Plant Operating Range Analyzed by the Best-Estimate Large Break LOCA Analysis for D. C. Cook Unit 1

	Parameter	Analyzed Value or Range
1.0	**Plant Physical Description**	
a)	Dimensions	Nominal
b)	Pressurizer location	On an intact loop[1]
c)	Hot assembly location	Anywhere in core[2]
d)	Hot assembly type[3]	15x15 Upgrade Fuel with ZIRLO® cladding or Optimized ZIRLO™ cladding, non-IFBA or IFBA
e)	Steam generator tube plugging level	≤ 10%
f)	Fuel assembly type[3]	15x15 Upgrade Fuel with ZIRLO® cladding or Optimized ZIRLO™ cladding, non-IFBA or IFBA
2.0	**Plant Initial Operating Conditions**	
2.1	**Reactor Power**	
a)	Maximum Core power	3315 MWt
b)	Peak heat flux hot channel factor (F_Q)[3,4]	≤ 2.15

[1] Analyzing the pressurizer as being located on an intact loop is limiting per Westinghouse methodology.
[2] 44 peripheral locations will not physically be lead power assembly.
[3] In the Westinghouse Reload Safety Analysis Checklist (RSAC) process, this parameter is identified as a key safety analysis parameter that could be impacted by a fuel reload.
[4] Parameter values affected by evaluation described in Section 14.3.1.6.2

Plant Operating Range Analyzed by the Best-Estimate Large Break LOCA Analysis for D. C. Cook Unit 1

	Parameter	Analyzed Value or Range
c)	Peak hot rod enthalpy rise hot channel factor ($F_{\Delta H}$)[3,4]	≤ 1.55
d)	Hot assembly radial peaking factor (P_{HA})[3,4]	≤ 1.55/1.04
e)	Hot assembly heat flux hot channel factor (F_{QHA})[4]	≤ 2.15/1.04
f)	Axial power distribution (P_{BOT}, P_{MID})[3]	Figure 14.3.1-2
g)	Low power region relative power (P_{LOW})[3]	$0.30 \le P_{LOW} \le 0.70$
h)	Hot assembly burnup	≤ 75,000 MWD/MTU, lead rod[2,5]
i)	MTC	≤ 0 at hot full power (HFP)
j)	Typical cycle length	18 months
k)	Minimum core average burnup[3]	≥ 10,000 MWD/MTU
l)	Maximum steady state depletion, F_Q[3,4]	1.90
2.2	**Fluid Conditions**	
a)	T_{AVG}[4]	$553.7 - 4.1°F \le T_{AVG} \le 575.4 + 5.1°F$
b)	Pressurizer pressure[4]	$2100 - 67$ psia $\le P_{RCS} \le 2100 + 67$ psia; $2250 - 67$ psia $\le P_{RCS} \le 2250 + 67$ psia
c)	Minimum thermal design flow	88,500 gpm/loop

[5] The fuel temperature and rod internal pressure data is only provided up to 62,000 MWD/MTU. In addition, the hot assembly/ hot rod will not have a burnup this high in ASTRUM analyses.

Plant Operating Range Analyzed by the Best-Estimate Large Break LOCA Analysis for D. C. Cook Unit 1

	Parameter	Analyzed Value or Range
d)	Upper head design	T_{HOT}
e)	Pressurizer level (at hot full power)[4]	56.1% of span (High T_{AVG}) 43.4% of span (Low T_{AVG})
f)	Accumulator temperature[4]	$60°F \leq T_{ACC} \leq 120°F$
g)	Accumulator pressure	$599.7 \text{ psia} \leq P_{ACC} \leq 672.7 \text{ psia}$
h)	Accumulator liquid volume	$921 \text{ ft}^3 \leq V_{ACC} \leq 971 \text{ ft}^3$
i)	Minimum accumulator boron	2228 ppm
3.0	**Accident Boundary Conditions**	
a)	Minimum safety injection flow[4]	Table 14.3.1-4a and 14.3.1-4b
b)	Safety injection temperature[4]	70°F ≤ SI Temp ≤ 105°F
c)	Safety injection delay[4]	27 seconds (with offsite power) 54 seconds (with LOOP)
d)	Containment modeling[4]	Figures 14.3.1-3 thru 14.3.1-9 and raw data in Tables 14.3.1-2, 14.3.1-3, and 14.3.1-7
e)	Initial containment pressure	See Table 14.3.1-2
f)	Containment spray initiation delay[4]	See Table 14.3.1-2
g)	Deck Fan initiation delay[4]	See Table 14.3.1-2
h)	Single failure	Loss of one ECCS train

Large-Break Containment Data (Ice Condenser Containment)

Net Free Volume Distribution Between Upper (UC), Lower (LC), Ice Condenser (IC) and Dead-Ended (DE) Compartments	UC: 729,969 ft^3 LC: 295,258 ft^3 IC: 122,350 ft^3 DE: 60,209 ft^3
Initial Condition Containment Pressure	14.7 psia
Maximum Temperature for the Upper (UC), Lower (LC) and Dead-Ended (DE) Compartments	UC: 100°F LC: 120°F DE: 120°F
Temperature Outside Containment	-22°F
Initial Spray Temperature at 14.7 psia	45°F[1]
Maximum Containment Spray Flow Rate[2]	3700 gpm / pump
Number of Spray Pumps Operating	2
Post-Accident Initiation of Spray System[2]	44 sec
Post-Accident Initiation of Deck Fans[2]	108 sec
Deck Fan Flow Rate	48,000 cfm / fan
Assumed Spray Efficiency of Water from Ice Condenser Drains	100%

[1] Due to errors identified with the LOTIC2 containment backpressure calculation, an evaluation was performed assuming a revised initial CTS temperature. See Section 14.3 .1.6.1 for more information.

[2] Parameter values affected by the evaluation described in Section 14.3.1.6.2.

INDIANA MICHIGAN POWER (An AEP Company)	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revision: 23 Table: 14.3.1-3 Page: 1 of 1

LARGE BREAK CONTAINMENT – HEAT SINKS DATA

(ICE CONDENSER CONTAINMENT)

Wall	Compartment	Area (ft^2)	Thickness (ft)	Material
1	UC	24036.	0.0329 / 3.2	steel / concrete
2	UC	5993.	0.0329 / 3.7	steel / concrete
3	UC	2593.	2.1	concrete
4	UC	17742.	4.2	concrete
5	UC	4973.	0.0392 / 13.7	steel / concrete
6	UC	21305.	0.0091	steel
7	UC	18067.	0.0196	steel
8	UC	6035.	0.1070	steel
9	UC	5079.	0.2300	steel
10	UC	23429.	0.1284	steel
11	LC	2682.	0.0218 / 5.3	steel / concrete
12	LC	447.	5.3	concrete
13	LC	51219.	6.8	concrete
14	LC	15033.	0.0200 / 5.40	steel / concrete
15	LC	42353.	0.0081	steel
16	LC	16886.	0.0166	steel
17	LC	13778.	0.0644	steel
18	LC	61214.	0.1076	steel
19	LC	4529.	14.04	concrete
20	LC	3439.	0.1561	steel

Minimum Safety Injection Pump (HHSI) and Residual Heat Removal Pump (RHR) Combined Injection Flow

Pressure (psia)	Original HHSI and RHR Total Injected Flow (gpm)[1,2]	Adjusted HHSI and RHR Total Injected Flow (gpm)[2,3]
14.7	3219.7	3044.9
34.7	2637.8	2455.0
54.7	2009.5	1802.4
74.7	1520.6	1390.3
94.7	1188.2	1045.0
114.7	788.0	629.3
134.7	267.3	259.1
154.7	262.9	255.5
174.7	258.5	251.9
194.7	254.1	248.3
214.7	249.6	244.6
234.7	245.0	240.8
254.7	240.4	237.1
274.7	235.7	233.3
294.7	231.0	229.4
314.7	226.0	225.5

[1] The original HHSI and RHR flow corresponds to the analysis results presented in the tables and figures, except for Table 14.3.1-5.

[2] HHSI and RHR total injected flow values affected by the evaluation described in Section 14.3.1.6.2. See Table 14.3.1-4C.

[3] The adjusted HHSI and RHR flow corresponds to the PCT results presented in the Adjusted HHSI and RHR Flow column in Table 14.3.1-5.

MINIMUM CENTRIFUGAL CHARGING PUMP (CCP) INJECTION FLOW

Pressure (psia)	Total CCP Injected Flow (gpm)
14.7	283.2
114.7	253.5
214.7	247.3
314.7	247.0
414.7	243.7
514.7	233.4
614.7	214.9
714.7	195.9
814.7	176.3
914.7	155.9
1014.7	134.7
1114.7	112.4
1214.7	88.9
1314.7	63.8
1414.7	36.3
1514.7	9.1
1614.7	0.0
1714.7	0.0

INDIANA MICHIGAN POWER An AEP Company	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revised: 27.0 Table:14.3.1-4C Page: 1 of 1

Minimum Safety Injection Pump (HHSI) and Residual Heat Removal Pump (RHR) Combined Injection Flow for the Return to NOP/NOT Evaluation

Pressure (psia)	HHSI and RHR Total Injected Flow at NOP/NOT Conditions (gpm)
15.7	3099
19.7	2997
24.7	2853
29.7	2707
34.7	2561
39.7	2412
54.7	1928
74.7	1465
94.7	1140
114.7	745
134.7	275
154.7	271
174.7	267
194.7	262
214.7	258
234.7	254
254.7	249
274.7	245
294.7	240
314.7	236
414.7	212
514.7	184
614.7	149
714.7	108
814.7	58
914.7	0

D. C. COOK UNIT 1 BEST-ESTIMATE LARGE BREAK LOCA RESULTS

Parameter	ASTRUM Result for Original HHSI and RHR Injection Flow Value	ASTRUM Result for Adjusted HHSI and RHR Injection Flow Value	10 CFR 50.46 Acceptance Criteria
95th Percentile PCT at the 95-Percent Confidence Level (°F)	2106	2128	≤2200
95th Percentile LMO at the 95-Percent Confidence Level (%)	10.0	11.1	≤17
95th Percentile CWO at the 95-Percent Confidence Level (%)	0.35	0.40	≤1

INDIANA MICHIGAN POWER (An AEP Company)	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revised: 29.0 Table: 14.3.1-6 Page: 1 of 1

Peak Cladding Temperature Including All Penalties and Benefits, Best-Estimate Large Break LOCA (BE LOCA) for D. C. Cook Unit 1

PCT for Analysis-of Record (AOR)	2128°F	
PCT Assessments Allocated to AOR		
		NOP/NOT[1]
• Design Input Changes with Respect to Plant Operations		-489°F
• Evaluation of Pellet Thermal Conductivity Degradation and Peaking Factor Burndown		+404°F
• Revised Heat Transfer Multiplier Distribution		-91°F
• HOTSPOT Burst Strain Error		+85°F
• Decay Group Uncertainty Factors Errors		-29°F
• Upflow Conversion		+14°F
BE LBLOCA PCT for Comparison to 10CFR50.46 Requirements		**2022°F**

[1] NOP/NOT refers to Unit 1 Return to Normal Operating Pressure and Temperature implemented by EC-52930

Nitrogen Mass and Energy Release Rates[1]

Time (s)	Flow Rate (lb_m / s)
0.	0.
50.	0.
50.01	236.
70.01	236.
70.02	0.
1000.	0.

[1] Parameter values affected by the evaluation described in Section 14.3.1.6.2. See Table 14.3.1-7A.

Nitrogen Mass and Energy Release Rates for the Return to NOP/NOT Evaluation

Time (s)	Flow Rate (lb_m / s)
0	0
44.3	0
44.31	254.6
64.31	254.6
64.32	0
1000.0	0

Sequence of Events for the Limiting Case[1]

Event	Time (sec)
Start of Transient	0.0
Safety Injection Signal	4.6
Accumulator Injection Begins	16.0
End of Blowdown	25.0
Bottom of Core Recovery	42.5
Accumulator Empty	49.3
Safety Injection Begins	58.6
PCT Occurs	247.0
End of Transient	500.0

[1] The evaluation for the return to NOP/NOT conditions and fuel TCD calculated a new limiting case. See Section 14.3.1.6.2 and Table 14.3.1-8A for more information.

Sequence of Events for the Limiting Return to NOP/NOT Evaluation Case

Event	Time (sec)
Start of Transient	0.0
Safety Injection Signal	5.0
Accumulator Injection Begins	12.0
End of Blowdown	24.6
Safety Injection Begins	33.0
Bottom of Core Recovery	35.2
Accumulator Empty	46.2
PCT Occurs	272.0
End of Transient	500.0

Plant Input Parameters for Small Break Loss-of-Coolant Accident

Core Rated Thermal Power-100% (MWt)	3304
Peak Linear Power, kW/ft	15.171
Fuel Type	15x15 Upgrade Fuel
Total Core Peaking Factor, F_Q	2.32
Hot Channel Enthalpy Rise Factor, $F_{\Delta H}$	1.55
Hot Assembly Average Power Factor, P_{HA}	1.38(4)
Thermal Design Flow, gpm/loop	83,200
Nominal Vessel Average Temperature, °F	577.4(1)
Nominal Pressurizer Pressure, psia	2250(2)
Pressurizer Pressure Uncertainty (psia)	±67
Minimum Auxiliary Feedwater Flow Rate, lbm/s per SG	14.68
Steam Generator Tube Plugging (Maximum), %	10
Initial Accumulator Water Volume, ft^3	946
Accumulator Tank Volume, ft^3/tank	1350
Accumulator Water Temperature, °F	130
Minimum Accumulator Cover Gas Pressure (minus uncertainties), psia	600
Refueling Water Storage Tank Temperature, °F	105
Nominal Steam Pressure, psia	848.32

Plant Input Parameters for Small Break Loss-of-Coolant Accident

SI Flow Delay Time, seconds	54
HHSI Cross-Tie Valve Position	Open (Injection & Cold Leg Recirculation)[3]
RHR Cross-Tie Valve Position	Open (Injection) Closed (Cold Leg Recirculation)

(1) Analysis supports operation over the range of nominal full-power Tavg values of 553.7°F – 575.4°F.

(2) Analysis supports operation at nominal initial pressurizer pressure (without uncertainties) of 2100 psia and 2250 psia.

(3) Conservatively modeled HHSI cross-tie valves closed in injection phase.

(4) Parameter value affected by the evaluation described in Section 14.3.2.4.1.2.See Table 14.3.2-1a.

Burnup-Dependent Hot Assembly Average Power Factor (P_{HA}) For Small Break Loss-of-Coolant Accident – Upflow Configuration

Assembly Burnup (MWD/MTU)	P_{HA} Limit without Uncertainty
0	1.38
28,000	1.38
30,000	1.250
60,000	1.139
62,000	1.139

INDIANA MICHIGAN POWER An AEP Company	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revision: 29.0 Table: 14.3.2-2 Page: 1 of 1

Time Sequence of Events for Small Break Loss-of-Coolant Accident[6]

Event Time (sec)	1.5-inch	2-inch	2.5-inch	2.75-inch	3.0-inch	3.25-inch	3.5-inch	3.75-inch	4.0-inch	6.0-inch	8.75-inch
Break Initiation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reactor Trip Signal	89.8	45.9	27.9	22.7	19.0	16.2	14.0	12.3	10.9	6.0	4.5
S-Signal	112.8	60.9	38.2	31.6	26.8	23.2	20.3	17.9	15.7	8.4	6.7
SI Flow Delivered[1]	166.8	114.9	92.2	85.6	80.8	77.2	74.3	71.9	69.7	62.4	60.7
Loop Seal Clearing[2]	2492	1341	857	628	516	445	386	390	302	146	30
Core Uncovery[4]	N/A	1897	1027	1017	963	780	664	630	602	342	N/A
Accumulator Injection	N/A	N/A	3065	2129	1707	1264	1031	940	823	345	168[3]
RWST Volume Delivered[5]	2165.6	2157.6	2145.4	2137.8	2130.0	2120.9	2114.4	2110.2	2106.4	2042.8	1590.7
PCT Time (BOL)	N/A	2284.4	2684.0	2140.6	2000.5	1483.4	1249.3	1129.8	986.2	404.1	N/A
Core Recovery [4]	N/A	6663	4032	4081	3977	3840	3973	4110	3404	423	N/A

Notes:

(1) SI is assumed to begin 54.0 seconds (SI delay time) after the S-Signal.

(2) Loop seal clearing is assumed to occur when the steam flow through the broken loop, loop seal is sustained above 1 lbm/s.

(3) For 8.75-inch break, accumulator injection begins for Loops 2-4 only; Loop 1 (broken loop) accumulator line is the location of the break and assumed to spill to containment.

(4) The latest point of sustained core uncovery/recovery is reported.

(5) The analysis assumes minimum usable RWST volume (280,000 gal) delivered via ECCS injection and containment spray before the low level RWST water level signal for switchover to cold leg recirculation is reached.

(6) See Table 14.3.2-2a for additional evaluation results for Upflow configuration.

Time Sequence of Events for Small Break Loss-of-Coolant Accident – Upflow Configuration				
Event Description	**Time (s)**			
	2.5 inch	**3.0-inch**	**3.25 inch**	**3.5- inch**
Break Initiation	0.0	0.0	0.0	0.0
Reactor Trip Signal	22.9	19.1	16.3	14.0
S-Signal	31.6	27.0	23.3	20.3
SI Flow Delivered(1)	85.6	81.0	77.3	74.3
Loop Seal Clearing(2)	625	535	467	388
Core Uncovery(4)	1023	646	586	638
Accumulator Injection(3)	2032	1475	1216	1016
PCT Time (BOL)	2051.7	1772.3	1418.3	1223.1
RWST Volume Delivered	2136.9	2126.3	2119.5	2113.7
Core Recovery(4)	4370	4003	3786	3914

Notes:

(1) SI is assumed to begin 54.0 seconds (SI delay time) after the S-Signal
(2) Loop seal clearing is assumed to occur when the steam flow through the broken loop, loop seal is sustained above 1 lbm/s
(3) Applies to all 4 loops
(4) The latest point of sustained core uncovery/recovery is reported.

Small Break Loss-of-Coolant Accident Calculations[2]

Break Size (in)	2-inch	2.5 inch	2.75 inch	3.0-inch	3.25 inch	3.5 inch	3.75 inch	4.0- inch	6.0- inch
PCT (°F)	968.4	1433.4	1452.5	1584.0	1725.0	1705.3	1517.9	1411.2	670.6
PCT Time (s)	2284.4	2684.0	2140.6	2000.5	1483.4	1249.3	1129.8	986.2	404.1
PCT Elevation (ft)	11.0	11.50	11.50	11.75	11.75	11.75	11.50	11.25	11.00
Max. Local ZrO_2 (%)	0.03	0.70	0.54	1.26	2.08	1.72	0.56	0.26	0.00
Max. Local ZrO_2 Elev. (ft)	11.0	11.50	11.50	11.75	11.75	11.50	11.50	11.25	11.00
Hot Rod Axial Average ZrO_2 (%)[1]	0.00	0.09	0.07	0.17	0.30	0.26	0.08	0.04	0.00

Notes:

(1) The hot rod axial average ZrO_2 conservatively represents the core wide average oxidation, since the core wide average ZrO_2 thickness will always be less than the corresponding hot rod axial average ZrO_2 thickness.
(2) See Table 14.3.2-3a for additional calculation results for Upflow configuration

Beginning of Life Small Break Loss-of-Coolant Accident Calculations – Upflow Configuration				
Item Description	**2.75-inch**	**3.0-inch**	**3.25-inch**	**3.5-inch**
PCT (^{o}F)	1522.9	1784.2	1771.7	1734.8
PCT Time (s)	2051.7	1772.3	1418.3	1223.1
PCT Elevation (ft)	11.5	11.75	11.75	11.75
Max Local ZrO_2 (%)	1.01	2.97	2.53	1.89
Max Local ZrO_2 Elev. (ft)	11.75	11.75	11.75	11.75
Hot Rod Axial Average ZrO_2 (%)	0.14	0.40	0.35	0.28

Upflow Configuration Limiting 3.0-Inch Small Break Loss-of-Coolant Accident Burnup Results

Burnup (MWD/MTU)	8000	8500(1)	9000(2)	10000	15000	50000(3)	62000(4)
PCT (°F)	1761.1	1831.4	1796.2	1794.6	1801.7	1776.3	1573.0
Max. Local ZrO2 (%)	2.33	6.13	6.19	6.16	5.65	2.96	1.14
Hot Rod Axial Average ZrO2 (%)	0.28	0.34	0.37	0.36	0.31	0.10	0.03
Total Maximum Local Oxidation(5) (%)	4.19	8.11	8.28	8.49	9.14	14.6	**15.7**

Notes:

(1) The limiting PCT occurs at the incipient burst point burnup of 8500 MWD/MTU.

(2) The limiting local transient oxidation and hot rod average oxidation occur at 9000 MWD/MTU.

(3) P_{HA} burndown would be available at the 50,000 MWD/MTU burnup; however, it is not credited.

(4) The 62,000 MWD/MTU case credits P_{HA} burndown to meet the maximum local oxidation limit of 17%.

(5) Includes summation of transient (max. local ZrO_2) and pre-transient oxidation.

