIR LOCK									AUX DOOR	NA	NA	B	O	DS				C		C	C					
121	UPPER PERSONNEL	YES	C300	48	50	NA	115	NONE	N/N	CONT DOOR	NA	NA	B	I	DS				C		C	C	3-260	NO	NO	NONE	27
	AIR LOCK									AUX DOOR	NA	NA	B	O	DS				C		C	C					
122	LOWER PAL AIR	YES	PC24	A,B	56	B7	3/4	I		1IASV5160	T	≤ 2	C	O	GL	3/4	S	A	O	C	O	C	NONE	NA	YES	AB	NONE
	SUPPLY									1IACV5350	NA	NA	C	I	CK	1/2	N/A	N/A	O		O	C					
122A	LOWER PAL LEAK	YES	PC23	48	56	C1				1IASV5410	T	≤ 2	C	O	GL	3/4	S		C		C	C		NA	YES	AB	NONE
	TEST																										
123	LOWER PAL	YES	BULK	A,B	56	NA	2	NONE		1IACV5390	NA	NA	C	O	CK	2	NA		C		C	C	NONE	NA	YES	NONE	NONE
	EQUALIZATION LINE		HEAD							1IACV5370	NA	NA	C	I	CK	2	NA		C		C	C					
124	UPPER PAL AIR	YES	PC24	A,B	56	B7	3/4	I		1IASV5080	T	≤ 2	C	O	GL	3/4	S	A	O	C	O	C	NONE	NA	YES	AB	NONE
	SUPPLY									1IACV5340	NA	NA	C	I	CK	1/2	N/A	N/A	O		O	C					
124A	UPPER PAL LEAK	YES	PC23	48	56	C1				1IASV5400	T	≤ 2	C	O	GL	3/4	S		C		C	C		NA	YES	AB	NONE
	TEST																										
125	UPPER PAL	YES	BULK	A,B	56	NA	2	NONE		1IACV5380	NA	NA	C	O	CK	2	NA		C		C	C	NONE	NA	YES	NONE	NONE
	EQUALIZATION LINE		HEAD							1IACV5360	NA	NA	C	I	CK	2	NA		C		C	C					
126	SPARE	YES	M452	48	50	C4	20			NONE	NA	NA	B		FLANGE	20			C		NA	NA	NONE	NO	NO	NONE	27
127	SPARE	YES	E251	48	50	C4	12			NONE	NA	NA	B		FLANGE	12			C		NA	NA	NONE	NO	NO	NONE	27

ERN: CN0097RZ DWG: CN-FSAR-677.01-23 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGES 01 THRU 26 WITH NOTES)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

NO.	REVISIONS
11	RELEASED FOR 2018 FSAR UPDATE EFFECT. DATE 10-03-18
10	RELEASED FOR 2016 FSAR UPDATE EFFECT. DATE 3-06-17
9	RELEASED FOR 2015 FSAR UPDATE EFFECT. DATE 5-18-15
8	RELEASED FOR 2014 FSAR UPDATE EFFECT. DATE 3-3-14
7	RELEASED FOR 2012 FSAR UPDATE EFFECT. DATE 7-9-12
6	RELEASED FOR 2011 FSAR UPDATE EFFECT. DATE 2-28-11
5	RELEASED FOR 2009 FSAR UPDATE EFFECT. DATE 4-18-09
4	RELEASED FOR 2007 FSAR UPDATE EFFECT. DATE 11-15-07
3	RELEASED FOR 2006 FSAR UPDATE EFFECT. DATE 5-31-06
2	RELEASED FOR 2004 FSAR UPDATE EFFECT. DATE 10-24-04
1	RELEASED FOR 2003 FSAR UPDATE EFFECT. DATE 3-27-03

ERN: CN0097S7

DWG: CN-FSAR-677.02-00 REV: 11

APPENDIX A
FROM TABLE 6-77,
(PAGE 01 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
1	PZR RELIEF TANK	YES	M216	A,B	55	B6	3	I	N/N	2NC-57	NA	NA	C	I	CK	3	N/A	N/A	C	N/A	C	C		YES	YES (42)	AB	NONE
	MAKEUP									2NC-56B	T	≤ 10	NW	O	GT	3	E	ARM	C	FAI	C	C					
										2NC-105 (V)	NA	NA		I													
										2NC-215 (D)	NA	NA		O													
2	NITROGEN TO PZR	YES	M212	A,B	55	A5	1	I/O	N/Y	2NC-54A	T	≤ 10	C	I	GL	1	E	ARM	C	FAI	C	C		YES	YES	AB	NONE
	RELIEF TANK									2NC-53B	T	≤ 10	C	O	GL	1	E	ARM	C	FAI	C	C					
3	NC PUMP MOTOR	YES	M327	A,B	56	A4	2	O	N/Y	2NC-141	NA	NA	C	I	GT	2	HW	M	LC	FAI	C	C		YES	YES	AB	NONE
	DRAIN TANK PUMP									2NC-142	NA	NA	C	O	GT	2	HW	M	LC	FAI	C	C					
	DISCHARGE									2NC-210 (V)	NA	NA		O													
4	NV LETDOWN LINE	YES	M347	A,B	55	A6	2	O	Y/Y	2NV-10A	T	≤ 10	NW	I	GT	2	P	AR	O	C	O	C		YES	YES (42)	NONE	NONE
										2NV-11A	T	≤ 10	NW	I	GT	2	P	AR	C	C	C	C					
										2NV-13A	T	≤ 10	NW	I	GT	2	P	AR	C	C	C	C					
										2NV-15B	T	≤ 10	C	O	GL	3	E	ARM	O	FAI	O	C					
										2NV-14	600 PSIG	NA	C	I	RV	3	N/A	N/A	C	FAI	C	C					
										2NV-836 (V)	NA	NA		I													
										2NV-886 (V)	NA	NA		I													
										2NV-889 (D)	NA	NA		I													
										2NV-950 (V)	NA	NA		I													
										2NV-951 (V)	NA	NA		I													
										2NV-952 (V)	NA	NA		I													
										2NV-953 (V)	NA	NA		I													
										2NV-954 (V)	NA	NA		O													
										2NV-991 (D)	NA	NA		I													
										2NV-992 (D)	NA	NA		I													
5	PZR AUX SPRAY	NO	M273	A,B	55	B2	3	I	Y/Y	2NV-861	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	C		NO	NO	NONE	32
	TRANSIENT LINE									2NV-862	NA	NA	NONE	O	GL	3	HW	M	LC	N/A	O	C					
										2NV-863 (D)	NA	NA		I													
										2NV-945 (D)	NA	NA		I													
6	NV CHARGING	NO	M330	NA	55	B1	3	I	Y/Y	2NV-22	NA	NA	NONE	I	CK	3	N/A	N/A	C	N/A	C	C		NO	NO	NONE	33
	LINE									2NV-314B	S	≤ 10	NONE	O	GT	3	E	ARM	O	FAI	O	C					
										2NV-21 (V)	NA	NA		I													
7	NC PUMP SEAL	YES	M256	A,B	55	A9	4	O	Y/Y	2NV-89A	T	≤ 10	NW	I	GT	4	E	ARM	O	FAI	O	C		NO	YES (42)	AB	NONE
	WATER RETURN									2NV-90	NA	NA	C	I	CK	3/4	N/A	N/A	C	N/A	N/A	N/A					
										2NV-91B	T	≤ 10	NW	O	GT	4	E	ARM	O	FAI	O	C					
8	NC PUMP SEAL INJ	NO	M343	NA	55	B1	2	I	Y/Y	2NV-46	NA	NA	NONE	I	CK	2	N/A	N/A	O	N/A	O	O		NO	NO	NONE	44
	WATER A SUPPLY									2NV-44A	NA	NA	NONE	O	GL	2	E	N/A	O	FAI	O	O					
										2NV-45 (V)	NA	NA		I													

ERN: CN0097QT

DWG: CN-FSAR-677.02-01 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 02 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
9	NC PUMP SEAL INJ	NO	M339	NA	55	B1	2	I	Y/Y	2NV-57	NA	NA	NONE	I	CK	2	N/A	N/A	O	N/A	O	O		NO	NO	NONE	44
	WATER B SUPPLY									2NV-55A	NA	NA	NONE	O	GL	2	E	N/A	O	FAI	O	O					
										2NV-56 (V)	NA	NA		I													
10	NC PUMP SEAL INJ	NO	M344	NA	55	B1	2	I	Y/Y	2NV-68	NA	NA	NONE	I	CK	2	N/A	N/A	O	N/A	O	O		NO	NO	NONE	44
	WATER C SUPPLY									2NV-66A	NA	NA	NONE	O	GL	2	E	N/A	O	FAI	O	O					
										2NV-67 (V)	NA	NA		I													
										2NV-830 (D)	NA	NA		I													
11	NC PUMP SEAL INJ	NO	M350	NA	55	B1	2	I	Y/Y	2NV- 79	NA	NA	NONE	I	CK	2	N/A	N/A	O	N/A	O	O		NO	NO	NONE	44
	WATER D SUPPLY									2NV-77A	NA	NA	NONE	O	GL	2	E	N/A	O	FAI	O	O					
										2NV-78 (V)	NA	NA		I													
12	REACTOR MAKEUP	YES	M259	A,B	56	B1	1	I	N/N	2NB-262	NA	NA	C	I	CK	3/4	N/A	N/A	C	N/A	N/A	N/A	9-105	YES	YES	AB	NONE
	WATER FLUSH HDR									2NB-260B	T	≤ 10	C	O	GL	1	E	ARM	C	FAI	C	C					
										2NB-261 (V)	NA	NA		I													

ERN: CN0097QU

DWG: CN-FSAR-677.02-02 REV: 9

APPENDIX A
FROM TABLE 6-77.
(PAGE 03 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47) (6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
13	ICE COND ICE	YES	M394	48	53	C4	5	I	(9)	FLANGE	NA	NA	B	N/A	FLANGE	N/A	N/A	N/A	N/A	N/A	N/A	N/A		NO	(9)	NONE	NONE
	BLOWING AIR																										
14	ICE COND ICE	YES	M371	48	53	C4	6	O	(9)	FLANGE	NA	NA	B	N/A	FLANGE	N/A	N/A	N/A	N/A	N/A	N/A	N/A		NO	(9)	NONE	NONE
	BLOWING AIR																										
15	ICE COND GLYCOL	YES	M373	A,B	56	B1	4	I	N/N	2NF-228A	T	≤ 10	C	O	GT	4	P	AR	O	C	O	C		N(29)	YES	AB	NONE
	PMPS DISCH LINE									2NF-229	NA	NA	C	I	CK	4	N/A	N/A	O	N/A	O	C					
										2NF-959 (D)	NA	NA		I													
										2NF-969 (D)	NA	NA		Ø													
										2NF-972 (V)	NA	NA		Ø													
										2NF-955 (V)	NA	NA		Ø													
16	ICE COND GLYCOL	YES	M372	A,B	56	A7	4	O	N/N	2NF-233B	T	≤ 10	C	I	GT	4	E	ARM	O	FAI	O	C		N(29)	YES	AB	NONE
	PUMPS SUCT LINE									2NF-234A	T	≤ 10	C	O	GT	4	P	AR	O	C	O	C					
										2NF-235	NA	NA	C	I	CK	3/4	N/A	N/A	C	N/A	C	C					
										2NF-957 (V)	NA	NA		I													
										2NF-953 (D)	NA	NA		O													
										2NF-954 (V)	NA	NA		O													
										2NF-971 (D)	NA	NA		O													
17	CONT HYDROGEN	YES	M332	A,B,E	56	B7	4	I	Y/N	2VY-15B	T	NOTE 50	C	O	GT	4	E	ARM	LC	FAI	C	C		YES	YES	AB	NONE
	PURGE INLET									2VY-16	NA	NA	C	I	CK	4	N/A	N/A	C	N/A	C	C					
	BLOWER DISCH LINE									2VY-21 (V)	NA	NA		I													
18	CONT HYDROGEN	YES	M346	A,B,E	56	A5	4	I	Y/Y	2VY-17A	T	NOTE 50	C	I	GT	4	E	ARM	LC	FAI	C	C		YES	YES	NONE	NONE
	PURGE OUTLET LINE									2VY-18B	T	NOTE 50	C	O	GT	4	E	ARM	LC	FAI	C	C					

ERN: CN0097QW

DWG: CN-FSAR-677.02-03 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 04 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
19	ND PUMP SUCT A	NO	M276	48	55	D5	12	O	Y/Y	2ND-2A	(10)	NA	NONE	I	GT	12	E	ARM	C	FAI	O	C		NO	NO	NONE	34
	FROM LOOP									2ND-3	450 PSIG	NA	NONE	I	RV	4	N/A	N/A	C	N/A	C	C					
										2ND-5 (V)	NA	NA		I													
										2ND-81 (V)	NA	NA		O													
										2NS-18A	NA	NA		O		12											
										2ND-6 (V)	NA	NA		O													
										2NI-185A	NA	NA		O		18											
										2ND-25A	NA	NA		O		2											
										2ND-7	NA	NA		O		3/4											
										2ND-124 (V)	NA	NA		O													
										2ND-82	NA	NA		O		1											
										2ND-10	NA	NA		O	CK	8											
										2ND-67	NA	NA		O		8											
										2ND-88 (V)	NA	NA		O													
										2FW-27A	NA	NA		O		12											
										2FW-28	NA	NA		O		12											
										2FW-29 (V)	NA	NA		O													
										2NI-488	NA	NA		O	GL	1/2											
										2ND-12	NA	NA		O	GL	3/4											
										2FW94	NA	NA		O	GL	3/4											
										2FW96	NA	NA		O	CK	3/4											
										2FW98	NA	NA		O	GL	3/4											
										2ND144	NA	NA		O	GL	3/4											
										2FW146	NA	NA		O	GL	3/4											
										2NDPG5100	NA	NA		O													
										2NDPG5101	NA	NA		O													
										2NDPX5150	NA	NA		O													
										2NDPS5200	NA	NA		O													
										2NDPT5090	NA	NA		O													
										2NDPG5200	NA	NA		O													
						2 FLEX HOSES FROM 2A ND SEAL WATER HX					NA	NA		O		3/4											

ERN: CN0097QX

DWG: CN-FSAR-677.02-04 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 05 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
20	ND PUMP SUCT B	NO	M315	48	55	D5	12	O	Y/Y	2ND-37A	(10)	NA	NONE	I	GT	12	E	ARM	C	FAI	O	C		NO	NO	NONE	34
	FROM LOOP									2ND-38	450 PSIG	NA	NONE	I	RV	4	N/A	N/A	C	N/A	C	C					
										2ND-40 (V)	NA	NA		I													
										2ND-86 (V)	NA	NA		O													
										2NS-1B	NA	NA		O		12											
										2ND-41 (V)	NA	NA		O													
										2NI-184B	NA	NA		O		12											
										2ND-59B	NA	NA		O		2											
										2ND-66	NA	NA		O		1											
										2ND-84	NA	NA		O		3/4											
										2ND-44	NA	NA		O		8											
										2ND-68	NA	NA		O		8											
										2ND-46	NA	NA		O		3/4											
										2ND-89 (V)	NA	NA		O													
										2FW-56	NA	NA		O		12											
										2FW-57 (V)	NA	NA		O													
										2FW-55B	NA	NA		O		12											
										2NI-487	NA	NA		O		1/2											
										2FW95	NA	NA		O	GL	3/4											
										2FW97	NA	NA		O	CK	3/4											
										2FW99	NA	NA		O	CK	3/4											
										2ND145	NA	NA		O	GL	3/4											
										2ND147	NA	NA		O	GL	3/4											
										2NDPG5110	NA	NA		O													
										2NDPG5111	NA	NA		O													
										2NDPX5160	NA	NA		O													
										2NDPS5210	NA	NA		O													
										2NDPT5080	NA	NA		O													
										2NDPG5210	NA	NA		O													
						2 FLEX HOSES FROM 2B ND SEAL WATER HX					NA	NA		O		3/4											
										2NDPG5211																	
21	NV PUMP INJ	NO	M351	NA	55	B7	4	I	Y/Y	2NI-9A	S	NA	NONE	O	GT	4	E	ARM	C	FAI	C	O		NO	NO	NONE	35
	LINE TO COLD LEGS									2NI-10B	S	NA	NONE	O	GT	4	E	ARM	C	FAI	C	O					
										2NI-12	NA	NA	NONE	I	CK	3	N/A	N/A	C	N/A	C	C					
										2NI-3	NA	NA	NONE	O	GL	1	HW	M	C	C	C	C					
										2NI-194 (V)	NA	NA		I													
										2NI-456 (V)	NA	NA		O													NONE
22	NITROGEN TO	YES	M331	A,B	56	B7	1	I	N/N	2NI-48	NA	NA	C	I	CK	1	N/A	N/A	C	N/A	C	C		YES	YES	AB	
	ACCUMULATORS									2NI-47A	T	≤ 10	C	O	GL	1	E	ARM	C	FAI	C	C					NONE
										2NI-107 (V)	NA	NA		I													
23	NI TEST LINE	YES	M322	A,B	56	A10	3/4	I	N/N	2NI-95A	T	≤ 10	C	I	GT	3/4	E	ARM	C	FAI	C	C		YES	YES	AB	
										2NI-96B	T	≤ 10	C	O	GL	3/4	E	ARM	C	FAI	C	C					
										2NI-120B	T	≤ 10	C	O	GL	3/4	E	ARM	C	FAI	C	C					
										2NI-471	NA	NA	C	I	CK	3/4	NA	NA									
										2NI-361 (V)	NA	NA		O													
										2NI-362 (D)	NA	NA		O													
										2NIPG5220	NA	NA		O													
										2NIPT5220	NA	NA		O													

ERN: CN0097QZ

DWG: CN-FSAR-677.02-05 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 06 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
24	ND CROSSOVER	NO	M207	A,B	55	B8	12	I	N/Y	2NI-154B	T	≤ 10	NONE	I	GL	3/4	E	ARM	C	FAI	C	C		NO	NO	NONE	39
	DISCHG TO HOT									2NI-183B	NA	NA	NW	O	GT	12	E	RM	C	FAI	C	C/O					
	LEGS									2NI-125	NA	NA	NONE	I	CK	8	N/A	N/A	C	N/A	C	C/O					
										2NI-129	NA	NA	NONE	I	CK	8	N/A	N/A	C	N/A	C	C/O					
										2NI-216 (V)	NA	NA		O													
25	NI PUMP B	NO	M320	NA	55	B8	4	I	Y/Y	2NI-152B	NA	NA	NONE	O	GT	4	E	RM	C	FAI	C	C/O		NO	NO	NONE	51
	DISCHG TO HOT									2NI-153A	T	≤ 10	NONE	I	GL	3/4	E	ARM	C	FAI	C	C					
	LEGS									2NI-156	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	C/O					
										2NI-159	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	C/O					
										2NI-211 (V)	NA	NA		O													
										2NI-400 (V)	NA	NA		I													
										2NI-401 (V)	NA	NA		I													
										2NI-429 (D)	NA	NA		I													
										2NI-430 (D)	NA	NA		I													
										2NI-402 (V)	NA	NA		I													
										2NI-457 (V)	NA	NA		I													
										2NI-458 (V)	NA	NA		I													
										2NIFE5530	NA	NA		I		2											
										2NIFE5480	NA	NA		I		2											
										2NI-155	NA	NA		I		1 1/2											
										2NI-158	NA	NA		I		1 1/2											
26	NI PUMP A	NO	M317	NA	55	B8	4	I	Y/Y	2NI-121A	NA	NA	NONE	O	GT	4	E	RM	C	FAI	C	C/O		NO	NO	NONE	51
	DISCHG TO HOT									2NI-122B	T	≤ 10	NONE	I	GL	3/4	E	ARM	C	FAI	C	C					
	LEGS									2NI-124	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	C/O					
										2NI-128	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	C/O					
										2NI-209 (V)	NA	NA		O													
										2NI-127	NA	NA		I		1 1/2											
										2NIFE5460	NA	NA		I		2											
										2NIFE5470	NA	NA		I		2											
										2NI-123	NA	NA		I		1 1/2											

ERN: CN0097R0 DWG: CN-FSAR-677.02-06 REV: 9

APPENDIX A
FROM TABLE 6-77.
(PAGE 07 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
27	ND HX A DISCHG	NO	M336	A,B	55	B5	8	I	Y/Y	2NI-173A	NA	NA	NW	O	GT	8	E	RM	O	FAI	O	O		NO	NO	NONE	39
	TO COLD LEGS									2NI-174	NA	NA	NONE	I	GL	3/4	D	RM	C	C	C	C					
										2NI-175	NA	NA	NONE	I	CK	6	N/A	N/A	C	N/A	O	O					
										2NI-176	NA	NA	NONE	I	CK	6	N/A	N/A	C	N/A	O	O					
										2NI-214 (D)	NA	NA		O													
										2NI-419 (V)	NA	NA		I													
										2NI-420 (V)	NA	NA		I													
										2NI-421 (V)	NA	NA		I													
										2NI-428 (D)	NA	NA		I													
										2NI-418	NA	NA		I													
										2NIFE5900	NA	NA		I		6											
										2NIFE5890	NA	NA		I		6											
										2NI-478	NA	NA		I		3/4											
										2NI500 (D)	NA	NA			GL												
										2NI501	NA	NA	C	I	CK	1/2	N/A	N/A	C/O	N/A	O/C	O/C			YES		
										2NI502 (V)	NA	NA			GL												
										2NI531 (V)	NA	NA			GL												
										2NI532	NA	NA	C	I	CK	1/2	N/A	N/A	C/O	N/A	C/O	C/O			YES		
										2NI533 (D)	NA	NA			GL												
28	ND HX B DISCHG	NO	M307	A,B	55	B5	8	I	Y/Y	2NI-178B	NA	NA	NW	O	GT	8	E	RM	O	FAI	O	O		NO	NO	NONE	39
	TO COLD LEGS									2NI-179	NA	NA	NONE	I	GL	3/4	D	RM	C	C	C	C					
										2NI-180	NA	NA	NONE	I	CK	6	N/A	N/A	C	N/A	O	O					
										2NI-181	NA	NA	NONE	I	CK	6	N/A	N/A	C	N/A	O	O					
										2NI-416	NA	NA		I													
										2NI-215 (D)	NA	NA		O													
										2NI-459 (V)	NA	NA		I													
										2NIFE5910	NA	NA		I		6											
										2NIFE5920	NA	NA		I		6											
										2NI-477	NA	NA		I		3/4											
										2NI494 (D)	NA	NA			GL	1/2											
										2NI495	NA	NA	C	I	CK	1/2	N/A	N/A	C/O	N/A	C/O	C/O			YES		
										2NI496 (V)	NA	NA			GL	1/2											
										2NI536 (V)	NA	NA			GL	1/2											
										2NI537	NA	NA	C	I	CK	1/2	N/A	N/A	C/O	N/A	C/O	C/O			YES		
										2NI538 (D)	NA	NA			GL	1/2											