INDIANA MICHIGAN POWER An AEP Company	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revision: 25.0 Table: 14.3.2-4 Sheet: 1 of 2

Safety Injection Flows Used in the SBLOCA Analysis - Injection Phase (1 CHG pump, 1 HHSI pump, 1 RHR pump - faulted loop injects to RCS pressure – 1.5-inch through 6-inch breaks)

RCS Pressure (psia)	Broken Loop (lbm/sec)	Intact Loops (lbm/sec)		
	Loop 1	Loop 2	Loop 3	Loop 4
14.7	188.63	158.38	175.00	159.93
114.7	127.20	102.43	117.32	103.38
214.7	38.89	12.50	34.37	12.50
314.7	37.49	12.21	33.10	12.21
414.7	35.93	11.90	31.73	11.90
514.7	34.30	11.57	30.26	11.57
614.7	32.56	11.23	28.64	11.23
714.7	30.73	10.88	26.98	10.88
814.7	28.80	10.54	25.22	10.54
914.7	26.74	10.18	23.35	10.18
1014.7	24.34	9.82	21.14	9.82
1114.7	21.49	9.46	18.54	9.46
1214.7	18.00	9.10	15.32	9.10
1314.7	13.03	8.70	10.73	8.70
1414.7	10.36	8.29	8.29	8.29
1514.7	9.82	7.86	7.86	7.86
1614.7	9.27	7.42	7.42	7.42
1714.7	8.72	6.98	6.98	6.98
1814.7	8.08	6.47	6.47	6.47

Safety Injection Flows Used in the SBLOCA Analysis - Injection Phase (1 CHG pump, 1 HHSI pump, 1 RHR pump - faulted loop injects to RCS pressure – 1.5-inch through 6-inch breaks)

RCS Pressure (psia)	Broken Loop (lbm/sec)	Intact Loops (lbm/sec)		
	Loop 1	Loop 2	Loop 3	Loop 4
1914.7	7.41	5.93	5.93	5.93
2014.7	6.72	5.38	5.38	5.38
2114.7	5.94	4.76	4.76	4.76
2214.7	5.02	4.01	4.01	4.01
2314.7	0	0	0	0

INDIANA MICHIGAN POWER An AEP Company	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revision: 25.0 Table: 14.3.2-5 Sheet: 1 of 2

Safety Injection Flows Used in the SBLOCA Analysis – Injection Phase (1 CHG pump, 1 HHSI pump, 1 RHR pump – faulted loop CHG flow injects to RCS pressure and faulted loop HHSI / RHR flow spills to containment (0 psia) – 8.75-inch break)

RCS Pressure (psia)	Broken Loop (lbm/sec)		Intact Loops (lbm/sec)		
	Loop 1 CHG	Loop 1 RHR / HHSI	Loop 2	Loop 3	Loop 4
14.7	16.34	157.03	139.36	156.01	140.26
34.7	16.27	215.73	126.84	99.71	127.64
54.7	16.20	274.56	115.46	32.18	116.17
74.7	16.13	303.81	97.04	12.90	97.63
94.7	16.06	323.64	72.95	12.84	73.37
114.7	15.98	345.72	43.70	12.78	43.93
134.7	15.91	365.86	12.73	12.73	12.73
154.7	15.84	365.86	12.67	12.67	12.67
214.7	15.63	365.86	12.50	12.50	12.50
314.7	15.25	365.86	12.21	12.21	12.21
414.7	14.83	365.86	11.90	11.90	11.90
514.7	14.45	365.86	11.57	11.57	11.57
614.7	14.03	365.86	11.23	11.23	11.23
714.7	13.60	365.86	10.88	10.88	10.88
814.7	13.17	365.86	10.54	10.54	10.54
914.7	12.73	365.86	10.18	10.18	10.18
1014.7	12.29	365.86	9.82	9.82	9.82
1114.7	11.83	365.86	9.46	9.46	9.46
1214.7	11.38	365.86	9.10	9.10	9.10

INDIANA MICHIGAN POWER An AEP Company	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revision: 25.0 Table: 14.3.2-5 Sheet: 2 of 2

Safety Injection Flows Used in the SBLOCA Analysis – Injection Phase (1 CHG pump, 1 HHSI pump, 1 RHR pump – faulted loop CHG flow injects to RCS pressure and faulted loop HHSI / RHR flow spills to containment (0 psia) – 8.75-inch break)

RCS Pressure (psia)	Broken Loop (lbm/sec)		Intact Loops (lbm/sec)		
	Loop 1 CHG	Loop 1 RHR / HHSI	Loop 2	Loop 3	Loop 4
1314.7	10.88	365.86	8.70	8.70	8.70
1414.7	10.36	365.86	8.29	8.29	8.29
1514.7	9.82	365.86	7.86	7.86	7.86
1614.7	9.27	365.86	7.42	7.42	7.42
1714.7	8.72	365.86	6.98	6.98	6.98
1814.7	8.08	365.86	6.47	6.47	6.47
1914.7	7.41	365.86	5.93	5.93	5.93
2014.7	6.72	365.86	5.38	5.38	5.38
2114.7	5.94	365.86	4.76	4.76	4.76
2214.7	5.02	365.86	4.01	4.01	4.01
2314.7	0	365.86	0	0	0

INDIANA MICHIGAN POWER An AEP Company	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revision: 25.0 Table: 14.3.2-6 Sheet: 1 of 2

Safety Injection Flows Used in the SBLOCA Analysis - Recirculation Phase
(1 CHG pump, 1 HHSI pump, 1 RHR pump - faulted loop injects to RCS pressure – RHR Spray active – 1.5 – through 6 inch breaks)

RCS Pressure (psia)	Broken Loop (lbm/sec)	Intact Loops (lbm/sec)		
	Loop 1	Loop 2	Loop 3	Loop 4
14.7	36.1	32.1	31.3	32.3
34.7	35.9	31.9	31.1	32.1
54.7	35.7	31.7	30.9	31.9
74.7	35.5	31.5	30.7	31.7
94.7	35.3	31.3	30.5	31.5
114.7	35.0	31.1	30.3	31.3
134.7	34.8	30.9	30.1	31.1
154.7	34.6	30.7	29.9	30.9
174.7	34.3	30.5	29.7	30.6
194.7	34.1	30.3	29.5	30.4
214.7	33.9	30.1	29.3	30.2
234.7	33.6	29.9	29.1	30.0
254.7	33.4	29.6	28.9	29.8
274.7	33.2	29.4	28.7	29.6
294.7	32.9	29.2	28.4	29.3
314.7	32.7	29.0	28.2	29.1
414.7	31.5	27.9	27.2	28.0
514.7	30.2	26.7	26.0	26.8
614.7	28.8	25.5	24.9	25.6
714.7	27.4	24.2	23.6	24.3
814.7	26.0	22.9	22.3	23.0
914.7	24.5	21.5	21.0	21.6
1014.7	22.6	19.9	19.4	20.0

INDIANA MICHIGAN POWER An AEP Company	**INDIANA MICHIGAN POWER** **D. C. COOK NUCLEAR PLANT** **UPDATED FINAL SAFETY ANALYSIS REPORT**	Revision: 25.0 Table: 14.3.2-6 Sheet: 2 of 2

Safety Injection Flows Used in the SBLOCA Analysis - Recirculation Phase (1 CHG pump, 1 HHSI pump, 1 RHR pump - faulted loop injects to RCS pressure – RHR Spray active – 1.5 - through 6 inch breaks)				
RCS Pressure (psia)	**Broken Loop (lbm/sec)**	**Intact Loops (lbm/sec)**		
	Loop 1	**Loop 2**	**Loop 3**	**Loop 4**
1114.7	20.7	18.1	17.7	18.1
1214.7	18.4	15.9	15.6	16.0
1314.7	15.3	13.0	12.8	13.1
1414.7	11.4	9.4	9.3	9.4
1514.7	9.2	7.4	7.4	7.4
1614.7	8.7	7.0	7.0	7.0
1714.7	8.1	6.6	6.6	6.6

INDIANA MICHIGAN POWER An AEP Company	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revision: 25.0 Table: 14.3.2-7 Sheet: 1 of 2

Safety Injection Flows Used in the SBLOCA Analysis – Recirculation Phase (1 CHG pump, 1 HHSI pump, 1 RHR pump – faulted loop CHG flow injects to RCS pressure and faulted loop HHSI/RHR flow spills to containment (0 psia) – RHR Spray active – 8 5 inch break)

RCS Pressure (psia)	Broken Loop (lbm/sec)		Intact Loops (lbm/sec)		
	Loop 1 – CHG	Loop 1 – RHR/HHSI	Loop 2	Loop 3	Loop 4
14.7	15.4	20.7	32.1	31.3	32.3
34.7	15.4	39.8	31.9	12.4	32.0
54.7	15.3	39.9	31.6	12.4	31.8
74.7	15.3	40.0	31.4	12.3	31.5
94.7	15.2	40.1	31.1	12.2	31.2
114.7	15.1	40.3	30.8	12.2	31.0
134.7	15.0	40.4	30.6	12.1	30.7
154.7	15.0	40.5	30.3	12.1	30.4
174.7	14.9	40.6	30.0	12.0	30.1
194.7	14.8	40.8	29.7	12.0	29.9
214.7	14.8	40.9	29.4	11.9	29.6
234.7	14.7	41.1	29.2	11.8	29.3
254.7	14.6	41.2	28.9	11.8	29.0
274.7	14.5	41.3	28.6	11.7	28.7
294.7	14.5	41.4	28.3	11.7	28.4
314.7	14.4	41.6	28.0	11.6	28.1
414.7	14.1	42.2	26.5	11.3	26.6
514.7	13.7	42.9	24.9	11.0	25.0
614.7	13.3	55.9	22.6	10.7	22.6
714.7	12.8	57.8	19.8	10.4	19.8
814.7	12.4	59.8	16.5	10.0	16.6

INDIANA MICHIGAN POWER An AEP Company	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revision: 25.0 Table: 14.3.2-7 Sheet: 2 of 2

Safety Injection Flows Used in the SBLOCA Analysis – Recirculation Phase
(1 CHG pump, 1 HHSI pump, 1 RHR pump –
faulted loop CHG flow injects to RCS pressure and faulted loop
HHSI/RHR flow spills to containment (0 psia) – RHR Spray active – 8.75 inch break)

RCS Pressure (psia)	Broken Loop (lbm/sec)		Intact Loops (lbm/sec)		
	Loop 1 – CHG	Loop 1 – RHR/HHSI	Loop 2	Loop 3	Loop 4
914.7	12.0	62.2	12.7	9.7	12.7
1014.7	11.6	64.3	9.3	9.3	9.3
1114.7	11.1	64.3	9.0	9.0	9.0
1214.7	10.7	64.3	8.6	8.6	8.6
1314.7	10.2	64.3	8.3	8.3	8.3
1414.7	9.8	64.3	7.9	7.9	7.9
1514.7	9.2	64.4	7.4	7.4	7.4
1614.7	8.7	64.4	7.0	7.0	7.0
1714.7	8.1	64.4	6.6	6.6	6.6

Peak Cladding Temperature Including All Penalties and Benefits, Small Break LOCA (SBLOCA) for D. C. Cook Unit 1	
PCT for Analysis-of-Record (AOR)	1725ºF
PCT Assessments Allocated to AOR	
• Upflow Conversion	+107°F
SBLOCA PCT for Comparison to 10 CFR 50.46 Requirements	1832ºF

SELECTED INPUT PARAMETERS* USED FOR THE COOK NUCLEAR PLANT UNITS 1 AND 2 REDUCED TEMPERATURE AND PRESSURE AND RERATING PROGRAM LOCA FORCES ANALYSIS

Input Parameter	Value
Steam Generator Tube Plugging Level	15% Uniform
Vessel Inlet Temperature	511.7°F
Vessel Outlet Temperature	582.3°F
Loop Flow Rate	88,500 gpm
Reactor Power	3588 MWt
Reactor Coolant System Pressure	2250 psia

DONALD C. COOK ICE CONDENSER ANALYSIS PARAMETERS

Reactor Containment Volume (net free volume)	
Upper Compartment, ft^3 [(1)]	727,628
Ice Condenser, ft^3 [(1)]	110,520
Lower Compartment (active), ft^3 [(1)]	293,801
Total Active Volume, ft^3	1,131,949
Lower Compartment (dead ended), ft^3	61,309
Total Containment Volume, ft^3	Not Applicable
Reactor Containment Air Compression Ratio	1.42
NSSS Power, MWt	3425
Design Energy Release to Containment	
Initial blowdown mass release, lbm	543,885
Initial blowdown energy release, Btu	338.8×10^6
Ice Condenser Parameters	
Weight of ice in condenser, lbm	2.20×10^6
Additional System Parameters	
Core Inlet Temperature (±5.1 °F), °F	552.5 [(2)]
Initial Steam Generator Steam Pressure, psia	858.2
Assumed Maximum Containment Back Pressure, psia	26.7

[(1)] Reference 36 and 38
[(2)] Includes +4.1°F allowance for instrument error, deadband, and +1°F for cold leg streaming.
This is information utilized in the current containment pressure analysis discussed in Section 14.3.4.1.3.1.

DECK LEAKAGE SENSITIVITY

Break Size	5 ft^2 Deck Leak Air Compression Peak (psig) [1]	Deck Leakage Area (ft^2)	Spray Flow Rate (gpm)	Resultant Peak Containment Pressure (psig)
Double ended	7.8	54	0	12.0
0.6 double ended	6.6	46	0	12.0
3 ft^2	6.25	50	0	12.0
8-inch diameter	5.5	56	4000	12.2
8-inch diameter	5.5	35	2000	12.0
8-inch diameter [2]	5.5	56	2000	11.3
6-inch diameter	5.0	56	4000	10.4
2 1/2-inch diameter	4.0	56	4000	8.5
1/2-inch diameter	3.0	50	4000	3.0

[1] The current design basis value for the deck leakage is 7 sq. ft.

[2] This case assumes upper compartment structural heat sink steam condensation of 8 lb/sec and 30 percent of deck leakage is air.

Structural Heat Sink Table

Upper Compartment	Area (ft^2)	Thickness (ft)	Material
Structure 1	29,958.25		
Layer 1		0.001	Paint (Top Coat)
Layer 2		0.0005	Paint (Primer)
Layer 3		0.029741	Carbon Steel
Layer 4		3.0364	Concrete
Structure 2	12,571.35		
Layer 1		0.001	Paint (Top Coat)
Layer 2		0.00275	Paint (Primer)
Layer 3		2.710421	Concrete
Structure 3	15,526.8		
Layer 1		0.001	Paint (Top Coat)
Layer 2		0.00275	Paint (Primer)
Layer 3		2.2728	Concrete
Structure 4	1,306.25		
Layer 1		0.001	Paint (Top Coat)
Layer 2		0.0005	Paint (Primer)
Layer 3		0.209108	Carbon Steel

Structural Heat Sink Table

Upper Compartment	Area (ft^2)	Thickness (ft)	Material
Structure 5	4,207.55		
Layer 1		0.001	Paint (Top Coat)
Layer 2		0.0005	Paint (Primer)
Layer 3		0.064932	Carbon Steel
Structure 6	22,443.75		
Layer 1		0.001	Paint (Top Coat)
Layer 2		0.0005	Paint (Primer)
Layer 3		0.017572	Carbon Steel
Structure 7	24,149.01		
Layer 1		0.001	Paint (Top Coat)
Layer 2		0.0005	Paint (Primer)
Layer 3		0.010036	Carbon Steel

Structural Heat Sink Table

Lower Compartment	Area (ft^2)	Thickness (ft)	Material
Structure 8	6,734.55		
Layer 1		0.001	Paint (Top Coat)
Layer 2		0.0005	Paint (Primer)
Layer 3		0.0167	Carbon Steel
Layer 4		1.0103	Concrete
Structure 9	14,642.35		
Layer 1		0.001	Paint (Top Coat)
Layer 2		0.00275	Paint (Primer)
Layer 3		5.8355	Concrete
Structure 10	25,872.3		
Layer 1		0.001	Paint (Top Coat)
Layer 2		0.00275	Paint (Primer)
Layer 3		2.699	Concrete
Structure 11	3,214.8		
Layer 1		0.001	Paint (Top Coat)
Layer 2		0.0005	Paint (Primer)
Layer 3		0.09286	Carbon Steel

Structural Heat Sink Table

Lower Compartment	Area (ft^2)	Thickness (ft)	Material
Structure 12	3,499.8		
Layer 1		0.001	Paint (Top Coat)
Layer 2		0.0005	Paint (Primer)
Layer 3		0.06918	Carbon Steel
Structure 13	12,312.0		
Layer 1		0.001	Paint (Top Coat)
Layer 2		0.0005	Paint (Primer)
Layer 3		0.013136	Carbon Steel
Structure 14	58,073.355		
Layer 1		0.001	Paint (Top Coat)
Layer 2		0.0005	Paint (Primer)
Layer 3		0.00952	Carbon Steel

Structural Heat Sink Table

Ice Condenser	Area (ft^2)	Thickness (ft)	Material
Structure 15	149,600.0		
Ice Baskets			
Layer 1		0.00663	Steel
Structure 16	75,865.0		
Lattice Frames			
Layer 1		0.0217	Steel
Structure 17	28,670.0		
Lower Support Structure			
Layer 1		0.0587	Steel
Structure 18	3,336.0		
Ice Condenser Floor			
Layer 1		0.00275	Paint
Layer 2		0.33	Concrete
Structure 19	19,100.0		
Containment Wall Panels and Containment Shell			
Layer 1		1.0	Steel and Insulation
Layer 2		0.0625	Steel Shell

Structural Heat Sink Table

Ice Condenser	Area (ft^2)	Thickness (ft)	Material
Structure 20	13,055.0		
Crane Wall Panels and Crane Wall			
Layer 1		1.0	Steel and Insulation
Layer 2		1.0	Concrete

Material Property Data

Upper and Lower Compartments		
Material	**Thermal Conductivity (Btu / hr-ft - °F)**	**Volumetric Heat Capacity (Btu / ft^3 - °F)**
Paint (on concrete)		
Primer	0.19	29.3
Top Coat	0.19	75.0
Concrete	0.81	30.4
Paint (on steel)		
Primer	0.4	29.3
Top Coat	0.4	75.0
Steel	26.0	58.8
Ice Condenser Compartment		
Material	**Thermal Conductivity (Btu / hr-ft - °F)**	**Volumetric Heat Capacity (Btu / ft^3 - °F)**
Paint (on concrete)	0.0833	28.4
Insulation (on concrete)	0.2	3.663
Concrete	0.8	28.8
Insulation (on steel)	0.15	2.75
Steel	26.0	56.4

D. C. Cook Unit 1 DECL Min Containment Energy Accounting - Blowdown

	Approximate End of Blowdown (10.0 sec)
Ice Heat Removal[1]	202.99 MBTU
Structural Heat Sinks[1]	19.96 MBTU
RHR Heat Exchanger Heat Removal[1]	0.0 MBTU
Spray Heat Exchanger[1]	0.0 MBTU
Energy Content of Sump[2]	204.21 MBTU
Ice Melted	0.668 Mlbm

[1] Integrated Energy
[2] Sum of active and inactive sump

INDIANA MICHIGAN POWER (An AEP Company)	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revised: 27.0 Table:14.3.4-6B Page: 1 of 1

D. C. Cook Unit 1 DECL Min Containment Energy Accounting – Melt-Out and Peak Pressure

	Approximate Time of Ice Melt-Out (~712.91 sec)[1]	**Approximate Time of Peak Pressure (~108 sec)[2]**
Ice Heat Removal[3]	576.39 MBTU	576.39 MBTU
Structural Heat Sinks[3]	123.75 MBTU	163.27 MBTU
RHR Heat Exchanger Removal[3]	111.22 MBTU	190.47 MBTU
Spray Heat Exchanger[3]	118.49 MBTU	204.56 MBTU
Energy Content of Sump[4]	549.58 MBTU	560.49 MBTU
Ice Melted	2.2 Mlbm	2.2 Mlbm

[1] Used 7712.9 sec

[2] Used 10784.2 sec

[3] Integrated Energy

[4] Active Sump

Unit 1 Steamline Break Mass / Energy Releases Inside Containment 30% of 3327 MWt NSSS Power, 1.4 ft^2 Double-Ended Rupture, Failure - MSIV		
Time (sec)	**Mass (lb_m / sec)**	**Energy (Btu / sec)**
0.0	0.0	0.000E+00
0.001	9,833	1.172E+07
0.2	20,092	2.396E+07
1.0	19,499	2.327E+07
2.46	18,757	2.24J E+07
2.4601	8,928	1.068E+07
4.2	8,045	9.645E+06
4.4	8,205	9.838E+06
10.0	6,741	8.105E+06
12.4	6,276	7.551E+06
12.6	1,620	1.950E+06
19.8	1,290	1.553E+06
26.2	1,093	1.316E+06
32.6	961.4	1.157E+06
39.0	881.7	1.061E+06
45.4	835.1	1.004E+06
76.4	859.3	1.034E+06
279.8	841.1	1.012E+06
281.4	826.4	9.938E+05
283.2	787.7	9.468E+05
285.0	731.1	8.783E+05
288.6	553.6	6.630E+05

Unit 1 Steamline Break Mass / Energy Releases Inside Containment
30% of 3327 MWt NSSS Power, 1.4 ft^2 Double-Ended Rupture, Failure - MSIV

Time (sec)	Mass (lb_m / sec)	Energy (Btu / sec)
292.2	315.1	3.744E+05
292.8	281.6	3.340E+05
293.4	259.8	3.078E+05
294.0	252.8	2.994E+05
294.8	259.5	3.075E+05
296.2	286.1	3.395E+05
296.8	291.0	3.454E+05
301.6	282.2	3.348E+05
306.8	275.9	3.272E+05
323.2	258.4	3.062E+05
329.6	247.8	2.934E+05
340.8	216.4	2.556E+05
348.0	182.5	2.149E+05
361.2	103.5	1.208E+05
385.6	56.6	6.537E+04
1,800.6	56.3	6.502E+04
1,803.2	20.6	2.374E+04
1,803.4	0.0	0.000E+00

INDIANA MICHIGAN POWER An AEP Company	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revised: 27.0 Table: 14.3.4-8 Page: 1 of 2

Unit 1 Steam line Break Mass / Energy Releases Inside Containment
100.34% of 3327 MWt NSSS Power, 0.865 ft^2 Split Break, Failure - MSIV

Time (sec)	Mass (lb_m / sec)	Energy (Btu / sec)
0.0	0.0	0.000E+00
0.2	1,549.0	1.851E+06
5.2	1,456.4	1.743E+06
5.4	1,523.9	1.824E+06
9.6	1,648.5	1.969E+06
11.8	1,691.6	2.019E+06
14.0	1,706.9	2.037E+06
17.8	1,694.1	2.023E+06
22.6	1,448.0	1.735E+06
25.4	1,348.9	1.618E+06
31.2	1,196.0	1.437E+06
37.0	1,083.1	1.303E+06
42.8	995.5	1.198E+06
48.6	927.2	1.116E+06
60.2	830.4	1.000E+06
71.8	769.5	9.269E+05
83.4	728.8	8.778E+05
106.6	680.9	8.200E+05
129.8	661.2	7.962E+05
223.2	653.8	7.872E+05
238.0	567.5	6.829E+05
243.6	518.9	6.241E+05

Unit 1 Steam line Break Mass / Energy Releases Inside Containment
100.34% of 3327 MWt NSSS Power, 0.865 ft^2 Split Break, Failure - MSIV

Time (sec)	Mass (lb_m / sec)	Energy (Btu / sec)
249.2	451.8	5.428E+05
254.6	368.8	4.421E+05
260.2	274.5	3.279E+05
263.0	230.4	2.745E+05
265.8	192.2	2.283E+05
268.4	161.7	1.916E+05
271.2	135.3	1.599E+05
274.0	114.8	1.353E+05
276.8	99.5	1.169E+05
279.6	87.4	1.025E+05
281.0	82.5	9.666E+04
285.2	72.8	8.510E+04
293.4	61.6	7.180E+04
299.0	58.5	6.815E+04
310.0	56.5	6.580E+04
1,800.8	55.9	6.504E+04
1,807.6	15.6	1.794E+04
1,807.8	0.0	0.000E+00

INDIANA MICHIGAN POWER An AEP Company	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revised: 28.0 Table: 14.3.4-9 Page: 1 of 1

Double-Ended Rupture Steamline Breaks

Power Level	Break Size	Single Failure	Peak Temperature @ Time
100.34%	1.4 ft^2	MSIV	323.8°F @ 55.57 sec
100.34%	1.4 ft^2	AFW Runout Control	323.7°F @ 54.76 sec
70%	1.4 ft^2	MSIV	323.8°F @ 12.36 sec
70%	1.4 ft^2	AFW Runout Control	323.8°F @ 12.36 sec
30%	1.4 ft^2	MSIV	324.3°F @ 12.36 sec
30%	1.4 ft^2	AFW Runout Control	324.3°F @ 12.36 sec
0%	1.4 ft^2	MSIV	320.9°F @ 131.3 sec
0%	1.4 ft^2	AFW Runout Control	320.4°F @ 132.8 sec
0%	1.0 ft^2	MSIV	324.5°F @ 265.4 sec
0%	1.0 ft^2	AFW Runout Control	324.1 °F @ 140.8 sec

INDIANA MICHIGAN POWER An AEP Company	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revised: 28.0 Table: 14.3.4-10 Page: 1 of 1

Split Steamline Breaks

Power Level	Break Size	Single Failure	Peak Temperature @ Time
100.34%	0.865 ft^2	MSIV	324.7°F @ 96.57 sec
100.34%	0.865 ft^2	AFW Runout Control	324.5°F @ 95.86 sec
70%	0.857 ft^2	MSIV	324.7°F @ 72.43 sec
70%	0.857 ft^2	AFW Runout Control	324.5°F @ 111.4 sec
30%	0.834 ft^2	MSIV	324.6°F @ 122.9 sec
30%	0.834 ft^2	AFW Runout Control	324.3°F @ 116.7 sec
0%	0.808 ft^2	MSIV	324.3°F @ 142.8 sec
0%	0.808 ft^2	AFW Runout Control	324.5°F @ 119.7 sec

LOWER COMPARTMENT TEMPERATURE TRANSIENT CALCULATION RESULTS

Case	Maximum LC Temp °F	Time T_{max} Sec.	Time Of Containment*	
			Spray	Fan
0.6 ft^2	326.1	151.39	53.	605.
0.35 ft^2	325.8	322.8	59.	617.
0.1 ft^2	320.7	651.	106.	663.