ERN: CN0097R1

DWG: CN-FSAR-677.02-07 REV: 9

APPENDIX A
FROM TABLE 6-77.
(PAGE 08 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
29	NI PUMPS A & B	NO	M352	A,B	55	B5	4	I	Y/Y	2NI-162A	NA	NA	NW	O	GT	4	E	RM	O	FAI	C	O		NO	NO	NONE	39
	DISCHG TO COLD									2NI-163	NA	NA	NONE	I	GL	3/4	D	RM	C	C	C	C					
	LEGS									2NI-165	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	O/C					
										2NI-167	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	O/C					
										2NI-169	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	O/C					
										2NI-171	NA	NA	NONE	I	CK	2	N/A	N/A	C	N/A	C	O/C					
										2NI-485	NA	NA	C	I	CK	1	N/A	N/A	C	N/A	C	C			YES		
										2NI-424 (V)	NA	NA		I													
										2NI-483 (V)	NA	NA		I													
										2NI-422 (V)	NA	NA		I													
										2NI-437 (V)	NA	NA		I													
										2NI-213 (V)	NA	NA		O													
										2NI-423	*	NA		I		1											
										2NI-164	NA	NA		I		1 1/2											
										2NI-166	NA	NA		I		1 1/2											
										2NI-168	NA	NA		I		1 1/2											
										2NI-170	NA	NA		I		1 1/2											
										2NIFE5490	NA	NA		I													
										2NIFE5500	NA	NA		I													
										2NIFE5510	NA	NA		I													
										2NIFE5520	NA	NA		I													
													* REFER TO OP/2/A/6200/06														
30	CONTAINMENT	NO	M303	48	56	C1	18	O	Y/Y	2NI-185A	NA	NA	NONE	O	GT	18	E	RM	C	FAI	C	C/O		NO	NO	NONE	22
	SUMP RECIRC LINE				56	C1				2NI-515	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C			YES	AB	
	A				56	C1				2NI-516	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C			YES	AB	
					56	C1				2NI-517	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C			YES	AB	
					56	C1				2NI-518	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C			YES	AB	
					56	C1				2NI-519	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C			YES	AB	
					56	C1				2NI-520	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C			YES	AB	
					56	C1				2NI-521	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C			YES	AB	
					56	C1				2NI-522	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C			YES	AB	
31	CONTAINMENT	NO	M210	48	56	C1	18	O	Y/Y	2NI-184B	NA	NA	NONE	O	GT	18	E	RM	C	FAI	C	C/O		NO	NO	NONE	22
	SUMP RECIRC LINE				56	C1				2NI-523	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C			YES	AB	
	B				56	C1				2NI-524	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C			YES	AB	
					56	C1				2NI-525	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C			YES	AB	
					56	C1				2NI-526	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C			YES	AB	
					56	C1				2NI-527	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C			YES	AB	
					56	C1				2NI-528	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C			YES	AB	
					56	C1				2NI-529	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C			YES	AB	
					56	C1				2NI-530	NA	NA	NONE	O	GL	1	N/A	N/A	C	N/A	C	C			YES	AB	

ERN: CN0097R3

DWG: CN-FSAR-677.02-08 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 09 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47) (6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
32	SPARE	YES	M301	48	50	C4	20	N/A	N/A	NONE	NA	NA	B	N/A	FLANGE	20	N/A	N/A	C	N/A	N/A	N/A		NO	NO	NONE	27
33	(UNIT 1 ONLY)																										
34	SPARE	YES	M234	48	50	C4	20	N/A	N/A	NONE	NA	NA	B	N/A	FLANGE	20	N/A	N/A	C	N/A	N/A	N/A		NO	NO	NONE	27
35	CONTAINMENT	NO	M362	A,B	56	B9	8	I	Y/Y	2NS-32A	P	NA	NW	O	GT	8	E	ARM	C	FAI	C	O		NO	NO	NONE	45
	SPRAY LINE									2NS-33	NA	NA	NONE	I	CK	8	N/A	N/A	C	N/A	C	O					
										2NS-110 (V)	NA	NA		I													
										2NS-65 (V)	NA	NA		O													
										2NS-64 (PX)	NA	NA		O		2											
36	CONTAINMENT	NO	M370	A,B	56	B9	8	I	Y/Y	2NS-29A	P	NA	NW	O	GT	8	E	ARM	C	FAI	C	O		NO	NO	NONE	45
	SPRAY LINE									2NS-30	NA	NA	NONE	I	CK	8	N/A	N/A	C	N/A	C	O					
										2NS-109 (V)	NA	NA		I													
										2NS-62 (V)	NA	NA		O													
										2NS-61 (PX)	NA	NA		O		2											
37	CONTAINMENT	NO	M380	A,B	56	B9	8	I	Y/Y	2NS-15B	P	NA	NW	O	GT	8	E	ARM	C	FAI	C	O		NO	NO	NONE	45
	SPRAY LINE									2NS-16	NA	NA	NONE	I	CK	8	N/A	N/A	C	N/A	C	O					
										2NS-108 (V)	NA	NA		I													
										2NS-48 (V)	NA	NA		O													
										2NS-45 (PX)	NA	NA		O		2											
38	CONTAINMENT	NO	M387	A,B	56	B9	8	I	Y/Y	2NS-12B	P	NA	NW	O	GT	8	E	ARM	C	FAI	C	O		NO	NO	NONE	45
	SPRAY LINE									2NS-13	NA	NA	NONE	I	CK	8	N/A	N/A	C	N/A	C	O					
										2NS-107 (V)	NA	NA		I													
										2NS-37 (V)	NA	NA		O													
										2NS-36 (PX)	NA	NA		O		2											
39	ND CONTAINMENT	NO	M369	A,B	56	B9	8	I	Y/Y	2NS-43A	NA	NA	NW	O	GT	8	E	RM	C	FAI	C	C/O		NO	NO	NONE	45
	SPRAY LINE A									2NS-46	NA	NA	NONE	I	CK	8	N/A	N/A	C	N/A	C	C/O					
										2NS-112 (V)	NA	NA		I													
										2NS-71 (V)	NA	NA		O													
										2NS-74 (T)	NA	NA		O													
										2NS-44 (PX)	NA	NA		O		2											
40	ND CONTAINMENT	NO	M381	A,B	56	B9	8	I	Y/Y	2NS-38B	NA	NA	NW	O	GT	8	E	RM	C	FAI	C	C/O		NO	NO	NONE	45
	SPRAY LINE B									2NS-41	NA	NA	NONE	I	CK	8	N/A	N/A	C	N/A	C	C/O					
										2NS-111 (V)	NA	NA		I													
										2NS-68 (V)	NA	NA		O													
										2NS-39 (PX)	NA	NA		O		2											
										2NS-73 (T)	NA	NA		O													
41	REACTOR COOLANT	YES	M348	A,B	56	A1	3/4	I/O	N/N	2WL-450A	T	≤ 10	C	I	GL	3/4	E	ARM	O	FAI	O	C		YES	YES	AB	NONE
	DRAIN TANK GAS									2WL-451B	T	≤ 10	C	O	GL	1	E	ARM	O	FAI	O	C					
	SPACE TO WG SYS																										

ERN: CN0097R5

DWG: CN-FSAR-677.02-09 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 10 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
42	REACTOR COOLANT	YES	M345	A,B	56	A9	3	O	N/Y	2WL-805A	T	≤ 10	NW	I	GT	3	E	ARM	O	FAI	O	C		NO (43)	YES (42)	AB	NONE
	DRAIN TANK HX									2WL-807B	T	≤ 10	NW	O	GT	3	E	ARM	O	FAI	O	C					
	DISCHG									2WL-806	NA	NA	C	I	CK	1/2	N/A	N/A	C	N/A	C	C					
43	VENT UNIT	YES	M221	A,B	56	A9	6	O	N/N	2WL-867A	(14) T	≤ 10	NW	I	GT	4	E	ARM	O	FAI	O	C		NO (43)	YES (42)	AB	NONE
	CONDENSATE DRAIN									2WL-869B	(14) T	≤ 10	NW	O	GT	4	E	ARM	O	FAI	O	C					
	HEADER									2WL-868	NA	NA	C	I	CK	3/4	N/A	N/A	C	N/A	C	C					
44	CONT FLOOR SUMP	YES	M374	A,B	56	A9	4	O	N/N	2WL-825A	(14) T	≤ 10	NW	I	GT	4	E	ARM	O	FAI	O	C		NO (43)	YES (42)	AB	NONE
	& INCORE INST									2WL-827B	(14) T	≤ 10	NW	O	GT	4	E	ARM	O	FAI	O	C					
	SUMP PUMP									2WL-321	NA	NA	C	I	CK	3/4	N/A	N/A	C	N/A	C	C					
	DISCHG									2WL-999 (V)	NA	NA		O													
45	SG DRAIN PUMP	YES	M359	A,B	56	A9	3	O	N/N	2WL-A21	NA	NA	NW	I	GT	3	HW	M	LC	N/A	C	C		NO (43)	YES (42)	AB	NONE
	DISCHG									2WL-A22	NA	NA	C	I	CK	3/4	N/A	N/A	C	N/A	C	C					
										2WL-A24	NA	NA	NW	O	GT	3	HW	M	LC	N/A	C	C					
										2WL-A23 (V)	NA	NA		I													
46	EQUIP DECON LINE	YES	M356	A,B	56	A4	1	I	N/N	2WE-20	NA	NA	C	O	GL	1	HW	M	LC	N/A	C	C		YES	YES	AB	NONE
	(13)									2WE-22	NA	NA	C	I	GL	1	HW	M	LC	N/A	C	C					
										2WE-56(V)	NA	NA		O													
47	FUEL TRANSFER	YES	C354	48	50	C2	20	NONE	Y/Y	FLANGE	NA	NA	B	I	DS/FG	N/A	N/A	NA	C	N/A	O	C		NO	NO	NONE	27
	TUBE																										
48	REFUELING WATER	YES	M358	A,B	56	A4	4	O	Y/N	2FW-11	NA	NA	C	I	PG	4	HW	M	LC	N/A	C	C		YES	YES	AB	NONE
	PUMP SUCT									2FW-13	NA	NA	C	O	PG	4	HW	M	LC	N/A	C	C					
										2FW-12 (V)	NA	NA		I													
49	REFUELING CAVITY	YES	M377	A,B	56	B2	6	I	Y/N	2FW-4	NA	NA	C	O	GT	6	HW	M	LC	N/A	C/O	C		YES	YES	AB	NONE
	FILL LINE									2FW-5	NA	NA	C	I	CK	6	N/A	N/A	C	N/A	C/O	C					
										2FW-30 (V)	NA	NA		I													
50	PZR SAMPLE	YES	M235	A,B	55	A7	1/2	O	Y/N	2NM-3A	T	≤ 10	C	I	GL	1/2	E	ARM	O	FAI	O	C		YES	YES	AB	NONE
										2NM-6A	T	≤ 10	C	I	GL	1/2	E	ARM	C	FAI	C	C					
										2NM-424	NA	NA	C	I	CK	1/2	N/A	N/A	C	N/A	C	C					
										2NM-7B	T	≤ 10	C	O	GL	1/2	E	ARM	C	FAI	C	C					

ERN: CN0097R7 DWG: CN-FSAR-677.02-10 REV: 9

APPENDIX A
FROM TABLE 6-77,
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UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47) (6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
51	REACTOR COOLANT	YES	M310	A,B	55	A7	1/2	O	Y/N	2NM-22A	T	≤ 10	C	I	GL	1/2	E	ARM	O	FAI	O	C		YES	YES	AB	NONE
	HOT LEG SAMPLE									2NM-25A	T	≤ 10	C	I	GL	1/2	E	ARM	C	FAI	C	C					
										2NM-26B	T	≤ 10	C	O	GL	1/2	E	ARM	O	FAI	C	C					
										2NM-425	NA	NA	C	I	CK	1/2	N/A	N/A	C	N/A	C	C					
										*2NM-283 (V)	NA	NA		I													
										2NM-464 (V)	NA	NA		I													
										2NM-466 (D)	NA	NA		I													
										2NM-969 (D)	NA	NA		I													
52	NI ACCUMULATOR	YES	M236	A,B	56	A6	1/2	O	Y/N	2NM-72B	T	≤ 10	C	I	GL	1/2	E	ARM	C	FAI	C	C		YES	YES	NONE	NONE
	SAMPLE									2NM-75B	T	≤ 10	C	I	GL	1/2	E	ARM	C	FAI	C	C					
										2NM-78B	T	≤ 10	C	I	GL	1/2	E	ARM	C	FAI	C	C					
										2NM-81B	T	≤ 10	C	I	GL	1/2	E	ARM	C	FAI	C	C					
										2NM-69	700 PSIG	NA	C	I	RV	3/4	N/A	N/A	C	N/A	C	C					
										2NM-82A	T	≤ 10	C	O	GL	1/2	E	ARM	C	FAI	C	C					
53	SG A SAMPLE	NO	M335	A,B	57	A7	1/2	O	Y/N	2NM-187A	T	≤ 10	NONE	I	GL	1/2	E	ARM	C	FAI	C	C		NO	NO	NONE	23
										2NM-190A	T	≤ 10	NONE	I	GL	1/2	E	ARM	O	FAI	O	C					
										2NM-191B	T	≤ 10	NONE	O	GL	1/2	E	ARM	O	FAI	O	C					
										2NM-426	NA	NA	NONE	I	CK	3/4	N/A	N/A	C	N/A	C	C					
54	SG B SAMPLE	NO	M338	A,B	57	A7	1/2	O	Y/N	2NM-197B	T	≤ 10	NONE	I	GL	1/2	E	ARM	C	FAI	C	C		NO	NO	NONE	23
										2NM-200B	T	≤ 10	NONE	I	GL	1/2	E	ARM	O	FAI	O	C					
										2NM-201A	T	≤ 10	NONE	O	GL	1/2	E	ARM	O	FAI	O	C					
										2NM-427	NA	NA	NONE	I	CK	3/4	N/A	N/A	C	N/A	C	C					
55	SG C SAMPLE	NO	M340	A,B	57	A7	1/2	O	Y/N	2NM-207A	T	≤ 10	NONE	I	GL	1/2	E	ARM	C	FAI	C	C		NO	NO	NONE	23
										2NM-210A	T	≤ 10	NONE	I	GL	1/2	E	ARM	O	FAI	O	C					
										2NM-211B	T	≤ 10	NONE	O	GL	1/2	E	ARM	O	FAI	O	C					
										2NM-428	NA	NA	NONE	I	CK	3/4	N/A	N/A	C	N/A	C	C					
56	SG D SAMPLE	NO	M341	A,B	57	A7	1/2	O	Y/N	2NM-217B	T	≤ 10	NONE	I	GL	1/2	E	ARM	C	FAI	C	C		NO	NO	NONE	23
										2NM-220B	T	≤ 10	NONE	I	GL	1/2	E	ARM	O	FAI	O	C					
										2NM-221A	T	≤ 10	NONE	O	GL	1/2	E	ARM	O	FAI	O	C					
										2NM-429	NA	NA	NONE	I	CK	1"	N/A	N/A	C	N/A	C	C					
57	COMP COOLING TO	NO	M376	A,B	57	B6	4	I	Y/Y	2KC-322	NA	NA	NONE	I	CK	4	N/A	N/A	O	N/A	O	C		NO	NO	NONE	37
	RC DRAIN TANK									2KC-320A	T	≤ 20	NW	O	GT	4	E	ARM	O	FAI	O	C					
	HX									2KC-321 (V)	NA	NA		I													
58	COMP COOLING	NO	M355	A,B	57	A9	4	O	Y/Y	2KC-332B	T	≤ 20	NW	I	GT	4	E	ARM	O	FAI	O	C		NO	NO	NONE	37
	FROM DRAIN TANK									2KC-280	NA	NA	NONE	I	CK	1	N/A	N/A	C	N/A	C	C					
	HX									2KC-333A	T	≤ 20	NW	O	GT	4	E	ARM	O	FAI	O	C					
										2KC-823 (D)	NA	NA		O													
										2KC-E58 (V)	NA	NA		I													
59	KC TO RX VESSEL	YES	M328	A,B	56	B6	8	I	Y/Y	2KC-338B	P	≤ 40	NW	O	GT	8	E	ARM	O	FAI	O	C		NO (43)	YES	AB	NONE
	SUPP & RCP									2KC-340	NA	NA	C	I	CK	8	N/A	N/A	O	N/A	O	C					
	COOLERS									2KC-339 (V)	NA	NA		I													

* 2NM283 ABANDONED IN PLACE PER EC 112663.

ERN: CN0097R9

DWG: CN-FSAR-677.02-11 REV: 11

APPENDIX A
FROM TABLE 6-77.
(PAGE 12 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE. IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
60	KC FROM RX	YES	M321	A,B	56	A9	8	O	Y/Y	2KC-424B	P	≤ 40	NW	I	GT	8	E	ARM	O	FAI	O	C		NO (43)	YES	AB	NONE
	VESSEL SUPP &									2KC-425A	P	≤ 40	NW	O	GT	8	E	ARM	O	FAI	O	C					
	RCP COOLERS VENT									2KC-279	NA	NA	C	I	CK	1	N/A	N/A	C	N/A	C	C					
	UNITS									2KC-861 (V)	NA	NA		I													
										2KC-822 (V)	NA	NA		O													
										2KC-020	NA	NA		I		1											
61	COMP COOLING TO	NO	M218	C	57	D8	4	I	Y/Y	2KC-305B	T	≤ 20	NW	O	GT	4	E	ARM	C	FAI	C	C		NO (30)	NO	NONE	37
	EXCESS LETDOWN									2KC-306 (V)	NA	NA		I													
	HX									2KC-895 (D)	NA	NA		I													
										2KC-307	NA	NA		I		4			LO								
										2KC-309	NA	NA		I		4			LO								
										2KC-310 (V)	NA	NA		I			O		C	FAI							
										2KC-311	NA	NA		I		3/4	O		C	FAI							
										2KC-312	NA	NA		I		3/4	O		C	FAI							
										2KC-313	135 PSIG	NA		I	RV	3/4											
										2KC-897 (V)	NA	NA		I													
										2KC-314 (D)	NA	NA		I													
62	COMP COOLING	NO	M217	C	57	D8	4	O	Y/Y	2KC-315B	T	≤ 20	NW	O	GT	4	E	ARM	C	FAI	C	C		NO (30)	NO	NONE	37
	FROM EXCESS									2KC-897 (V)	NA	NA		I													
	LETDOWN HX									2KC-314 (D)	NA	NA		I													
										2KC-306 (V)	NA	NA		I													
										2KC-307	NA	NA		I		4			LO								
										2KC-309	NA	NA		I		4			LO								
										2KC-310 (V)	NA	NA		I			O		C	FAI							
										2KC-311	NA	NA		I		3/4	O		C	FAI							
										2KC-312	NA	NA		I		3/4	O		C	FAI							
										2KC-313	135 PSIG	NA		I	RV	3/4											
										2KC-895 (D)	NA	NA		I													
63	COMP COOLING TO	YES	M323	A,B	56	A7	2	O	N/N	2KC-47	NA	NA	C	I	CK	3/4	N/A	N/A	C	N/A	C	C		YES	YES	AB	NONE
	COMP COOLING									2KC-429B	T	≤ 10	C	I	GL	2	E	ARM	O	FAI	O	C					
	DRAIN SUMP									2KC-430A	T	≤ 10	C	O	GL	2	E	ARM	O	FAI	O	C					
										2KC-E60 (V)	NA	NA		I													
64	RN TO NC PUMP	YES	M240	A,B	56	B6	12	I	N/Y	2RN-437B	P	≤ 60	NW	O	GT	12	E	ARM	O	FAI	O	C		NO (43)	YES (42)	AB	NONE
	& LWR CONT VENT									2RN-438	NA	NA	C	I	CK	12	N/A	N/A	O	N/A	O	C					
	UNITS									2RN-908 (D)	NA	NA		O													
										2RN-862 (V)	NA	NA		O													

ERN: CN0097RG

DWG: CN-FSAR-677.02-12 REV: 10

APPENDIX A
FROM TABLE 6-77,
(PAGE 13 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47) (6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
65	RN FROM NC	YES	M230	A,B	56	A9	12	O	Y/Y	2RN-484A	P	≤ 60	NW	I	GT	12	E	ARM	O	FAI	O	C		NO (43)	YES (42)	AB	NONE
	PUMP & LWR CONT									2RN-487B	P	≤ 60	NW	O	GT	12	E	ARM	O	FAI	O	C					
	VENT UNITS									2RN-485	NA	NA	C	I	CK	3/4	N/A	N/A	C	N/A	C	C					
										2RN-907 (D)	NA	NA		I													
66	RN TO UPPER CONT	YES	M385	A,B	56	B6	6	I	N/Y	2RN-404B	P	≤ 10	NW	O	GT	6	E	ARM	O	FAI	O	C		NO (43)	YES (42)	AB	NONE
	VENT UNITS									2RN-405	NA	NA	C	I	CK	6	N/A	N/A	O	N/A	O	C					
										2RN-860 (V)	NA	NA		I													
67	SPARE	YES	M308	48	50	C4	6	N/A	N/A	FLANGED	NA	NA	B	N/A	FLANGED	6	N/A	N/A	C	N/A	N/A	N/A		NO	NO	NONE	27
68	INCORE INST ROOM	YES	M213	A,B,E	56	A5	12	I	Y/N	2VP-17A	(14) T	NOTE 50	C	I	BF	12	D	AR	LC	C	C	C		YES	YES	AB	NONE
	PURGE IN									2VP-18B	(14) T	NOTE 50	C	O	BF	12	D	AR	LC	C	C	C					
										2VPPX5130	NA	NA		O													
69	INCORE INST ROOM	YES	M140	A,B,E	56	A5	12	O	Y/Y	2VP-19A	(14) T	NOTE 50	C	I	BF	12	D	AR	LC	C	C	C		YES	YES	AB	NONE
	PURGE OUT									2VP-20B	(14) T	NOTE 50	C	O	BF	12	D	AR	LC	C	C	C					
										2VPPX5140	NA	NA		O													
70	UPPER	YES	M456	A,B,E	56	A5	24	I	Y/N	2VP-1B	(14) T	NOTE 50	C	O	BF	24	D	AR	LC	C	O	C		YES	YES	AB	NONE
	COMPARTMENT									2VP-2A	(14) T	NOTE 50	C	I	BF	24	D	AR	LC	C	O	C					
	PURGE INLET									2VPPX5060	NA	NA		O													
71	UPPER	YES	M432	A,B,E	56	A5	24	I	Y/N	2VP-3B	(14) T	NOTE 50	C	O	BF	24	D	AR	LC	C	O	C		YES	YES	AB	NONE
	COMPARTMENT									2VP-4A	(14) T	NOTE 50	C	I	BF	24	D	AR	LC	C	O	C					
	PURGE INLET									2VPPX5070	NA	NA		O													
72	LOWER	YES	M357	A,B,E	56	A5	24	I	Y/N	2VP-6B	(14) T	NOTE 50	C	O	BF	24	D	AR	LC	C	O	C		YES	YES	AB	NONE
	COMPARTMENT									2VP-7A	(14) T	NOTE 50	C	I	BF	24	D	AR	LC	C	O	C					
	PURGE INLET									2VPPX5080	NA	NA		O													
73	LOWER	YES	M434	A,B,E	56	A5	24	I	Y/N	2VP-8B	(14) T	NOTE 50	C	O	BF	24	D	AR	LC	C	O	C		YES	YES	AB	NONE
	COMPARTMENT									2VP-9A	(14) T	NOTE 50	C	I	BF	24	D	AR	LC	C	O	C					
	PURGE INLET									2VPPX5090	NA	NA		O													

ERN: CN0097RI

DWG: CN-FSAR-677.02-13 REV: 9

APPENDIX A
FROM TABLE 6-77.
(PAGE 14 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
74	CONT PURGE	YES	M368	A,B,E	56	A5	24	O	Y/Y	2VP-10A	(14) T	NOTE 50	C	I	BF	24	D	AR	LC	C	O	C		YES	YES	AB	NONE
	EXHAUST									2VP-11B	(14) T	NOTE 50	C	O	BF	24	D	AR	LC	C	O	C					
										2VPPX5100	NA	NA		O													
75	CONT PURGE	YES	M433	A,B,E	56	A5	24	O	Y/Y	2VP-12A	(14) T	NOTE 50	C	I	BF	24	D	AR	LC	C	O	C		YES	YES	AB	NONE
	EXHAUST									2VP-13B	(14) T	NOTE 50	C	O	BF	24	D	AR	LC	C	O	C					
										2VPPX5110	NA	NA		O													
76	CONT PURGE	YES	M119	A,B,E	56	A5	24	O	Y/Y	2VP-15A	(14) T	NOTE 50	C	I	BF	24	D	AR	LC	C	O	C		YES	YES	AB	NONE
	EXHAUST									2VP-16B	(14) T	NOTE 50	C	O	BF	24	D	AR	LC	C	O	C					
										2VPPX5120	NA	NA		O													
77	SG D BLOWDOWN	NO	M455	A,B	57	A7	4	O	Y/Y	2BB-8A	T	≤ 10	NONE	I	GT	4	E	ARM	O	FAI	C	C	10-31	NO	NO	NONE	23
										2BB-10B	T	≤ 10	NONE	O	GT	4	E	ARM	O	FAI	C	C					
										2BB-52	NA	NA	NONE	I	CK	1	N/A	N/A	C	N/A	C	C					
										2BB-147B	T	≤ 10	NONE	O	GL	1	E	ARM	C	FAI	C	C					
										2BB-122 (D)	NA	NA		I													
78	SG A BLOWDOWN	NO	M142	A,B	57	A7	4	O	Y/Y	2BB-56A	T	≤ 10	NONE	I	GT	4	E	ARM	O	FAI	C	C	10-31	NO	NO	NONE	23
										2BB-57B	T	≤ 10	NONE	O	GT	4	E	ARM	O	FAI	C	C					
										2BB-53	NA	NA	NONE	I	CK	1	N/A	N/A	C	N/A	C	C					
										2BB-148B	T	≤ 10	NONE	O	GL	1	E	ARM	C	FAI	C	C					
										2BB-123 (D)	NA	NA		I													

ERN: CN0097RK DWG: CN-FSAR-677.02-14 REV: 9

APPENDIX A
FROM TABLE 6-77.
(PAGE 15 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
79	SG C BLOWDOWN	NO	M3105	A,B	57	A7	4	O	Y/Y	2BB-60A	T	≤ 10	NONE	I	GT	4	E	ARM	O	FAI	C	C	10-31	NO	NO	NONE	23
										2BB-61B	T	≤ 10	NONE	O	GT	4	E	ARM	O	FAI	C	C					
										2BB-54	NA	NA	NONE	I	CK	1	N/A	N/A	C	N/A	C	C					
										2BB-149B	T	≤ 10	NONE	O	GL	1	E	ARM	C	FAI	C	C					
										2BB-62 (V)	NA	NA		I													
80	SG B BLOWDOWN	NO	M277	A,B	57	A7	4	O	Y/Y	2BB-19A	T	≤ 10	NONE	I	GT	4	E	ARM	O	FAI	C	C	10-31	NO	NO	NONE	23
										2BB-21B	T	≤ 10	NONE	O	GT	4	E	ARM	O	FAI	C	C					
										2BB-55	NA	NA	NONE	I	CK	1	N/A	N/A	C	N/A	C	C					
										2BB-150B	T	≤ 10	NONE	O	GL	1	E	ARM	C	FAI	C	C					
										2BB-125 (V)	NA	NA		I													
										2BB-20 (D)	NA	NA		O													
81	CONT AIR RELEASE	YES	M386	A,B,E	56	A5	4	O	Y/N	2VQ-2A	(14) T	≤ 5	C	I	DP	4	E	ARM	C	FAI	C	C		YES	YES	AB	NONE
										2VQ-3B	(14) T	≤ 5	C	O	GT	4	E	ARM	C	FAI	C	C					
82	CONT AIR ADDITION	YES	M204	A,B,E	56	A5	4	I	Y/N	2VQ-15B	(14) T	≤ 5	C	O	GT	4	E	ARM	C	FAI	C	C		YES	YES	AB	NONE
										2VQ-16A	(14) T	≤ 5	C	I	DP	4	E	ARM	C	FAI	C	C					
83	FEEDWATER A	NO	M110	C	57	D1	18	I	Y/N	2CF-33	S	NA	NONE	O	GT	18	H	AR	O	C	C	C		NO	NO	NONE	23
										2CF-91	NA	NA	NONE	O	GL	3/4	HW	N/A	LC	N/A	C	C					
										2CF-90	S	NA	NONE	O	GT	2	D	AR	C	C	C	C					
										2CF-126 (D)	NA	NA		O													
										2CF-92	NA	NA		O	CK	3/4											
										2CF-35	NA	NA		I	CK	16											
										2CF-143	NA	NA		I	GT	1											
										2CFFE5320	NA	NA		I		16											
										2CFPX5830	NA	NA		I													
										2CFPX5840	NA	NA		I													
										2CFTX5750	NA	NA		I													
84	FEEDWATER B	NO	M262	C	57	D1	18	I	Y/N	2CF-42	S	NA	NONE	O	GT	18	H	AR	O	C	C	C		NO	NO	NONE	23
										2CF-93	NA	NA	NONE	O	GL	3/4	HW	N/A	LC	N/A	C	C					
										2CF-89	S	NA	NONE	O	GT	2	D	AR	C	C	C	C					
										2CF-94	NA	NA		O	CK	3/4											
										2CF-44	NA	NA		I	CK	16											
										2CF-144	NA	NA		I	GT	1											
										2CFFE5330	NA	NA		I		16											
										2CFPX5850	NA	NA		I													
										2CFPX5860	NA	NA		I													
										2CFTX5780	NA	NA		I													

ERN: CN0097RL   DWG: CN-FSAR-677.02-15   REV: 9

APPENDIX A
FROM TABLE 6-77.
(PAGE 16 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47) (6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
85	FEEDWATER C	NO	M309	C	57	D1	18	I	Y/N	2CF-51	S	NA	NONE	O	GT	18	H	AR	O	C	C	C		NO	NO	NONE	23
										2CF-95	NA	NA	NONE	O	GL	3/4	HW	N/A	LC	N/A	C	C					
										2CF-88	S	NA	NONE	O	GT	2	D	AR	C	C	C	C					
										2CF-177 (D)	NA	NA		O													
										2CF-96	NA	NA		O	CK	3/4											
										2CF-53	NA	NA		I	CK	16											
										2CF-145	NA	NA		I	GT	1											
										2CFFE5340	NA	NA		I													
										2CFPX5870	NA	NA		I													
										2CFPX5880	NA	NA		I													
										2CFTX5790	NA	NA		I													
86	FEEDWATER D	NO	M422	C	57	D1	18	I	Y/N	2CF-60	S	NA	NONE	O	GT	18	H	AR	O	C	C	C		NO	NO	NONE	23
										2CF-97	NA	NA	NONE	O	GL	3/4	HW	N/A	LC	N/A	C	C					
										2CF-87	S	NA	NONE	O	GT	2	D	AR	C	C	C	C					
										2CF-98	NA	NA		O	CK	3/4											
										2CF-62	NA	NA		I	CK	16											
										2CF-146	NA	NA		I	GT	1											
										2CFFE5350	NA	NA		I													
										2CFPX5890	NA	NA		I													
										2CFPX5900	NA	NA		I													
										2CFTX5810	NA	NA		I													

ERN: CN0097RN **DWG:** CN-FSAR-677.02-16 **REV:** 9

APPENDIX A
FROM TABLE 6-77.
(PAGE 17 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
87	AUX FEEDWATER A	NO	M143	C	57	D1	4	I	Y/Y	2CA-62A	NA	NA	NONE	O	GT	4	E	RM	O	FAI	O	O		NO	NO	NONE	23
										2CA-66B	NA	NA	NONE	O	GT	4	E	RM	O	FAI	O	O					
										2CA-121	NA	NA	NONE	O	GL	3/4	HW	N/A	LC	N/A	C	C					
										2CA-149	S	NA	NONE	O	GT	4	P	AR	O(12)	C	C	C					
										2BW-1	NA	NA	NONE	O	GT	2	HW	N/A	LC	N/A	C	C					
										2CA-185	S	NA	NONE	O	GT	2	P	AR	O	C	C	C					
										2CF-151	NA	NA	NONE	O	GT	2	HW	N/A	LC	C	C	C					
										2CA-254 (V)	NA	NA		O													
										2CA-233 (V)	NA	NA		O													
										2CF-160 (V)	NA	NA		O													
										2CF-90	S	NA	NONE	O	GT	2	D			C							
										2CF-147	NA	NA		O	CK	2											
										2CA-134	NA	NA		O	CK	3/4											
										2CA-189	NA	NA		O	CK	2											
										2CA-223	NA	NA		O		2											
										2CA-165	NA	NA		I													
										2CAFE5090	NA	NA		O		6											
										2CAFT5090	NA	NA		O													
										2CAFT5091	NA	NA		O													
										2CAFT5093	NA	NA		O													
88	AUX FEEDWATER B	NO	M278	C	57	D1	4	I	Y/Y	2CA-54B	NA	NA	NONE	O	GT	4	E	RM	O	FAI	O	O		NO	NO	NONE	23
										2CA-58A	NA	NA	NONE	O	GT	4	E	RM	O	FAI	O	O					
										2CA-120	NA	NA	NONE	O	GL	3/4	HW	N/A	LC	N/A	C	C					
										2CA-150	S	NA	NONE	O	GT	4	P	AR	O(12)	C	C	C					
										2BW-26	NA	NA	NONE	O	GT	2	HW	N/A	LC	N/A	C	C					
										2CA-186	S	NA	NONE	O	GT	2	P	AR	O	C	C	C					
										2CF-152	NA	NA	NONE	O	GT	2	HW	N/A	LC	C	C	C					
										2CA-166 (D)	NA	NA		O													
										2CA-253 (V)	NA	NA		O													
										2CA-237 (V)	NA	NA		O													
										2CA-238 (V)	NA	NA		O													
										2CF-89	S	NA	NONE	O	GT	2	D			C							
										2CF-148	NA	NA		O	CK	2											
										2CA-133	NA	NA		O	CK	3/4											
										2CA-190	NA	NA		O	CK	2											
										2CA-224	NA	NA		O		2											
										2CAFE5100	NA	NA		O		6											
										2CAFT5100	NA	NA		O													
										2CAFT5101	NA	NA		O													
										2CAFT5103	NA	NA		O													

ERN: CN0097RP **DWG:** CN-FSAR-677.02-17 **REV:** 9

APPENDIX A
FROM TABLE 6-77.
(PAGE 18 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
89	AUX FEEDWATER C	NO	M3106	C	57	D1	4	I	Y/Y	2CA-46B	NA	NA	NONE	O	GT	4	E	RM	O	FAI	O	O		NO	NO	NONE	23
										2CA-50A	NA	NA	NONE	O	GT	4	E	RM	O	FAI	O	O					
										2CA-119	NA	NA	NONE	O	GL	3/4	HW	N/A	LC	N/A	C	C					
										2CA-151	S	NA	NONE	O	GT	4	P	AR	O(12)	C	C	C					
										2BW-17	NA	NA	NONE	O	GT	2	HW	N/A	LC	N/A	C	C					
										2CA-187	S	NA	NONE	O	GT	2	P	AR	O	C	C	C					
										2CF-153	NA	NA	NONE	O	GT	2	HW	N/A	LC	C	C	C					
										2CA-251 (V)	NA	NA		O													
										2CA-168 (D)	NA	NA		O													
										2CA-225	NA	NA		O		2			O								
										2CA-216 (V)	NA	NA		O													
										2CA-241 (V)	NA	NA		O													
										2CA-239 (V)	NA	NA		O													
										2CF-88	S	NA	NONE	O	GT	2	D		C								
										2CF-149	NA	NA		O	CK	2											
										2CA-132	NA	NA		O	CK	3/4											
										2CA-191	NA	NA		O	CK	2											
										2CAFE5110	NA	NA		O		6											
										2CAFT5110	NA	NA		O													
										2CAFT5111	NA	NA		O													
										2CAFT5113	NA	NA		O													
90	AUX FEEDWATER D	NO	M457	C	57	D1	4	I	Y/Y	2CA-38A	NA	NA	NONE	O	GT	4	E	RM	O	FAI	O	O		NO	NO	NONE	23
										2CA-42B	NA	NA	NONE	O	GT	4	E	RM	O	FAI	O	O					
										2CA-118	NA	NA	NONE	O	GL	3/4	HW	N/A	LC	N/A	C	C					
										2CA-152	S	NA	NONE	O	GT	4	P	AR	O (12)	C	C	C					
										2BW-10	NA	NA	NONE	O	GT	2	HW	N/A	LC	N/A	C	C					
										2CA-188	S	NA	NONE	O	GT	2	P	AR	O	C	C	C					
										2CA-246 (D)	NA	NA		O													
										2CA-247 (V)	NA	NA		O													
										2CA-169 (D)	NA	NA		O													
										2CA-244 (V)	NA	NA		O													
										2CA-170 (V)	NA	NA		O													
										2CA-252 (V)	NA	NA		O													
										2CA-245 (V)	NA	NA		O													
										2CF-87	S	N.A	NONE	O	GT	2	D	N/A	C	C	C	C					
										2CF-154	NA	NA		O	GT	2			LC								
										2CF-150	NA	NA		O	CK	2											
										2CA-135	NA	NA		O	CK	3/4											
										2CA-192	NA	NA		O	CK	2											
										2CA-226	NA	NA		O	GT	2											
										2CAFE5120	NA	NA		O													
										2CAFT5120	NA	NA		O													
										2CAFT5121	NA	NA		O													
										2CAFT5123	NA	NA		O													

ERN: CN0097RQ **DWG:** CN-FSAR-677.02-18 **REV:** 9

APPENDIX A
FROM TABLE 6-77.
(PAGE 19 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
91	MAIN STEAM A	NO	M113	C	57	D3	34	O	Y/Y	2SM-7	P	NA	NONE	O	GL	34	P	AR	O	C	O	C		NO	NO	NONE	23
										2SV-20	1175 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-21	1190 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-22	1205 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-23	1220 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-24	1230 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-71 (PX)	NA	NA	NONE	O		1/2			C								
										2SV-19	P	NA	NONE	O	GT	6	P	AR	C	C	C	C					
										2SM-12	P	NA	NONE	O	GL	3	D	AR	C	C	C	C					
										2SM-16 (D)	NA	NA	NONE	O			HW	N/A	LC	N/A	C	C					
										2SM-73	NA	NA	NONE	O	GL	1	HW	N/A	LC	N/A	C	C					
										2SM-77A	NA	NA	NONE	O	GT	2	E	R	O	N/A	O	C					
										2SM-105	NA	NA	NONE	O	GT	2	HW	N/A	LC	N/A	C	C					
										2SM-121 (V)	NA	NA	NONE	I			HW	N/A	LC	N/A	C	C					
										2SM-143 (S)	NA	NA	NONE	O			HW	N/A	LC	N/A	C	C					
										2SV-67 (V)	NA	NA	NONE	O			HW	N/A	C	N/A	C	C					
										2SV-27A	NA	NA	NONE	O	GT	6	E		O								
										2SV-74	NA	NA		O		3/4			LC								
										2SMFE5000	NA	NA		I		32											
										2SMFE5790	NA	NA		O		2											
										2SMFT5000	NA	NA		I													
										2SMFT5010	NA	NA		I													
										2SMLS5710	NA	NA		O													
										2SMPT5080	NA	NA		O													
										2SMPT5081	NA	NA		O													
										2SMPT5090	NA	NA		O													
										2SMPT5100	NA	NA		O													
										2SMPT5520	NA	NA		O													
										2SVFE5200	NA	NA		O		2											

ERN: CN0097RS

DWG: CN-FSAR-677.02-19 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 20 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
92	MAIN STEAM B	NO	M261	C	57	D7	34	O	Y/Y	2SM-5	P	NA	NONE	O	GL	34	P	AR	O	C	O	C		NO	NO	NONE	23
										2SV-14	1175 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-15	1190 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-16	1205 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-17	1220 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-18	1230 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-13	P	NA	NONE	O	GT	6	P	AR	C	C	C	C					
										2SM-11	P	NA	NONE	O	GL	3	D	AR	C	C	C	C					
										2SM-72	NA	NA	NONE	O	GL	1	HW	N/A	LC	N/A	C	C					
										2SM-76B	NA	NA	NONE	O	GT	2	E	R	O	N/A	O	C					
										2SM-104	NA	NA	NONE	O	GT	2	HW	N/A	LC	N/A	C	C					
										2SM-120 (V)	NA	NA	NONE	I			HW	N/A	LC	N/A	C	C					
										2SM-142 (S)	NA	NA	NONE	O			HW	N/A	LC	N/A	C	C					
										2SA-1	NA	NA	NONE	O	GT	6	HW	N/A	LO*	N/A	O	O					
										2SM-17 (D)	NA	NA	NONE	O			HW	N/A	LC	N/A	C	C					
										2SV-66 (V)	NA	NA	NONE	O			HW	N/A	C	N/A	C	C					
										2SV-70 (PX)	NA	NA		O		1/2											
										2SV-28A	NA	NA	NONE	O	GT	6	E		O								
										2SV-75	NA	NA		O		3/4			LC								
										2SMFE5020	NA	NA		I		32											
										2SMFE5780	NA	NA		O		2											
										2SMFT5020	NA	NA		I													
										2SMFT5030	NA	NA		I													
										2SMLS5700	NA	NA		O													
										2SMPT5110	NA	NA		O													
										2SMPT5111	NA	NA		O													
										2SMPT5120	NA	NA		O													
										2SMPT5130	NA	NA		O													
										2SMPT5510	NA	NA		O													
										2SVFE5210	NA	NA		O		1											