* Hi-2 Pressure Setpoint used was 3.5 psig.
Relay time used for spray actuation after Hi-2 signal was 45 sec.
Relay time used for fan actuation after Hi-2 signal was 600 sec.

0.35 FT^2 SPLIT 30% POWER		
Time (sec)	**Mass (lb/sec)**	**Energy (BTU/sec)**
.1000E-01	.7970E+03	.9480E+06
.1000E+01	.7970E+03	.9480E+06
.3000E+01	.7890E+03	.9388E+06
.5000E+01	.7820E+03	.9308E+06
.7000E+01	.7760E+03	.7239E+06
.9000E+01	.7700E+03	.9169E+06
.1000E+02	.7680E+03	.9145E+06
.1300E+02	.7760E+03	.9237E+06
.1500E+02	.7800E+03	.9284E+06
.1600E+02	.8960E+03	.1066E+07
.1900E+02	.1240E+03	.1476E+07
2000E+02	.7720E+03	.9195E+06
.2500E+02	.7090E+03	.8466E+06
.3000E+02	.6630E+03	.7930E+06
.3500E+02	.6280E+03	.7520E+06
.4000E+02	.6010E+03	.7203E+06
.5000E+02	.5630E+03	.6756E+06
.6000E+02	.5350E+03	.6425E+06
.7000E+02	.5140E+03	.6176E+06
.8000E+02	.4970E+03	.5974E+06
.9000E+02	.4830E+03	.5808E+06
.1000E+03	.4700E+03	.5653E+06
.1200E+03	.4500E+03	.5415E+06
.1400E+03	.4320E+03	.5200E+06
.1600E+03	.4160E+03	.5008E+06
.1800E+03	.4020E+03	.4841E+06
.2000E+03	.3890E+03	.4685E+06
.2400E+03	.3650E+03	.4397E+06
.2800E+03	.3440E+03	.4144E+06
.3200E+03	.3240E+03	.3904E+06
.3600E+03	.3060E+03	.3687E+06
.4000E+03	.2890E+03	.3481E+06
.5000E+03	.2530E+03	.3046E+06
.6000E+03	.2230E+03	.2683E+06
.7000E+03	.1990E+03	.2392E+06
.8000E+03	.1790E+03	.2150E+06
.9000E+03	.1620E+03	.1944E+06
.1000E+04	.1480E+03	.1774E+06

0.6 FT^2 SPLIT 30% POWER		
Time (sec)	**Mass (lb/sec)**	**Energy (BTU/sec)**
.1000E-01	.1365E+04	.1624E+07
.1000E+01	.1365E+04	.1624E+07
.3000E+01	.1341E+04	.1596E+07
.5000E+01	.1320E+04	.1572E+07
.7000E+01	.1302E+04	.1551E+07
.8000E+01	.1293E+04	.1541E+07
.1000E+02	.1297E+04	.1545E+07
.1200E+02	.1298E+04	.1546E+07
.1300E+02	.1297E+04	.1545E+07
.1400E+02	.1268E+04	.1513E+07
.1600E+02	.1196E+04	.1429E+07
.1800E+02	.1133E+04	.1355E+07
.2000E+02	.1079E+04	.1292E+07
2200E+02	.1033E+04	.1238E+07
.2400E+02	.9940E+03	.1192E+07
.2700E+02	.9440E+03	.1133E+07
.3200E+02	.8800E+03	.1057E+07
.3600E+02	.8420E+03	.1012E+07
.4000E+02	.8110E+03	.9754E+06
.4600E+02	.7740E+03	.9313E+06
.5000E+02	.7540E+03	.9074E+06
.6000E+02	.7130E+03	.8584E+06
.7500E+02	.6680E+03	.8045E+06
.9500E+02	.6250E+03	.7529E+06
.1200E+03	.5840E+03	.7036E+06
.1400E+03	.5570E+03	.6711E+06
.1800E+03	.5110E+03	.6156E+06
.2200E+03	.4720E+03	.5685E+06
.2400E+03	.4530E+03	.5455E+06
.2600E+03	.4350E+03	.5238E+06
.3000E+03	.4020E+03	.4838E+06
.3600E+03	.3600E+03	.4330E+06
.4200E+03	.3250E+03	.3905E+06
.5000E+03	.2870E+03	.3445E+06
.5600E+03	.2680E+03	.3154E+06
.6000E+03	.2480E+03	.2972E+06
.8600E+03	.1790E+03	.2136E+06
.9600E+03	.1610E+03	.1918E+06
.9800E+03	.1580E+03	.1882E+06
.1000E+04	.1550E+03	.1846E+06

KEY PARAMETERS AFFECTING SPLIT STEAM LINE BREAKS

Variable	Values Used In LOTIC-3 Report	Values for D. C. Cook
Full Load Steam Pressure (psia)	1000	820
Plant Power (Mwt)	3425	3403
Time Delay to Feedline Isolation (sec)	15	≤9.0
Time Delay to Steam Line Isolation (sec)	15	≤9.0

STEAM LINE RUPTURE IN STEAM GENERATOR DOGHOUSE

Mass Energy Release Rates
Outlet Nozzle Break (Top Break)

Time (Sec)	Mass Flowrate (lbm/sec) $x10^3$	Energy Flowrate (BTU/sec) $x10^6$
0.0	19.421	23.110
0.042	19.421	23.110
0.043	13.830	16.458
0.2	13.430	15.982
0.45	16.630	16.239
0.75	26.430	19.040
1.05	34.630	21.428
1.9	33.350	20.358
2.9	31.680	19.395
3.5	31.000	18.678

MAIN FEEDWATER LINE BREAK IN STEAM GENERATOR DOGHOUSE

Mass and Energy Releases
(Break at Side of Vessel)

	Reverse Flow	
Time (seconds)	Mass Flow (lbm/sec)	Energy Flow (Btu/sec)
0.0	8919	4.866×10^6
20.23	8919	4.866×10^6
20.24	0	0
	Forward Flow	
Time (seconds)	Mass Flow (lbm/sec)	Energy Flow (Btu/sec)
0.0	5711	2.451×10^6
∞	5711	2.451×10^6
	Total Flow	
Time (seconds)	Mass Flow (lbm/sec)	Energy Flow (Btu/sec)
0.0	14630	7.317×10^6
20.23	14630	7.317×10^6
20.24	5711	2.451×10^6

TABLE 14.3.4-16

DOUBLE-ENDED SPRAY LINE BREAK

MASS AND ENERGY RELEASES

(When using this table, add 15% multiplier to mass & energy results.)

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
.00000	0.	0.
.00101	1.8429935E+03	1.2012554E+06
.00201	2.0768869E+03	1.3312080E+06
.00302	2.0954232E+03	1.3410507E+06
.00401	2.0943466E+03	1.3398926E+06
.00502	2.0906198E+03	1.3372569E+06
.00600	2.0847010E+03	1.3334349E+06
.00703	2.0776894E+03	1.3290038E+06
.00800	2.0718446E+03	1.3252736E+06
.00901	2.0684832E+03	1.3229372E+06
.01000	2.0667746E+03	1.3215515E+06
.01102	2.0657651E+03	1.3205642E+06
.01200	2.0657312E+03	1.3202011E+06
.01301	2.0710642E+03	1.3227266E+06
.01400	2.0895916E+03	1.3326883E+06
.01505	2.1237904E+03	1.3513713E+06
.01605	2.1428041E+03	1.3615888E+06
.01705	2.1327342E+03	1.3556010E+06
.01804	2.1286790E+03	1.3530305E+06
.01905	2.1408255E+03	1.3594780E+06
.02004	2.1330134E+03	1.3547994E+06
.02108	2.1170413E+03	1.3456154E+06
.02207	2.1196063E+03	1.3467887E+06
.02308	2.1314002E+03	1.3530903E+06
.02400	2.1400977E+03	1.3576929E+06
.02501	2.1475536E+03	1.3615802E+06
.02602	2.1559827E+03	1.3660339E+06
.02707	2.1678910E+03	1.3724086E+06
.02804	2.1768474E+03	1.3771613E+06
.02907	2.1816274E+03	1.3795673E+06
.03009	2.1827097E+03	1.3799305E+06
.03107	2.1841837E+03	1.3805245E+06
.03212	2.1872679E+03	1.3820107E+06
.03301	2.1894643E+03	1.3830366E+06
.03411	2.1903771E+03	1.3833149E+06

TABLE 14.3.4-16

DOUBLE-ENDED SPRAY LINE BREAK

MASS AND ENERGY RELEASES

(When using this table, add 15% multiplier to mass & energy results.)

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
.03504	2.1897285E+03	1.3827485E+06
.03607	2.1861418E+03	1.3805329E+06
.03703	2.1786958E+03	1.3761844E+06
.03807	2.1711481E+03	1.3717868E+06
.03906	2.1650758E+03	1.3682259E+06
.04009	2.1587371E+03	1.3645103E+06
.04102	2.1527706E+03	1.3610346E+06
.04212	2.1468107E+03	1.3575467E+06
.04305	2.1432206E+03	1.3554088E+06
.04406	2.1404771E+03	1.3537320E+06
.04510	2.1384998E+03	1.3524847E+06
.04601	2.1374125E+03	1.3517571E+06
.04705	2.1369632E+03	1.3513688E+06
.04809	2.1372622E+03	1.3514036E+06
.04911	2.1379671E+03	1.3516676E+06
.05006	2.1388546E+03	1.3520428E+06
.05108	2.1400630E+03	1.3525916E+06
.05207	2.1411605E+03	1.3530872E+06
.05318	2.1418610E+03	1.3533545E+06
.05404	2.1420277E+03	1.3533548E+06
.05515	2.1419234E+03	1.3531771E+06
.05609	2.1415416E+03	1.3528611E+06
.05711	2.1410383E+03	1.3524782E+06
.05812	2.1409677E+03	1.3523442E+06
.05901	2.1414214E+03	1.3525173E+06
.06004	2.1427085E+03	1.3531458E+06
.06104	2.1448478E+03	1.3542536E+06
.06207	2.1481439E+03	1.3559989E+06
.06303	2.1514351E+03	1.3577536E+06
.06402	2.1550387E+03	1.3596806E+06
.06501	2.1585740E+03	1.3615691E+06
.06604	2.1618098E+03	1.3632912E+06
.06710	2.1647229E+03	1.3648345E+06
.06814	2.1673799E+03	1.3662365E+06
.06905	2.1694828E+03	1.3673439E+06
.07008	2.1716796E+03	1.3684953E+06

TABLE 14.3.4-16

DOUBLE-ENDED SPRAY LINE BREAK

MASS AND ENERGY RELEASES

(When using this table, add 15% multiplier to mass & energy results.)

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
.07111	2.1735789E+03	1.3694836E+06
.07213	2.1750499E+03	1.3702354E+06
.07317	2.1759218E+03	1.3706558E+06
.07412	2.1760897E+03	1.3706871E+06
.07523	2.1755041E+03	1.3702969E+06
.07602	2.1743802E+03	1.3696191E+06
.07705	2.1726900E+03	1.3686222E+06
.07801	2.1708169E+03	1.3675296E+06
.07902	2.1688239E+03	1.3663702E+06
.08006	2.1667850E+03	1.3651854E+06
.08100	2.1651864E+03	1.3642490E+06
.08204	2.1632686E+03	1.3631342E+06
.08306	2.1613432E+03	1.3620171E+06
.08410	2.1593726E+03	1.3608757E+06
.08504	2.1576149E+03	1.3598670E+06
.08603	2.1556593E+03	1.3587375E+06
.08708	2.1538655E+03	1.3576993E+06
.08814	2.1523767E+03	1.3568314E+06
.08915	2.1513646E+03	1.3562298E+06
.09005	2.1510544E+03	1.3560230E+06
.09115	2.1514210E+03	1.3561899E+06
.09214	2.1524508E+03	1.3567285E+06
.09307	2.1540139E+03	1.3575665E+06
.09405	2.1562098E+03	1.3587565E+06
.09504	2.1589196E+03	1.3602332E+06
.09601	2.1619926E+03	1.3619135E+06
.09712	2.1660659E+03	1.3641459E+06
.09811	2.1700593E+03	1.3663392E+06
.09910	2.1743398E+03	1.3686932E+06
.10011	2.1788810E+03	1.3711929E+06
.10505	2.1997980E+03	1.3827080E+06
.11017	2.2084042E+03	1.3873725E+06
.11511	2.1979605E+03	1.3814517E+06
.12010	2.1755220E+03	1.3688892E+06
.12501	2.1516732E+03	1.3555705E+06
.13001	2.1350205E+03	1.3462681E+06

TABLE 14.3.4-16

DOUBLE-ENDED SPRAY LINE BREAK

MASS AND ENERGY RELEASES

(When using this table, add 15% multiplier to mass & energy results.)

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
.13501	2.1319480E+03	1.3445234E+06
.14009	2.1415298E+03	1.3498034E+06
.14510	2.1540075E+03	1.3566900E+06
.15015	2.1608228E+03	1.3604378E+06
.15500	2.1603593E+03	1.3601520E+06
.16007	2.1547404E+03	1.3570065E+06
.16515	2.1446526E+03	1.3513889E+06
.17002	2.1327374E+03	1.3447619E+06
.17509	2.1250311E+03	1.3404793E+06
.18010	2.1255323E+03	1.3407503E+06
.18500	2.1307501E+03	1.3436315E+06
.19010	2.1359241E+03	1.3464861E+06
.19507	2.1377315E+03	1.3474736E+06
.20008	2.1357354E+03	1.3463523E+06
.21002	2.1305966E+03	1.3434798E+06
.22009	2.1455142E+03	1.3517412E+06
.23010	2.1609519E+03	1.3602792E+06
.24007	2.1500994E+03	1.3542251E+06
.25001	2.1319210E+03	1.3441210E+06
.26002	2.1212847E+03	1.3437534E+06
.27006	2.1408201E+03	1.3490219E+06
.28015	2.1382240E+03	1.3475602E+06
.29011	2.1219655E+03	1.3385282E+06
.30028	2.1125694E+03	1.3333092E+06
.31011	2.1146636E+03	1.3344534E+06
.32004	2.1134582E+03	1.3337664E+06
.33005	2.1102424E+03	1.3319670E+06
.34002	2.1162685E+03	1.3352858E+06
.35002	2.1252674E+03	1.3402496E+06
.36002	2.1249488E+03	1.3400427E+06
.37007	2.1182970E+03	1.3363273E+06
.38010	2.1179299E+03	1.3360961E+06
.39027	2.1241025E+03	1.3394390E+06
.40003	2.1244819E+03	1.3396673E+06
.41001	2.1157197E+03	1.3347842E+06
.42004	2.1079031E+03	1.3304251E+06

TABLE 14.3.4-16

DOUBLE-ENDED SPRAY LINE BREAK

MASS AND ENERGY RELEASES

(When using this table, add 15% multiplier to mass & energy results.)

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
.43006	2.1057949E+03	1.3292307E+06
.44011	2.1038434E+03	1.3281221E+06
.45008	2.1005501E+03	1.3262686E+06
.46002	2.1008990E+03	1.3264325E+06
.47013	2.1046381E+03	1.3284716E+06
.48001	2.1065466E+03	1.3294937E+06
.49011	2.1055653E+03	1.3289117E+06
.50010	2.1065499E+03	1.3294210E+06
.51005	2.1109307E+03	1.3318103E+06
.52014	2.1132353E+03	1.3330479E+06
.53006	2.1104929E+03	1.3314882E+06
.54010	2.1067324E+03	1.3293690E+06
.55002	2.1047031E+03	1.3282077E+06
.56003	2.1025984E+03	1.3270031E+06
.57000	2.0994619E+03	1.3252280E+06
.58000	2.0974864E+03	1.3240966E+06
.59023	2.0978998E+03	1.3242862E+06
.60010	2.0987566E+03	1.3247206E+06
.61005	2.0988030E+03	1.3247041E+06
.62019	2.0998437E+03	1.3252383E+06
.63007	2.1029363E+03	1.3269102E+06
.64009	2.1057724E+03	1.3284358E+06
.65011	2.1063355E+03	1.3287028E+06
.66008	2.1058521E+03	1.3283898E+06
.67006	2.1056166E+03	1.3282154E+06
.68003	2.1048258E+03	1.3277315E+06
.69009	2.1027606E+03	1.3265436E+06
.70006	2.1004766E+03	1.3252341E+06
.71021	2.0994186E+03	1.3246041E+06
.72013	2.0991217E+03	1.3243955E+06
.73018	2.0986674E+03	1.3240994E+06
.74006	2.0987148E+03	1.3240815E+06
.75009	2.1001279E+03	1.3248191E+06
.76008	2.1022067E+03	1.3259240E+06
.77007	2.1038110E+03	1.3267654E+06
.78001	2.1049477E+03	1.3273479E+06

TABLE 14.3.4-16

DOUBLE-ENDED SPRAY LINE BREAK

MASS AND ENERGY RELEASES

(When using this table, add 15% multiplier to mass & energy results.)

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
.79005	2.1060244E+03	1.3278975E+06
.80008	2.1065644E+03	1.3281484E+06
.81002	2.1059659E+03	1.3277697E+06
.82003	2.1046670E+03	1.3270043E+06
.83006	2.1036100E+03	1.3263731E+06
.84009	2.1028557E+03	1.3259083E+06
.85013	2.1019975E+03	1.3253876E+06
.86002	2.1012207E+03	1.3249123E+06
.87004	2.1011387E+03	1.3248209E+06
.88001	2.1018523E+03	1.3251709E+06
.89009	2.1029599E+03	1.3257378E+06
.90001	2.1041960E+03	1.3263762E+06
.92003	2.1066767E+03	1.3276561E+06
.93004	2.1070790E+03	1.3278333E+06
.94009	2.1068436E+03	1.3276548E+06
.95015	2.1064606E+03	1.3273966E+06
.91007	2.1055640E+03	1.3270867E+06
.96022	2.1060345E+03	1.3271155E+06
.97001	2.1052992E+03	1.3266634E+06
.98005	2.1042714E+03	1.3260489E+06
.99010	2.1033853E+03	1.3255134E+06
1.00003	2.1030192E+03	1.3252670E+06
1.00015	2.1030185E+03	1.3252660E+06
1.01010	2.1031598E+03	1.3252999E+06
1.02001	2.1036738E+03	1.3255407E+06
1.03002	2.1044850E+03	1.3259460E+06
1.04010	2.1053738E+03	1.3263933E+06
1.05011	2.1060053E+03	1.3266987E+06
1.06006	2.1063215E+03	1.3268299E+06
1.07003	2.1065103E+03	1.3268901E+06
1.08001	2.1065562E+03	1.3268717E+06
1.09002	2.1062535E+03	1.3266603E+06
1.10005	2.1054973E+03	1.3261987E+06
1.11001	2.1045159E+03	1.3256120E+06
1.12004	2.1036583E+03	1.3250948E+06
1.13020	2.1030886E+03	1.3247376E+06

TABLE 14.3.4-16

DOUBLE-ENDED SPRAY LINE BREAK

MASS AND ENERGY RELEASES

(When using this table, add 15% multiplier to mass & energy results.)

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
1.14007	2.1028399E+03	1.3245581E+06
1.15004	2.1028392E+03	1.3245158E+06
1.16002	2.1030452E+03	1.3245891E+06
1.17008	2.1033358E+03	1.3247086E+06
1.18009	2.1036084E+03	1.3248175E+06
1.19008	2.1038945E+03	1.3249345E+06
1.20005	2.1041572E+03	1.3250391E+06
1.21005	2.1041987E+03	1.3250213E+06
1.22004	2.1038425E+03	1.3247830E+06
1.23001	2.1031332E+03	1.3243498E+06
1.24003	2.1022976E+03	1.3238470E+06
1.25007	2.1014833E+03	1.3233569E+06
1.26010	2.1007977E+03	1.3229378E+06
1.27007	2.1002438E+03	1.3225929E+06
1.28000	2.0998158E+03	1.3223173E+06
1.29006	2.0995386E+03	1.3221250E+06
1.30006	2.0993915E+03	1.3220048E+06
1.31013	2.0994058E+03	1.3219736E+06
1.32023	2.0995298E+03	1.3220039E+06
1.33005	2.0995986E+03	1.3220040E+06
1.34003	2.0994684E+03	1.3218931E+06
1.35003	2.0990790E+03	1.3216402E+06
1.36003	2.0984545E+03	1.3212564E+06
1.37021	2.0977429E+03	1.3208245E+06
1.38008	2.0969880E+03	1.3203695E+06
1.39003	2.0962009E+03	1.3198970E+06
1.40007	2.0954355E+03	1.3194364E+06
1.41000	2.0947605E+03	1.3190272E+06
1.42008	2.0941729E+03	1.3186648E+06
1.43000	2.0937703E+03	1.3184063E+06
1.44009	2.0935338E+03	1.3182384E+06
1.45002	2.0933865E+03	1.3181211E+06
1.46007	2.0932071E+03	1.3179859E+06
1.47003	2.0929094E+03	1.3177850E+06
1.48002	2.0924851E+03	1.3175144E+06
1.49013	2.0919562E+03	1.3171856E+06

TABLE 14.3.4-16

DOUBLE-ENDED SPRAY LINE BREAK

MASS AND ENERGY RELEASES

(When using this table, add 15% multiplier to mass & energy results.)

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
1.50005	2.0913287E+03	1.3168027E+06
1.51010	2.0906026E+03	1.3163655E+06
1.52003	2.0897881E+03	1.3158794E+06
1.53000	2.0889400E+03	1.3153753E+06
1.54004	2.0881300E+03	1.3148919E+06
1.55003	2.0874180E+03	1.3144632E+06
1.56002	2.0868363E+03	1.3141071E+06
1.57009	2.0863657E+03	1.3138119E+06
1.58003	2.0859830E+03	1.3135658E+06
1.59008	2.0856058E+03	1.3133222E+06
1.60014	2.0852041E+03	1.3130654E+06
1.61003	2.0847664E+03	1.3127889E+06
1.62002	2.0842650E+03	1.3124767E+06
1.63000	2.0836788E+03	1.3121187E+06
1.64000	2.0829808E+03	1.3116980E+06
1.65005	2.0822069E+03	1.3112361E+06
1.66001	2.0813530E+03	1.3107288E+06
1.67010	2.0805367E+03	1.3102429E+06
1.68013	2.0797667E+03	1.3097828E+06
1.69008	2.0790890E+03	1.3093745E+06
1.70008	2.0784817E+03	1.3090042E+06
1.71005	2.0779442E+03	1.3086733E+06
1.72006	2.0774536E+03	1.3083681E+06
1.73003	2.0769919E+03	1.3080787E+06
1.74005	2.0765358E+03	1.3077923E+06
1.75017	2.0760313E+03	1.3074793E+06
1.76021	2.0754782E+03	1.3071398E+06
1.77003	2.0748364E+03	1.3067506E+06
1.78009	2.0741177E+03	1.3063189E+06
1.79004	2.0733817E+03	1.3058784E+06
1.80001	2.0725989E+03	1.3054116E+06
1.81000	2.0718428E+03	1.3049592E+06
1.82003	2.0711342E+03	1.3045334E+06
1.83004	2.0704825E+03	1.3041393E+06
1.84005	2.0698712E+03	1.3037673E+06
1.85006	2.0693256E+03	1.3034315E+06

TABLE 14.3.4-16

DOUBLE-ENDED SPRAY LINE BREAK

MASS AND ENERGY RELEASES

(When using this table, add 15% multiplier to mass & energy results.)