*VALVE IS ADMIN LOCKED OPENED PER ITS 3.7.5

ERN: CN0097RU

DWG: CN-FSAR-677.02-20 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 21 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
93	MAIN STEAM C	NO	M393	C	57	D7	34	O	Y/Y	2SM-3	P	NA	NONE	O	GL	34	P	AR	O	C	O	C		NO	NO	NONE	23
										2SV-8	1175 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-9	1190 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-10	1205 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-11	1220 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-12	1230 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-7	P	NA	NONE	O	GT	6	P	AR	C	C	C	C					
										2SV-69 (PX)	NA	NA	NONE	O		1/2											
										2SM-10	P	NA	NONE	O	GL	3	D	AR	C	C	C	C					
										2SM-18 (D)	NA	NA	NONE	O			HW	N/A	LC	N/A	C	C					
										2SM-71	NA	NA	NONE	O	GL	1	HW	N/A	LC	N/A	C	C					
										2SM-75A	NA	NA	NONE	O	GT	2	E	R	O	N/A	O	C					
										2SM-103	NA	NA	NONE	O	GT	2	HW	N/A	LC	N/A	C	C					
										2SM-119 (V)	NA	NA	NONE	I			HW	N/A	LC	N/A	C	C					
										2SM-141 (S)	NA	NA	NONE	O			HW	N/A	LC	N/A	C	C					
										2SA-4	NA	NA	NONE	O	GT	6	HW	N/A	LO*	N/A	O	O					
										2SV-65 (V)	NA	NA	NONE	O			HW	N/A	C	N/A	C	C					
										2SV-26B	NA	NA	NONE	O	GT	6	E		O								
										2SV-73	NA	NA		O		3/4			LC								
										2SMFE5040	NA	NA		I		32											
										2SMFE5770	NA	NA		O		2											
										2SMFT5040	NA	NA		I													
										2SMFT5050	NA	NA		I													
										2SMLS5690	NA	NA		O													
										2SMPT5140	NA	NA		O													
										2SMPT5141	NA	NA		O													
										2SMPT5150	NA	NA		O													
										2SMPT5160	NA	NA		O													
										2SMPT5500	NA	NA		O													
										2SVFE5220	NA	NA		O		1											

*VALVE IS ADMIN LOCKED OPENED PER ITS 3.7.5

ERN: CN0097RW DWG: CN-FSAR-677.02-21 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 22 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
94	MAIN STEAM D	NO	M423	C	57	D3	34	O	Y/Y	2SM-1	P	NA	NONE	O	GL	34	P	AR	O	C	O	C		NO	NO	NONE	23
										2SV-2	1175 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-3	1190 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-4	1205 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-5	1220 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-6	1230 PSIG	NA	NONE	O	SV	6	N/A	N/A	C	N/A	C	C					
										2SV-1	P	NA	NONE	O	GT	6	P	AR	C	C	C	C					
										2SM-9	P	NA	NONE	O	GL	3	D	AR	C	C	C	C					
										2SM-19 (D)	NA	NA	NONE	O			HW	N/A	LC	N/A	C	C					
										2SM-70	NA	NA	NONE	O	GL	1	HW	N/A	LC	N/A	C	C					
										2SM-74B	NA	NA	NONE	O	GT	2	E	R	O	N/A	O	C					
										2SM-102	NA	NA	NONE	O	GT	2	HW	N/A	LC	N/A	C	C					
										2SM-118 (V)	NA	NA	NONE	I			HW	N/A	LC	N/A	C	C					
										2SM-140 (S)	NA	NA	NONE	O			HW	N/A	LC	N/A	C	C					
										2SV-64 (TD)	NA	NA	NONE	O			HW	N/A	C	N/A	C	C					
										2SV-68 (PX)	NA	NA		O		1/2											
										2SV-25B	NA	NA	NONE	O	GT	6	E		O								
										2SV-72	NA	NA		O		3/4			LC								
										2SMFE5060	NA	NA		I		32											
										2SMFE5760	NA	NA		O		2											
										2SMFT5060	NA	NA		I													
										2SMFT5070	NA	NA		I													
										2SMLS5680	NA	NA		O													
										2SMPT5170	NA	NA		O													
										2SMPT5171	NA	NA		O													
										2SMPT5180	NA	NA		O													
										2SMPT5190	NA	NA		O													
										2SMPT5490	NA	NA		O													
										2SVFE5230	NA	NA		O		1											
95	INTERIOR FIRE PROTECTION	YES	M316	A,B	56	B6	6	I	N/N	2RF-389B	T	≤ 5	NW	O	GT	4	E	ARM	C	FAI	C	C		NO (43)	YES (42)	AB	NONE
										2RF-392	NA	NA	C	I	CK	4	N/A	N/A	C	N/A	C	C					
										2RF-410 (D)	NA	NA		I													
										2RF-390 (V)	NA	NA		O													
96	DEMIN WATER	YES	M337	A,B	56	B1	2	I	N/N	2YM-119B	T	≤ 10	C	O	GL	2	E	ARM	O	FAI	O	C		YES	YES	AB	NONE
										2YM-121	NA	NA	C	I	CK	2	N/A	N/A	O	N/A	O	C					
										2YM-317 (D)	NA	NA		I													
										2YM-120 (V)	NA	NA		O													

ERN: CN0097RY

DWG: CN-FSAR-677.02-22 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 23 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47) (6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
97	INSTRUMENT AIR	YES	M220	A,B	56	B1	2	I	N/N	2VI-77B	P	< 11(53)	C	O	DP	2	E	ARM	O	FAI	O	C		YES	YES	AB	NONE
										2VI-79	NA	NA	C	I	CK	2	N/A	N/A	O	N/A	O	C					
										2VI-312A	T	≤ 10	C	O	GL	2	E	ARM	O	FAI	O	C					
										2VI-78 (V)	NA	NA		O													
98	STATION AIR	YES	M219	A,B	56	B7	3	I	N/N	2VS-54B	T	≤ 15	C	O	GT	3	E	ARM	C	FAI	O	C		YES	YES	AB	NONE
										2VS-56	NA	NA	C	I	CK	3	N/A	N/A	C	N/A	O	C					
										2VS-809 (V)	NA	NA		O													
										2VS-55 (V)	NA	NA		O													
99	BREATHING AIR	YES	M215	A,B	56	B7	2	I	N/N	2VB-83B	T	< 11(53)	C	O	DP	2	E	ARM	C	FAI	O	C		YES	YES	AB	NONE
										2VB-85	NA	NA	C	I	CK	2	N/A	N/A	C	N/A	O	C					
										2VB-84 (V)	NA	NA		O													
100	CONT PRESS	YES	CNIP-	48	56	C5	1/2	NONE	Y/Y	(41)			(49)														
	SENSING CHII		2NS2							2NSSV0020	NA	NA	C	O	GL	1/2	S	N/A	O	O	O	O		YES	YES	AB	NONE
										2NSLP5060	NA	NA	C	O													
										2NSLP5170	NA	NA	C	O													
										2NSLP5180	NA	NA	C	O													
										2VQLP5040	NA	NA	C	O													
101	CONT PRESS	YES	CNIP-	48	56	C5	1/2	NONE	Y/Y	(41)			(49)														
	SENSING CHI		2NS1							2NSSV0010	NA	NA	C	O	GL	1/2	S	N/A	O	O	O	O		YES	YES	AB	NONE
										2NSLP5070	NA	NA	C	O													
										2NSLP5160	NA	NA	C	O													
										2NSLP5190	NA	NA	C	O													
										2NSLP5370	NA	NA	C	O													
102	CONT PRESS	YES	CNIP-	48	56	C5	1/2	NONE	Y/Y	(41)			(49)														
	SENSING CHIII		2NS3							2NSSV0030	NA	NA	C	O	GL	1/2	S	N/A	O	O	O	O		YES	YES	AB	NONE
										2NSLP5050	NA	NA	C	O													
										2NSLP5250	NA	NA	C	O													
										2NSLP5260	NA	NA	C	O													
103	CONT PRESS	YES	CNIP-	48	56	C5	1/2	NONE	Y/Y	(41)			(49)														
	SENSING CHIV		2NS4							2NSSV0040	NA	NA	C	O	GL	1/2	S	N/A	O	O	O	O		YES	YES	AB	NONE
										2NSLP5040	NA	NA	C	O													
										2NSLP5240	NA	NA	C	O													
										2NSLP5270	NA	NA	C	O													
										2NSLP5380	NA	NA	C	O													
104	EQPT HATCH	YES	C400	48	50	C2	240	NONE	N/N	NONE	NA	NA	B	I	DS/FG				C		C	C	3-260	NO	NO	YRD	27
105	PSL HATCH (5)	YES	NONE	48	50	NA	115	NONE	N/N	NONE	NA	NA	B	I	DS				C		C	C	3-260	NO	NO	NONE	27
106	REACTOR COOLANT	YES	M329	A,B	56	A5	2	I	Y/Y	2NC-195B	T	≤ 10	C	O	GT	2	E	ARM	C	FAI	C	C		YES	YES	AB	NONE
	PUMP MTR OIL FILL									2NC-196A	T	≤ 10	C	I	GT	2	E	ARM	C	FAI	C	C					

ERN: CN0097S0 DWG: CN-FSAR-677.02-23 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 24 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47) (6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
107	REACTOR BUILDING	YES	M361	A,B	56	B6	6	I	N/N	2RF-447B	T	≤ 5	NW	O	GT	4	E	ARM	C	FAI	C	C		NO (43)	YES (42)	AB	NONE
	SPRINKLERS									2RF-448	NA	NA	C	I	CK	4	N/A	N/A	C	C	C	C					
										2RF-142 (V)	NA	NA		I													
108	CONT VALVE INJ	NO	M253	A,B	56	B7	1	I	Y/Y	2NW-35A	T	NA	NONE	O	GL	1	E	ARM	C	FAI	C	O		NO	NO	NONE	38
	WTR A TRAIN									2NW-37	NA	NA	NONE	I	CK	1	N/A	N/A	C	C	C	O					
										2NW-36 (V)	NA	NA		O													
109	CONT VALVE INJ	NO	M243	A,B	56	B7	1	I	Y/Y	2NW-105B	T	NA	NONE	O	GL	1	E	ARM	C	FAI	C	O		NO	NO	NONE	38
	WTR B TRAIN									2NW-107	NA	NA	NONE	I	CK	1	N/A	N/A	C	N/A	C	O					
										2NW-106 (V)	NA	NA		O													
110	STBY MAKEUP	YES	M228	A,B	56	B7	2	I	N/N	2NV-872A	T	≤ 10	C	O	GL	2	E	ARM	C	FAI	C	C		YES	YES	NONE	NONE
	PUMP DISCHARGE									2NV-874	NA	NA	C	I	CK	2	N/A	N/A	C	N/A	C	C					
	LINE									2NV-873 (V)	NA	NA		O													
111	CON RADIATION	YES	CNIP-	A,B	56	A1		O		2MISV5230	T	≤ 2	C	O	GL	1	S	A	O	C	O	C		YES	YES	AB	NONE
	MONITOR		EMF							2MISV5231	T	≤ 2	C	I	GL	1	S	A	O	C	O	C					
			(IN)																								
112	CON RADIATION	YES	CNIP-	A,B	56	A1		I		2MISV5232	T	≤ 2	C	O	GL	1	S	A	O	C	O	C		YES	YES	AB	NONE
	MONITOR		EMF							2MISV5233	T	≤ 2	C	I	GL	1	S	A	O	C	O	C					
			(OUT)																								
113	ILRT PRESS LINE	YES	CNIP-	A,B	56	A4	1/2	NONE		2MIMV6481	NA	NA	C	O	GL	1/2	HW	N/A	C		C	C		NO (29)	YES	YRD	NONE
	LOWER CONTAIN		MI 5							2MIMV6480	NA	NA	C	I	GL	1/2	HW	N/A	C		C	C					

ERN: CN0097S1

DWG: CN-FSAR-677.02-24 REV: 9

APPENDIX A
FROM TABLE 6-77,
(PAGE 25 OF 26)
UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47)(6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
114	ILRT PRESS LINE	YES	CNIP-	A,B	56	A4	1/2	NONE		2MIMV6491	NA	NA	C	O	GL	1/2	HW	N/A	C		C	C		NO (29)	YES	YRD	NONE
	ICE COND		MI 6							2MIMV6490	NA	NA	C	I	GL	1/2	HW	N/A	C		C	C					
115	ILRT PRESS LINE	YES	CNIP-	A,B	56	A4	1/2	NONE		2MIMV6471	NA	NA	C	O	GL	1/2	HW	N/A	C		C	C		NO (29)	YES	YRD	NONE
	UPPER CONTAIN		MI7							2MIMV6470	NA	NA	C	I	GL	1/2	HW	N/A	C		C	C					
116	CON ATMOS H2	YES	CNIP-	48	56	A1	1/2	O		2MISV0070 (41)	NA	NA	C (49)	I	GL	1/2	S	N/A	C	C	C	C/O		YES	YES	AB	NONE
	CONC LEVEL		MI 1		RG1.11					2MISV0110 (41)	NA	NA	C (49)	O	GL	1/2	S	N/A	C	C	C	C/O					
	XMITTER (IN)		M274							2MISV0150	NA	NA	C (49)		GL	1/2	S	N/A	C	C	C	C					
	TRAIN A																										
117	CONT ATMOS H2	YES	CNIP-	48	56	A1	1/2	I		2MISV0090 (41)	NA	NA	C (49)	I	GL	1/2	S	N/A	C	C	C	C/O		YES	YES	AB	NONE
	CONC LEVEL		MI 3		RG1.11					2MISV0130 (41)	NA	NA	C (49)	O	GL	1/2	S	N/A	C	C	C	C/O					
	XMITTER (OUT)		M274							2MISV0170	NA	NA	C (49)		GL	1/2	S	N/A	C	C	C	C					
	TRAIN A																										
118	CONT ATMOS H2	YES	CNIP-	48	56	A1	1/2	O		2MISV0080 (41)	NA	NA	C (49)	I	GL	1/2	S	N/A	C	C	C	C/O		YES	YES	AB	NONE
	CONC LEVEL		IMI 2		RG1.11					2MISV0120 (41)	NA	NA	C (49)	O	GL	1/2	S	N/A	C	C	C	C/O					
	XMITTER (IN)		M274							2MISV0160	NA	NA	C (49)		GL	1/2	S	N/A	C	C	C	C					
	TRAIN B																										
119	CONT ATMOS H2	YES	CNIP-	48	56	A1	1/2	I		2MISV0100 (41)	NA	NA	C (49)	I	GL	1/2	S	N/A	C	C	C	C/O		YES	YES	AB	NONE
	CONC LEVEL		IMI 4		RG1.11					2MISV0140 (41)	NA	NA	C (49)	O	GL	1/2	S	N/A	C	C	C	C/O					
	XMITTER (OUT)		M274							2MISV0180	NA	NA	C (49)		GL	1/2	S	N/A	C	C	C	C					
	TRAIN B																										
120	LOWER PERSONNEL	YES	C100	48	50	NA	115	NONE	N/N	CONT DOOR	NA	NA	B	I	DS				C		C	C		NO	NO	NONE	27
	AIR LOCK									AUX DOOR	NA	NA	B	O	DS												
121	UPPER PERSONNEL	YES	C300	48	50	NA	115	NONE	N/N	CONT DOOR	NA	NA	B	I	DS				C		C	C		NO	NO	NONE	27
	AIR LOCK									AUX DOOR	NA	NA	B	O	DS												
122	LOWER PAL AIR	YES	PC24	A,B	56	B7	3/4	I		2IASV5160	T	≤ 2	C	O	GL	3/4	S	A	O	C	O	C		NA	YES	AB	NONE
	SUPPLY									2IASV5350	NA	NA	C	I	CK	3/4	N/A	N/A	O		O	C					

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APPENDIX A
FROM TABLE 6-77,
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UNIT 2 CONTAINMENT ISOLATION VALVE DATA

ITEM NO.	SERVICE	APP J	PEN NO.	TS 3.6.3 APPLICABLE CONDITION	GDC NO.	(1) VALVE ARR.	NOM. LINE SIZE IN.	(15) FLOW DIR.	(7) SEISMIC EQUIP. I/O	(47) (6) VALVE NO.	(2) ACTUATION SIGNAL	(47) ISO TIME (SEC)	LRT TYPE	(19) VALVE LOC.	(3) TYPE VALVE	SIZE, IN.	(4) TYPE ACT.	(4) ACT TYPE	(4) NORMAL POS.	(4) FAIL SAFE POS.	(4) SHUT DOWN POS.	(4) POST ACCID. POS.	FSAR FIG. NO.	(52) VENT & DRAIN TYPE A TEST	(18) TYPE C TEST	RELEASE LOC.	JNT
122A	LOWER PAL LEAK TEST	YES	PC23	48	56	C1				2IASV5410	T	≤ 2	C	O	GL	3/4	S		C		C	C		NA	YES	AB	NONE
123	LOWER PAL EQUALIZATION LINE	YES	BULK HEAD	A,B	56	NA	3/4	NONE		2IACV5390	NA	NA	C	O	CK	2	NA		C		C	C		NA	YES	NONE	NONE
										2IACV5370	NA	NA	C	I	CK	2	NA		C		C	C					
124	UPPER PAL AIR SUPPLY	YES	PC24	A,B	56	B7	3/4	I		2IASV5080	T	≤ 2	C	O	GL	3/4	S	A	O	C	O	C		NA	YES	AB	NONE
										2IACV5340	NA	NA	C	I	CK	1/2	N/A	N/A	O		O	C					
124A	UPPER PAL LEAK TEST	YES	PC23	48	56	C1				2IASV5400	T	≤ 2	C	O	GL	3/4	S		C		C	C		NA	YES	AB	NONE
125	UPPER PAL EQUALIZATION LINE	YES	BULK HEAD	A,B	56	NA	3/4	NONE		2IACV5380	NA	NA	C	O	CK	2	NA		C		C	C		NA	YES	NONE	NONE
										2IACV5360	NA	NA	C	I	CK	2	NA		C		C	C					
126	SPARE	YES	M452	48	50	C4	20			NONE	NA	NA	B	NA	FLANGE	20			C		NA	NA		NO	NO	NONE	27
127	SPARE	YES	E251	48	50	C4	12			NONE	NA	NA	B	NA	FLANGE	12			C		NA	NA		NO	NO	NONE	27

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Table 6-78. Comparison of Containment Purge System With Branch Technical Position CSB 6-4, Revision 2

Paragraph	Compliance Status
B-1-a	The Containment Isolation System is described in Section 6.2.4. Operability of the containment purge isolation valves is currently under review by the Equipment Qualifications Branch. (Reference E. G. Adensan's April 1, 1982 letter to W. O. Parker.)
B-1-b	The system has a total of nine supply and exhaust penetrations (as shown on Figure 9-129) in order to serve the upper and lower compartments of the ice condenser containment and to limit the penetration sizes.
B-1-c	Containment penetration and isolation valve sizes are listed in Table 6-77. Limitations on purge system operation are provided in the Technical Specifications.
B-1-d	In Compliance. See Section 6.2.4.
B-1-e	In Compliance. See Section 6.2.4.
B-1-f	In Compliance. See Section 6.2.4.
B-1-g	The potential for entrainment of debris in the containment purge isolation valves is minimized by the ice condenser containment design. Since the lower containment purge isolation valves will be closed during power, startup, hot standby and hot shutdown modes of operation (Modes 1-4) (Technical Specification requirement), any debris generated from the postulated LOCA would be confined to the lower compartment by the ice condenser's filtering the debris. The upper containment isolation valves are not in the ice condenser blowdown stream, further reducing the probability of debris entrainment in the valves. In addition, the Containment Purge System is seismic Category 2.
B-2	In Compliance. See description of Containment Purge System in Section 9.4.5.
B-3	In Compliance. See description of Containment Auxiliary Carbon Filter System in Section 9.4.6.
B-4	In Compliance. See Sections 6.2.4 and 6.2.6.
B-5-a	The loss-of-coolant accident analysis does not assume the purge valves are open at the onset of the postulated LOCA. Purge system operation is limited by the Technical Specifications. The Technical Specifications also limit the iodine inventory in the Reactor Coolant System. Lower and upper compartment purge valves are closed during power, startup, hot standby, and hot shutdown modes of operation (Modes 1-4).
B-5-b	There is no safety-related equipment in the area beyond the purge system isolation valves that would be affected by escaping air and steam, even assuming failure of the duct work.

Paragraph	Compliance Status
B-5-c	If the system is in operation at the start of an accident the amount of air lost while the valves are closing is insignificant. (See response to Question 42.64, McGuire FSAR) The maximum containment pressure analysis is presented in Section 6.2.1.3.2.2.
B-5-d	An allowable leak rate for these valves has been developed in the Type "C" test program.

Table 6-79. Applicable Codes, Standards and Guides Used in the Design of the Electric H^2 Recombiner

Historical information in italics below required to be revised.

1. *Regulatory Guides*
    a. *1.7*
    b. *1.28*
    c. *1.38*
    d. *1.29*
2. *10CFR50 GDC-2, 41, 42, 43 Appendix A*
3. *Industry Codes*
    a. *ASME IX*
    b. *National Electric Code National Electric Manufacturing Association*
    c. *National Fire Protection Association*
    d. *Underwriter Lab.*
    e. *IEEE 308*
    f. *IEEE 323 (1971)*
    g. *IEEE 344 (1971)*

Table 6-80. Electric Hydrogen Recombiner Typical Parameters

Histocial information in italics below not required to be revised.