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
1.86007	2.0688391E+03	1.3031290E+06
1.87004	2.0683537E+03	1.3028266E+06
1.88007	2.0678600E+03	1.3025183E+06
1.89005	2.0673398E+03	1.3021967E+06
1.90017	2.0667719E+03	1.3018481E+06
1.91001	2.0661520E+03	1.3014713E+06
1.92008	2.0654916E+03	1.3010717E+06
1.93007	2.0647986E+03	1.3006537E+06
1.94002	2.0641131E+03	1.3002406E+06
1.95002	2.0634306E+03	1.2998286E+06
1.96004	2.0627835E+03	1.2994362E+06
1.97001	2.0621900E+03	1.2990740E+06
1.98001	2.0616378E+03	1.2987343E+06
1.99001	2.0611133E+03	1.2984091E+06
2.00006	2.0606351E+03	1.2981098E+06
2.01017	2.0601755E+03	1.2978210E+06
2.02002	2.0596908E+03	1.2975184E+06
2.03010	2.0591909E+03	1.2972067E+06
2.04002	2.0586654E+03	1.2968812E+06
2.05018	2.0581050E+03	1.2965364E+06
2.06005	2.0575012E+03	1.2961667E+06
2.07004	2.0568982E+03	1.2957985E+06
2.08009	2.0562820E+03	1.2954219E+06
2.09012	2.0556887E+03	1.2950588E+06
2.10002	2.0551138E+03	1.2947052E+06
2.11010	2.0545765E+03	1.2943725E+06
2.12013	2.0540837E+03	1.2940645E+06
2.13010	2.0536205E+03	1.2937729E+06
2.14019	2.0531798E+03	1.2934939E+06
2.15007	2.0527452E+03	1.2932172E+06
2.16008	2.0523014E+03	1.2929356E+06
2.17003	2.0518411E+03	1.2926450E+06
2.18009	2.0513588E+03	1.2923422E+06
2.19004	2.0508552E+03	1.2920279E+06
2.20009	2.0503249E+03	1.2916980E+06
2.21011	2.0497884E+03	1.2913649E+06

TABLE 14.3.4-16

DOUBLE-ENDED SPRAY LINE BREAK

MASS AND ENERGY RELEASES

(When using this table, add 15% multiplier to mass & energy results.)

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
2.22017	2.0492528E+03	1.2910321E+06
2.23014	2.0487253E+03	1.2907039E+06
2.24005	2.0482384E+03	1.2903987E+06
2.25001	2.0477626E+03	1.2900986E+06
2.26009	2.0473225E+03	1.2898187E+06
2.27004	2.0468923E+03	1.2895433E+06
2.28001	2.0465016E+03	1.2892908E+06
2.29005	2.0460991E+03	1.2890308E+06
2.30001	2.0456898E+03	1.2887674E+06
2.31012	2.0452463E+03	1.2884848E+06
2.32007	2.0448340E+03	1.2882196E+06
2.33014	2.0443954E+03	1.2879401E+06
2.34004	2.0439367E+03	1.2876484E+06
2.35001	2.0434889E+03	1.2873633E+06
2.36011	2.0430542E+03	1.2870850E+06
2.37008	2.0426322E+03	1.2868139E+06
2.38012	2.0422433E+03	1.2865609E+06
2.39005	2.0418693E+03	1.2863161E+06
2.40004	2.0415246E+03	1.2860877E+06
2.41008	2.0412113E+03	1.2858761E+06
2.42005	2.0408975E+03	1.2856645E+06
2.43008	2.0406149E+03	1.2854698E+06
2.44013	2.0403182E+03	1.2852674E+06
2.45001	2.0400192E+03	1.2850640E+06
2.46020	2.0397042E+03	1.2848514E+06
2.47007	2.0393890E+03	1.2846382E+06
2.48001	2.0390787E+03	1.2844277E+06
2.49005	2.0387565E+03	1.2842108E+06
2.50017	2.0384506E+03	1.2840029E+06
2.51008	2.0381551E+03	1.2838008E+06
2.52000	2.0378823E+03	1.2836107E+06
2.53003	2.0376188E+03	1.2834258E+06
2.54003	2.0373717E+03	1.2832502E+06
2.55004	2.0371414E+03	1.2830827E+06
2.56007	2.0369174E+03	1.2829200E+06
2.57007	2.0367206E+03	1.2827722E+06

TABLE 14.3.4-16

DOUBLE-ENDED SPRAY LINE BREAK

MASS AND ENERGY RELEASES

(When using this table, add 15% multiplier to mass & energy results.)

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
2.58005	2.0365020E+03	1.2826116E+06
2.59008	2.0362817E+03	1.2824507E+06
2.60014	2.0360644E+03	1.2822909E+06
2.61006	2.0358300E+03	1.2821214E+06
2.62001	2.0355880E+03	1.2819481E+06
2.63008	2.0353598E+03	1.2817817E+06
2.64006	2.0351206E+03	1.2816095E+06
2.65009	2.0349045E+03	1.2814499E+06
2.66003	2.0346896E+03	1.2812913E+06
2.67013	2.0344844E+03	1.2811382E+06
2.68004	2.0342912E+03	1.2809913E+06
2.69000	2.0341169E+03	1.2808550E+06
2.70009	2.0339484E+03	1.2807220E+06
2.71006	2.0337700E+03	1.2805830E+06
2.72003	2.0335952E+03	1.2804464E+06
2.73003	2.0334197E+03	1.2803093E+06
2.74018	2.0332272E+03	1.2801628E+06
2.75014	2.0330332E+03	1.2800152E+06
2.76007	2.0328279E+03	1.2798616E+06
2.77002	2.0326244E+03	1.2797091E+06
2.78002	2.0324222E+03	1.2795567E+06
2.79008	2.0322290E+03	1.2794097E+06
2.80006	2.0320428E+03	1.2792666E+06
2.81009	2.0318584E+03	1.2791244E+06
2.82006	2.0316917E+03	1.2789921E+06
2.83006	2.0315113E+03	1.2788520E+06
2.84015	2.0313383E+03	1.2787161E+06
2.85005	2.0311662E+03	1.2785814E+06
2.86003	2.0309809E+03	1.2784384E+06
2.87004	2.0307972E+03	1.2782965E+06
2.88006	2.0306091E+03	1.2781518E+06
2.89010	2.0304103E+03	1.2780018E+06
2.90019	2.0302106E+03	1.2778513E+06
2.91001	2.0299968E+03	1.2776931E+06
2.92007	2.0297956E+03	1.2775412E+06
2.93007	2.0295874E+03	1.2773863E+06

TABLE 14.3.4-16

DOUBLE-ENDED SPRAY LINE BREAK

MASS AND ENERGY RELEASES

(When using this table, add 15% multiplier to mass & energy results.)

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
2.94014	2.0293708E+03	1.2772257E+06
2.95003	2.0291890E+03	1.2770853E+06
2.96002	2.0289876E+03	1.2769341E+06
2.97013	2.0287920E+03	1.2767858E+06
2.98010	2.0285960E+03	1.2766370E+06
2.99010	2.0283918E+03	1.2764839E+06
3.00017	2.0281887E+03	1.2763315E+06

FAN ROOM - BACKFLOW CONTRIBUTION

Time (sec)	Mass Flow Rate 10^3 lb/sec	Energy Flow Rate 10^6 BTU/sec
0	7.54	8.99
.1	4.68	5.58
.2	4.48	5.34
.3	4.41	5.26
.4	4.32	5.15
.5	4.27	5.09
.6	4.15	4.95
.7	3.93	4.68
.8	3.59	4.28
.9	3.62	4.32
1.0	3.53	4.21
1.5	3.17	3.78
2.0	3.00	3.58
2.5	2.93	3.49
3.0	2.87	3.42
3.5	2.87	3.42
4.0	2.83	3.37
4.5	2.79	3.33
5.0	2.81	3.35
5.5	2.77	3.30
6.0	2.72	3.24
6.5	2.72	3.24
7.0	2.69	3.21
8.0	2.65	3.16
8.5	2.65	3.16
9.0	2.65	3.16
9.5	2.65	3.16
10.0	2.65	3.16

With 1.4 ft^2 orifice in cross-connect to steam dump header; break in longest line.

FAN ROOM - FORWARD FLOW CONTRIBUTION

Time (sec)	Mass Flow Rate 10^3 lb/sec	Energy Flow Rate 10^6 BTU/sec
0	5.55	6.62
.1	4.15	4.94
.2	3.05	3.64
.4	2.95	3.52
.6	2.90	3.46
.8	2.78	3.31
1.0	2.75	3.28
1.5	2.67	3.19
2.0	3.45	3.38
2.5	9.50	5.26
3.0	9.42	5.21
3.5	9.38	5.19
4.0	9.33	5.16
4.5	9.28	5.13
5.0	9.23	5.10
5.5	9.16	5.07
6.0	9.10	5.04
6.5	9.03	5.01
7.0	8.95	4.97
7.5	8.86	4.93
8.0	8.80	4.91
8.5	8.70	4.86
9.0	8.58	4.81
9.5	8.46	4.76
10.0	8.33	4.70

TABLE 14.3.4-18

DOUBLE-ENDED HOT LEG BREAK

MASS AND ENERGY RELEASES

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
0.00000	0.000000+4	0.000000+6
0.00201	6.296400+4	3.616100+7
0.00401	7.377000+4	4.235700+7
0.00900	6.916800+4	3.973700+7
0.01200	7.047200+4	4.051200+7
0.01602	7.176400+4	4.127400+7
0.01800	7.220100+4	4.153500+7
0.02500	7.467100+4	4.308700+7
0.02600	9.129400+4	5.264000+7
0.03000	9.888800+4	5.705000+7
0.03100	9.359200+4	5.392400+7
0.03300	1.034800+5	5.976200+7
0.04100	9.387700+4	5.419200+7
0.04301	9.958000+4	5.748900+7
0.04500	9.310800+4	5.373800+7
0.04900	1.018200+5	5.884600+7
0.05300	9.121800+4	5.262800+7
0.05401	1.044100+5	6.038900+7
0.05501	9.202900+4	5.320000+7
0.05800	9.912800+4	5.729100+7
0.06000	9.173100+4	5.296500+7
0.06301	9.862900+4	5.702600+7
0.06400	9.010400+4	5.204400+7
0.06500	9.892900+4	5.723900+7
0.06701	9.587100+4	5.549400+7
0.06801	1.003200+5	5.805800+7

TABLE 14.3.4-18

DOUBLE-ENDED HOT LEG BREAK

MASS AND ENERGY RELEASES

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
0.07101	9.013600+4	5.208200+7
0.07200	9.396300+4	5.452900+7
0.07501	8.496600+4	4.913900+7
0.07600	9.286800+4	5.381600+7
0.08000	9.345900+4	5.411400+7
0.08301	9.631400+4	5.578500+7
0.08900	9.182300+4	5.321800+7
0.09401	8.716100+4	5.049300+7
0.10002	8.686700+4	5.036900+7
0.10103	8.751800+4	5.074300+7
0.10702	8.667200+4	5.026600+7
0.11702	8.066200+4	4.679300+7
0.12400	7.836000+4	4.550000+7
0.13004	7.823800+4	4.547300+7
0.19005	6.766600+4	3.960300+7
0.40013	6.328000+4	3.674300+7
0.60020	6.005400+4	3.460400+7
1.00020	5.560800+4	3.192700+7
1.52020	5.046300+4	2.929200+7
2.00020	4.687700+4	2.759500+7
3.00000	4.687700+4	2.759500+7

TABLE 14.3.4-19

SINGLE-ENDED COLD LEG BREAK

MASS AND ENERGY RELEASES

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
.00000	0.000000+4	0.000000+7
.00200	2.4652E+04	1.2752E+07
.00900	3.4491E+04	1.7946E+07
.01400	5.0203E+04	2.6009E+07
.02100	6.0914E+04	3.1606E+07
.03203	7.2136E+04	3.7456E+07
.04304	8.3502E+04	4.3434E+07
.05101	8.5426E+04	4.4414E+07
.06503	8.4836E+04	4.4078E+07
.08305	8.0678E+04	4.1866E+07
.09607	7.5506E+04	3.9152E+07
.11001	7.4227E+04	3.8487E+07
.13403	7.5861E+04	3.9362E+07
.14601	7.6620E+04	3.9755E+07
.16010	7.6233E+04	3.9551E+07
.18303	7.5634E+04	3.9236E+07
.19804	7.4886E+04	3.8846E+07
.21101	7.3690E+04	3.8219E+07
.23006	7.4895E+04	3.8860E+07
.24610	7.5605E+04	3.9233E+07
.25607	7.5224E+04	3.9028E+07
.26309	7.4595E+04	3.8696E+07
.28206	7.3024E+04	3.7873E+07
.30006	7.3101E+04	3.7920E+07
.31610	7.4255E+04	3.8528E+07
.33509	7.4163E+04	3.8475E+07

TABLE 14.3.4-19

SINGLE-ENDED COLD LEG BREAK

MASS AND ENERGY RELEASES

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
.35108	7.4723E+04	3.8773E+07
.37109	7.3988E+04	3.8382E+07
.41506	7.5856E+04	3.9368E+07
.44107	7.5568E+04	3.9214E+07
.46702	7.4918E+04	3.8871E+07
.49303	7.4959E+04	3.8896E+07
.53003	7.4459E+04	3.8635E+07
.64516	7.3810E+04	3.8313E+07
.69503	7.3409E+04	3.8118E+07
.73001	7.3524E+04	3.8194E+07
.77006	7.3550E+04	3.8224E+07
.83001	7.1814E+04	3.7342E+07
.87509	7.2210E+04	3.7577E+07
.92001	7.1425E+04	3.7191E+07
.96002	7.1669E+04	3.7344E+07
1.0400	7.0980E+04	3.7031E+07
1.1701	7.0215E+04	3.6723E+07
1.3202	6.9872E+04	3.6671E+07
1.4001	6.9903E+04	3.6760E+07
1.7002	6.5502E+04	3.4750E+07
2.0000	6.2185E+04	3.3253E+07
2.5001	5.5091E+04	2.9852E+07
3.0002	4.8491E+04	2.6562E+07
5.0000	4.8491E+04	2.6562E+07

TABLE 14.3.4-20

SINGLE-ENDED HOT LEG BREAK

MASS AND ENERGY RELEASES

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
.00000	0.000000+4	0.000000+7
.00100	2.986053E+04	1.811825E+07
.00301	4.343918E+04	2.634650E+07
.00501	4.292521E+04	2.602551E+07
.01001	4.446135E+04	2.695169E+07
.01400	5.141999E+04	3.123442E+07
.01700	4.673055E+04	2.831411E+07
.02200	4.933676E+04	2.992951E+07
.02700	6.370431E+04	3.867952E+07
.03301	7.988087E+04	4.855038E+07
.03901	7.280847E+04	4.417453E+07
.05001	7.321976E+04	4.444181E+07
.06002	6.824339E+04	4.137223E+07
.06503	6.529671E+04	3.957400E+07
.07204	6.781116E+04	4.112542E+07
.08003	6.387430E+04	3.870615E+07
.08701	6.107294E+04	3.699999E+07
.09200	6.153000E+04	3.728505E+07
.10101	5.928957E+04	3.591744E+07
.11003	5.571592E+04	3.374574E+07
.12001	5.454139E+04	3.303515E+07
.13202	5.230680E+04	3.168585E+07
.14102	5.268915E+04	3.193353E+07
.14802	5.253517E+04	3.184939E+07
.16105	5.355463E+04	3.248006E+07
.17003	5.336413E+04	3.235884E+07

TABLE 14.3.4-20

SINGLE-ENDED HOT LEG BREAK

MASS AND ENERGY RELEASES

Time (sec)	Mass (lb/sec)	Energy (BTU/sec)
.18500	5.353877E+04	3.246602E+07
.20003	5.186517E+04	3.149525E+07
.22500	4.640067E+04	2.829631E+07
.25002	4.433356E+04	2.709931E+07
.30003	4.316692E+04	2.649927E+07
.32811	4.406912E+04	2.715201E+07
.35016	4.359122E+04	2.691206E+07
.40004	4.291035E+04	2.645033E+07
.42302	4.323305E+04	2.665236E+07
.45011	4.282392E+04	2.641563E+07
.52004	4.230519E+04	2.601617E+07
.60016	4.197678E+04	2.568951E+07
.70035	4.194488E+04	2.555825E+07
.80004	4.204749E+04	2.547428E+07
.88531	4.220963E+04	2.546782E+07
1.00012	4.190713E+04	2.535124E+07
1.50000	3.994366E+04	2.439612E+07
2.00023	3.835372E+04	2.358048E+07
2.50028	3.711276E+04	2.282196E+07
3.00016	3.583929E+04	2.204359E+07
5.00000	3.583929E+04	2.204359E+07

TABLE 14.3.4-21

STEAM GENERATOR ENCLOSURE – TMD VOLUME INPUT

TMD Node	Volume (ft^3)
46	4106
47	1125
48	634
49	615
50	1021
51	1076
52	669
53	661
54	998
55	3900
56	1030
57	634
58	615
59	807
60	990
61	669
62	661
63	801

TABLE 14.3.4-22

PRESSURIZER ENCLOSURE MODEL – TMD VOLUME INPUT

TMD Node	Description	Volume (ft^3)	TMD Node Unique to this Model	TMD Node Common to Loop Subcompartment Model
1	Loop Compartment	2.2415E+04	No	Yes
2	Loop Compartment	2.2845E+04	No	Yes
3	Loop Compartment	4.1329E+04	No	Yes
4	Loop Compartment	2.7398E+04	No	Yes
5	Loop Compartment	2.2839E+04	No	Yes
6	Loop Compartment	1.9921E+04	No	Yes
7	Ice Condenser	3.5230E+03	No	Yes
8	Ice Condenser	3.5230E+03	No	Yes
9	Ice Condenser	3.4090E+03	No	Yes
10	Ice Condenser	4.1660E+03	No	Yes
11	Ice Condenser	4.1660E+03	No	Yes
12	Ice Condenser	4.0330E+03	No	Yes
13	Ice Condenser	8.3300E+03	No	Yes
14	Ice Condenser	8.3300E+03	No	Yes
15	Ice Condenser	8.0590E+03	No	Yes
16	Ice Condenser	5.7680E+03	No	Yes
17	Ice Condenser	5.7680E+03	No	Yes
18	Ice Condenser	5.5800E+03	No	Yes
19	Ice Condenser	4.4850E+03	No	Yes
20	Ice Condenser	4.4850E+03	No	Yes
21	Ice Condenser	4.3400E+03	No	Yes
22	Ice Condenser	4.4850E+03	No	Yes

TABLE 14.3.4-22

PRESSURIZER ENCLOSURE MODEL – TMD VOLUME INPUT

TMD Node	Description	Volume (ft^3)	TMD Node Unique to this Model	TMD Node Common to Loop Subcompartment Model
23	Ice Condenser	4.4850E+03	No	Yes
24	Ice Condenser	4.3400E+03	No	Yes
25	Upper Containment	7.3432E+05	No	Yes
26	Pipe Trench	1.0435E+04	No	Yes
27	Fan/Accumulator Room	2.6969E+04	No	Yes
28	Pipe Trench	1.0435E+04	No	Yes
29	Instrument Room	1.7479E+04	No	Yes
30	Pipe Trench	1.0435E+04	No	Yes
31	Fan/Accumulator Room	2.6969E+04	No	Yes
32	Pipe Trench	1.0435E+04	No	Yes
33	Upper Reactor Cavity	1.8012E+04	No	Yes
34	Ice Condenser	5.3850E+03	No	Yes
35	Ice Condenser	6.3650E+03	No	Yes
36	Ice Condenser	1.2729E+04	No	Yes
37	Ice Condenser	8.8130E+03	No	Yes
38	Ice Condenser	6.8540E+03	No	Yes
39	Ice Condenser	6.8540E+03	No	Yes
40	Ice Condenser	2.8910E+03	No	Yes
41	Ice Condenser	3.4180E+03	No	Yes
42	Ice Condenser	6.8350E+03	No	Yes
43	Ice Condenser	4.7320E+03	No	Yes
44	Ice Condenser	3.6810E+03	No	Yes
45	Ice Condenser	3.6810E+03	No	Yes

TABLE 14.3.4-22

PRESSURIZER ENCLOSURE MODEL – TMD VOLUME INPUT

TMD Node	Description	Volume (ft^3)	TMD Node Unique to this Model	TMD Node Common to Loop Subcompartment Model
46	Pressurizer Enclosure	1.5517E+03	Yes	No
47	Pressurizer Enclosure	3.0260E+02	Yes	No
48	Pressurizer Enclosure	4.3106E+02	Yes	No
49	Pressurizer Enclosure	3.5367E+02	Yes	No

TABLE 14.3.4-23

FAN ACCUMULATOR ROOM MODEL – TMD VOLUME INPUT

TMD Node	Volume (ft^3)
27	3800
54	4000
55	7800
56	4300
57	4400

TABLE 14.3.4-24

LOOP SUBCOMPARTMENT MODEL – TMD VOLUME INPUT

TMD Node	Description	Volume (ft^3)	TMD Node Unique to this Model	TMD Node Common to Pressurizer Enclosure & Steam Generator Enclosure Models
1	Loop Compartment	2.2415E+04	No	Yes
2	Loop Compartment	2.2845E+04	No	Yes
3	Loop Compartment	4.1329E+04	No	Yes
4	Loop Compartment	2.7398E+04	No	Yes
5	Loop Compartment	2.2839E+04	No	Yes
6	Loop Compartment	1.9921E+04	No	Yes
7	Ice Condenser	3.5230E+03	No	Yes
8	Ice Condenser	3.5230E+03	No	Yes
9	Ice Condenser	3.4090E+03	No	Yes
10	Ice Condenser	4.1660E+03	No	Yes
11	Ice Condenser	4.1660E+03	No	Yes
12	Ice Condenser	4.0330E+03	No	Yes
13	Ice Condenser	8.3300E+03	No	Yes
14	Ice Condenser	8.3300E+03	No	Yes
15	Ice Condenser	8.0590E+03	No	Yes
16	Ice Condenser	5.7680E+03	No	Yes
17	Ice Condenser	5.7680E+03	No	Yes
18	Ice Condenser	5.5800E+03	No	Yes
19	Ice Condenser	4.4850E+03	No	Yes
20	Ice Condenser	4.4850E+03	No	Yes