1. Power (Maximum)	*75 KW*[1]
2. Capacity (Minimum)	*100 scfm*
3. Heaters	
a. Number	*4 Banks*
b. Heater Surface Area/Heater	*28 ft.*^{2}
c. Maximum Heat Flux	*7.9 Watts/in.*^{2}
d. Maximum Sheath Temperature	*1550°F*
4. Gas Temperature	
a. Inlet	*80 to 155°F*
b. In Heater Section	*1150 to 1400°F*
5. Materials	
a. Outer Structure	*300-Series S.S.*
b. Inner Structure	*Incoloy-800*
c. Heater Element Sheath	*Incoloy-800*
6. Dimensions	
a. Height	*8.0 ft.*
b. Width	*3.9 ft.*
c. Depth	*4.6 ft.*
7. Weight	*4000 lb.*

Note:

1. Power can be controlled by SCR.

Table 6-81. Containment Hydrogen Sample and Purge System Design Data

CONTAINMENT PURGE BLOWER	
1. Type	Rotary Blower
2. Quantity Per Unit	1
3. Design Inlet Temperature, °F	120
4. Design Inlet Pressure, PSIA	A+m
5. Capacity, SCFM	100
6. Discharge Pressure, PSIG	8
7. Casing Design Pressure, PSIG	10

Table 6-82. Deleted Per 2006 Update

Table 6-83. Deleted Per 2006 Update

Table 6-84. Deleted Per 1991 Update

Table 6-85. Deleted Per 1991 Update

Table 6-86. Deleted Per 1991 Update

Table 6-87. Emergency Core Cooling System Component Parameters

Cold Leg Injection Accumulators	
Number	4
Design Pressure, psig	700
Design Temperature, °F	300
Operating Temperature, °F	100-150
Normal Operating Pressure, psig	600
Minimum Operating Pressure, psig	585
Total Volume, ft^3	1346 each
Minimum Water Volume, ft^3	1020 each
Maximum Volume N_2 gas, ft^3	326
Boric Acid Concentration, nominal, ppm	Controlled by COLR
Boric Acid Concentration, minimum, ppm	Controlled by COLR
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
Max. Flow Rate, gpm	560
Head At Max. Flow Rate, ft. (nominal)	1400
Discharge Head at Shutoff, ft. (nominal)	6150
Motor Rating, bhp[2]	600
Required NPSH (ECCS) Max. Flowrate, ft.	18.5 (34)[3]
Available NPSH (ECCS) Max. Flowrate, ft.	59.1 (72)[3]
Safety Injection Pumps	
Number	2
Design Pressure, psig	1750
Design Temperature, °F	300
Design Flow Rate, gpm	400
Design Head, ft.(nominal required)	2540
Max. Flow Rate, gpm	675

Head at Max. Flow Rate, ft. (nominal)	1650
Discharge Head at Shutoff, ft. (nominal)	3545
Motor Rating, bhp[2]	4000
Required NPSH (ECCS) Max. Flow Rate, ft.	29
Available NPSH (ECCS) Max. Flow Rate, ft.	60.9
Residual Heat Removal Pumps	
(See Section 5.4.7 for design parameters)	
Residual Heat Exchangers	
(See Section 5.4.7 for design parameters)	
Motor Operated Valves	
Maximum opening or closing time for valves up to and including 8 inches, sec.	10
Maximum opening or closing rate for valves over 8 inches, (inches per minute per inch of nominal valve size), sec.	49

Notes:

1. Includes miniflow
2. 1.15 Service factor not included
3. Values in parentheses are from updated calculation described in section 6.3.2.2

Table 6-88. ECCS Relief Valve Data

Description	Fluid Discharged	Fluid Inlet Temp. Normal	Set Pressure Psig	Back Pressure Constant	Psig Buildup	*Design Minimum Capacity* [(3)(4)]
N_2 Supply to Accumulators GN44	N_2	120	675	0	0	*1500 scfm*
Safety Injection Pump Discharge Line [(1)] NI119, NI151	Water	100	1900	3	50	*20 gpm*
Residual Heat Removal Pump Safety Injection Line ND31, ND64	Water	120	600	3	50	*400 gpm*
Safety Injection Pump/ Pumps Suction Header [(2)] NI102	Water	100	220	3	50	*25 gpm*
Cold Leg Injection Accumulator NI52, NI63, NI74, NI96	Water or N_2 Gas	120	700	0	0	*1500 scfm*

Notes:

1. 1900 psig relief valve provides overpressure protection for the safety injection pump discharge line downstream of discharge check valve.
2. 220 psig relief valve provides overpressure protection for the pump casing, pump suction line, and pump discharge line upstream of discharge check valve.
3. Fm actual capacities of the relief valves, see the Valve Data Sheets.
4. This column is Historical Information not required to be revised.

Table 6-89. Motor Operated Isolation Valves In ECCS

Function	Valve I.D.	Interlocks	Automatic Features	Position Indication	Alarms
Cold Leg Accumulator Isolation Valves	NI54A NI65B NI76A NI88B	None	Opens (if closed) on S. Opens (if closed) on NC pressure greater than P-11. Power to valve operator removed during plant normal power operation	MCB	Yes-Out of Position
NI Pump Suction from FWST	NI100B NI103A NI125B	None	None. Power to valve NI100B operator removed during plant normal power operation	MCB	Yes-Out of Position
ND Suction from FWST	FW27A (FW55B)	Cannot be opened unless the following are closed. Sump valve NI185A (NI184B), auxiliary spray valve NS43A (NS38B), ND discharge to CCP (NI Pump) suction valve ND28A (NI136B) and NS pump suction from containment sump valve NS18A (NS1B).	Valve closes when valve NI185A (NI184B) reaches its full open position.	MCB	Yes-Out of Position
ND Pump Discharge to CCP (NI Pump) Suction	ND28A (NI136B)	Cannot be opened unless NI pump miniflow isolated (valves NI115 and NI144A, or NI147B closed) ND to NC isolated [ND1B or ND2A closed (ND36B or ND37A)] and sump isolation valve open NI185A (ND184B)	None	MCB	Yes-Out of Position

Function	Valve I.D.	Interlocks	Automatic Features	Position Indication	Alarms
NI Pump Hot Leg Discharge Header	NI121A NI152B	None	None (Closed with power removed per T.S.)	MCB	Yes-Out of Position
ND Hot Leg Discharge Header	NI183B	None	None (Closed with power removed per T.S.)	MCB	Yes-Out of Position
Containment Sump Isolation Valve	NI184B (NI185A)	Cannot be opened unless ND to NC isolated, ND36B or ND37A (ND1B or ND2A) closed and FWST outlet valve FW55B (FW27A) closed.[1]	Opens on FWST Low With S Signal (This bypasses the interlocks associated with control room pushbutton)	MCB	Yes-Out of Position
CCP Suction from RWST	NV252A NV253B	None	Opens on S, low VCT level, and BDMS.	MCB	Yes-Out of Position
CCP Normal Suction	NV188A NV189B	None	Closes on S if CCP Suction from FWST valves open	MCB	Yes-Out of Position
NI Pump to C.L.	NI162A	None	None (open with power removed)	MCB	Yes-Out of Position
CCP Normal Discharge	NV312A NV314B	None	Closes on S	MCB	None
CCP to Cold Leg Discharge Isolation	NI9A NI10B	None	Opens on S	MCB	Yes-Out of Position
CCP/NI Pump Suctions Crossover	NI332A NI333B NI334B	None	None	MCB	Yes-Out of Position

Function	Valve I.D.	Interlocks	Automatic Features	Position Indication	Alarms
NC to ND Isolation Valves	ND1B and ND2A (ND36B and ND37A)	Can be opened only if the following valves are closed: ND suction from FWST FW27A (FW55B), containment sump isolation valve NI185A (NI184B), ND Pump discharge to CCP (NI Pump) suction valve ND28A (NI136B), and the residual containment spray valve NS43A (NS38B). Also, NC pressure must be below setpoint.	None	MCB	Yes-ND suct open and NC HI press
ND to NC Cold Legs	NI173A NI178B	None	None (open with power removed)	MCB	Yes-Out of Position
NI Pump Miniflow	NI115A NI144A NI147B	To open any of these valves the following must be closed: ND discharge to CCP valve ND28A and ND discharge to NI Pump valve NI136B.	None Valve NI147B has power removed from operator during plant normal power operation.	MCB	Yes-Out of Position
ND Cross Connect	ND32A ND65B	None	None	MCB	Yes-Out of Position
NI Pump Cross Connect	NI118A	None	None	MCB	Yes-Out of Position
CCP Miniflow	NV202B NV203A	None	None	MCB	Yes-Out of Position

Function	Valve I.D.	Interlocks	Automatic Features	Position Indication	Alarms
NS Suction from FWST	NS20A (NS3B)	Cannot be Opened Unless NS Suction from Sump valve NS18A (NS1B) is closed.	None	MCB	Yes-Out of Position
NS Suction from Sump	NS18A (NS1B)	Cannot be Opened Unless NS suction from FWST valve ND20A (NS3B) closed and sump isolation valve NI185A (NI184B) open.	None	MCB	Yes-Out of Position
Residual Containment Spray	NS43A (NS38B)	Cannot be opened unless ND to NC isolation valve ND1B or ND2A (ND36B or ND37A) is closed and Containment Sump Isolation valve NI185A (NI184B) is open and an enable signal is generated by the Containment Pressure Control System.	Valve closes automatically (if open) on disable signal from the Containment Pressure Control System	MCB	Yes-Out of Position

Note:

1. When two of four RWST level channels indicate a RWST level less than the low level setpoint in conjunction with an "S" signal, the two containment sump isolation valves are automatically opened to realign the two RHR pumps to take suction from the sump for the start of the recirculation mode. The automatic circuit therefore bypasses the block which prevents these valves from being opened by the operator during normal operations when the RWST/RHR isolation valves are open.

Table 6-90. Materials Employed For Emergency Core Cooling System Components

Component	Material
Accumulators (cold leg)	Carbon Steel, Clad with Austenitic Stainless Steel
Pumps	
Centrifugal charging	Austenitic Stainless Steel
Safety Injection	Austenitic Stainless Steel
Residual Heat Removal	Austenitic 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	Austenitic Stainless Steel
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 or, 17-4PH Stainless
Motor Operated Valves Containing Non-Radioactive, Boron - Free Fluids	
Body, Bonnet and Flange	Carbon Steel
Stems	Corrosion Resistance Steel
Diaphragm Valves	Austenitic Stainless Steel
Accumulator Check Valves	
Parts Contacting Borated Water	Austenitic Stainless Steel
Clapper Arm Shaft	17-4 PH Stainless
Relief Valves	
Stainless Steel Bodies	Stainless Steel

Component	Material
Carbon Steel Bodies	Carbon Steel
All Nozzles, Discs, Spindles and Guides	Austenitic Stainless Steel
Bonnets for Stainless Steel Valves without a Balancing Bellows	Stainless Steel or Plated Carbon Steel
All Other Bonnets	Carbon Steel
Piping	
All Piping in Contact with Borated Water	Austenitic Stainless Steel

Table 6-91. Failure Mode and Effects Analysis - Emergency Core Cooling System - Active Components

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
1. Motor operated gate valve NV188A (NV189B analogous)	Fails to close on demand.	Injection - cold legs of RC loops.	Failure reduces redundancy of providing VCT discharge isolation. No effect on safety for system operation; isolation valves NV189B (NV188A) and check valve NV229 provide backup tank discharge isolation.	Valve position indication (open to closed position change) at MCB. Valve close position monitor light and alarm for group monitoring of components at MCB.	Valve is electrically interlocked with isolation valve NV252A (NV253B). Valve closes on actuation by an SI "S" signal providing isolation valve NV252A (NV253B) is at a full open position. Unit 1 Only: Valves 1NV188A and 1NV189B are electrically interlocked with isolation valves 1NV252A and 1NV253B. When either 1NV188A or 1NV189B starts to close, both 1NV252A and 1NV253B will go open.

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
2. Motor operated gate valve NV252A (NV253B analogous)	Fails to open on demand.	Injection - cold legs of RC loops.	Failure reduces redundancy of providing fluid flow from RWST to suction of CCP's. No effect on safety for system operation. Valve (NV253B) opens to provide backup flow path to suction of CCP's.	Valve position indication (closed to open position change) at MCB. Valve open position monitor light and alarm for group monitoring of components at MCB.	Valve is electrically interlocked with the instrumentation that monitors fluid level of the VCT. Valve opens upon actuation by an “S” signal or upon actuation by a “Low-Low-Level” VCT signal or BDMS. Unit 1 Only: Valves 1NV252A and 1NV253B are electrically interlocked with isolation valves 1NV188A and 1NV189B. When either 1NV188A or 1NV189B starts to close, both 1NV252A and 1NV253B will go open.

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
3. Centrifugal charging pump A (pump B analogous)	Fails to deliver working fluid.	Injection and recirculation cold legs of RC loops.	Failure reduces redundancy of providing emergency coolant to the RCS at prevailing incident RCS pressure Fluid flow from CCP "A" will be lost. Minimum flow requirements at prevailing high RCS pressures will be met by CCP “B” delivery.	CCP discharge header flow (NVP6080) at MCB. Open pump switchgear circuit breaker indication at MCB. Circuit breaker close position monitor light for group monitoring of components at MCB. Common breaker alarm at MCB.	One CCP used for normal charging of RCS during plant operation. Pump circuit breaker aligned to close on actuation by an “S” signal.
4. Motor operated globe valve NV202B (NV203A analogous)	Fails to close on demand.	Injection - cold legs of RC loops.	Failure reduces redundancy of providing isolation of CCP miniflow line. No effect on safety for system operation. Valve NV203A in miniflow line provides backup isolation.	Same method of detection as that stated for item #1.	Valve remains open to assure continued CCP miniflow. Valve can be closed when operator is certain RCS pressure is low enough to assure minimum flow requirements for pumps.

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
5. Motor operated gate valve NV312A (NV314B analogous)	Fails to close on demand.	Injection - cold legs of RC loops.	Failure reduces redundancy of providing isolation of CCP discharge to normal charging line of CVCS. No effect on safety for system operation. Valve NV314B provides backup CVCS normal charging line isolation.	Valve position indication (open to closed position change) at MCB. Valve close position monitor light for group monitoring of components at MCB.	Valve aligned to close upon actuation by an "S" signal.
6. Motor operated gate valve NI9A (NI10B analogous)	Fails to open on demand.	Injection - cold legs of RC loops.	Failure reduces redundancy of fluid flow paths from CCP to the RCS. No effect on safety for operation. Valve NI10B opens to provide backup flow path from CCP.	Same methods of detection as that stated for item #2.	Valve aligned to open upon actuation by an "S" signal.

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
7. Motor operated globe valve ND25A (ND59B analogous)	1. Fails to close on demand.	Injection - cold legs of RC loops.	1. Failure reduces working fluid delivered to RCS from RHR pump A. Minimum flow requirements for LHSI will be met by RHR pump B delivering working fluid to RCS.	1. Valve position indication (open to closed position change) at MCB. RHR pump return line to cold legs flow indication (NDP5190) at MCB.	Valve is regulated by signal from pressure sensor located in pump discharge header. The control valve opens when the RHR pump discharge flow is less than 533 gpm and closes when the flow exceeds 1400 gpm.

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
	2. Fails closed	Injection - cold legs of RC loops.	2. Failure results in an insufficient fluid flow through RHR pump A for a small LOCA or steam line break resulting in possible pump damage. If pump becomes inoperative, minimum flow requirements for LHSI will be met by RHR pump B delivering working fluid to RCS.	2. Valve position indication (closed to open position change) at MCB. RHR pump return line to cold legs flow indication (NDP5190) at MCB.	

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
8. Residual heat removal pump A (Pump B analogous)	Fails to deliver working fluid.	Injection - cold legs of RC loops.	Failure reduces redundancy of providing emergency coolant to the RCS from the RWST at low RCS pressure. Fluid flow from RHR pump A will be lost. Minimum flow requirements for LHSI will be met by RHR pump B delivering working fluid.	RHR pump return line to cold legs flow indication (NDP5190) and low flow alarm at MCB. RHR pump discharge pressure (NDP5090) at MCB. Open pump switchgear circuit breaker indication at MCB. Circuit breaker close position monitor light for group monitoring of components at MCB. Common breaker trip alarm at MCB.	The RHR pump is sized to deliver reactor coolant through the RHR heat exchanger to meet plant cooldown and startup operations. The pump circuit breaker is aligned to close on actuation by an “S” signal.

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
9. Safety Injection pump A, (Pump B analogous)	Fails to deliver working fluid.	Injection - cold legs of RC loops.	Failure reduces redundancy of providing emergency coolant to the RCS from the RWST at high RCS pressure (1520 psi). Fluid flow from SI pump A will be lost. Minimum flow requirements for HHSI will be met by SI pump B delivering working fluid.	SI pumps discharge pressure (NIP5440) at MCB. SI pump discharge flow (NIP5450) at MCB. Open pump switchgear circuit breaker indication Circuit breaker close position monitor light and alarm for group monitoring of components at MCB. Common breaker trip alarm at MCB.	Pump circuit breaker aligned to close on actuation by an “S” signal.

Component		Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
10.	Motor operated gate valve NI185A (NI184B analogous)	Fails to open on demand.	Recirculation - cold legs of RC loops.	Failure reduces redundancy of providing fluid from the Containment Sump to the RCS during recirculation. RHR pump A will not provide recirculation flow. Minimum LHSI flow requirements will be met through opening of isolation valve NI184B and recirculation of fluid by RHR pump B.	Same methods of detection as those stated for item #2. In addition failure may be detected through monitoring of RHR pump return line to cold legs flow indication (NDP5190) and RHR pump discharge pressure (NDP5090) at MCB.	Valve is actuated to open by “S” signal in coincidence with “Lo” Level RWST signal. Valve is electrically interlocked from being opened from MCB by isolation valves FW27A, ND2A and ND1B.
11.	Motor operated gate valve FW27A (FW55B analogous)	Fails to close on demand.	Recirculation - cold legs of RC loops.	Failure reduces redundancy of providing flow isolation of Containment Sump from RWST. No effect on safety for system operation. Check valve FW28 & FW96 provides backup isolation.	Same methods of detection as those stated for item #1.	Valve automatically closes when NI185A is fully open and MCB switch is in “auto” position. Valve is electrically interlocked with isolation valves ND28A, NI185A, NS43A, and NS18A. It may not be remotely opened from MCB unless these valves are closed.

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
12. Motor operated gate valve ND32A (ND65B analogous)	Fails to close on demand.	Recirculation - cold legs of RC loops.	Failure reduces redundancy of providing RHR pump train separation for recirculation of fluid to cold legs of RCS. No effect on safety for system operation. Valve ND65B provides backup isolation for LHSI/RHR pump train separation.	Same methods of detection as those stated for item #1.	
13. Motor operated globe valve NI147B	Fails to close on demand.	Recirculation - cold legs of RC loops.	Failure reduces redundancy of providing isolation of SI pump's miniflow line isolation from RWST. No effect on safety for system operation. Valve (NI115A and NI144A) in each pump's miniflow line provide backup isolation.	Same methods of detection as those stated for item #1.	Valve is electrically interlocked with isolation valves ND28A and NI136B. It may not be opened unless these valves are closed.

Component		Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
14.	Motor operated globe valve NI115A (NI144A analogous)	Fails to close on demand.	Recirculation - cold legs of RC loops.	Failure reduces redundancy of providing isolation of SI pump A miniflow isolation from RWST. No effect on safety for system operation. Valve NI147B in common miniflow line provides backup isolation.	Same methods of detection as those stated for item #1.	Same remark as that stated for item #16.
15.	Motor operated gate valve ND28A	Fails to open on demand.	Recirculation - cold legs of RC loops.	Failure reduces redundancy of providing flow to suction of CCP's from RHR pumps. No effect on safety for system operation. Flow requirements for CCP suction will be met by flow from RHR pump B via cross-tie line and opening of isolation valve NI332A or NI333B and normally open valve NI334B.	Same methods of detection as those stated for item #2.	Valve is electrically interlocked with isolation valves NI115A, NI144A, NI147B, ND2A and ND1B, and NI185A. Valve cannot be opened unless valve NI147B or valves NI115A and NI144A are closed, and valve ND2A or ND1B is closed, and valve NI185A is open.

Component		Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
16.	Motor operated gate valve NI136B	Fails to open on demand.	Recirculation - cold legs of RC loops.	Failure reduces redundancy of providing flow to suction of SI pumps from RHR pumps. No effect on safety for system operation. Flow requirements for SI pump suction will be met by flow from RHR pump A via cross-tie line and opening of isolation valve NI332A or NI333B and valve ND28A.	Same methods of detection as those stated for item #2.	Valve is electrically interlocked with isolation valves NI115A, NI144A, NI147B, ND37A, ND36B, and NI184B. Valve cannot be opened unless valve NI147B or valves NI115A and NI144A are closed, and valve ND37A or ND36B is closed, and valve NI184B is open.
17.	Motor operated gate valve NI332A (NI333B analogous)	Fails to open on demand.	Recirculation - cold legs of RC loops.	Failure reduces redundancy of providing fluid flow through cross-tie between suction of CCP's and SI pumps. No effect on safety for system operation. Valve NI333B opens to provide backup flow path through cross-tie line.	Same methods of detection as those for item #2.	

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
18. Motor operated gate valve NI100B	Fails to close on demand.	Recirculation - cold legs of RC loops.	Failure reduces redundancy of providing flow isolation of SI pump suction from RWST. No effect on safety for system operation. Check valve NI101 provides backup isolation.	Same methods of detection as those stated for item #1.	
19. Motor operated gate valve NV252A (NV253B analogous)	Fails to close on demand.	Recirculation - cold legs of RC loops.	Failure reduces redundancy of providing flow isolation of suction of CCP's from RWST. No effect on safety for system operation. Check valve NV254 provides backup isolation.	Same methods of detection as those state previously for failure of item during injection phase of ECCS operation.	

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
20. Residual heat removal pump A (pump B analogous)	Fails to deliver working fluid.	Recirculation - cold legs of RC loops.	Failure reduces redundancy of providing recirculation of coolant to the RCS from the Containment Sump. Fluid flow from RHR pump A will be lost. Minimum recirculation flow requirements for LHSI flow will be met by RHR pump B delivering working fluid.	Same methods of detection as those stated previously for failure of item during injection phase of ECCS operation.	

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
21. Safety injection pump A, (pump B analogous)	Fails to deliver working fluid.	Recirculation - cold or hot legs of RC loops.	Failure reduces redundancy of providing recirculation of coolant to the RCS from the Containment Sump to cold legs of RC loops via RHR and SI pumps. Fluid flow from SI pump A will be lost. Minimum recirculation flow requirements for HHSI flow will be met by SI pump B delivering working fluid.	Same methods of detection as those stated previously for failure of item during injection phase of ECCS operation.	

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
22. Motor operated gate valve NI173A	Fails to close on demand.	Recirculation - hot legs of RC loops.	Failure reduces redundancy of providing recirculation of coolant from the Containment Sump to hot legs of RC loops. Fluid flow from RHR pump A will continue to flow to cold legs of RC loops. Minimum recirculation flow requirements to hot legs of RC loops will be met by RHR pump B recirculating fluid to RC hot legs via SI pumps.	Same methods of detection as those stated for item #1.	