TABLE 14.3.4-24

LOOP SUBCOMPARTMENT MODEL – TMD VOLUME INPUT

TMD Node	Description	Volume (ft^3)	TMD Node Unique to this Model	TMD Node Common to Pressurizer Enclosure & Steam Generator Enclosure Models
21	Ice Condenser	4.3400E+03	No	Yes
22	Ice Condenser	4.4850E+03	No	Yes
23	Ice Condenser	4.4850E+03	No	Yes
24	Ice Condenser	4.3400E+03	No	Yes
25	Upper Containment	7.3432E+05	No	Yes
26	Pipe Trench	1.0435E+04	No	Yes
27	Fan/Accumulator Room	2.6969E+04	No	Yes
28	Pipe Trench	1.0435E+04	No	Yes
29	Instrument Room	1.7479E+04	No	Yes
30	Pipe Trench	1.0435E+04	No	Yes
31	Fan/Accumulator Room	2.6969E+04	No	Yes
32	Pipe Trench	1.0435E+04	No	Yes
33	Upper Reactor Cavity	1.8012E+04	No	Yes
34	Ice Condenser	5.3850E+03	No	Yes
35	Ice Condenser	6.3650E+03	No	Yes
36	Ice Condenser	1.2729E+04	No	Yes
37	Ice Condenser	8.8130E+03	No	Yes
38	Ice Condenser	6.8540E+03	No	Yes
39	Ice Condenser	6.8540E+03	No	Yes
40	Ice Condenser	2.8910E+03	No	Yes

TABLE 14.3.4-24

LOOP SUBCOMPARTMENT MODEL – TMD VOLUME INPUT

TMD Node	Description	Volume (ft^3)	TMD Node Unique to this Model	TMD Node Common to Pressurizer Enclosure & Steam Generator Enclosure Models
41	Ice Condenser	3.4180E+03	No	Yes
42	Ice Condenser	6.8350E+03	No	Yes
43	Ice Condenser	4.7320E+03	No	Yes
44	Ice Condenser	3.6810E+03	No	Yes
45	Ice Condenser	3.6810E+03	No	Yes
46	Steam Generator Enclosure	3.4040E+03	Yes	No
47	Steam Generator Enclosure	3.1210E+03	Yes	No
48	Steam Generator Enclosure	3.1210E+03	Yes	No
49	Steam Generator Enclosure	3.4040E+03	Yes	No
50	Steam Generator Enclosure	7.5010E+03	Yes	No
51	Steam Generator Enclosure	6.9860E+03	Yes	No
52	Steam Generator Enclosure	6.9860E+03	Yes	No
53	Steam Generator Enclosure	7.5010E+03	Yes	No

TABLE 14.3.4-25

REACTOR CAVITY – TMD VOLUME INPUT MODEL

TMD Node		**Volume (ft^3)**
1	Break Location (CPS 189) – Inspection Volume	131.4
2	Lower Reactor Cavity – Below RPV	3724.9
3	Reactor Vessel Annular Region	7.2
4	Reactor Vessel Annular Region	0.6
5	Reactor Vessel Annular Region	3.5
6	Reactor Vessel Annular Region	4.1
7	Reactor Vessel Annular Region	0.6
8	Reactor Vessel Annular Region	44.8
9	Reactor Vessel Annular Region	0.6
10	Reactor Vessel Annular Region	3.4
11	Reactor Vessel Annular Region	4.0
12	Reactor Vessel Annular Region	0.5
13	Reactor Vessel Annular Region	43.8
14	Reactor Vessel Annular Region	0.6
15	Reactor Vessel Annular Region	3.4
16	Reactor Vessel Annular Region	5.6
17	Reactor Vessel Annular Region	2.7
18	Reactor Vessel Annular Region	43.8
19	Reactor Vessel Annular Region	7.7

TABLE 14.3.4-25

REACTOR CAVITY – TMD VOLUME INPUT MODEL

TMD Node		Volume (ft^3)
20	Reactor Vessel Annular Region	11.0
21	Reactor Vessel Annular Region	91.0
22	Reactor Vessel Annular Region	18.9
23	Reactor Vessel Annular Region	92.8
24	Reactor Vessel Annular Region	19.0
25	Reactor Vessel Annular Region	94.6
26	Reactor Vessel Annular Region	18.9
27	Reactor Vessel Annular Region	92.8
28	Reactor Vessel Annular Region	18.7
29	Reactor Vessel Annular Region	91.0
30	Reactor Vessel Annular Region	7.9
31	Reactor Vessel Annular Region	11.0
32	Reactor Vessel Annular Region	92.8
33	Reactor Vessel Annular Region	0.6
34	Reactor Vessel Annular Region	3.5
35	Reactor Vessel Annular Region	5.5
36	Reactor Vessel Annular Region	2.5
37	Reactor Vessel Annular Region	44.8
38	Upper Reactor Cavity	15720.9
39	Inspection Volume (CPS 188)	135.0

TABLE 14.3.4-25

REACTOR CAVITY – TMD VOLUME INPUT MODEL

TMD Node		**Volume (ft^3)**
40	Inspection Volume (CPS 187)	132.1
41	Inspection Volume Port &Pipe Sleeve (CPS 186)	217.5
42	Inspection Volume Port &Pipe Sleeve (CPS 185)	214.0
43	Inspection Volume Port &Pipe Sleeve (CPS 184)	214.0
44	Inspection Volume (CPS 183)	132.1
45	Inspection Volume (CPS 182)	133.2
46	Broken Loop Pipe Sleeve (CPS 189)	75.2
47	Unbroken Loop Pipe Sleeve (CPS 188)	26.7
48	Unbroken Loop Pipe Sleeve (CPS 187)	26.7
49	Unbroken Loop Pipe Sleeve (CPS 183)	26.7
50	Unbroken Loop Pipe Sleeve (CPS 182)	61.1
51	Loop Compartment	147644.0
52	Loop Compartment	147644.0
53	Broken Loop Inspection Port (CPS 189)	46.900
54	Unbroken Loop Inspection Port (CPS 188)	52.2
55	Unbroken Loop Inspection Port (CPS 187)	52.2
56	Unbroken Loop Inspection Port (CPS 183)	52.2

TABLE 14.3.4-25

REACTOR CAVITY – TMD VOLUME INPUT MODEL

TMD Node		Volume (ft^3)
57	Unbroken Loop Inspection Port (CPS 182)	46.9
58	Instrument Tunnel	1825.9
59	Upper Containment	3934200.0 [1]
60	Lower RX Cavity Keyway	6547.1
61	Reactor Vessel Annular Region	0.5
62	Reactor Vessel Annular Region	0.5

[1] The upper compartment was modeled as an infinite sump.

TABLE 14.3.4-26

STEAM GENERATOR ENCLOSURE MODEL - TMD FLOW PATH INPUT

STEAM LINE BREAK

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
46H-47	0.94	0.022	9.451	4.794	55.9	4.514	0.573
46R-48	0.673	0.022	6.590	3.538	25.4	1.948	0.290
46A-55	0.902	0.022	8.958	4.771	48.9	2.876	0.308
47H-51	0.938	0.022	9.891	4.297	50.1	5.102	0.691
47R-48	0.385	0.022	10.599	4.984	40.7	8.747	0.295
47A-56	0.765	0.022	7.776	4.976	25.5	3.065	0.352
48H-52	0.723	0.022	8.652	3.524	25.3	3.779	0.609
48R-49	0.296	0.022	13.767	5.057	41.3	12.841	0.947
48A-57	0.765	0.022	3.524	4.976	25.5	2.61	0.614
49H-53	0.757	0.022	9.229	3.744	26.712	4.375	0.662
49R-50	0.012	0.022	11.303	5.609	45.808	10.437	0.326
49A-46	0.662	0.022	7.522	3.967	28.302	2.93	0.326
50H-54	0.795	0.022	9.366	5.318	44.852	4.648	0.628
50R-47	0.677	0.022	7.590	5.079	41.48	5.008	0.295
50A-46	0.982	0.022	8.957	6.599	55.652	4.241	0.471
51H-2	1.339	0.022	8.248	4.107	46.4	3.522	0.564
51R-52	0.866	0.022	10.780	6.412	48.18	8.594	0.427

TABLE 14.3.4-26

STEAM GENERATOR ENCLOSURE MODEL - TMD FLOW PATH INPUT

STEAM LINE BREAK

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
52H-2	0.722	0.022	10.937	7.201	49.1	8.128	0.962
52R-53	0.244	0.022	13.263	6.553	49.24	12.392	0.949
53H-1	2.100	0.022	9.453	6.272	48.212	7.392	0.963
53R-54	0.090	0.022	10.939	6.736	50.614	9.147	0.415
54H-1	0.988	0.022	6.483	3.730	39.852	3.164	0.526
54R-51	0.442	0.022	8.412	6.539	49.135	5.253	0.402
55H-56	0.703	0.022	7.977	3.765	43.90	2.775	0.470
55R-57	0.673	0.022	6.590	3.538	25.4	1.961	0.290
55A-58	0.649	0.022	7.456	3.91	27.9	2.863	0.322
56H-60	0.518	0.022	7.572	2.856	33.3	2.898	0.501
56R-57	0.373	0.022	10.568	4.972	40.6	8.713	0.291
57H-61	0.723	0.022	8.617	3.506	25.17	3.750	0.608
57R-58	0.296	0.022	13.767	5.057	41.3	12.841	0.947
58H-62	0.626	0.022	8.410	3.322	23.7	3.652	0.591
58R-59	0.015	0.022	11.778	5.609	45.644	10.611	0.429
59H-63	0.744	0.022	9.215	4.730	36.217	4.548	0.632
59R-56	0.703	0.022	7.253	3.88	31.69	4.938	0.227
59A-55	0.943	0.022	7.807	5.236	40.097	3.002	0.380

TABLE 14.3.4-26

STEAM GENERATOR ENCLOSURE MODEL - TMD FLOW PATH INPUT

STEAM LINE BREAK

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
60H-2	1.111	0.022	7.718	3.567	40.3	3.304	0.529
60R-61	0.599	0.022	10.819	6.468	48.6	8.937	0.402
61H-2	0.857	0.022	9.837	6.292	42.9	6.169	0.839
61R-62	0.287	0.022	13.247	6.373	47.89	12.349	0.947
62H-3	2.121	0.022	9.457	6.245	48.00	8.091	1.0
62R-63	0.230	0.022	11.335	7.026	52.793	10.153	0.432
63H-3	0.820	0.022	5.494	2.564	26.517	2.727	0.412
63R-60	0.684	0.022	7.090	4.434	33.317	4.767	0.273

TABLE 14.3.4-27

STEAM GENERATOR ENCLOSURE MODEL - TMD FLOW PATH INPUT

FEEDWATER LINE BREAK

(CHANGES TO TABLE 14.3.4-26 TO CONVERT TO A FEED LINE BREAK.)

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
46H-47							0.771
46R-48							0.612
47H-51							0.609
48H-52							0.496
49H-53							0.533
49A-46							0.701
50H-54							0.591
50A-46							0.780
55H-56							0.660
55R-57							0.613
55A-58							0.696
56H-60							0.437
57H-61							0.492
58H-62							0.476
59H-63							0.563
59A-55							0.700

TABLE 14.3.4-28

PRESSURIZER ENCLOSURE MODEL – TMD FLOW PATH INPUT

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
1-2	0.63	0.	18.6	1.0	635.0	0.	0.601
1-33	1.5	0.	4.23	1.0	11.9	0.	0.016
1-27	2.85	0.	3.6	1.0	21.4	0.	0.129
2-3	0.72	0.	25.0	1.0	600.0	0.	0.601
2-27	2.85	0.	5.5	1.0	85.3	0.	0.252
3-4	0.28	0.	33.5	1.0	570.	0.	0.648
3-33	1.5	0.	4.33	1.0	32.4	0.	0.021
3-27	2.85	0.	3.6	1.0	21.3	0.	0.128
4-5	0.56	0.	19.1	1.0	600.0	0.	0.601
4-33	1.5	0.	4.42	1.0	24.5	0.	0.022
4-31	2.85	0.	3.6	1.0	21.3	0.	0.128
5-6	0.63	0.	18.6	1.0	635.0	0.	0.601
5-31	2.85	0.	5.5	1.0	85.3	0.	0.129
6-1	1.45	0.	29.2	1.0	58.5	0.	0.055
6-33	1.5	0.	4.23	1.0	11.9	0.	0.014
6-31	2.85	0.	3.6	1.0	21.4	0.	0.129
7-8	0.	0.0276	12.278	0.855	112.8	16.0	0.727
8-9	0.	0.0276	12.278	0.855	112.8	16.0	0.727
9-34	0.812	0.0276	8.8558	0.855	112.8	8.0	0.727

TABLE 14.3.4-28

PRESSURIZER ENCLOSURE MODEL – TMD FLOW PATH INPUT

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
10-11	0.	0.0276	12.278	0.855	131.31	16.0	0.727
11-12	0.	0.0276	12.278	0.855	131.31	16.0	0.727
12-35	0.812	0.0276	8.8558	0.855	131.31	8.0	0.727
13-14	0.	0.0276	12.278	0.855	266.63	16.0	0.727
14-15	0.	0.0276	12.278	0.855	266.63	16.0	0.727
15-36	0.812	0.0276	8.8558	0.855	266.63	8.0	0.727
16-17	0.	0.0276	12.278	0.855	184.59	16.0	0.727
17-18	0.	0.0276	12.278	0.855	184.59	16.0	0.727
18-37	0.812	0.0276	8.8558	0.855	184.59	8.0	0.727
19-20	0.	0.0276	12.278	0.855	143.57	16.0	0.727
20-21	0.	0.0276	12.278	0.855	143.57	16.0	0.727
21-38	0.812	0.0276	8.8558	0.855	143.57	8.0	0.727
22-23	0.	0.0276	12.278	0.855	143.57	16.0	0.727
23-24	0.	0.0276	12.278	0.855	143.57	16.0	0.727
24-39	0.812	0.0276	8.8558	0.855	143.57	8.0	0.727
25-6	1.45	0.	6.08	1.0	2.2	0.	.01
26-32	0.99	0.	64.5	1.0	17.0	0.	0.85
26-28	0.69	0.	45.8	1.0	25.0	0.	0.357
27-26	2.85	0.	8.0	1.0	55.0	0.	0.417

TABLE 14.3.4-28

PRESSURIZER ENCLOSURE MODEL – TMD FLOW PATH INPUT

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
27-29	2.85	0.	2.7	1.0	2.5	0.	0.008
28-3	2.6	0.	13.2	1.0	35.7	0.	0.077
28-27	2.85	0.	8.0	1.0	43.0	0.	0.254
29-28	2.85	0.	2.0	1.0	0.25	0.	0.001
29-3	2.85	0.	3.0	1.0	0.25	0.	0.002
30-28	0.99	0.	46.6	1.0	20.0	0.	1.0
30-4	2.6	0.	13.2	1.0	35.7	0.	0.106
31-30	2.85	0.	8.0	1.0	43.0	0.	0.254
31-29	2.85	0.	2.7	1.0	2.5	0.	0.007
32-30	0.69	0.	40.0	1.0	25.0	0.	0.417
32-31	2.85	0.	8.0	1.0	55.0	0.	0.331
33-2	1.5	0.	4.69	1.0	23.8	0.	0.034
33-5	1.5	0.	4.65	1.0	23.8	0.	0.034
34-25	1.45	0.	2.8	1.0	233.8	0.	0.659
35-25	1.43	0.	2.8	1.0	267.6	0.	0.65
36-25	1.43	0.	2.8	1.0	539.5	0.	0.625
37-25	1.41	0.	3.2	1.0	376.5	0.	0.636
38-25	1.44	0.	2.8	1.0	289.4	0.	0.646
39-25	1.43	0.	2.8	1.0	296.3	0.	0.646

TABLE 14.3.4-28

PRESSURIZER ENCLOSURE MODEL – TMD FLOW PATH INPUT

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
40-1	0.89	0.	10.36	1.0	121.9	1.0	0.225
40-7	0.227	0.01517	8.222	0.855	106.7	8.0	0.33
40-41	7.5	0.	13.8	1.0	24.7	0.	0.075
41-2	0.89	0.	10.36	1.0	144.0	1.0	0.225
41-10	0.227	0.01517	8.222	0.855	126.1	8.0	0.33
41-42	12.5	0.	22.4	1.0	24.7	0.	0.046
42-3	0.89	0.	10.36	1.0	288.0	1.0	0.225
42-13	0.227	0.01517	8.222	0.855	252.2	8.0	0.33
42-43	12.5	0.	25.3	1.0	24.7	0.	0.041
43-4	0.89	0.	10.36	1.0	199.4	1.0	0.225
43-16	0.227	0.01517	8.222	0.855	174.6	8.0	0.33
43-44	10.0	0.	18.4	1.0	24.7	0.	0.056
44-5	0.89	0.	10.36	1.0	155.1	1.0	0.225
44-19	0.227	0.01517	8.222	0.855	135.8	8.0	0.33
44-45	10.0	0.	16.1	1.0	24.7	0.	0.064
45-6	0.89	0.	10.36	1.0	155.1	1.0	0.225
45-22	0.227	0.01517	8.222	0.855	135.87	8.0	0.33
46-47	1.264	0.025	15.54	2.50	17.93	13.86	0.41
46-48	0.856	0.025	17.86	5.19	27.24	15.80	0.65

TABLE 14.3.4-28

PRESSURIZER ENCLOSURE MODEL – TMD FLOW PATH INPUT

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
46-49	0.788	0.025	17.43	3.66	25.14	15.40	0.60
47-4	1.91	0.025	11.69	2.50	17.93	11.69	1.00
48-4	1.665	0.025	8.87	3.84	18.93	9.22	0.73
48-49	1.268	0.025	7.883	4.50	52.61	7.883	0.47
48-47	0.888	0.025	10.302	2.50	29.23	10.302	0.26
49-4	1.291	0.025	8.80	2.66	17.60	9.05	0.72
49-47	1.064	0.025	11.793	2.50	29.23	14.99	0.26

TABLE 14.3.4-29

FAN / ACCUMULATOR ROOM MODEL – TMD FLOW PATH INPUT

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_E (ft)	A_T /A
27R-29	1.61	0.	1.66	1.0	1.0	0.	0.003
27H-28	2.17	0.	0.36	1.0	13.2	0.	0.094
27-3A	2.02	0.	0.085	1.0	0.68	0.	0.002
54H-27	0.25	0.	11.77	1.0	108	0.	0.320
54R-28	1.75	0.	4.22	1.0	21.2	0.	0.068
54A-3	2.12	0.	7.89	1.0	17.3	0.	0.075
55H-54	0.21	0.	15.84	1.0	170	0.	0.578
55A-28	2.10	0.	2.0	1.0	34.3	0.	0.110
55R-26	2.09	0.	29.91	1.0	34.7	0.	0.111
55-2R	1.86	0.	14.07	1.0	90.9	0.	0.382
55-56H	0.21	0.	16.24	1.0	170	0.	0.578
56R-26	1.89	0.	4.30	1.0	24.7	0.	0.076
56A-1	1.72	0.	5.99	1.0	14.5	0.	0.060
56-57H	0.25	0.	14.26	1.0	108	0.	0.635
57R-26	2.06	0.	0.32	1.0	17.2	0.	0.105
57A-1	2.36	0.	1.27	1.0	29.6	0.	0.068

Table 14.3.4-30
Loop Subcompartment Model – TMD Flow Path Input

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
1-2	0.63	0.	18.6	1.0	635.0	0.	0.601
1-33	1.5	0.	4.23	1.0	11.9	0.	0.016
1-27	2.85	0.	3.6	1.0	21.4	0.	0.129
2-3	0.72	0.	25.0	1.0	600.0	0.	0.601
2-27	2.85	0.	5.5	1.0	85.3	0.	0.252
3-4	0.28	0.	33.5	1.0	570.	0.	0.648
3-33	1.5	0.	4.33	1.0	32.4	0.	0.021
3-27	2.85	0.	3.6	1.0	21.3	0.	0.128
4-5	0.56	0.	19.1	1.0	600.0	0.	0.601
4-33	1.5	0.	4.42	1.0	24.5	0.	0.022
4-31	2.85	0.	3.6	1.0	21.3	0.	0.128
5-6	0.63	0.	18.6	1.0	635.0	0.	0.601
5-31	2.85	0.	5.5	1.0	85.3	0.	0.129
6-1	1.45	0.	29.2	1.0	58.5	0.	0.055
6-33	1.5	0.	4.23	1.0	11.9	0.	0.014

Table 14.3.4-30
Loop Subcompartment Model – TMD Flow Path Input

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
6-31	2.85	0.	3.6	1.0	21.4	0.	0.129
7-8	0.	0.0276	12.278	0.855	112.8	16.0	0.727
8-9	0.	0.0276	12.278	0.855	112.8	16.0	0.727
9-34	0.812	0.0276	8.8558	0.855	112.8	8.0	0.727
10-11	0.	0.0276	12.278	0.855	131.31	16.0	0.727
11-12	0.	0.0276	12.278	0.855	131.31	16.0	0.727
12-35	0.812	0.0276	8.8558	0.855	131.31	8.0	0.727
13-14	0.	0.0276	12.278	0.855	266.63	16.0	0.727
14-15	0.	0.0276	12.278	0.855	266.63	16.0	0.727
15-36	0.812	0.0276	8.8558	0.855	266.63	8.0	0.727
16-17	0.	0.0276	12.278	0.855	184.59	16.0	0.727
17-18	0.	0.0276	12.278	0.855	184.59	16.0	0.727
18-37	0.812	0.0276	8.8558	0.855	184.59	8.0	0.727
19-20	0.	0.0276	12.278	0.855	143.57	16.0	0.727
20-21	0.	0.0276	12.278	0.855	143.57	16.0	0.727

Table 14.3.4-30
Loop Subcompartment Model – TMD Flow Path Input

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
21-38	0.812	0.0276	8.8558	0.855	143.57	8.0	0.727
22-23	0.	0.0276	12.278	0.855	143.57	16.0	0.727
23-24	0.	0.0276	12.278	0.855	143.57	16.0	0.727
24-39	0.812	0.0276	8.8558	0.855	143.57	8.0	0.727
25-6	1.45	0.	6.08	1.0	2.2	0.	.01
26-32	0.99	0.	64.5	1.0	17.0	0.	0.85
26-28	0.69	0.	45.8	1.0	25.0	0.	0.357
27-26	2.85	0.	8.0	1.0	55.0	0.	0.417
27-29	2.85	0.	2.7	1.0	2.5	0.	0.008
28-3	2.6	0.	13.2	1.0	35.7	0.	0.077
28-27	2.85	0.	8.0	1.0	43.0	0.	0.254
29-28	2.85	0.	2.0	1.0	0.25	0.	0.001
29-3	2.85	0.	3.0	1.0	0.25	0.	0.002
30-28	0.99	0.	46.6	1.0	20.0	0.	1.0
30-4	2.6	0.	13.2	1.0	35.7	0.	0.106

Table 14.3.4-30
Loop Subcompartment Model – TMD Flow Path Input

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
31-30	2.85	0.	8.0	1.0	43.0	0.	0.254
31-29	2.85	0.	2.7	1.0	2.5	0.	0.007
32-30	0.69	0.	40.0	1.0	25.0	0.	0.417
32-31	2.85	0.	8.0	1.0	55.0	0.	0.331
33-2	1.5	0.	4.69	1.0	23.8	0.	0.034
33-5	1.5	0.	4.65	1.0	23.8	0.	0.034
34-25	1.45	0.	2.8	1.0	233.8	0.	0.659
35-25	1.43	0.	2.8	1.0	267.6	0.	0.65
36-25	1.43	0.	2.8	1.0	539.5	0.	0.625
37-25	1.41	0.	3.2	1.0	376.5	0.	0.636
38-25	1.44	0.	2.8	1.0	289.4	0.	0.646
39-25	1.43	0.	2.8	1.0	296.3	0.	0.646
40-1	0.89	0.	10.36	1.0	121.9	1.0	0.225
40-7	0.227	0.01517	8.222	0.855	106.7	8.0	0.33
40-41	7.5	0.	13.8	1.0	24.7	0.	0.075