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
23. Motor operated gate valve ND32A (ND65B analogous)	Fails to open on demand.	Recirculation - hot legs of RC loops.	Failure reduces redundancy of providing recirculation of coolant from the Containment Sump to the hot legs of RC loops. For ND32A minimum flow requirements will be met by RHR pump B recirculating fluid via ND65B to RC hot legs or via NI136B and the SI pumps. For ND65B, minimum flow requirements will be met by RHR pump A recirculating fluid via ND32A to RC hot legs or via NI332A, NI333B, and NI334B and the SI pumps.	Valve position indication (closed to open position change) at MCB. Valve close position monitor light and alarm for group monitoring of components at MCB. In addition, RHR pump discharge pressure (NDP5090) at MCB (NDP5080 analogous).	
24. Motor operated gate valve NI183B	Fails to open on demand.	Recirculation - hot legs of RC loops.	Same effect on system operation as that stated for item #26.	Same methods of detection as those stated for item #2. In addition, RHR pump discharge pressure (NDP5090) at MCB.	

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
25. Motor operated gate valve NI178B	Fails to close on demand.	Recirculation - hot legs of RC loops.	Failure reduces redundancy of providing recirculation of coolant from the Containment Sump to hot legs of RC loops. Fluid flow from RHR pump B will continue to flow to cold legs of loops. Minimum recirculation flow requirements to hot legs of RC loops will be met by RHR pump A recirculating fluid to RC hot legs.	Same methods of detection as those stated for item #1.	
26. Motor operated gate valve NI118A (NI150B analogous)	Fails to close on demand.	Recirculation - hot legs of RC loops.	Failure reduces redundancy of providing flow isolation of SI pump flow to cold legs of RC loops. No effect on safety for system operation. Valve NI162A provides backup isolation against flow to cold legs of RC loops. If loss of train "A" power, see item 24.	Same methods of detection as those stated for item #1.	

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
27. Motor operated gate valve NI121A (NI152B analogous)	Fails to open on demand.	Recirculation - hot legs of RC loops.	Failure reduces redundancy of providing recirculation of coolant to the hot legs of RCS from the Containment Sump via SI pumps. Minimum recirculation flow requirements to hot legs of RC loops will be met by RHR pump A recirculating fluid from Containment Sump to hot legs of RC loops and SI pump B recirculating fluid to hot legs A and D of RC loops through the opening of isolation valve NI152B.	Same methods of detection as those stated for item #2. In addition, SI pump discharge pressure (NIP5440) and flow (NIP5450) at MCB.	

Component		Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
28.	Motor operated gate valve NI162A	Fails to close on demand.	Recirculation - hot legs of RC loops.	Failure reduces redundancy of providing flow isolation of SI pump flow to cold legs of RC loops. No effect on safety for system operation. Valves NI118A and NI150B in cross-tie line between HHSI/SI pumps provides backup isolation against flow to cold legs of RC loops. If loss of train "A" power, see item 24.	Same method of detection as that stated for item #1.	

Component		Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks
29.	Residual heat removal pump A (Pump B analogous)	Fails to deliver working fluid.	Recirculation - hot legs of RC loops.	Failure reduces redundancy of providing recirculation of coolant from the Containment Sump to the hot legs of RC loops. Fluid flow from RHR pump A will be lost. Minimum flow requirements to hot legs of RC loop will be met by RHR pump B recirculating fluid to RC hot legs via SI pumps.	Same method of detection as that stated previously for failure of item during injection phase of ECCS operation.	

Component	Failure Mode	ECCS Operation Phase	Effect on System Operation[1]	Failure Detection Method[2]	Remarks

Notes:

1. List of Abbreviations and Acronyms Used
   HSP - Hydraulic Service Panel
   LHSI – Low Head Safety Injection
   CCP – Centrifugal Charging Pump
   RV – Reactor Vessel
   LOCA – Loss of Coolant Accident
   MCB – Main Conrol Board
   NPSH – Net Positive Suction Head
   RC – Reactor Coolant
   RCS – Reactor Coolant System
   RHR – Residual Heat Removal
   RWST – Refueling Water Storage Tank
   SI – Safety Injection
   VCT – Volume Control Tank
2. As part of plant operation, periodic tests, surveillance inspections and instrument calibrations are made to monitor equipment and performance. Failures may be detected during such monitoring of equipment in addition to detection methods noted.

Table 6-92. Single Active Failure Analysis For Emergency Core Cooling System Components

Component	Malfunction	Comments
Short Term Phase		
1. Pumps		
a. Centrifugal charging	Fails to start	Two provided, evaluation based on operation of one.
b. Safety injection	Fails to start	Two provided, evaluation based on operation of one.
c. Residual heat removal	Fails to start	Two provided, evaluation based on operation of one.
2. Automatically Operated Valves		
a. CCP to cold leg injection isolation	Fails to open	Two parallel lines; one valve in either line required to open.
b. Residual heat removal pump suction line from containment sump	Fails to open	Only one RHR pump required to meet LPSI flow criteria.
c. Residual heat removal pump suction line from refueling water storage tank	Fails to close	Switchover sequence allows for failure of one suction line to be isolated.
d. Centrifugal Charging Pumps		
1) Suction line from refueling water storage tank	Fails to open	Two parallel lines; only one valve in either line required to open.
2) CCP to Cold Leg Discharge normal charging path	Fails to close	Two valves in series; only one valve required to close.
3) Suction from volume control tank	Fails to close	Two valves in series; only one valve required to close.
Long Term Phase		
1. Valves Operated Manually from the Control Room		
a. Residual heat removal pumps suction line from refueling water storage tank	Fails to close	Check valve in series with one gate valve; operation of only one valve required.
b. 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.

Component	**Malfunction**	**Comments**
c. Centrifugal charging pump suction line from refueling water storage tank	Fails to close	Check valve in series with two parallel gate valves. Operation of the check valve or both gate valves required.
d. High head pump suction line at discharge of residual heat exchanger	Fails to open	Separate and independent high head injection paths to safety injection pumps and charging pumps taking suction from discharge of residual heat exchangers; operation of only one valve required.
e. Residual heat removal cross-connect line	Fails to close	Two valves in series; operation of one required.
f. Safety injection pump miniflow lines	Fails to close	Two parallel valves provided in series with a third. Operation of either both parallel valves or series valve required.
g. Safety injection/charging cross-connect line in suction header	Fails to open	Two parallel valves provided; operation of either one required.
h. Safety injection/residual heat removal hot leg isolation valves	Fails to open	Three flow paths available. Adequate flow to core is assured by any two.
i. Safety injection/residual heat removal cold leg isolation valves	Fails to close	Redundant valves provided with suitable arrangements to preclude pump runout.

Table 6-93. Sequence Of Changeover Operation From Injection To Recirculation

AUTOMATIC ACTIONS	
A1.	The containment recirculation sump isolation valves (NI184B and NI185A) open when two out of four Refueling Water Storage Tank (FWST) level instruments indicate a FWST level equal to or below the Low level setpoint in conjunction with an “S” signal.
A2.	The RHR pump/FWST isolation valves in each pump suction line (FW27A and FW55B) automatically closes when the corresponding containment sump valve reaches its full open position.
MANUAL ACTIONS	
After these automatic actions, which complete switchover of the RHR pumps to the containment recirculation sump, the operator performs the following manual actions to complete the switchover.	
M1.	Monitor foldout page.
M2.	Verify adequate containment sump level.
M3.	Reset Safety Injection.
M4.	Reset the diesel generator load sequencers.
M5.	Verify that the containment recirculation sump isolation valves are open (NI185A, NI184B).
M6.	Verify that the RHR pump/FWST isolation valves are closed (FW27A, FW55B).
M7.	Verify that the RHR pumps are on.
The remaining manual actions required to complete switchover are delayed until the FWST Low-Low level is reached. At that time, the operator proceeds immediately to step M8. In the interim period, the operator performs the following nonessential manual actions.	
M8.	Verify adequate containment sump level.
M9.	Verify that the RHR pumps are on.
M10.	Verify that the RHR hot leg injection isolation valves are closed (ND32A, ND65B).
M11.	Verify that RCS pressure is less than 1620 psig.
M12.	Close the safety injection pump recirculation line isolation valves (NI115A, NI144A).
M13.	Restore power to the safety injection pumps recirculation header to FWST isolation valve (NI147B).
M14.	Close NI147B.
M15.	Verify that at least one of the centrifugal charging pumps recirculation isolation valves is closed (NV203A, NV202B).
M16.	Verify that the safety injection pump suction crossover from RHR isolation valve is open (NI334B).
M17.	Open the safety injection pump suction crossover from RHR isolation valves (NI331A, NI333B).
M18.	Open the RHR heat exchanger outlet to charging pump suction isolation valves (ND28A, NI136B).

M19.	Restore power to the safety injection pumps suction from the FWST isolation valve (NI100B).
M20.	Close NI100B.
M21.	Close the parallel centrifugal charging pumps suction from the FWST isolation valves (NV252A, NV253B).
To establish one train of containment spray, the following manual actions are performed. These actions may be delayed until the FWST Low-Low level is reached.	
M22.	Verify both containment spray pumps off.
M23.	Close the containment spray pump suction from the FWST isolation valves (NS20A, NS3B).
M24.	Verify containment pressure greater than 3 psig.
M25.	Verify adequate containment sump level.
M26.	Verify containment spray pump A available to run.
If containment spray pump A not available, align containment spray pump B using actions beginning at M27a.	
M26a.	Verify that the containment recirculation sump isolation valve is open (NI185A).
M26b.	Verify containment spray pump B is off.
M26c.	Open containment spray header containment isolation valves (NS-29A, NS32A).
M26d.	Verify that the containment spray pump A suction from the FWST isolation valve (NS20A) is closed.
M26e.	Open the containment spray pump A suction from the containment sump isolation valve (NS18A).
M26f.	Verify the following are open (NS29A, NS32A, NS18A).
M26g.	Verify containment pressure greater than 1 psig.
M26h.	Start containment spray pump A.
M26i.	Align RN to A train containment spray heat exchanger.
M26j.	Open the containment spray heat exchanger A inlet isolation valve (RN144A).
M26k.	Open the containment spray heat exchanger A outlet isolation valve (RN148A).
If containment spray pump A is operating, only steps M27a, M27b, M27d, and M27e are performed to complete transfer of pump suction to the containment sump.	
M27a.	Verify that the containment recirculation sump isolation valve is open (NI184B).
M27b.	Verify containment spray pump A off.
M27c.	Open containment spray header containment isolation valves (NS15B, NS12B).
M27d.	Verify that the containment spray pump B suction from the FWST isolation valve (NS3B) is closed.
M27e.	Open the containment spray pump B suction from the containment sump isolation valve (NS1B).

Sequence Of Changeover Operation From Injection To Recirculation	
M27f.	Verify the following are open (NS15B, NS12B, NS1B).
M27g.	Verify containment pressure greater than 1 psig.
M27h.	Start containment spray pump B.
M27i.	Align RN to B train containment spray heat exchanger.
M27j.	Open the containment spray heat exchanger B inlet isolation valve (RN225B).
M27k.	Open the containment spray heat exchanger B out let isolation valve (RN229B).

Notes:

1. The step numbers identified in Table 6-93 are not intended to reflect the procedure step numbers.
2. If waiting for FWST low-low level after aligning one train of containment spray, actions M11, M12, M13, and M14 may be performed prior to reaching FWST low-low level.
3. To establish one train of RHR spray, the following steps are taken:
   - Verify at least one ND train aligned in cold leg recircu
   - Verify containment pressure greater than setpoint
   - Verify time greater than 50 minutes post-LOCA
   - Verify NV and NI SI flow
   - Verify that the RHR hot leg injection isolation valves are closed (ND32A, ND65B)
   - Verify RHR pump A available and RHR pump B not aligned for spray
     a. Close the RHR header A to the RCS cold legs isolation valve (NI173A).
     b. Open the RHR pump A discharge to containment spray header isolation (NS43A).
   - Verify RHR pump B available and RHR pump A not aligned for spray
     a. Close the RHR header B to RCS cold legs isolation valve (NI178B).
     b. Open the RHR pump B discharge to containment spray header isolation valve (NS38B).
4. The transfer of the containment spray pump suction to the containment sump should be performed even though the pump is either not available or not operating.

Table 6-94. 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 and residual heat removal pump
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 compartment or the auxiliary building sump or safety injection or charging pump compartments	From containment sump to the high head injection headers via alternate residual heat removal pump, residual heat exchanger, safety injection or charging pump

Table 6-95. Safety Related Solenoid Valves Inside Containment Below Elevation 571'0

Solenoid Valve	Functional Description
NVSV0010	Controls air to valve NV1A Letdown Isolation
NVSV0020	Controls air to valve NV2A Letdown Isolation
NVSV0320	Controls air to valve NV32B Charging Isolation
NVSV0390	Controls air to valve NV39A Charging Isolation
NVSV0520	Controls air to valve NV52A RCP #1 Seal Leakoff Isolation
NVSV0630	Controls air to valve NV63B RCP #1 Seal Leakoff Isolation
NVSV0740	Controls air to valve NV74A RCP #1 Seal Leakoff Isolation
NVSV0850	Controls air to valve NV85B RCP #1 Seal Leakoff Isolation
NVSV1010	Controls air to valve NV101A RCP #1 Seal Bypass
NVSV1020	Controls air to valve NV102A RCP #1 Seal Standpipe Makeup
NVSV1070	Controls air to valve NV107B RCP #1 Seal Standpipe Makeup
NVSV1120	Controls air to valve NV112A RCP #1 Seal Standpipe Makeup
NVSV1170	Controls air to valve NV117B RCP #1 Seal Standpipe Makeup
NVSV1220	Controls air to valve NV122B Excess Letdown Isolation
NVSV1230	Controls air to valve NV123B Excess Letdown Isolation
NVSV1240	Controls air to valve NV124B Excess Letdown Control Valve
NVSV1241	Controls air to valve NV124B Excess Letdown Control Valve
NVSV1250	Controls air to valve NV125 Excess Letdown Flow Path
NCSV0580	Controls air to valve NC58A Prt Spray Valve

Table 6-96. Active Valves Inside Containment Below Elevation 571'0"

Valve Number	Valve Function
BB149B	BB Tempering Line Containment Isolation
BB150B	BB Tempering Line Containment Isolation
NC196A	NCP Motor Oil Fill Line Containment Isolation
ND1B	NC to ND Suction Isolation Valve
ND2A	NC to ND Suction Isolation Valve
ND36B	NC to ND Suction Isolation Valve
ND37A	NC to ND Suction Isolation Valve
NV1A	Letdown Isolation (air operated)
NV2A	Letdown Isolation (air operated)
NV10A	Letdown Orifice Selection & Containment Isolation (air operated)
NV11A	Letdown Orifice Selection & Containment Isolation (air operated)
NV13A	Letdown Orifice Selection & Containment Isolation (air operated)
NV37A	NV Auxiliary Pressurizer Spray
NV122B	Excess Letdown/Isolation (air operated)
NV123B	Excess Letdown/Isolation (air operated)
NV89A	Seal Water Return Containment Isolation (air operated)
RN484A	RN Return Header Containment Isolation
WL805A	NCDT Discharge Containment Isolation
WL825A	Containment Floor & Equip Sump & II Sump Containment Isolation
WL867A	Vent, Unit Condensate Drain Containment Isolation
VQ15B	Containment Air Addition & Release Containment Isolation
KC429B[1]	KC Equipment Drain Header Containment Isolation
NC54A[1]	Prt Sample & Vent Containment Isolation
NI95A[1]	NI Test Header Containment Isolation
NM6A[1]	Pzr Sample Containment Isolation

Valve Number	Valve Function
NM72B[1]	Cold Leg Accumulator Sample Containment Isolation
NM75B[1]	Cold Leg Accumulator Sample Containment Isolation
NM78B[1]	Cold Leg Accumulator Sample Containment Isolation
NM81B[1]	Cold Leg Accumulator Sample Containment Isolation
NM187A[1]	Steam Generator Sample Containment Isolation
NM190A[1]	Steam Generator Sample Containment Isolation
NM197B[1]	Steam Generator Sample Containment Isolation
NM200B[1]	Steam Generator Sample Containment Isolation
NM207A[1]	Steam Generator Sample Containment Isolation
NM210A[1]	Steam Generator Sample Containment Isolation
NM217B[1]	Steam Generator Sample Containment Isolation
NM220B[1]	Steam Generator Sample Containment Isolation
NI54A	Cold Leg Accumulator Isolation Valves
NI65B	Cold Leg Accumulator Isolation Valves
NI76A	Cold Leg Accumulator Isolation Valves
NI88B	Cold Leg Accumulator Isolation Valves
NI438A[1]	Cold Leg Accumulator Nitrogen Supply to PORV Activator
KC332B	KC Return from NCDT Containment Isolation

Note:

1. Valve operator not qualified for submergence

Table 6-97. 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 and 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	Lined up to the high head safety injection connections on each RCS cold leg. 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 to cold legs of reactor coolant piping	Lined up to cold legs of reactor coolant piping

Table 6-98. 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, Technical Specification (minimum) gal.	377,537
Boron Concentration in Refueling Water Storage Tanks, Minimum, ppm	Controlled by COLR
Boron Concentration in Accumulator, minimum, ppm	Controlled by COLR
Number of Cold Leg Injection Accumulators	4
Minimum Accumulator Pressure, psia	600
Nominal Accumulator Water Volume, ft^3	1050
System Valves, Interlocks, and Piping Required for the Above Components which are Operable	All

Table 6-99. 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 ft^3
Safety Injection Subcooling	55 BTU/lbm
Containment Pressure	14.7 psia
Ice Condenser Maximum Boron Concentration	2330 ppm

Table 6-100. Comparison of Control Room Area Protection Against Toxic Gas Hazards With Regulatory Guide 1.95, Revision 1, January 1977

Paragraph	Compliance Status	Comments
A.	In compliance	• This section contains general introductory information. CNS is considered in compliance with this information.
B.	See comments	• This section contains some general introductory information about chlorine. One statement, which is assumed to be an underlying assumption behind the guide, is that chlorine located onsite is normally stored in large quantities ("one-ton tanks or large railroad cars"). CNS does not have chlorine stored onsite in large, single containers. All chlorine is in small (100 lbs. or less) cylinders. Although CNS does have multiple small cylinders, there is no credible single failure that would cause the release of chlorine from ore than one cylinder. Additionally, there are no nearby industrial, transportation or military facilities that would have or use large quantities of chlorine. Therefore, the guidance provided in this paragraph is not assumed to apply to CNS. CNS does comply with other applicable sections of the guide as described in section C below. The absence of a large, single source of chlorine onsite or offsite near the plant makes protection against natural or accidental events such as earthquakes, flooding, fire, explosive overpressure, missiles or chlorine cylinder connection failures an insignificant concern. This is because even if a cylinder was to break, rupture or leak due to one of these events, there is not enough inventory to create a control room habitability concern. This conclusion is drawn from the guidance provided in Regulatory Guides 1.95 and 1.78 (Regulatory Guide 1.95 provides for the exclusion of chlorine inventories below 150 lbs. from most of the requirements in the guide and Regulatory Guide 1.78 contains a general exclusion of chemical inventories 100 lbs. or less from the requirements of that guide) and from the location of the cylinders onsite (no cylinders are near or in a direct line to a control room outside air intakes). Calculation CNC 1211.00-00-0124 contains the

Paragraph	Compliance Status	Comments
		justification for determining that the CNS control room is adequately protected from the affects of an accidental chlorine release. That calculation contains a discussion on the feasibility of various accidents causing a chlorine spill. Accidents such as transportation/handling accidents, over-pressurization, earthquake, flood and missile (tornado and turbine) events are addressed. Again, the location of the cylinders and the quantity present would not create a significant release that could affect control room habitability. The need for automatic isolation of the control room is not required based on the discussion above and on the information in section C.2.
C-1	In Compliance	• CNS does not store liquefied chlorine within 100 meters (330 ft) of the control room or its outside air intakes
C-2	In Compliance	• CNS only uses chlorine cylinders with 100 lbs. or less that are stored more than 100 meters (330 ft) from the control room and its outside air intakes. Manual isolation of the control room intakes is provided. (Note: Per this section, it is implied that automatic isolation of the control room outside air intakes is not required.)
C-3	See comments	• Although CNS has multiple cylinders of chlorine on site, each cylinder contains no more than 100 lbs. of chlorine. CNS has no bulk (large single containers) storage of chlorine on site. Whenever cylinders are manifolded together a separate, independent regulator is mounted directly to each cylinder. The regulators ensure that flow will be stopped if a manifold or tubing failure occurred. Therefore, a single failure would only release the contents of a single cylinder which would be less than the 150 lbs. limit addressed in Regulatory Guide 1.95. Thus, the requirements of this section are not applicable to CNS. It should also be noted that NSM CN-50486 will replace and downgrade the VC system chlorine detectors to non-safety devices. Upon implementation of this NSM, administrative controls will be established to ensure that no more than 2 chlorine cylinders are manifolded

Paragraph	Compliance Status	Comments
		together and that each manifolded cylinder contains no more than 50 lbs. of chlorine Note: Calculation CNC-1211.00-00-0124 provides justification for ensuring the control room is adequately protected from the affects of an accidental chlorine release.
C.3.a.1	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room “Types” are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.3.a.2	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room “Types” are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.3.a.3	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room “Types” are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.3.a.4	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room “Types” are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.3.b	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room “Types” are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.3.c	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room “Types” are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine

Paragraph	Compliance Status	Comments
		cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.3.d	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room "Types" are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.3.e	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room "Types" are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.3.f	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room "Types" are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.4	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room "Types" are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.4.a	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room "Types" are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.4.b	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room "Types" are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)

Paragraph	Compliance Status	Comments
C.4.b.1	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room "Types" are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.4.b.2	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room "Types" are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.4.b.3	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room "Types" are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.4.c	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room "Types" are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.4.d	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room "Types" are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.4.d.1	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room "Types" are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.4.d.2	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room "Types" are only applicable to control rooms exposed to the

Paragraph	Compliance Status	Comments
		hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.4.d.3	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room “Types” are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.4.d.4	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room “Types” are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.4.d.5	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room “Types” are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.4.d.6	Not Applicable	• CNS only uses chlorine cylinders with 100 lbs. or less. Control room “Types” are only applicable to control rooms exposed to the hazards from 150 lbs. or larger chlorine cylinders. Thus, the requirements of this section are not applicable to CNS. (Also, see comments on section C.3.)
C.5	Not Applicable	• This section discusses the leakage characteristics of the control room to quantify the potential inleakage of chlorine. However, since CNS maintains the control room at a positive pressure of ≥0.125 inwg at all times (except during times required for personnel ingress/egress and under controlled circumstances such as maintenance activities or train swapping conditions), inleakage is not a concern. Also, as stated in the discussion for section C.3, there are only chlorine cylinders with 100 lbs. or less onsite. These cylinders are all located such that leakage from the cylinders could not flow directly into the control room

Paragraph	Compliance Status	Comments
		outside air intakes and impact control room habitability. (Any chlorine plume would be dispersed and/or diluted before it could credibly reach a control room intake.) Therefore, the guidance in this section is not applicable to CNS.
C.6	In compliance	• As a defense-in-depth measure, redundant non safety-related chlorine detectors will be provided in each control room outside air intake. These detectors will provide alarms in the control room in the event that chlorine is present in an intake. Annunciator Response procedures will address actions to be taken if an alarm is received. Emergency procedures will address release of toxic chemicals onsite. Abnormal proceduress will address the evacuation of the control room, if necessary, and take the plant to a safe and stable condition.
D.	In Compliance	• This section contains general information. CNS is considered in compliance with this information.