Table 14.3.4-30
Loop Subcompartment Model – TMD Flow Path Input

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
41-2	0.89	0.	10.36	1.0	144.0	1.0	0.225
41-10	0.227	0.01517	8.222	0.855	126.1	8.0	0.33
41-42	12.5	0.	22.4	1.0	24.7	0.	0.046
42-3	0.89	0.	10.36	1.0	288.0	1.0	0.225
42-13	0.227	0.01517	8.222	0.855	252.2	8.0	0.33
42-43	12.5	0.	25.3	1.0	24.7	0.	0.041
43-4	0.89	0.	10.36	1.0	199.4	1.0	0.225
43-16	0.227	0.01517	8.222	0.855	174.6	8.0	0.33
43-44	10.0	0.	18.4	1.0	24.7	0.	0.056
44-5	0.89	0.	10.36	1.0	155.1	1.0	0.225
44-19	0.227	0.01517	8.222	0.855	135.8	8.0	0.33
44-45	10.0	0.	16.1	1.0	24.7	0.	0.064
45-6	0.89	0.	10.36	1.0	155.1	1.0	0.225
45-22	0.227	0.01517	8.222	0.855	135.87	8.0	0.33
46-1	2.09	0.	10.0	1.0	123.31	1.0	0.001

Table 14.3.4-30
Loop Subcompartment Model – TMD Flow Path Input

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
46-2	2.21	0.	11.5	1.0	104.12	1.0	0.001
47-2	2.21	0.	11.5	1.0	104.12	1.0	0.001
47-3	2.09	0.	10.0	1.0	123.31	1.0	0.001
48-5	2.21	0.	11.5	1.0	104.12	1.0	0.001
48-4	2.09	0.	10.0	1.0	123.31	1.0	0.001
49-6	2.09	0.	10.0	1.0	123.31	1.0	0.001
49-5	2.21	0.	11.5	1.0	104.12	1.0	0.001
50-46	2.93	0.	17.6	1.0	121.43	1.0	0.001
50-51	0.874	0.	8.43	1.0	44.89	1.0	0.282
51-47	2.93	0.	17.6	1.0	121.43	1.0	0.001
52-48	2.93	0.	17.6	1.0	121.43	1.0	0.001
53-49	2.93	0.	17.6	1.0	121.43	1.0	0.001
53-52	0.874	0.	8.43	1.0	44.89	1.0	0.282

Table 14.3.4-31
Reactor Cavity Model – TMD Flow Path Input

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
1H-3	1.312	0.021	1.895	1.338	12.570	1.130	0.463
1R-53	0.386	0.021	2.200	1.420	9.290	1.290	0.293
1A-46	0.419	0.021	7.080	1.125	5.780	6.690	0.211
2H-60	0.230	0.021	20.202	13.953	199.980	17.524	0.645
2R-32	0.969	0.021	14.211	1.082	3.488	14.071	1.000
2A-8	0.984	0.021	12.638	1.082	1.783	12.567	1.000
3H-6	0.412	0.021	2.008	0.759	1.081	0.590	0.721
3R-7	0.287	0.021	1.752	0.902	1.357	1.032	0.522
3A-11	0.403	0.021	2.026	0.759	1.081	0.617	0.738
4H-9	0.000	0.021	3.627	0.459	0.043	3.627	1.000
4R-38	0.996	0.021	0.122	0.467	0.842	0.094	1.000
4A-5	0.363	0.021	0.431	0.467	0.842	0.134	0.349
5H-10	0.000	0.021	3.539	1.349	1.305	3.539	1.000
5R-34	0.000	0.021	3.578	1.349	1.305	3.578	1.000
5A-6	0.144	0.021	1.727	0.904	1.498	1.376	1.000
6H-11	0.000	0.021	3.285	0.902	1.016	3.285	1.000
6R-35	0.499	0.021	2.661	0.902	1.016	2.361	1.000
6A-61	0.755	0.021	1.033	0.805	0.197	0.088	1.000
7H-61	0.000	0.021	2.879	0.819	0.2000	2.879	1.000
7R-36	0.411	0.021	0.942	0.681	0.314	0.702	0.231
7A-8	0.788	0.021	2.915	0.426	0.200	1.577	1.000
8H-3	0.489	0.021	8.814	0.759	1.081	3.803	0.606
8R-13	0.000	0.021	3.268	1.079	13.563	3.268	1.000
8A-37	0.000	0.021	3.304	1.079	13.563	3.304	1.000
9H-14	0.000	0.021	3.587	0.459	0.043	3.587	1.000
9R-38	0.996	0.021	0.122	0.467	0.823	0.094	1.000
9A-10	0.366	0.021	0.423	0.467	0.823	0.132	0.341
10H-15	0.000	0.021	3.500	1.349	1.305	3.500	1.000

Table 14.3.4-31
Reactor Cavity Model – TMD Flow Path Input

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
10R-11	0.144	0.021	1.727	0.904	1.466	1.376	1.000
11H-16	0.444	0.021	2.513	0.902	1.016	2.169	1.000
11R-62	0.789	0.021	1.056	0.671	0.164	0.049	1.000
12H-17	0.382	0.021	0.897	0.722	0.408	0.580	0.300
12R-3	0.287	0.021	1.752	0.902	1.357	1.032	0.522
12A-13	0.817	0.021	2.711	0.353	0.168	1.548	1.000
13H-18	0.000	0.021	3.232	1.079	13.563	3.232	1.000
13R-2	0.985	0.021	12.637	1.082	1.744	12.567	1.000
13A-3	0.479	0.021	8.983	0.759	1.081	3.984	0.620
14H-19	0.937	0.021	1.902	0.459	0.043	1.795	1.000
14R-38	0.996	0.021	0.122	0.467	0.823	0.094	1.000
14A-15	0.366	0.021	0.423	0.467	0.823	0.132	0.341
15H-19	0.001	0.021	5.057	1.349	1.305	5.150	1.000
15R-16	0.144	0.021	3.102	0.904	1.466	2.751	1.000
16H-39	0.971	0.021	0.506	1.901	4.232	0.070	0.320
16R-20	0.177	0.021	4.552	0.837	1.307	4.393	0.579
16A-17	0.361	0.021	3.748	0.647	0.515	3.648	0.351
17H-21	0.943	0.021	1.715	0.722	0.408	1.626	1.000
17R-39	0.698	0.021	0.591	2.150	4.943	0.109	0.785
17A-18	0.424	0.021	4.625	0.647	0.515	1.455	1.000
18H-21	0.097	0.021	4.634	1.079	13.563	4.530	0.909
18R-2	0.985	0.021	12.637	1.082	1.744	12.567	1.000
19H-22	0.262	0.021	4.919	1.271	1.348	4.304	1.000
19R-38	1.356	0.021	0.547	0.467	1.610	0.224	1.000
19A-20	0.144	0.021	3.160	0.904	2.866	2.775	1.000
20H-22	0.667	0.021	4.177	0.655	1.307	2.793	0.363
20R-40	0.934	0.021	0.557	1.901	4.232	0.116	0.166
20A-21	0.852	0.021	7.973	0.433	1.018	4.682	0.299

Table 14.3.4-31
Reactor Cavity Model – TMD Flow Path Input

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
21H-23	0.067	0.021	6.285	1.064	13.971	6.160	0.936
21R-40	1.042	0.021	0.484	1.599	3.677	0.073	0.021
21A-2	0.970	0.021	14.208	1.082	3.411	14.071	1.000
22H-24	0.281	0.021	6.008	1.017	2.562	5.613	0.711
22R-23	0.879	0.021	8.429	0.428	0.992	5.084	0.284
22A-38	1.401	0.021	1.727	0.467	1.647	0.503	1.000
23H-25	0.073	0.021	6.435	1.045	13.877	6.314	0.930
23R-41	1.033	0.021	0.969	1.810	4.330	0.151	0.025
23A-2	0.969	0.021	14.211	1.082	3.488	14.071	1.000
24H-26	0.281	0.021	6.008	1.017	2.562	5.613	0.711
24R-38	1.401	0.021	1.728	0.467	1.683	0.503	1.000
24A-25	0.905	0.021	8.247	0.404	0.966	5.018	0.271
25H-27	0.073	0.021	6.435	1.045	13.877	6.314	0.930
25R-42	1.044	0.021	0.850	1.392	3.330	0.112	0.019
25A-2	0.969	0.021	14.214	1.082	3.566	14.071	1.000
26H-28	0.253	0.021	5.843	1.012	2.656	5.413	0.737
26R-38	1.401	0.021	1.727	0.467	1.647	0.503	1.000
26A-27	0.879	0.021	8.429	0.428	0.992	5.084	0.284
27H-29	0.067	0.021	6.285	1.064	13.971	6.160	0.936
27R-43	1.030	0.021	1.115	2.150	4.943	0.175	0.028
27A-2	0.969	0.021	14.211	1.082	3.488	14.071	1.000
28H-30	0.260	0.021	4.969	1.271	1.348	4.369	1.000
28R-38	1.401	0.021	1.726	0.467	1.610	0.503	1.000
28A-29	0.852	0.021	8.350	0.433	1.018	4.746	0.299
29H-32	0.067	0.021	6.421	1.044	13.971	6.284	0.936
29R-43	1.029	0.021	1.115	2.150	4.943	0.175	0.029
29A-2	0.970	0.021	14.208	1.082	3.411	14.071	1.000
30H-33	0.937	0.021	1.945	0.459	0.043	1.835	1.000

Table 14.3.4-31
Reactor Cavity Model – TMD Flow Path Input

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
30R-38	1.355	0.021	0.548	0.467	1.647	0.224	1.000
30A-31	0.144	0.021	3.160	0.904	2.931	2.775	1.000
31H-35	0.214	0.021	4.778	0.832	1.213	4.701	0.538
31R-45	1.049	0.021	0.489	1.551	3.613	0.063	0.150
31A-28	0.667	0.021	4.192	0.655	1.307	2.805	0.363
32H-36	0.955	0.021	1.733	0.681	0.314	1.662	1.000
32R-31	0.879	0.021	8.070	0.428	0.992	5.027	0.284
32A-44	1.042	0.021	0.484	1.599	3.677	0.073	0.021
33H-4	0.000	0.021	3.667	0.459	0.043	3.667	1.000
33R-38	0.996	0.021	0.122	0.467	0.842	0.094	1.000
33A-34	0.363	0.021	0.431	0.467	0.842	0.134	0.349
34H-30	0.001	0.021	5.171	1.349	1.305	5.266	1.000
34R-35	0.144	0.021	3.102	0.904	1.498	2.751	1.000
35H-45	0.996	0.021	0.489	1.551	3.613	0.063	0.281
35R-36	0.373	0.021	4.946	0.635	0.483	4.700	0.322
36H-45	0.720	0.021	0.586	1.810	4.330	0.105	0.748
36R-37	0.462	0.021	4.435	0.635	0.483	1.495	1.000
37H-32	0.096	0.021	4.764	1.079	13.563	4.678	0.909
37R-2	0.984	0.021	12.638	1.082	1.783	12.567	1.000
38H-43	0.957	0.021	3.670	1.590	9.820	2.050	0.021
38R-42	0.957	0.021	3.670	1.590	9.820	2.050	0.021
38A-41	0.957	0.021	3.670	1.590	9.820	2.050	0.021
39H-20	1.033	0.021	0.506	1.901	4.232	0.070	0.166
39R-54	0.473	0.021	2.450	1.590	9.820	1.380	0.314
39A-21	1.029	0.021	0.591	2.150	4.943	0.109	0.029
40H-22	0.951	0.021	0.557	1.901	4.232	0.116	0.123
40R-55	0.473	0.021	2.450	1.590	9.820	1.380	0.314
40A-23	1.042	0.021	0.484	1.599	3.677	0.073	0.021

Table 14.3.4-31
Reactor Cavity Model – TMD Flow Path Input

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
41H-24	1.071	0.021	0.856	1.551	3.613	0.091	0.093
41R-25	1.033	0.021	1.025	1.810	4.330	0.153	0.024
41A-22	1.066	0.021	0.856	1.551	3.613	0.091	0.105
42H-26	0.982	0.021	0.922	1.551	3.613	0.147	0.105
42R-27	1.044	0.021	0.850	1.392	3.330	0.112	0.019
42A-24	0.987	0.021	0.922	1.551	3.613	0.147	0.093
43H-28	1.055	0.021	0.954	1.901	4.232	0.114	0.110
43R-52	1.407	0.021	4.500	1.095	5.938	4.500	0.0001
43A-26	1.050	0.021	0.954	1.901	4.232	0.114	0.123
44H-29	1.042	0.021	0.484	1.599	3.677	0.073	0.021
44R-31	0.930	0.021	0.557	1.901	4.232	0.116	0.176
44A-28	0.956	0.021	0.557	1.901	4.232	0.116	0.110
45H-50	0.422	0.021	6.120	1.060	5.490	5.590	0.202
45R-57	0.394	0.021	2.200	1.420	9.290	1.290	0.293
45A-32	1.033	0.021	0.586	1.810	4.330	0.105	0.025
46H-51	0.995	0.021	6.505	1.125	5.780	6.505	1.000
47H-51	0.995	0.021	2.250	1.095	5.938	2.250	1.000
47R-39	0.412	0.021	2.280	1.095	5.940	2.300	0.228
48H-51	0.995	0.021	2.250	1.095	5.938	2.250	1.000
48R-40	0.412	0.021	2.280	1.095	5.940	2.300	0.228
49H-44	0.412	0.021	2.280	1.095	5.940	2.300	0.228
49R-52	0.995	0.021	2.250	1.095	5.938	2.250	1.000
50H-51	0.995	0.021	5.560	1.058	5.493	5.560	1.000
51H-38	1.400	0.021	4.500	5.011	80.4	4.500	0.059
51R-52	0.280	0.021	33.500	1.000	570.000	0.000	0.648
51A-58	0.854	0.021	9.183	9.509	126.000	7.282	1.000
52H-42	1.417	0.021	5.860	1.058	5.493	5.860	0.0001
52R-38	1.400	0.021	4.500	5.011	80.4	4.500	0.059

Table 14.3.4-31
Reactor Cavity Model – TMD Flow Path Input

Flow Path	K	f	L_I (ft)	D_H (ft)	A_T (ft^2)	L_{eq} (ft)	A_T /A
52A-41	1.417	0.021	5.860	1.058	5.493	5.860	0.0001
53H-38	0.958	0.021	2.236	2.400	9.710	2.086	1.000
54H-38	0.956	0.021	1.275	2.780	10.240	1.275	1.000
55H-38	0.956	0.021	1.275	2.780	10.240	1.275	1.000
56H-44	0.473	0.021	2.450	1.590	9.820	1.380	0.314
56R-38	0.956	0.021	1.275	2.780	10.240	1.275	1.000
57H-38	0.958	0.021	2.240	2.400	9.710	2.086	1.000
58H-60	0.374	0.021	9.918	9.509	126.000	7.675	0.321
59H-52	2.819	0.000	50.625	1.000	465.65	50.625	0.001
59R-51	2.819	0.000	50.625	1.000	465.65	50.625	0.001
60H-0	0.000	0.000	0.000	1.000	1.000	0.000	0.000
60R-0	0.000	0.000	0.000	1.000	1.000	0.000	0.000
60A-0	0.000	0.000	0.000	1.000	1.000	0.000	0.000
61H-3	0.307	0.021	1.623	0.902	1.240	0.903	0.478
61R-35	0.474	0.021	1.434	0.832	1.213	1.137	1.000
62H-3	0.307	0.021	1.623	0.902	1.240	0.903	0.478
62R-12	0.000	0.021	2.879	0.685	0.168	2.879	1.000
62A-16	0.438	0.021	1.329	0.902	1.240	1.056	1.000

Compartment Volume and Area[1]

Compartment	Free Volume (ft^3)	Vent Area (ft^2)
Upper Reactor Cavity	15,720	165
Lower Reactor Cavity	14,769	172
Steam Generator		
Enclosure A	10,905	412
Enclosure B	10,107	330
Pressurizer	2,,639	54
Fan Accumulator Room	26,969	299

1 The volumes listed are those that were utilized for the respective subcompartment analysis.

PEAK DIFFERENTIAL PRESSURE (PSI)

STEAM LINE BREAK AT OUTLET NOZZLE (BOUNDING)[1]

						Limiting Containment Conditions
Across Structures:	DP55-25=42.7691	PSI	@	1.210	SEC	T_{High}/P_{Low}
	DP56-25=31.1990	PSI	@	1.297	SEC	T_{High}/P_{Low}
	DP57-25=31.1953	PSI	@	1.296	SEC	T_{High}/P_{Low}
	DP58-25=31.5021	PSI	@	1.291	SEC	T_{High}/P_{Low}
	DP59-25=31.5003	PSI	@	1.292	SEC	T_{High}/P_{Low}
	DP60-25=19.3257	PSI	@	1.344	SEC	T_{High}/P_{Low}
	DP61-25=19.1868	PSI	@	1.346	SEC	T_{High}/P_{Low}
	DP62-25=19.1902	PSI	@	1.342	SEC	T_{High}/P_{Low}
	DP63-25=19.3621	PSI	@	1.340	SEC	T_{High}/P_{Low}
	DP55-46=25.7593	PSI	@	.017	SEC	T_{Low}/P_{Low}
	DP56-47=13.7783	PSI	@	.022	SEC	T_{Low}/P_{Low}
	DP57-48=12.1139	PSI	@	.034	SEC	T_{Low}/P_{Low}
	DP60-51=11.0594	PSI	@	.038	SEC	T_{Low}/P_{Low}
	DP61-52=10.0894	PSI	@	.041	SEC	T_{Low}/P_{Low}
Across Steam Generator Vessel:	DP56-58=-2.8489	PSI	@	.024	SEC	T_{Low}/P_{Low}
	DP57-59=-3.9901	PSI	@	.023	SEC	T_{Low}/P_{Low} Node 46 Break
	DP60-62=2.6747	PSI	@	.041	SEC	T_{Low}/P_{Low}
	DP61-63=-1.9412	PSI	@	.030	SEC	T_{Low}/P_{Low} Node 46 Break

[1] All breaks are in Node 55 unless otherwise noted.

PEAK DIFFERENTIAL PRESSURE (PSI)

FEEDWATER LINE BREAK AT SIDE

(BOUNDING)[1]

						Limiting Containment Conditions
Across Structures:	DP55-25=5.3159	PSI	@	.220	SEC	$T_{Low}/P_{Low}/ICE_{Low}$
	DP56-25=5.3788	PSI	@	.217	SEC	$T_{Low}/P_{Low}/ICE_{Low}$
	DP57-25=5.3801	PSI	@	.219	SEC	$T_{Low}/P_{Low}/ICE_{Low}$
	DP58-25=5.8566	PSI	@	.222	SEC	$T_{Low}/P_{Low}/ICE_{Low}$
	DP59-25=6.0058	PSI	@	.161	SEC	$T_{Low}/P_{Low}/ICE_{High}$
	DP60-25=5.6043	PSI	@	.214	SEC	$T_{Low}/P_{Low}/ICE_{Low}$
	DP61-25=5.5785	PSI	@	.212	SEC	$T_{Low}/P_{Low}/ICE_{Low}$
	DP62-25=6.8782	PSI	@	.022	SEC	$T_{Low}/P_{Low}/ICE_{High}$
	DP63-25=16.2857	PSI	@	.012	SEC	$T_{Low}/P_{Low}/ICE_{High}$
	DP55-46=3.2606	PSI	@	.045	SEC	$T_{Low}/P_{Low}/ICE_{High}$
	DP56-47=3.3787	PSI	@	.030	SEC	$T_{Low}/P_{Low}/ICE_{Low}$ Node 54 Break
	DP57-48=2.9672	PSI	@	.039	SEC	$T_{Low}/P_{Low}/ICE_{High}$
	DP60-51=5.2378	PSI	@	.021	SEC	$T_{Low}/P_{Low}/ICE_{Low}$ Node 54 Break
	DP61-52=5.0053	PSI	@	.027	SEC	$T_{Low}/P_{Low}/ICE_{High}$
Across Steam Generator Vessel:	DP56-58=-1.4657	PSI	@	.023	SEC	$T_{High}/P_{Low}/ICE_{High}$
	DP57-59=-3.9920	PSI	@	.015	SEC	$T_{Low}/P_{Low}/ICE_{High}$
	DP60-62=-2.2928	PSI	@	.027	SEC	$T_{Low}/P_{Low}/ICE_{High}$
	DP61-63=-15.5871	PSI	@	.011	SEC	$T_{Low}/P_{Low}/ICE_{High}$

[1] All breaks are in Node 63 unless otherwise noted.

ICE CONDENSER AZIMUTHAL DIFFERENTIAL PRESSURE DISTRIBUTION

TMD BREAK LOCATION ELEMENTS						
	1	2	3	4	5	6
Ice Condenser	Bays 1 thru 2.75	Bays 2.75 thru 6	Bays 7 thru 12.5	Bays 12.5 thru 17	Bays 18 thru 20.5	Bays 20.5 thru 24
Elements	9	12	15	18	21	24
Pressure	7.4 psid	6.1 psid	5.5 psid	5.5 psid	6.1 psid	7.4 psid
Elements	8	11	14	17	20	23
Pressure	9.2 psid	7.6 psid	6.8 psid	6.8 psid	7.5 psid	9.2 psid
Elements	7	10	13	16	19	22
Pressure	11.8 psid	9.8 psid	8.7 psid	8.7 psid	9.7 psid	11.8 psid
Elements	40	41	42	43	44	45
Pressure	14.8 psid	12.6 psid	11.2 psid	11.2 psid	12.4 psid	14.5 psid

SENSITIVITY STUDIES FOR COOK NUCLEAR PLANT

Parameter	Change Made From Base Value	Change In Operating Deck Dp	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 Inertial Length	+10%	+4%	+1%
Break Compartment Inertial 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 Inertial Lengths	+10%	+5%	+4%
All Inertial Lengths	-10%	-5%	-3%
Ice Bed Loss Coefficients	+10%	0	0
Ice Bed Loss Coefficients	- 10%	0	0
Entrainment Level	0% Ent	-27%	-11%

SENSITIVITY STUDIES FOR COOK NUCLEAR PLANT

Parameter	Change Made From Base Value	Change In Operating Deck Dp	Change In Peak Pressure Against The Shell
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%
Ice Condenser Flow Area	-10%	0	+4%
Ice Condenser	+20%	0	-6%
Ice Condenser Flow Area	-50%	0	+8%
Initial Pressure in Containment	+0.3 psi	+2%	+2%
Initial Pressure in Containment	-0.3 psi	-2%	-2%
Reactor Coolant Break Enthalpy	-13.0%	+6%	+3%
Compressibility Factor	Addition of the compressibility factor	+4%	0

All values shown are to the nearest percent.