Table 6-101. Comparison of Control Room Habitability Protection Against Toxic Gas Hazards Described in Regulatory Guide 1.78, Revision 0, June 1974

Paragraph	Compliance Status	Comments
A.	In compliance	• This section contains general introductory information. CNS is considered in compliance with this information.
B.	In compliance	• This section contains a general discussion that CNS is considered to be in compliance with. As stated in this section, the purpose of Regulatory Guide 1.78 is "to identify those chemicals which, if present in sufficient quantities, could result in the control room becoming uninhabitable." The guide requires a review of chemicals used and stored onsite as well as those in nearby areas. For the purposes of the guide "nearby" is defined as within a 5-mile radius of the plant. UFSAR section 2.2 documents the review that was conducted to identify potential sources of hazardous chemicals from onside locations and also nearby industrial, transportation and military facilities. Based on that review, there are no industrial facilities within a 5-mile radius that use or store bult chemicals capable of producing toxic gases that would affect CNS. (The closest industrial site is identified as Celenese Fibers and Celenese Chemical Co. that is located 7.3 miles southeast of CNS.) There is one airport within a 5-mile radius of CNS. The Rock Hill Airport (known as Bryant Field) is 4.2 miles south of CNS. This airport, however, does not have Air Carrier traffic and so bulk hazardous materials that could affect the station are not shipped or received at this airport. There are no military facilities within a 5-mile radius of CNS except for the local National Guard and Military Reserve unit in Rock Hill. There are no bulk hazardous chemicals at this facility that would impact CNS. Thus, the lack of nearby industries that use bulk chemicals and the location of existing transportation routes eliminate concerns associated with offsite hazardous chemicals. Bulk chemicals from onsite sources are also

Paragraph	Compliance Status	Comments
		adressed in UFSAR section 2.2. In general it is not possible for gases to "leak" into the control room since the CNS control room is maintained at a positive pressure. However, gases that could get into the VC system outside air intakes will be discharged into the control room unless they are filtered out by the VC system filter units. Two gases, chlorine and carbon dioxide, are the only two gases identified as needing to be evaluated to determine their potential to affect control room habitability. Chlorine gas comes from the mixture of hypochlorite and sulfuric acid or from liquefied chlorine, which is used for water treatment. Hypochlorite is used on site for water treatment at the cooling towers. This chemical is stored in two 2,500 gal. Tanks located in the cooling tower yard adjacent to the 1A and 2A tower basins. A concrete catchment area and an offloading apron (hypochlorite is brought to the tanks via truck) surround the tanks and is capable of containing the contents of at least one tank should a rupture or spill occur. Any hypochlorite spill would be contained within the catchment for eventual treatment and removal. Bulk storage of sulfuric acid is located at the Water Chemistry Building in two 15,000 gal. Tanks. Each tank is set in a catchment basin cable of holding the entire contents of the tank should a rupture or spill occur. The basin drain valve is controlled to release spills to a sump for eventual treatment. The physical separation between the sulfuric acid tanks and the hypochlorite tanks is approximately 700 ft. Up to a 330 gallon (max.) tote bin of sulfuric acid placed on a 400 gallon IBC spill pallet will be located in the yard between the Initial Holdup Pond and Settling Pond A. This location is approximately 250 feet from the nearest hypochlorite tank. A 6,650 gallon vertical storage tank of sulfuric acid is located in each of the Cooling Tower Chemical Addition Buildings that are adjacent to the 1B and 2B cooling towers. Each tank is set in a concrete catchment basin capable of holding 110% of the entire contents of the tank should a rupture or spill occur. The physical

Paragraph	Compliance Status	Comments
		separation between the sulfuric acid tanks and the nearest hypochlorite tanks located at the respective 1A and 2A cooling towers is approximately 365 ft. Thus, due to the physical separation and the barriers around each of these chemicals it is not credible to assume they can mix and chlorine gas generation from these bulk chemicals is not possible. The other source of onsite chlorine is from liquefied chlorine. Liquefied chlorine is used for water treatment in the secondary chemistry area (used in the YF system) and at the RY Chlorination House. It is also located at the designated chlorine storage facility. Although CNS has multiple cylinders of chlorine on site, each cylinder contains no more than 100 lbs. Of chlorine. There is no bulk (large single containers) storage of chlorine at CNS. Whenever cylinders are manifolded together a separate, independent regulator is mounted directly to each cylinder. The regulators ensure that flow will be stopped if a manifold or tubing failure occurred. Therefore, a single failure would only release the contents of a single cylinder which would be less than 100 lbs. Thus, the requirements of this section are not applicable to CNS. Note that calculation CNC-1211.00-00-0124 provides the justification for ensuring the control room is adequately protected from the affects of an accidental chlorine release. Additionally, NSM CN-50486 will replace and downgrade the VC system chlorine detectors to non-safety devices. Before this is done, administative controls will be established to ensure that no more than 2 chlorine cylinders are manifolded together and that each manifolded cylinder contains no more than 50 lbs. of chlorine. Carbon dioxide is not a toxic gas but it could create a control room habitability concern due to its asphyxiation potential. This substance is used in the fire suppression system for the diesels and the CA Pumps. The carbon dioxide used in the diesel fire suppression system is contained in two 7.5

Paragraph	Compliance Status	Comments
		ton tanks. The tanks are located on the 594 elevation in the east end of the Turbine Building (one tank in the Unit 1 Turbine Building and one tank in the Unit 2 Turbine Building). Because carbon dioxide is heavier than air, a spill within the Turbine Building would result in the gas falling into the Turbine Building basement through any number of large openings in the Turbine Building floor. Releases through the diesel fire system piping are not considered since the piping is empty except when the system is in service and pipe breaks during a diesel fire are not considered to occur concurrently. The carbon dioxide used for the CA Pumps fire suppression system is contained in 36 cylinders located on the 543' elevation of the Auxiliary Building. Of these 36 cylinders, 18 are in the Unit 1 CA Pump room and 18 are in the Unit 2 CA Pump room. Each Pump room has 2 banks of 9 cylinders; one bank as a primary source and one bank as a backup source. A release from any of these cylinders or discharge headers would result in carbon dioxide either staying on the 543' elevation or falling to a lower elevation within the Auxiliary Building. Any carbon dioxide spill would be readily detectable by station personnel since carbon dioxide forms a visible white fog when released. This fog would alert station personnel to take the necessary actions to correct any leakage. Based on the above reasoning, it is not credible to assume that carbon dioxide could get into a control room intake. The fact that the control room is normally pressurized prevents gases from "leaking" into the space through cracks or other opening. Therefore, carbon dioxide is not considered a control room habitability concern. Fire-fighting equipment has been evaluated and determined not to be a toxic gas hazard relative to control room Carbon dioxide habitability. Based on the absence of hazardous chemicals from offsite sources and the

Paragraph	Compliance Status	Comments
		limited number of hazardous chemicals onsite in sufficient quantity to create control room habitability concerns, chlorine is the only chemical that needs to be evaluated under Regulatory Guide 1.78. Since a "separate guide" was issued to address chlorine gas concerns, the use of chlorine gas at CNS will be addressed in greater detail under the discussion for Regulatory Guide 1.95.
C.1	See comments	• Based on the discussion in Section 2.2 of the CNS UFSAR there are no major depots or storage tanks of hazardous chemicals known or projected to be present within a five-mile radius of CNS.
C.2	See comments	• Based on the discussion in Section 2.2 of the CNS UFSAR there are no hazardous chemicals known or projected to be frequently shipped by rail, water or road routes within a five-mile radius of CNS.
C.3	See comments	• Chlorine and carbon dioxide are the only chemicals hazardous to the control room stored onsite. Based on the limitations listed in Regulatory Guide 1.95, quantities of chlorine less than 150 lbs. do not present a significant control room habitability hazard. (Chlorine is stored at CNS in quantities of 100 lbs. or less in individual cylinders.) Carbon dioxide is not a control room habitability concern based on the discussion in section B. Thus, instrumentation and alarm requirements are not applicable to CNS.
C.4	See comments	• Based on chlorine being the only chemical needing evaluation (see section B.) and the 100 lb. Limit established in section C.3, there are no chemicals that need be considered under this section.
C.5	See comments	• Based on chlorine being the only chemical needing evaluation (see section B.) and the 100 lb. limit established in section C.3, there are no chemicals that need be considered under this section.
C.5.a	See comments	• See comments on section C.5.

Paragraph	Compliance Status	Comments
C.5.b	See comments	• See comments on section C.5.
C.6	See comments	• Based on chlorine being the only chemical needing evaluation (see section B.) and the 100 lb. limit established in section C.3, there are no chemicals that need be considered under this section.
C.7	See comments	• Based on chlorine being the only chemical needing evaluation (see section B.) and the 100 lb. limit established in section C.3, there are no chemicals that need be considered under this section.
C.8	See comments	• Based on chlorine being the only chemical needing evaluation (see section B.) and the 100 lb. limit established in section C.3, there are no chemicals that need be considered under this section.
C.8.a	See comments	• See comments on section C.8.
C.8.b	See comments	• See comments on section C.8.
C.9	See comments	• Based on chlorine being the only chemical needing evaluation (see section B.) and the 100 lb. limit established in section C.3, there are no chemicals that need be considered under this section. (Note that CNS pressurizes the control room to ≥ 0.125 inwg (not 0.25 inwg) relative to all adjacent areas per Technical Specification SR 3.7.10.4. This is considered adequate to prevent entry of gases from outside the space.)
C.10	See comments	• Based on the 100 lb. limit discussed in section C.3, CNS does not need to account for hazardous chemicals, including chlorine, affecting control room habitability. Therefore, analysis is not required to address the impact on control room habitability due to hazardous chemicals in a continuous inflow of 10 cfm of unfiltered air. (Note that from a radiological standpoint, 10 cfm of unfiltered inleakage is assumed in the dose analysis to account for ingress and egress.)
C.11	See comments	• CNS does not take credit for the removal of hazardous chemicals by filtration.
C.12	See comments	• Based on the 100 lb. limit discussed in section C.3, CNS does not need to account for hazardous chemicals, including chlorine,

Paragraph	Compliance Status	Comments
		affecting control room habitability. Additionally, the cylinders the chlorine is contained in are rated for transportation accidents. This indicates that they should be strong enough to withstand the effects from earthquake and flood related events. A tornado would not be associated with calm air conditions. Therefore, a chemical release during a tornado would not pose a concern since atmospheric dispersion would dilute any hazardous chemical plume.
C.13	See comments	• Based on the 100 lb. limit discussed in section C.3, CNS does not need to account for hazardous chemicals, including chlorine, affecting control room habitability. As a defense-in-depth measure, self-contained breathing apparatus are provided for the control room operators but this is not required under this Regulatory Guide.
C.14	See comments	• Based on the 100 lb. limit discussed in section C.3, CNS does not need to account for hazardous chemicals, including chlorine, affecting control room habitability. The CNS control room ventilation system does, nonetheless, have redundant chlorine detectors, filter trains, outside air intakes and outside air intake isolation valves (manually actuated). These components, however, are not required to meet single-failure criterion under this Regulatory Guide.
C.15	See comments	• Based on the 100 lb. limit discussed in section C.3, CNS does not need to account for hazardous chemicals, including chlorine, affecting control room habitability. However, as a defense-in-depth measure, redundant non safety-related chlorine detectors will be provided in each contol room outside air intake. These detectors will provide alarms in the control room in the event that chlorine is present in an intake. Annunciator Response procedures will address actions to be taken if an alarm is received. Emergency procedures will address release of toxic chemicals on site. Abnormal procedures will address evacuation of the control room, if necessary, and take the plant to a safe and stable condition. None of these procedures,

Paragraph	Compliance Status	Comments
		however, are required under this Regulatory Guide.
Appendix A	See comments	• Based on the 100 lb. limit discussed in section C.3, CNS does not need to account for hazardous chemicals, including chlorine, affecting control room habitability. Therefore, an analysis based on the guidance in this appendix is not required for CNS.
Appendix B	See comments	• Based on the 100 lb. limit discussed in section C.3, CNS does not need to account for hazardous chemicals, including chlorine, affecting control room habitability. Therefore, an analysis based on the guidance in this appendix is not required for CNS.

Table 6-102. Ice Condenser Elemental Iodine Removal Efficiency[1]

Time Interval Post LOCA (Hours)	Iodine Removal Efficiency
0.0 to 0.0123	0.0
0.0123 to 0.0306	0.99
0.0306 to 0.0548	0.98
0.0548 to 151	0.95
0.151 to 0.222	0.72
0.222 to 0.464	0.67
0.464 to 0.655	0.59
0.655 to 0.887	0.56
0.887 to 1.07	0.51
1.07 to 1.11	0.41
1.11 to 1.12	0.33
1.12 to 720	0.0

Note:

1. The ice condenser removal efficiencies given in the above table are for use in realistic analyses. For conservative Regulatory Guide 1.4 type analyses, an efficiency of 30 percent per pass for elemental iodine is assumed. The ice condenser is assumed to be ineffective for organic and particulate iodine removal. The inlet steam-air mixture coming into the ice condenser is greater than 90% steam by volume initially due to the delaying of the operation of the containment deck fans. Without the delay of operation of the deck fans, the amount of steam by volume in the inlet mixture initially would be much lower and the ice condenser iodine removal efficiencies would be reduced.

Table 6-103. Process Lines Subject to Augmented Inservice Inspection

System	Description	Process Pipe Size
Main Steam (SM)	Steam Outlet Line from A, B, C, D Steam Generators Doghouse portion only	34 Inches
Nuclear Service Water (RN)	RN Supply Header 1A, 1B, 2A, and 2B piping in the Auxiliary Building QQ column line entering the Auxiliary Building to the first isolation valves	30 Inches
Nuclear Service Water (RN)	RN Supply piping to Diesel Generator 1A, 1B, 2A, and 2B between the Diesel Generator Building walls and the first isolation valves in each of the four Diesel Generator rooms	10 Inches

Table 6-104. Wall Panel Design Loads[1]

A.	Service Loads	
	Weight of Panels on Containment and End Wall (58 ft length)	100 lbs/linear ft
	Weight of Panels Crane Wall (48 ft length)	60 lbs/linear ft
	Pressure (Wall panel internal)	0 to 0.5 psig
B.	OBE 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
C.	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
D.	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
E.	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)	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)	

Notes:

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 OBE 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 6-105. Ice Basket Load Summary

	MINIMUM TEST LOADS									
	Case I D + OBE		Case II D + DBA			Case III D + SSE		Case IV D + SSE + DBA		
Elevation[1] (ft.)	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

	BASIC DESIGN LOADS								
	D		OBE		SSE		DBA		
Elevation [1] (ft.)	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 6-106. Summary of Stresses in Basket Due to Design Loads

Elevation from Lower Support Structure, ft.	Design Load, 1b[1]		Maximum Stress, psi	Allowable Stresses, psi
	H	V		
0	304[(3)]	3029	11,508	19,950
12	650[(3)]	2271	17,100	19,950
24	761[(3)]	1514	17,976	19,950
36	835[(3)]	378	17,435	19,950
12	1017[(4)]	2003	23,988	24,750

Notes:

1. With 10% margin
2. Allowable stress = 0.6 x s_y x 1.33 per 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 6-107. 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	25
Grid Bars	ASTM A-570 Grade 13	25
Wire Mesh	ASTM A-641	25
Couple Screw	C-1022 Heat Treated to C52	130
Swivel Bracket Pieces	ASTM A-747 Type CB7Cu2 or ASTM A-352, Grade CA6NM	75/80
Swivel Bracket Assembly Clevis Pin and Cap Screws	ASTM A-193 Grade B8	60
Perforated Basket	ASTM A-569	25
Block Ice Minimum Restriction Basket Parts		
Wire Rope, 1/4", 7 x 19 strand	ASTM Type 302	6,400 lbs min breaking strength
Wire Rope End Swage	ASTM Type 304	30
Clasp Assembly (Except Spring)	ASTM Type 304	30
Base Plate Assembly	ASTM Type 304	30
Cruciform Assembly (Except Bolts)	ASTM Type 304	30
External Ring	ASTM Type 304	30
Rivets	ASTM A-286	90(shear)
Top Plate Assembly	ASTM Type 304	30
Top Clamp Assembly	ASTM Type 304	30
Cruciform, Top Clamp Bolts	ASTM A-574	140 (UTS)

Table 6-108. Allowable Stress Limits (D + OBE) For Ice Basket Materials

Material	Specified Minimum Yield (KSI)	Allowable Limits: Tension F_t = .6Fy (KSI)	Shear F_v = .4Fy (KSI)	Bearing F_p = .9Fy (KSI)	Bending F_b = .66Fy (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	25	15	10	22.5	16.5
ASTM A641	25	15	10	22.5	16.5
ASTM A569	25	15	10	22.5	16.5

Table 6-109. Allowable Stress Limits (D + SSE), (D + DBA) For Ice Basket Materials

Material	Specified Minimum Yield (KSI)	Tension $S_t=1.33F_t$ (KSI)	Allowable Limits Shear $S_v=1.33F_v$ (KSI)	Allowable Limits Bearing $S_p=1.33F_p$ (KSI)	Bending $S_b=1.33F_b$ (KSI)
Carbon Steel 130 KSI Minimum ASTM-A588	130	103.7	69.2	155.6	114.1
ASTM	50	39.9	26.6	59.8	43.9
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	25	19.95	13.3	29.9	21.9
ASTM A641	25	19.95	13.3	29.9	21.9
ASTM A569	25	19.95	13.3	29.9	21.9

Table 6-110. Allowable Stress Limits (D + SSE + DBA) For Ice Basket Materials

Material	Specified Minimum Yield (KSI)	Allowable Limits Tension S_t=1.65F_t (KSI)	Shear S_v=1.65F_v (KSI)	Bearing S_p=1.65F_p (KSI)	Bending S_b=1.33F_b (KSI)
Carbon Steel 130 SKI 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	25	24.7	16.5	37.1	27.2
ASTM A641	25	24.7	16.5	37.1	27.2
ASTM A569	25	24.7	16.5	37.1	27.2

Table 6-111. 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 6-112. 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)

Notes:

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

Table 6-113. 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 6-114. 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 6-115. Ice Basket - Basket End Stress Summary

Load Case No.	Horiz. Load H (LBF)	Vert. Load V (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 6-116. Ice Basket 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 (85.8)[(2)]	12.0 (52.0)	16.8 (28.8)	4.3 (12.8)
II	300	-1596	43.1 (114.1)	7.8 (69.2)	11.0 (38.3)	2.8 (17.0)
III	251	3028	74.7 (114.1)	13.6 (69.2)	19.1 (38.3)	4.8 (17.0)
IV	551	-2671	73.1 (141.6)	13.3 (85.8)	18.7 (47.5)	4.7 (21.1)

Notes:

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

Table 6-117. Ice Basket 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 (85.8)[2]	14.9 (52.0)	20.9 (28.8)	5.3 (12.8)
II	289	-1198	40.2 (114.1)	7.3 (64.2)	10.3 (38.3)	2.6 (17.0)
III	818	2271	88.5 (114.1)	16.1 (64.2)	22.6 (38.3)	5.7 (17.0)
IV	1108	-2004	95.3 (141.6)	17.4 (85.8)	24.4 (47.5)	6.2 (21.1)

Notes:

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

Table 6-118. Ice Basket 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 (85.8)[2]	15.0 (52.0)	21.0 (28.8)	5.3 (12.8)
II	233	-799	29.0 (114.1)	5.3 (64.2)	7.4 (38.3)	1.9 (17.0)
III	1122	1513	86.5 (114.1)	15.8 (69.2)	22.1 (38.3)	5.6 (17.0)
IV	1355	-1335	93.2 (141.6)	17.0 (85.8)	23.9 (47.5)	6.0 (21.1)

Notes:

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

Table 6-119. Ice Basket 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 (85.8)[(2)]	12.2 (52.0)	17.1 (28.8)	4.32 (12.8)
II	176	-371	16.4 (114.1)	3.0 (64.2)	4.2 (38.3)	1.1 (17.0)
III	1161	757	69.1 (114.1)	12.6 (69.2)	17.7 (38.3)	4.5 (17.0)
IV	1338	-639	74.4 (141.6)	13.6 (85.8)	19.0 (47.5)	4.8 (21.1)

Notes:

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

Table 6-120. Crane and Rail Assembly Design Loads

A	**Normal Operation**	
	Crane Weight (excluding rails)	7200 lbs
	Maximum Capacity During Plant Erection	6000 lbs (Each of two cranes)
	Maximum Capacity	6000 lbs (one crane)
	Maximum Load Expected	2500 lbs

Table 6-121. Refrigeration System Parameters

1.0	General—per twin Containment station	
	Cooling water Temperature, Maximum design	90 F
	Number of ice condenser units	2
2.0	Refrigeration — per twin Containment station	
2.1	Glycol Chilling Machines —	6 packages installed
	Manufacturer	Westinghouse
	Quantity	4 dual packages
	Refrigeration capacity per chiller (half Pkg), nominal	25 tons[1]
	Total plant capacity, nominal, 4 x 2 x 25	200 tons[1]
	Glycol flow per evaporator, normal	~127 gpm
	Glycol flow per evaporator at max. P	200 gpm
	Glycol pressure, maximum design	150 psig
	Pressure drop through evaporator, normal	16 feet
	Maximum allowable P through evaporator	40 feet
	Glycol entering temperature, estimated	2 F
	Glycol exit temperature	minus 5 F
	Cooling water flow per condenser, normal	110 gpm[1]
	Total cooling water flow, 4 x 2 x 110	880 gpm[1]
	Cooling water pressure, maximum design	150 psig
	Pressure drop through condenser	3.6 feet
	Approximate refrigerant charge per chiller	150 lbs
	Refrigerant	R—502
	Manufacturer Quantity	Carrier 2 Per Plant
	Refrigeration Capacity Per Chiller, Normal	26.7 Tons
	Glycol Flow Per Evaporator, Normal	111 GPM
	Glycol Pressure, Maximum Design	150 PSIG
	Pressure Drop Through Evaporator, Normal	4.1 Ft.
	Glycol Entering Temperature, Estimated	2.3°F
	Glycol Exit Temperature	Minus 5°F
	Cooling Water Flow Per Condenser, Normal (2 per skid)	71 GPM

	Cooling Water Pressure, Maximum Design		250 PSIG	
	Pressure Drop Through Condenser, Normal		2.45 ft	
	Approximate Refrigerant Charge Per Chiller (Circuit 1/Circuit 2)		77 lbs./69 lbs.	
	Refrigerant		R-502	
2.2	Glycol Circulation Pumps — 6 installed; 3 pumps/unit			
	Design flow per pump		190 gpm	
	TDH at design flow		220 feet	
	Shut—off head		250 feet	
	NPSH required at design point		~12 feet	
2.3	Pressure Relief Valves			
2.3.1	External Headers 2 — installed			
	Set pressure (for thermal expansion of glycol)		150 psig	
	Capacity at set pressure (each)		20 gpm	
2.3.2	Floor Cooling System Heater (1 per containment)			
	Set pressure		150 psig	
	Capacity at set pressure		20 gpm	
2.3.3	Glycol headers inside Ice Condenser (1 per containment)			
	Set pressure		150 psig	
	Capacity at set pressure		15 gpm	
2.4	Refrigeration Medium (glycol) — UCAR Thermofluid 17 or equal			
	Concentration, ethylene glycol in water 50 weight % or 47.8 Volume %.			
	At temperature:	—5 F	0 F	100F
	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
3.0	Ice Condenser — per one containment unit			
3.1	Ice Bed			
	Amount of ice initially stored per unit nominal	3.0×10^6 lbs		
	Minimum amount of ice in storage	See Tech Spec		
	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, calculated, approx.	10^6 lbs.		
	Temperature of ice & static air	15 F nominal		

	Pressure at lower doors due to cold head, nominal	1 psf
	Inlet opening pressure	1 psf
3.2	Air Handling Units — 30 dual packages installed per Containment	
	Refrigeration requirements per containment, calculated	51.5 tons nominal
	Gross capacity per dual package rated	1.5 tons
	Glycol entering temperature, approx.	—5 F
	Glycol exit temperature, approx.	1 F
	Glycol flow per air handler (1/2 package)	6 gpm
	Total glycol flow, 30 x 2 x 6	360 gpm
	Glycol pressure drop. estimated	50 feet
	Air blower head	2" H_20
	Air entering temperature, estimated	19 F
	Air exit temperature	10 F

Note:

1. Nominal refrigeration rating based on 85 F cooling water.

Table 6-122. Lower Inlet Door Design Parameters and Loads

A.	Normal Operation	
	Temperature, Lower Compartment, Maximum, F	120
	Temperature, Ice Bed, Minimum, F	10
	Pressure across Doors, psf	1.0 Nominal
B.	Seismic	
	Response of Crane Wall at Door Elevation	
	Horizontal, OBE, g	0.20 g
	Vertical, OBE, g	0.05 g
	Horizontal, SSE, g	0.40 g
	Vertical, SSE, g	0.10 g
C.	Accident Conditions	
	Temperature, Lower Compartment, Maximum, F	250

Note:

1. Pressure across doors as shown in UFSAR Figure 6-153. For design purposes at 40% margin shall be applied to differential pressure given in this figure.

Table 6-123. Top Deck Design Parameters and Loads

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 6-124. Summary of Results. Upper Blanket Door Structural Analysis — LOCA

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

Note:

1. Key to Design Basis

    A. Allowable value per AISC—69 limits

    B. ASTM-177 minimum tensile with AISC allowable

    C. ASTM-A325 minimum tensile with AISC allowable

    D. Strength values per Manufacturer's literature

Table 6-125. Intermediate Deck Design Parameters and Loads

A.	Normal Operations	
	Ambient Temperature before cooldown, maximum, F	100
	Ambient temperature, minimum, F	15
	Temperature differential across deck, estimated, F	±
B.	Dead Weight	
	Panel, lbs per ft^2, maximum	5.5
	Static design equivalent of live load (personnel traffic), psf	100
C.	Accident Conditions	
	Post-LOCA temperature (no ΔP applied), max. F	190
	Pressure across intermediate deck	See old FSAR Figure 6.2.2-62

Note:

1. For design purposes a 40% margin is applied to the differential pressure.

Table 6-126. Summary of Waltz Mill Tests

Compaction Tests

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

Test	Started	Terminated	Length of test (months)	Equivalent Height of Bed (feet)	Compaction (% volume In First Year)
D′	1/21/69	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 6-127. Ice Condenser Temperature Instrumentation

ICE BED RTD'S:

RTD No.	Bay No.	Radial Loc.	Elev. Above Wear Slab	Type	RTD No.	Bay No.	Radial Loc.	Elev. Above Wear Slab	Type
1	24	3	55FT	(2)	28	10	2	55FT	(1)
2	24	3	30FT9	(2)	30	10	2	30FT9	(1)
3	24	3	0FT0	(2)	31	7	1	55FT	(1)
4	21	2	55FT	(1)	32	7	1	30FT9	(1)
5	21	2	30FT9	(1)	33	7	1	10FT6	(1)
6	21	2	10FT6	(1)	34	7	2	55FT	(1)
7	18	1	55FT	(1)	35	7	2	30FT9	(1)
8	18	1	30FT9	(1)	36	7	2	10FT6	(1)
9	18	1	10FT6	(1)	37	7	3	55FT	(1)
10	18	2	55FT	(1)	38	7	3	30FT9	(1)
11	18	2	30FT9	(1)	39	7	3	10FT6	(1)
12	18	2	10FT6	(1)	40	4	2	55FT	(1)
13	18	3	55FT	(1)	41	4	2	30FT9	(1)
14	18	3	30FT9	(1)	42	4	2	10FT6	(1)
15	18	3	10FT6	(1)	43	1	3	55FT	(2)
16	15	2	55FT	(1)	44	1	3	30FT9	(2)
17	15	2	30FT9	(1)	45	1	3	0FT0	(2)
18	15	2	10FT6	(1)	46	13		59FT6	(3)
19	13	1	55FT	(6)	47	13		59FT6	(4)
20	13	1	30FT9	(6)	48	spare			(5)
21	13	1	10FT6	(6)					
22	13	2	55FT	(1)					
23	13	2	30FT9	(1)					
24	13	2	10FT6	(1)					
25	13	3	55FT	(2)					
26	13	3	30FT9	(2)					
27	13	3	0FT0	(2)					

FLOOR COOLING RTD's: (Unit 1 Only)

RTD No.	Bay No.	Radial Loc.	Approx. Elev. Above Wear Slab	Type	RTD No.	Bay No.	Radial Loc.	Approx. Elev. Above Wear Slab	Type
					13	13		2FT0	
2	2		2FT0		14	14		2FT0	
3	3		2FT0		15	15		2FT0	
4	4		2FT0		16	16		2FT0	
5	5		2FT0		17	17		2FT0	
6	6		2FT0		18	18		2FT0	
7	7		2FT0		19	19		2FT0	
					20	20		2FT0	
9	9		2FT0		21	21		2FT0	
10	10		2FT0		22	22		2FT0	
11	11		2FT0		23	23		2FT0	
12	12		2FT0						

TEMPERATURE SWITCHES:

Switch No.	Bay No.	Radial Loc.	Elev. Above Wear Slab	Type
1	1	2	57FT	(T)
2	4	2	57FT	(T)
3	7	2	57FT	(T)
4	18	2	57FT	(T)
5	21	2	57FT	(T)
6	24	2	57FT	(T)

WALL PANEL RTD's: (Unit 1 Only)

RTD No.	Bay No.	Radial Loc.	Elev. Above Wear Slab	Type
Deleted row(s) per 2004 Update				
29	13		1FT0	(8)
Deleted row(s) per 2004 Update				

FLOOR COOLING RTD's: (Unit 1 Only)

RTD No.	Bay No.	Radial Loc.	Approx. Elev. Above Wear Slab	Type	RTD No.	Bay No.	Radial Loc.	Approx. Elev. Above Wear Slab	Type

WEAR SLAB RTD's: (Unit 1 Only)

RTD No.	Bay No.	Radial Loc.	Elev. Above Wear Slab	Type
Deleted row(s) per 2004 Update				
45	17	2		(7)
Deleted row(s) per 2004 Update				

Notes:

1. The ice bed is defined as the region in the ice condenser between the top of the lower support structure and the intermediate deck doors. If we call the ice condenser floor our reference elevation of 0'-0" (actual plant elevation is 594'-10 3/4"), then the ice bed extends from about the 10' elevation up to about the 58' elevation. The RTD tip elevations, shown in the table in conjunction with Figure 6-175 are given using this elevation scheme.
2. Type No.
   - (1) (2) (6) - LATTICE-FRAME MTD. ICE BED TEMP. RTD
   - (3) (4) - PLENUM-PANEL MTD. RTD
   - (7) - WEAR SLAB (FLOOR) MTD. RTD (Unit 1 Only)
   - (8) - WALL PANEL MTD. RTD (Unit 1 Only)
   - (T) - TEMPERATURE SWITCH
3. See Figure 6-175 for radial coordinates for Ice Bed Instrumentation.
4. The radial locations are not given for the floor cooling RTDs.
5. The floor cooling RTDs monitor glycol temperature and are located on glycol piping leaving the floor cooling coils. The radial locations are a parameter which pertains to temperature probes in the ice condenser that are not associated with process piping.

Table 6-128. Ice Condenser Allowable Limits[1]

Load Combination	Elastic Analysis: Mechanical[(2)]	Elastic Analysis: Mechanical and Thermal	Elastic Analysis: Fatigue	Limit Analysis[(3)] (Load Factors)	Test (Load Factors)
D+OBE	S	3S	AISC Part 1	1.42	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	1.42
D+SSE±DBA	1.65 S	N.A.	N.A.	1.18	1.3

Notes:

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 be 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.
4. S = Allowable stresses as defined in Sections 1.5 and 1.6 of the AISC Part 1 Specification.

Table 6-129. Summary of Catawba Loads-Tangential Case Obtained Using The Two-Mass Dynamic Model

Earthquake Condition and Direction	Lattice Frame Load-Kips	Ice Basket Impact Load-lbs	Design Values	
			Lattice Frame Load-Kips	Ice Basket Load-lbs
OBE, N-S	4.4	305	8	1000
OBE, E-W	5.2	422	8	1000
SSE, N-S	7.0	652	10	1400
SSE, E-W	8.0	760	10	1400

Table 6-130. Summary of Catawba Loads-Radial Case Obtained Using the Two-Mass Dynamic Model

Earthquake Condition and Direction	Wall Panel Load-Kips	Impact Load-lbs	Design Values	
			Wall Panel Load-Kips	Impact Load-lbs
OBE, N-S	6.0	244	10	1000
OBE, E-W	6.1	271	10	1000
SSE, N-S	10.0	423	14	1400
SSE, E-W	10.3	480	14	1400

Table 6-131. Summary of Load Results of Five Non-Linear Dynamic Models

Maximum Load Average of 4 Earthquakes	2 Mass Model	3 Mass Model	9 Mass Model	48 Foot Beam Model	Phasing Mass Model	Design Load
Tangential Ice Basket Impact Load	760	1134		940	679	1400
Tangential Lattice Frame Load	8000			8700	6286	10000
Radial Ice Basket Impact Load	480		1295	800		1400
Radial Lattice Frame Load	10300			13200		14000
Link Impact Load					12600	15000

Table 6-132. Summary of Parameters Used In The Seismic Analysis

Item	Description	Catawba Parameters
1.	Lower Support Structure Stiffness	
	a. Radial Direction	430,000 lbs/in
	b. Tangential Direction	670,000 lbs/in
2.	Lattice Frame Cradles Combined Stiffness	
	a. Radial Direction	50,000 lbs/in
	b. Tangential Direction	23,900 lbs/in
3.	Local Impact Stiffness	
	a. Radial Direction	4.8 to 9.2 kip/in
	b. Tangential Direction	4.8 to 11.8 kip/in
4.	Ice Basket Weight with ice	37 lbs/ft (Flakice)
		41.7 lbs/ft (Maximized Block Ice)
5.	Gap Size	0.5 in (Internal Rings)
		0.246 (External Rings)
6.	Ice Basket Stiffness	
	a. Bending Rigidity (EI) where: E= modulus of elasticity, 1= moment of inertia,	330 x 10^6 lbs/in^2

Table 6-133. 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	i) 20 ft-lb CVN at - 20 F for steel over 36,000 psi yield strength ii) 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	i) Normalizing ii) Quench and Temper
Type of Steel	i) Rimed [(a)] ii) Semi-Killed [(b)] iii) Killed [(b,c)] iv) Killed - fine grain practice	i) Killed ii) Killed-fine grain practice

Notes:

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 6-134. Swivel Bracket Stress Summary (Ref.19) Load Case IV

	1222lb. Basket	Empty(250lb) Basket
SIDE BRACKETS (Top Coupling Piece, IB1)		
Combined bending + tension, side section	0.543	0.740
Shear Stress, lip	0.114	0.160
CLEVIS (Bottom Lug, 1B2)		
Shear at 5/16" neck	0.185	0.261
1/2" wide section tension	0.121	0.171
Bottom section, bending	0.330	0.618
1/2" wide side section, bending	0.089	0.073
1" round section	0.154	0.217
1/2 INCH DIAMETER ROD (Clevis Pin, 1B4)		
Shear Stress	0.579	0.814
3/8 INCH DIAMETER SCREWS (Part 1B3)		
Tension	0.440	0.618
PLATFORM ASSEMBLIES [1]		
Lug Stress (Combined uplift and moment)	Note 2	0.455
Support Bar Bending	Note 2	0.335
Support bar local stress at attachment point	Note 2	0.571
Shear reaction support bar	Note 2	0.096
OUTER PLATFORM ASSEMBLY[1]		
Inner channel bending	Note 2	0.900
Outer beam bending	Note 2	0.404
INNER PLATFORM ASSEMBLY[1]		
Outer channel bending	Note 2	0.675
Inner beam bending	Note 2	0.252
BASKET STRESSES[1]		

	1222lb. Basket	**Empty(250lb) Basket**
Screw shear	Note 2	0.639

Notes:

1. Lower Support Structure and Ice Basket Design loads increased to account for 5/8" gap in clevis assembly. Worst uplift load conservatively analyzed for 1222lb. (MNS Safety Margin limit) and empty basket. The highest calculated stress fraction was 0.9 for the outer platform inner channel. The elevation of this channel however is extremely conservative since it assumes that all of the baskets attached to it apply a 9624 lb force, implying that they are all empty.
2. Only evaluated for more critical empty basket case.

Table 6-135. Containment Coatings

	Surface	Coating Systems		Dry Film Thickness	Manufacturer	Notes
1.	Carbon Steel	Original System	DP-SP5 White Metal Blast Cleaning			1,2,3,4,5,6
	0°F-200°F	Prime Coat	DP#12-1 13-F-12KR-00 MZ#7	2.0 mils DFT	Mobil/Valspar	
		Finish Coat	DP#69-1 76-Series-00 High Build Epoxy	5.0 mils DFT	Mobil/Valspar	
		Maintenance System		7.0 mils DFT		
		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 to 3.0 mils DFT	Carboline	
		Finish Coat	DP#78-1 Carboline 890	5.0 to 7.0 mils DFT	Carboline	
2.	Carbon Steel	Original System	DP-SP10 Near White Metal Blast Cleaning			1,2,3,4,5,6
	0°F-200°F	Prime Coat	DP#17-1 89-R-10-00 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

	Surface	Coating Systems		Dry Film Thickness	Manufacturer	Notes
		Maintenance Coat	DP#78-1 Carboline 890	2.0 to 7.0 mils DFT	Carboline	
		New System	DP-SP10 Near White Blast Cleaning			1,2,3,4,5,6
		Prime Coat	DP#78-1 Carboline 890	2.0 to 4.0 mils DFT	Carboline	
		Finish Coat	DP#78-1 Carboline 890	5.0 to 7.0 mils DFT	Carboline	
3.	Carbon Steel	Original System	DP-SP10 Near White Metal Blast Cleaning			1,2,3,4,5,6
	0°F-200°F	Prime Coat	DP#69-1 76-Series-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	2.0 to 4.0 mils DFT	Carboline	
		Finish Coat	DP#78-1 Carboline 890	5.0 to 7.0 mils DFT	Carboline	
4.	Carbon Steel	Original System	DP-SP5 White Metal Blast Cleaning			1,2,3,4,5,6
	0°F-750°F	Prime Coat	DP#12-1 13-F-12KR-00-MZ#7	3.0 mils DFT	Mobil/Valspar	

	Surface	Coating Systems		Dry Film Thickness	Manufacturer	Notes
		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 to 5.0 mils DFT	Carboline	
5.	Carbon Steel	Original System	DP-SP10 Near White Metal Blast Cleaning			
	200°F-750°F	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		
6.	Concrete Floors	Original System	DP-SP25			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	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 to 12.0 mils DFT	Carboline	

	Surface	Coating Systems		Dry Film Thickness	Manufacturer	Notes
7.	Concrete Walls	Original Systems	DP-SP17			1,2,3,4,5,6
		Prime Coat	DP#36-1 46-X-29KR-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 to 7.0 mils DFT	Carboline	

Notes:

1. Original, Maintenance, and New Coating Systems meet Regulatory Guide 1.54.
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 in accordance with ANSI N101.4 and is provided by the Manufacturer.
5. Calculation CNC-1167.02-00-0001 is maintained documenting the square feet of unqualified coatings in containment.
6. Distribution of Containment Coating Specifications and Coating Schedules are transmitted by Document Control.

Table 6-136. Cruciform Cable Suspension System Design/Test Load Summary

Item	Description	Design Loads (lbs) Load Case No.				Test Loads (lbs) Load Case No.			
		I	II	III	IV	I	II	III	IV
1	Cable Bottom Swage	1334	3460	1389	3763	2495	4948	1986	4892
2	Bottom Clasp Assembly	1334	3960	1389	3763	2495	4948	1986	4892
3	Top Cap	2812	3300	3004	3603	5258	4719	4216	4684
4	Cable Top Clamp	2812	3300	3004	3603	5258	4719	4296	4684
5	Cruciforms	352	541	376	598	658	774	537	777
6	Bottom Cruciform Plate Assembly	352	541	376	598	658	774	537	777
7	Bottom Attachment Assembly Support Bar	3183	6701	3431	7004	5952	9582	4906	9105
8	Swivel Bracket	N/A	10161	N/A	10767	N/A	15983	N/A	15397

Table 6-137. External Coupling Ring and Rivet Design Load/Stress Summary

			Coupling Ring	Coupling Rivet	
Load Case No.	**Horizontal Load (lbs)**	**Vertical Load (lbs)**	**Bending Stress (Ksi)**	**Shear Stress (Ksi)**	**Bearing Stress (Ksi)**
I	244	N/A	Load Case IV Controls	Load Case II Controls	
II	296	6701	Load Case IV Controls	36.3(91)	47.6(53)
III	383	N/A	Load Case IV Controls	Load Case II Controls	
IV	679	7004	21.3(24.3)	Load Case II Controls	

Note:

1. Parenthetical values are minimum yield stress values

Table 6-138. Ice Basket Load Summary - Basic Design Loads (2000 Lb. Basket)

Elevation[1] (ft.)	D		1/2 SSE		SSE		DBA	
	H	V	H	V	H	V	H	V
0	0	2000	253	700	355	1100	143	-2312
6	0	1750	619	613	422	963	141	-2023
12	0	1500	709	525	421	825	138	-1734
18	0	1250	845	438	576	688	119	-1445
24	0	1000	957	350	563	550	111	-1156
30	0	750	980	262	552	412	101	-867
36	0	500	991	175	447	275	84	-578
42	0	250	923	88	410	137	71	-289
48	0	0	450	0	156	0	64	0

Note:

1. Above lower support structure