1973 WALTZ MILL PRELIMINARY TEST CONDITIONS

			Nominal Conditions	
Test Series	**^{G}test/ ^{G}plant**	**(Total Energy/Ice Wt.) test/ (Total Energy/Ice Wt.) plant**	**Subcooling In Piping**	**Varied in Test Setup**
Blowdown rate Series	37% 75% 100% 150% 10% 1.5%	100%	40ºF	Variable Orifice Sizes
Blowdown Energy Series	75% 100% 100%	150% 150% 200%	~40ºF	Variable Boiler Water levels
Blowdown Transient Shape Series	75% 75% 100% 100%	100%	~10ºF ~25ºF ~10ºF ~25ºF	Variable Conditions In Subcooled Leg

PEAK PRESSURES / DIFFERENTIALS

	DEHL Break In Element #6	**DECL Break In Element #6**
Pressure In Element #6 (Psig)	14.8 / 14.4	13.4 / 13.0
Peak Pressure In Ice Condenser Compartments (Psig)	10.6 / 10.6	9.8 / 9.9
Peak Differential Pressure Across Operating Deck or Lower Crane Wall (Psi)	14.5 / 14.1	12.3 / 11.7

EFFECTS OF VARYING POLYTROPIC EXPONENT

	Base Case	5% Decrease	10% Decrease	20% Decrease
Pressure In Element #6 (Psig)	14.8	14.8	14.8	14.9
Peak Pressure In Ice Condenser Compartment (Psig)	10.6	10.6	10.6	10.6
Peak Differential Pressure Across Operating Deck or Lower Crane Wall (Psi)	14.5	14.5	14.5	14.6

CALCULATED MAXIMUM PEAK PRESSURES COMPARED WITH DESIGN PRESSURE

(HISTORICAL INFORMATION)

Type of Break	Location[1]	Peak Pressure		Peak Differential Pressure[2]		Design
		Augmented	Unaugmented	Augmented	Unaugmented	
DECL	Element 1	13.7	14.1	10.8	12.7	16.6
DECL	Element 2	10.8	12.2[3]	8.6 [3]	10.5 [3]	12.0
DECL	Element 3	9.8	11.2 [3]	7.5 [3]	9.4 [3]	12.0
DECL	Element 4	9.7	11.1 [3]	7.6 [3]	9.5 [3]	12.0
DECL	Element 5	10.5	11.9 [3]	8.6 [3]	10.5 [3]	12.0
DECL	Element 6	11.6	13.0 [3]	10.4 [3]	12.3 [3]	16.6
DEHL	Element 1	13.3	13.7 [3]	13.0 [3]	13.5 [3]	16.6
DEHL	Element 2	10.6	11.0 [3]	10.3 [3]	10.8 [3]	12.0
DEHL	Element 3	8.9	9.3 [3]	8.3 [3]	8.8 [3]	12.0
DEHL	Element 4	9.0	9.4 [3]	8.0 [3]	8.5 [3]	12.0
DEHL	Element 5	10.5	10.9 [3]	10.2 [3]	10.7 [3]	12.0
DEHL	Element 6	13.6	14.0	13.2	13.7	16.6
DECL	Element 40	9.8	10.6	9.8	10.6	12.0
DECL	Element 41	8.7	9.5 [3]	8.7	9.5	12.0
DECL	Element 42	7.8	8.6 [3]	7.8	8.6	12.0
DECL	Element 43	7.8	8.6 [3]	7.8	8.6	12.0
DECL	Element 44	8.5	9.3 [3]	8.5	9.3	12.0

[1] Element 1-6 are break locations

[2] For Elements 1 through 6 the peak differential pressure is across the operating deck or the lower crane wall. For Elements 7 through 24 the peak differential pressure is across the upper crane wall. For Elements 40 through 45 the peak differential pressure is across the containment shell.

[3] The unaugmented peak pressure and peak differential pressure other than Elements 1/40 (DECL) and 6/45 (DEHL) are conservatively estimated by taking the ΔP (unaug-aug) and adding it to the augmented pressure. Elements 2 through 6 and 41 through 45 for DECL and 1 through 5 and 40 through 44 for DEHL reflect this change. In Elements 7 through 24 the ΔP (unaug-aug) for peak pressure was used to estimate the unaugmented peak differential pressure.

CALCULATED MAXIMUM PEAK PRESSURES COMPARED WITH DESIGN PRESSURE

(HISTORICAL INFORMATION)

Type of Break	Location[1]	Peak Pressure		Peak Differential Pressure[2]		Design
		Augmented	Unaugmented	Augmented	Unaugmented	
DECL	Element 45	9.5	10.3 [3]	9.5	10.3	12.0
DEHL	Element 40	10.7	10.8 [3]	10.7	10.8	12.0
DEHL	Element 41	8.3	8.4 [3]	8.3	8.4	12.0
DEHL	Element 42	7.0	8.1 [3]	7.0	8.1	12.0
DEHL	Element 43	7.1	7.2 [3]	7.1	7.2	12.0
DEHL	Element 44	8.4	8.5 [3]	8.4	8.5	12.0
DEHL	Element 45	10.7	10.8	10.7	10.8	12.0
DECL	Elements 7-8-9	6.1	6.1	6.6 [3]	6.6 [3]	12.0
DECL	Elements 10-11-12	5.9	6.1	5.9	6.1 [3]	12.0
DECL	Elements 13-14-15	5.6	6.0	5.2	5.6 [3]	12.0
DECL	Elements 16-17-18	6.0	6.2	5.4	5.6 [3]	12.0
DECL	Elements 19-20-21	6.7	6.7	6.0	6.0 [3]	12.0
DECL	Elements 22-23-24	6.0	6.1	6.6	6.7 [3]	12.0
DEHL	Elements 7-8-9	7.1	7.2	7.8	7.9 [3]	12.0
DEHL	Elements 10-11-12	7.6	7.6	6.8	6.8 [3]	12.0
DEHL	Elements 13-14-15	6.4	6.8	6.0	6.4 [3]	12.0
DEHL	Elements 16-17-18	6.0	6.5	6.1	6.6 [3]	12.0
DEHL	19-20-21	6.8	6.8	6.9	6.9 [3]	12.0
DEHL	22-23-24	7.1	7.5	7.6	8.0 [3]	12.0
STEAMLINE	S.G. Doghouse	20.8	20.8	20.5	20.5	26.4
STEAMLINE	Fan Room	13.9	13.9	13.9	13.9	16.0

CALCULATED MAXIMUM PEAK PRESSURES COMPARED WITH DESIGN PRESSURE

(HISTORICAL INFORMATION)

Type of Break	Location[1]	Peak Pressure		Peak Differential Pressure[2]		Design
		Augmented	Unaugmented	Augmented	Unaugmented	
SECL	Lower Rx Cavity	12.2	13.8	11.4	12.3	15.0
SECL	Upper Rx Cavity	40.4	47.0	36.9	44.1	48.0
6" Spray Line	Pressurizer Enclosure	14.0	17.8	13.1	16.4	80.0
LOCA	Reactor Vessel Annulus	63.0	95.0	63.0	95.0	1000.0
LOCA	Reactor Pipe Annulus	419.0	735.0	419.0	735.0	2000.0

DECL Minimum Safeguards Blowdown Mass & Energy

Time (sec)	Break Path 1		Break Path 2	
	Flow (lbm/s)	Energy (BTUs)	Flow (lbm/s)	Energy (BTUs)
0.00	0.00	0.00	0.00	0.00
1.00	69541.05	38072128.38	25274.17	13708526.28
2.00	59082.07	32734686.00	23523.83	13033059.18
3.00	43630.13	24731959.23	18283.46	10507768.61
4.00	35614.74	20458788.80	13731.27	7728808.39
5.00	31074.76	18041086.00	10691.77	6319115.92
6.00	28747.32	16793275.59	9608.03	5772305.39
7.00	25328.05	15318005.81	9202.82	5537586.42
8.00	20584.46	13406087.99	8493.19	5173844.80
9.00	16598.22	11561693.69	7677.87	4727423.32
10.00	13878.16	10235512.37	6945.21	4311501.04
11.00	11775.93	9157678.86	6207.16	3877731.54
12.00	10082.38	8255713.00	5513.96	3444372.92
13.00	8964.29	7114235.22	4885.53	3000354.64
14.00	9167.35	5969225.12	4181.30	2473806.33
15.00	8638.11	4897363.27	3479.19	1902292.53
16.00	8235.41	4000941.83	2913.84	1407060.24
17.00	7980.17	3354039.35	1663.75	592718.07
18.00	7652.02	2907301.23	1429.69	235952.37
19.00	7517.17	2517308.71	1548.75	222953.41
20.00	6899.28	2061869.74	1646.23	213900.65

DECL Minimum Safeguards Blowdown Mass & Energy

Time (sec)	Break Path 1		Break Path 2	
	Flow (lbm/s)	Energy (BTUs)	Flow (lbm/s)	Energy (BTUs)
21.00	5911.31	1611796.68	1712.29	210866.49
22.00	6186.76	1456722.22	1769.97	223369.02
23.00	4915.57	1100883.69	1838.57	232658.29
24.00	2928.20	661283.58	1850.57	242488.78
25.00	1237.20	265272.72	1854.23	238119.92
26.00	259.50	60950.94	1712.71	190109.81
27.00	259.50	60950.94	1622.04	160051.49
28.00	259.50	60950.94	1625.74	156190.40
29.00	259.50	60950.94	1496.97	140730.10
30.00	259.50	60950.94	1324.40	121410.32
31.00	259.50	60950.94	1936.18	175388.25
32.00	259.50	60950.94	1717.65	168218.37

.

DECL Minimum Safeguards Post-Blowdown Mass & Energy

Time (sec)	Break Path 1		Break Path 2	
	Flow (lbm/s)	Energy (BTUs)	Flow (lbm/s)	Energy (BTUs)
32.00	0.00	0.00	0.00	0.00
32.01	259.50	60950.94	1529.62	150693.05
32.99	259.50	60950.94	1529.62	150693.05
33.00	0.68	740.84	1686.47	184224.75
33.99	0.68	740.84	1686.47	184224.75
34.00	2041.99	484024.18	681.70	218031.44
53.99	2041.99	484024.18	681.70	218031.44
54.00	936.12	348048.67	228.87	126717.15
73.99	936.12	348048.67	228.87	126717.15
74.00	133.31	92740.89	169.55	60335.44
93.99	133.31	92740.89	169.55	60335.44
94.00	200.22	113509.29	185.90	63125.74
113.99	200.22	113509.29	185.90	63125.74
114.00	434.69	160224.09	193.90	69155.68
133.99	434.69	160224.09	193.90	69155.68
134.00	496.52	171162.54	194.18	69259.58
153.99	496.52	171162.54	194.18	69259.58
154.00	484.42	164758.35	188.51	66676.60
173.99	484.42	164758.35	188.51	66676.60
174.00	341.36	126112.47	187.84	60369.74
193.99	341.36	126112.47	187.84	60369.74

DECL Minimum Safeguards Post-Blowdown Mass & Energy

Time (sec)	Break Path 1		Break Path 2	
	Flow (lbm/s)	Energy (BTUs)	Flow (lbm/s)	Energy (BTUs)
194.00	296.67	111859.40	186.23	58202.67
213.99	296.67	111859.40	186.23	58202.67
214.00	235.07	98279.71	185.46	57878.89
233.99	235.07	98279.71	185.46	57878.89
234.00	200.80	93212.45	188.90	59963.60
253.99	200.80	93212.45	188.90	59963.60
254.00	258.35	117147.14	193.93	66361.33
273.99	258.35	117147.14	193.93	66361.33
274.00	476.25	165200.81	196.59	69750.08
323.99	476.25	165200.81	196.59	69750.08
324.00	244.12	108658.64	191.40	63004.55
373.99	244.12	108658.64	191.40	63004.55
374.00	370.40	147334.73	199.45	72649.77
423.99	370.40	147334.73	199.45	72649.77
424.00	386.48	145510.06	197.08	69708.86
473.99	386.48	145510.06	197.08	69708.86
474.00	285.56	124470.10	196.96	69050.41
523.99	285.56	124470.10	196.96	69050.41
524.00	453.97	168390.65	204.79	78240.10
573.99	453.97	168390.65	204.79	78240.10
574.00	386.29	153608.64	203.96	76553.49

DECL Minimum Safeguards Post-Blowdown Mass & Energy

Time (sec)	Break Path 1		Break Path 2	
	Flow (lbm/s)	Energy (BTUs)	Flow (lbm/s)	Energy (BTUs)
623.99	386.29	153608.64	203.96	76553.49
624.00	307.52	134565.16	200.92	73474.29
673.99	307.52	134565.16	200.92	73474.29
674.00	434.25	166350.42	208.41	80283.50
723.99	434.25	166350.42	208.41	80283.50
724.00	362.19	146367.64	204.02	75664.94
773.99	362.19	146367.64	204.02	75664.94
774.00	368.61	148685.27	207.10	77957.47
823.99	368.61	148685.27	207.10	77957.47
824.00	400.04	157351.26	209.89	80226.97
873.99	400.04	157351.26	209.89	80226.97
874.00	377.42	153664.13	213.41	82911.40
923.99	377.42	153664.13	213.41	82911.40
924.00	374.39	153418.33	218.44	86902.02
973.99	374.39	153418.33	218.44	86902.02
974.00	316.18	137637.64	214.00	82247.70
1023.99	316.18	137637.64	214.00	82247.70
1024.00	395.90	159231.26	232.11	96590.55
1073.99	395.90	159231.26	232.11	96590.55
1074.00	379.84	158622.36	226.96	93127.19
1123.99	379.84	158622.36	226.96	93127.19

DECL Minimum Safeguards Post-Blowdown Mass & Energy

Time (sec)	Break Path 1		Break Path 2	
	Flow (lbm/s)	Energy (BTUs)	Flow (lbm/s)	Energy (BTUs)
1124.00	312.18	141775.18	229.84	93794.70
1173.99	312.18	141775.18	229.84	93794.70
1174.00	377.80	163888.46	239.14	101396.33
1223.99	377.80	163888.46	239.14	101396.33
1224.00	318.81	151447.59	249.13	106422.61
1273.99	318.81	151447.59	249.13	106422.61
1274.00	392.11	171402.74	252.48	110393.74
1323.99	392.11	171402.74	252.48	110393.74
1324.00	304.71	143861.52	245.81	104280.95
1373.99	304.71	143861.52	245.81	104280.95
1374.00	373.43	170512.87	259.92	113873.85
1423.99	373.43	170512.87	259.92	113873.85
1424.00	291.54	148783.97	266.66	113413.92
1473.99	291.54	148783.97	266.66	113413.92
1474.00	271.78	142834.55	301.32	125478.43
1523.99	271.78	142834.55	301.32	125478.43
1524.00	229.24	131923.31	367.69	135927.28
1573.99	229.24	131923.31	367.69	135927.28
1574.00	158.10	109482.96	381.65	129932.15
1623.99	158.10	109482.96	381.65	129932.15
1624.00	116.25	84640.51	439.41	135415.35

DECL Minimum Safeguards Post-Blowdown Mass & Energy

Time (sec)	Break Path 1		Break Path 2	
	Flow (lbm/s)	Energy (BTUs)	Flow (lbm/s)	Energy (BTUs)
1673.99	116.25	84640.51	439.41	135415.35
1674.00	115.37	87695.35	463.55	137231.27
1723.99	115.37	87695.35	463.55	137231.27
1724.00	133.08	105191.32	342.94	122912.64
1773.99	133.08	105191.32	342.94	122912.64
1774.00	77.41	76446.17	174.88	84851.57
1823.99	77.41	76446.17	174.88	84851.57
1824.00	69.01	69732.06	108.91	64882.52
1873.99	69.01	69732.06	108.91	64882.52
1874.00	62.52	63595.65	101.04	59912.47
1923.99	62.52	63595.65	101.04	59912.47
1924.00	52.86	52618.60	150.11	62536.38
2123.99	52.86	52618.60	150.11	62536.38
2124.00	47.47	44916.11	353.27	109647.01
2323.99	47.47	44916.11	353.27	109647.01
2324.00	26.36	26516.93	396.35	119506.62
2523.99	26.36	26516.93	396.35	119506.62
2524.00	4.33	4793.89	397.58	120954.33
2723.99	4.33	4793.89	397.58	120954.33
2724.00	0.38	419.09	398.10	115923.21
2923.99	0.38	419.09	398.10	115923.21

INDIANA MICHIGAN POWER An AEP Company	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revised: 27.0 Table:14.3.4-42 Page: 6 of 14

DECL Minimum Safeguards Post-Blowdown Mass & Energy

Time (sec)	Break Path 1		Break Path 2	
	Flow (lbm/s)	Energy (BTUs)	Flow (lbm/s)	Energy (BTUs)
2924.00	7.64	3014.99	395.39	110002.00
3123.99	7.64	3014.99	395.39	110002.00
3124.00	119.76	30193.40	391.10	102294.41
3323.99	119.76	30193.40	391.10	102294.41
3324.00	3.48	2944.70	386.15	105742.93
3523.99	3.48	2944.70	386.15	105742.93
3524.00	38.19	9859.87	391.32	102943.28
3723.99	38.19	9859.87	391.32	102943.28
3724.00	130.64	25508.17	369.45	92730.58
3923.99	130.64	25508.17	369.45	92730.58
3924.00	30.33	6084.03	367.85	92571.63
4123.99	30.33	6084.03	367.85	92571.63
4124.00	5.48	1045.09	335.02	96823.53
4323.99	5.48	1045.09	335.02	96823.53
4324.00	0.05	57.80	141.02	65695.50
4523.99	0.05	57.80	141.02	65695.50
4524.00	0.00	4.51	118.72	61254.09
4723.99	0.00	4.51	118.72	61254.09
4724.00	0.03	33.96	116.23	59526.42
4923.99	0.03	33.96	116.23	59526.42
4924.00	0.02	25.81	128.46	61201.15

DECL Minimum Safeguards Post-Blowdown Mass & Energy

Time (sec)	Break Path 1		Break Path 2	
	Flow (lbm/s)	Energy (BTUs)	Flow (lbm/s)	Energy (BTUs)
5123.99	0.02	25.81	128.46	61201.15
5124.00	0.03	36.50	131.84	61294.88
5323.99	0.03	36.50	131.84	61294.88
5324.00	0.02	17.94	126.24	59042.74
5523.99	0.02	17.94	126.24	59042.74
5524.00	0.04	41.56	129.55	58830.68
5723.99	0.04	41.56	129.55	58830.68
5724.00	0.03	31.33	134.85	59411.87
5923.99	0.03	31.33	134.85	59411.87
5924.00	0.03	29.55	131.44	58352.90
6123.99	0.03	29.55	131.44	58352.90
6124.00	0.02	17.62	128.74	57416.45
6323.99	0.02	17.62	128.74	57416.45
6324.00	0.05	51.96	125.70	55976.66
6523.99	0.05	51.96	125.70	55976.66
6524.00	0.03	31.58	133.51	57429.33
6723.99	0.03	31.58	133.51	57429.33
6724.00	0.03	35.97	149.80	60217.58
6923.99	0.03	35.97	149.80	60217.58
6924.00	0.08	80.78	135.08	56705.62
7123.99	0.08	80.78	135.08	56705.62

INDIANA MICHIGAN POWER An AEP Company	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revised: 27.0 Table:14.3.4-42 Page: 8 of 14

DECL Minimum Safeguards Post-Blowdown Mass & Energy

Time (sec)	Break Path 1		Break Path 2	
	Flow (lbm/s)	Energy (BTUs)	Flow (lbm/s)	Energy (BTUs)
7124.00	0.09	91.71	155.80	60313.85
7323.99	0.09	91.71	155.80	60313.85
7324.00	0.13	138.16	141.47	56394.37
7523.99	0.13	138.16	141.47	56394.37
7524.00	0.12	131.00	138.72	55837.43
7723.99	0.12	131.00	138.72	55837.43
7724.00	0.10	105.77	129.96	53973.77
7923.99	0.10	105.77	129.96	53973.77
7924.00	0.10	112.89	129.87	53807.18
8123.99	0.10	112.89	129.87	53807.18
8124.00	0.08	90.35	127.90	53613.33
8323.99	0.08	90.35	127.90	53613.33
8324.00	0.08	87.92	127.23	52915.15
8523.99	0.08	87.92	127.23	52915.15
8524.00	0.07	80.67	133.71	53881.36
8723.99	0.07	80.67	133.71	53881.36
8724.00	0.10	108.62	128.32	52436.24
8923.99	0.10	108.62	128.32	52436.24
8924.00	0.07	74.12	128.65	51886.80
9123.99	0.07	74.12	128.65	51886.80
9124.00	0.07	72.73	126.79	50967.27

DECL Minimum Safeguards Post-Blowdown Mass & Energy

Time (sec)	Break Path 1		Break Path 2	
	Flow (lbm/s)	Energy (BTUs)	Flow (lbm/s)	Energy (BTUs)
9323.99	0.07	72.73	126.79	50967.27
9324.00	0.07	80.57	131.32	52068.57
9523.99	0.07	80.57	131.32	52068.57
9524.00	0.04	41.48	130.54	51729.07
9723.99	0.04	41.48	130.54	51729.07
9724.00	0.04	46.40	130.89	51085.18
9923.99	0.04	46.40	130.89	51085.18
9924.00	0.05	58.80	128.33	50241.49
10123.99	0.05	58.80	128.33	50241.49
10124.00	0.06	61.68	125.64	49433.24
10323.99	0.06	61.68	125.64	49433.24
10324.00	0.08	81.57	128.99	49735.65
10523.99	0.08	81.57	128.99	49735.65
10524.00	0.06	61.92	123.27	49377.78
10723.99	0.06	61.92	123.27	49377.78
10724.00	0.03	38.01	126.86	50355.47
10923.99	0.03	38.01	126.86	50355.47
10924.00	0.01	11.49	137.91	51858.61
11123.99	0.01	11.49	137.91	51858.61
11124.00	0.01	8.70	134.26	51017.92
11323.99	0.01	8.70	134.26	51017.92

DECL Minimum Safeguards Post-Blowdown Mass & Energy

Time (sec)	Break Path 1		Break Path 2	
	Flow (lbm/s)	Energy (BTUs)	Flow (lbm/s)	Energy (BTUs)
11324.00	0.00	1.44	129.31	49922.57
11523.99	0.00	1.44	129.31	49922.57
11524.00	0.02	16.85	132.54	50146.44
11723.99	0.02	16.85	132.54	50146.44
11724.00	0.02	18.24	128.57	49163.67
11923.99	0.02	18.24	128.57	49163.67
11924.00	0.00	4.62	130.65	49597.79
12123.99	0.00	4.62	130.65	49597.79
12124.00	0.03	28.53	129.02	48868.44
12323.99	0.03	28.53	129.02	48868.44
12324.00	0.02	19.81	130.04	48901.11
12523.99	0.02	19.81	130.04	48901.11
12524.00	0.01	12.25	134.80	49660.73
12723.99	0.01	12.25	134.80	49660.73
12724.00	0.01	7.23	127.80	48290.41
12923.99	0.01	7.23	127.80	48290.41
12924.00	0.01	10.91	125.73	47420.18
13123.99	0.01	10.91	125.73	47420.18
13124.00	0.04	46.45	128.02	47720.36
13323.99	0.04	46.45	128.02	47720.36
13324.00	0.02	16.88	132.33	48157.60

DECL Minimum Safeguards Post-Blowdown Mass & Energy

Time (sec)	Break Path 1		Break Path 2	
	Flow (lbm/s)	Energy (BTUs)	Flow (lbm/s)	Energy (BTUs)
13523.99	0.02	16.88	132.33	48157.60
13524.00	0.01	13.41	127.37	47643.24
13723.99	0.01	13.41	127.37	47643.24
13724.00	0.00	5.24	130.37	47699.14
13923.99	0.00	5.24	130.37	47699.14
13924.00	0.02	16.45	134.24	48251.35
14123.99	0.02	16.45	134.24	48251.35
14124.00	0.02	21.22	129.17	46980.21
14323.99	0.02	21.22	129.17	46980.21
14324.00	0.01	11.57	133.56	47728.45
14523.99	0.01	11.57	133.56	47728.45
14524.00	0.01	6.58	133.44	47914.23
14723.99	0.01	6.58	133.44	47914.23
14724.00	0.01	8.04	127.32	46612.04
14923.99	0.01	8.04	127.32	46612.04
14924.00	0.03	34.06	125.18	46638.62
15123.99	0.03	34.06	125.18	46638.62
15124.00	0.03	37.42	131.51	47737.44
15323.99	0.03	37.42	131.51	47737.44
15324.00	0.06	59.86	125.41	45532.79
15523.99	0.06	59.86	125.41	45532.79

DECL Minimum Safeguards Post-Blowdown Mass & Energy

Time (sec)	Break Path 1		Break Path 2	
	Flow (lbm/s)	Energy (BTUs)	Flow (lbm/s)	Energy (BTUs)
15524.00	0.04	45.91	135.23	48010.88
15723.99	0.04	45.91	135.23	48010.88
15724.00	0.00	3.96	123.62	46113.24
15923.99	0.00	3.96	123.62	46113.24
15924.00	0.02	16.75	128.65	47155.70
16123.99	0.02	16.75	128.65	47155.70
16124.00	0.01	6.96	119.16	44750.70
16323.99	0.01	6.96	119.16	44750.70
16324.00	0.03	33.10	123.17	45506.51
16523.99	0.03	33.10	123.17	45506.51
16524.00	0.04	39.51	124.63	45408.22
16723.99	0.04	39.51	124.63	45408.22
16724.00	0.03	36.72	123.75	45355.16
16923.99	0.03	36.72	123.75	45355.16
16924.00	0.06	64.79	122.55	44988.95
17123.99	0.06	64.79	122.55	44988.95
17124.00	0.20	215.56	121.50	44510.42
17323.99	0.20	215.56	121.50	44510.42
17324.00	0.17	181.30	122.31	44511.93
17523.99	0.17	181.30	122.31	44511.93
17524.00	0.03	36.66	124.99	44587.89

DECL Minimum Safeguards Post-Blowdown Mass & Energy

Time (sec)	Break Path 1		Break Path 2	
	Flow (lbm/s)	Energy (BTUs)	Flow (lbm/s)	Energy (BTUs)
17723.99	0.03	36.66	124.99	44587.89
17724.00	0.06	60.54	133.59	45884.13
17923.99	0.06	60.54	133.59	45884.13
17924.00	0.06	61.86	126.30	44629.85
18123.99	0.06	61.86	126.30	44629.85
18124.00	0.07	74.52	130.94	45415.03
18323.99	0.07	74.52	130.94	45415.03
18324.00	0.04	44.35	130.07	44954.87
18523.99	0.04	44.35	130.07	44954.87
18524.00	0.04	47.62	128.95	44951.28
18723.99	0.04	47.62	128.95	44951.28
18724.00	0.04	41.48	129.30	44821.25
18923.99	0.04	41.48	129.30	44821.25
18924.00	0.05	52.31	128.49	44598.03
19123.99	0.05	52.31	128.49	44598.03
19124.00	0.03	33.80	130.54	44857.31
19323.99	0.03	33.80	130.54	44857.31
19324.00	0.03	37.93	127.77	44246.79
19523.99	0.03	37.93	127.77	44246.79
19524.00	0.05	50.35	127.73	43920.88
19723.99	0.05	50.35	127.73	43920.88

DECL Minimum Safeguards Post-Blowdown Mass & Energy

Time (sec)	Break Path 1		Break Path 2	
	Flow (lbm/s)	Energy (BTUs)	Flow (lbm/s)	Energy (BTUs)
19724.00	0.03	31.33	130.55	44661.27
19924.00	0.03	31.33	130.55	44661.27
19924.1	0.06	11.81	130.84	44121.56
40000.0	88.46	16065.35	42.44	23087.88
60000.0	103.48	16013.02	27.42	20560.47
78272.0	108.62	14140.93	22.28	20897.30
78272.1	110.03	14323.78	20.87	19579.55
80000.0	110.34	14108.51	20.56	19650.11
89179.0	111.59	12891.10	19.31	20285.50
89179.1	111.94	12931.90	18.96	19914.41
100000.0	113.05	11415.34	17.85	20745.13

INDIANA MICHIGAN POWER An AEP Company	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revised: 27.0 Table:14.3.4-47 Page: 1 of 1

Parameters Used in Steamline Break Mass / Energy Releases for Unit 1

Parameter[1]	Parameter Value
NSSS Power, MWt	3,327
Core Power, MWt	3,304
RCS Flowrate (total), gpm (Thermal Design Flow)	354,000
Pressurizer Pressure psia	2,250
Pressurizer Water Volume, % span	56.06
RCS Vessel Average Temperature, °F	575.4
Steam Generator[2]	
Steam Temperature, °F	527.9
Steam Pressure, psia	870
Feedwater Temperature, °F	437.4
Water Level, % narrow-range span	43.8
Zero-Load Temperature, °F	547

[1] Nominal parameters are listed in this table.

[2] Steam generator performance data used in the analysis is conservatively high for steam temperature and pressure.

Parameters Used for the Radiological Consequence Analysis of a Loss of Coolant Accident

Parameter	Value
Core Power Level	3480 MWt
Containment Purge Release	
Containment Volume	1,066,352 ft^3 (minimum)
Iodine Chemical Form	
Elemental	4.85%
Organic	0.15%
Particulate	95%
Containment Purge Flow Rate	36,300 cfm
Containment Purge Isolation time	15 seconds
Containment Purge Filtration	0%
Removal by Wall Deposition	None
Removal by Sprays	None
Release Location	
Offsite	Unit 1 Vent
Onsite	Unit 2 Vent
Containment Leakage Release	
Containment Compartment Volumes(max)	
Upper Containment (Sprayed)	621,968 ft^3
Lower Containment (Sprayed)	103,770 ft^3
Fan Rooms (Sprayed)	48,913 ft^3
Upper Containment (Unsprayed)	122,600 ft^3
Ice Condenser (Unsprayed)	105,577 ft^3
Lower Containment (Unsprayed)	66,188 ft^3
Dead-End (Unsprayed)	18,663 ft^3
Containment Ventilation Flow Rates	
Fan Rooms to Lower Containment (Unsprayed)	14,580.5 cfm
Fan Rooms to Lower Containment (Sprayed)	22,859.5 cfm

Parameters Used for the Radiological Consequence Analysis of a Loss of Coolant Accident

Parameter	Value
Lower Containment (Unsprayed) to Dead-End	90 cfm
Dead-End to Fan Rooms	90 cfm
Lower Containment (Unsprayed) to Fan Rooms	1,350 cfm
Lower Containment (Unsprayed) to Ice Condenser	13,140.5 cfm
Lower Containment (Sprayed) to Ice Condenser	22,859.5 cfm
Ice Condenser to Upper Containment (Sprayed)	30,072.3 cfm
Ice Condenser to Upper Containment (Unsprayed)	5,927.7 cfm
Upper Containment (Sprayed) to Fan Rooms	30,072.3 cfm
Upper Containment (Unsprayed) to Fan Rooms	5,927.7 cfm
Lower Containment – Sprayed to/from Unsprayed	2,206.3 cfm (spray induced circulation)
Upper Containment – Sprayed to/from Unsprayed	4,086.7 cfm (spray induced circulation)
Containment Spray Start Time	300 seconds
Time that Containment Spray is Secured	24 hours
Containment Spray Flow Rate	
Upper Containment	1,466 gpm
Lower Containment	660 gpm
Fan Rooms	201 gpm
Elemental Iodine Removal Coefficients	
Upper Containment	20 hr^{-1}
Lower Containment	20 hr^{-1}
Fan Rooms	20 hr^{-1}
Time that Total Elemental DF Reaches 200	2 hours
Aerosol Spray Removal Coefficient	
Upper Containment	5.06 hr^{-1}
Lower Containment	6.65 hr^{-1}
Fan Rooms	3.03 hr^{-1}
Time that Total Aerosol DF Reaches 50	2.32 hours

Parameters Used for the Radiological Consequence Analysis of a Loss of Coolant Accident

Parameter	Value
Natural Deposition	
Elemental Iodine	None
Organic Iodine	None
Particulates	0.1 hr^{-1}
Containment Leakage Rate	
0-24 hours	0.18 %/day
24 hours-30 days	0.09
Containment Leakage Filtration	0%
Iodine Chemical Form	
Elemental	4.85%
Organic	0.15%
Particulate	95%
Iodine/Particulate Removal by Containment Sprays	None
Release Location	
Offsite	Unit 1 Containment Surface
Onsite	Unit 2 Containment Surface
ESF Leakage Release to the Auxiliary Building	
Containment Sump Volume	50,955 ft^3
ECCS Recirculation Start Time	1,388.4 seconds
Effective ESF Leakage Flow Rate	0.2 gpm
ESF Leakage Flashing Fraction	10%
Auxiliary Building Ventilation Filtration	0%
Iodine Chemical Form	
Elemental	97%
Organic	3%
Particulate	0%

Parameters Used for the Radiological Consequence Analysis of a Loss of Coolant Accident

Parameter	Value
Release Location	
Offsite	Unit 1 Vent
Onsite	Unit 2 Vent
ESF Leakage Release to the RWST	
Containment Sump Volume	50,955 ft^3
ECCS Recirculation Start Time	1,388.4 seconds
Effective ESF Leakage Flow Rate	1.0 gpm
Total Iodine Mass Released into the Sump	12,035.5 grams
Sump pH	7.0
Initial RWST pH	4.479
Initial RWST Liquid Volume	53,637.5 gallons
Elemental Iodine Release Fraction	0.0-0.1914
Organic Iodine Release Fraction	0.0015
RWST Liquid/Vapor Iodine Partition Coefficient	
Elemental	31.92 - 45.41
Organic	1.0
Release Location	
Offsite	Unit 1 RWST
Onsite	Unit 2 RWST
Offsite Breathing Rates	
0-8 hours	3.5E-04 m^3/sec
8-24 hours	1.8E-04 m^3/sec
24-720 hours	2.3E-04 m^3/sec
Control Room Parameters	
Volume	50,616 ft^3
Normal Ventilation Makeup Flow Rate	880 cfm
Emergency Ventilation Makeup Flow Rate	880 cfm

Parameters Used for the Radiological Consequence Analysis of a Loss of Coolant Accident

Parameter	Value
Emergency Ventilation Recirculation Flow Rate	4,520 cfm
Emergency Ventilation Filter Efficiency[1]	
Elemental Iodine	94.05%
Organic Iodine	94.05%
Particulates	98.01%
Delay to Switch to Emergency Mode	70 minutes (Safety Injection)
Unfiltered Inleakage	40 cfm
Occupancy Factors	
0-24 hours	1.0
24-96 hours	0.6
96-720 hours	0.4
Breathing Rate	3.5E-04 m^3/sec

[1] Includes 1% filter bypass leakage

D.C. COOK MAAP 14-NODE CONTAINMENT NODALIZATION

Node	Region
1	Cavity
2	Lower Compartment
3	Pipe Annulus Region
4	Ice Condenser
5	Ice Condenser Upper Plenum
6	Cylindrical Section of Upper Compartment
7	Lower Dome of Upper Compartment
8	Upper Dome of Upper Compartment
9	Pressurizer Enclosure
10	Steam Generator 1/4 Enclosure
11	Steam Generator 2/3 Enclosure
12	East Fan Room
13	West Fan Room
14	Instrument Room

D.C. COOK MAAP 14-NODE CONTAINMENT MODEL FLOW JUNCTIONS

Junction	Type	Description
1	AO[1]	Cavity 6 Lower Compartment (Bypass Tunnel)
2	AO	Cavity 6 Lower Compartment (Annular Gap)
3	AO	Lower Compartment 6 Upper Cylindrical Sec. (Refueling Cavity Drains)
4	UD[2]	Lower Compartment 6 Ice Condenser (Door Model)
5	AO	Lower Compartment 6 Pipe Annulus (over Weir Wall)
6	UD	Ice Condenser 6 Ice Upper Plenum
7	AO	Lower Compartment 6 Upper Cylindrical Section (Bypass)
8	Fan	Upper Cylindrical Section 6 West Fan Room (Cont. Air Recirc.)
9	OOAO[3]	Ice Upper Plenum 6 Upper Compartment Lower Dome
10	AO	Normal Cont. Leakage (Pipe Annuls 6 Env.)
11	OOAO	Cont. Failure (Pipe Annulus 6 Env.)
12	AO	Lower Compartment 6 PZR Enclosure
13	AO	Lower Compartment 6 SG 1/4 Enclosure
14	AO	Upper Compartment Lower Dome 6 Upper Dome
15	AO	Upper Cylinder Section 6 Upper Compartment Lower Dome
16	Fan	PZR Enclosure 6 East Fan Room (H_2 Skimmer)

[1] AO — Always Open - means junction is always open and flow may occur in either direction as well as counter-current natural circulation flow when applicable.

[2] UD — Uni-Directional - means that the junction performs like a check valve and only permits flow in one direction, as well as counter-current flow if the junction is open due to uni-directional flow.

[3] OOAO — Once Opened Always Open - means that once a sufficient pressure differential is developed to open the junction, it remains open thereafter regardless of the pressure differential.

D.C. COOK MAAP 14-NODE CONTAINMENT MODEL FLOW JUNCTIONS

Junction	Type	Description
17	Fan	SG 1&4 Enclosure 6 East Fan Room (H_2 Skimmer)
18	Fan	Upper Dome 6 East Fan Room (H_2 Skimmer)
19	UD	Ice Condenser 6 Lower Compartment (Flappers)
20	AO	Ice Condenser 6 Lower Compartment. (Drain Line)
21	AO	Lower Compartment 6 SG 2/3 Enclosure
22	Fan	SG 2/3 Enclosure 6 East Fan Room (H_2 Skimmer)
23	Fan	Instrument Room 6 East Fan Room (H_2 Skimmer)
24	Fan	West Fan Room 6 East Fan Room (H_2 Skimmer)
25	Fan	Upper Cylinder Section 6 East Fan Room (Containment Air Recirc.)
26	Fan	PZR 6 West Fan Room (H_2 Skimmer)
27	Fan	SG 1/4 Enclosure 6 West Fan Room (H_2 Skimmer)
28	Fan	SG 2/3 Enclosure 6 West Fan Room (H_2 Skimmer)
29	Fan	Instrument Room 6 West Fan Room (H_2 Skimmer)
30	Fan	Upper Dome 6 West Fan Room (H_2 Skimmer)
31	Fan	East Fan Room 6 West Fan Room (H_2 Skimmer)
32	AO	East Fan Room 6 Pipe Annulus (Floor Holes)
33	AO	West Fan Room 6 Pipe Annulus (Floor Holes)
34	AO	Instrument Room 6 Pipe Annulus (Floor Holes)
35	AO	East Fan Room 6 Lower Compartment (Fan Windows)
36	AO	West Fan Room 6 Lower Compartment (Fan Windows)
37	AO	East Fan Room 6 Instrument Room (Wall Openings)
38	AO	West Fan Room 6 Instrument Room (Wall Openings)
39	AO	Instrument Room 6 Lower Compartment
40	AO	Ice Upper Plenum 6 Upper Cylindrical Section (Bypass Area)
41	AO	Ice Condenser 6 Ice Upper Plenum (Bypass Area)

D.C. COOK MAAP 14-NODE CONTAINMENT MODEL FLOW JUNCTIONS

Junction	Type	Description
42	AO	Lower Compartment 6 Pipe Annulus (Holes in Weir Wall)
43	AO	Lower Compartment 6 Rx Cavity (NIS Holes)
44	AO	Lower Compartment 6 Rx Cavity (NIS Holes)

BOUNDING INSULATION QUANTITIES BY POTENTIAL BREAK LOCATION

	Transco RMI, ft^2	DP RMI, ft^2	Cal-Sil, ft^3	Fiberglass, ft^3	Marinite, ft^3	Min-K, ft^3
Lower Containment – Inside Crane Wall – Loop 1	--	39,530	348	--	2.09	--
Lower Containment – Inside Crane Wall – Loop 2	--	42,542	326	--	0.61	0.18
Lower Containment – Inside Crane Wall – Loop 3	--	43,828	352	--	7.05	0.08
Lower Containment – Inside Crane Wall – Loop 4	--	39,443	401	--	2.56	--
Lower Containment – Inside Crane Wall – PZR Vault area	--	19,942	121	--	--	--
Reactor Cavity	19,802	--	--	5	--	--
Total	**19,802**	**185,285**	**1,548**	**5**	**12.31**	**0.26**

DEGB COATINGS DEBRIS GENERATED WITHIN ZOI

Coating Type	Area, ft^2	Thickness, mils	Volume, ft^3	Density, lbs/ft^3	Weight, lbs
Qualified Coatings – Concrete Surfaces (ZOI – 5D)	894	12	0.894	111.6	99.8
Qualified Coatings – Steel Surfaces (ZOI – 5D)	1,007	12	1.007	111.6	112.7
Total Qualified (ZOI – 5D)	**1,901**	**-**	**1.90**	**-**	**212.5**
Unqualified Alkyd Coatings (ZOI – 10D)	57.7	4	0.019	98	1.9
Unqualified Epoxy Coatings (ZOI – 10D)	112.0	4	0.037	94	3.5
Total Unqualified (ZOI – 10D)	**169.7**	**-**	**0.056**	**-**	**5.4**

DGBS COATINGS DEBRIS GENERATED WITHIN ZOI

Coating Type	Area, ft^2	Thickness, mils	Volume, ft^3	Density, lbs/ft^3	Weight, lbs
Qualified Coatings – Concrete Surfaces (ZOI – 5D)	0	12	0.0	111.6	0.0
Qualified Coatings – Steel Surfaces (ZOI – 5D)	20	12	0.02	111.6	2.2
Total Qualified (ZOI – 5D)	**20**	**-**	**0.02**	**-**	**2.2**
Unqualified Alkyd Coatings (ZOI – 10D)	16.9	4	0.006	98	0.6
Unqualified Epoxy Coatings (ZOI – 10D)	56.0	4	0.019	94	1.8
Total Unqualified (ZOI – 10D)	**72.9**	**-**	**0.025**	**-**	**2.4**

UNQUALIFIED COATINGS DEBRIS GENERATED OUTSIDE ZOI

Coating Type	Area, ft^2	Thickness, mils	Volume, ft^3	Density, lbs/ft^3	Weight, lbs
Unqualified OEM Alkyd Handwheels and Limitorque Coatings outside 10D ZOI	1,429.5	4	0.48	98	47.0
Remaining Unqualified OEM Alkyd Coatings outside 10D ZOI	841.7	4	0.28	98	27.4
Remaining Unqualified OEM Epoxy Coatings outside 10D ZOI	538.0	4	0.18	94	16.9
Unqualified non-OEM Alkyd Coatings outside 10D ZOI	105.8	4	0.035	98	3.4
Unqualified non-OEM Epoxy Coatings outside 10D ZOI	991.2	4	0.33	94	31.0
Cold Galvanizing Compound	9,324.98	4	3.11	250	777.5
Total Unqualified	**13,231.18**	**-**	**4.415**	**-**	**903.2**

LATENT DEBRIS LOCATION UNIT 1 AND UNIT 2 BOUNDING VALUES

Debris Type	Upper Containment	Loop Compartment	Pipe Annulus	Ice Condenser	Total
Latent Fiber, lbs	5.4	15.6	8.4	0.6	**30**
Latent Dirt/Dust, lbs	30.6	88.4	47.6	3.4	**170**
Electromark Labels - break in Loop 1 or Loop 4, ft^2	--	21.8	30.48	--	**52.28**
Electromark Labels - break in Loop 2 or Loop 3, ft^2	--	20.14	30.48	--	**50.62**
Unqualified Labels, ft^2	8.77	13.62	3.55	--	**25.94**
Flexible Conduit PVC Jacketing, ft^2	--	1.57	--	--	**1.57**
Fire Barrier Tape, ft^2	--	708.83	--	--	**708.83**
Ice Storage Bag Fibers, ft^2	--	--	--	5.0	**5.0**
Ice Storage Bag Liner Shards, ft^2	--	--	--	0.87	**0.87**
Pieces of Rubber from platform where ice bags were opened, ft^2	--	--	--	0.22	**0.22**

CONTAINMENT MATERIALS

Submerged Aluminum Metal (Below El. 614 ft)	Mass, lb	Area, ft^2
Electrical Equipment (Limit Switches)	1.5	0.44
Fans and Motors	2.31	3.67
Radiation Detectors	0.72	0.36
Miscellaneous Components	17.72	6.46
NSSS Components (NRI-32,-36,-41A thru -44B) – Located in Reactor Cavity	244.00	83.00
TOTAL – Including Components in Reactor Cavity	266.25	93.93
TOTAL – Excluding NSSS Components in Reactor Cavity	**22.25**	**10.93**

Non-submerged Aluminum Metal (Above El. 614 ft)	Mass, lb	Area, ft^2
Electrical Equipment	0.80	0.81
Radiation Detectors	0.03	0.06
Valve Components	8.00	2.47
Crane Components	1.05	0.72
Miscellaneous Components	22.97	9.33
NSSS Components (RCP Cooling Coils)	1,152.00	8,000.00
TOTAL	**1,184.85**	**8,013.39**

Uncoated Concrete (Exposed Concrete)	Area, ft^2
Submerged (Below El. 614 ft)	6,412.78
Non-submerged (Above El. 614 ft)	1,077.10

Zinc Coated Steel (Below El. 614 ft)	Area, ft^2
Galvanized Steel (Below El. 614 ft)	70,831.64
Cold Zinc Coated Steel (Below El. 614 ft)	330.98
Total submerged zinc coated steel	**71,162.62**

Zinc Coated Steel (Above 614 ft)	Area, ft^2
Galvanized Steel (Above El. 614 ft)	495,734.96
Cold Zinc Coated Steel (Above El. 614 ft)	8994.00
Total non-submerged zinc coated steel	**504,728.96**

MAXIMUM ECCS/CTS FLOW RATES

ECCS/CTS Phase	Maximum ECCS/CTS Flow
Injection Phase - RWST Drawdown	15,500 gpm
Recirculation Phase	14,400 gpm

LOOP 4 RCS CROSSOVER LEG BREAK (DEGB) DEBRIS LOADS

AT THE MAIN STRAINER AND REMOTE STRAINER

Debris Type	Debris Load at Main Strainer at End of Pool Fill Phase	Overall Debris Load at Main Strainer	Overall Debris Load at Remote Strainer
RMI Small Pieces, ft^2	5267.52	7608.64	0
RMI Large Pieces, ft^2	975.5	1560.8	0
Cal-Sil Fines, lbs	89.568	123.156	133.904
Erosion of Cal-Sil Small Pieces to fines, lbs	0	23.2	18.56
Cal-Sil Small Pieces, lbs	11.6	23.2	0
Marinite I fines, lbs	0.0448	0.0616	0.0728
Erosion of Marinite I Small Pieces to fines, lbs	0	0.005	0.004
Marinite I Small Pieces, lbs	0.0025	0.005	0
Erosion of Marinite I Large Pieces to fines, lbs	0	0.0322	0.0138
Marinite I Large Pieces, lbs	0.0092	0.0161	0
Marinite 36 fines, lbs	0.3456	0.4752	0.5616
Erosion of Marinite 36 Small Pieces to fines, lbs	0	0.036	0.0288
Marinite 36 Small Pieces, lbs	0.018	0.036	0
Erosion of Marinite 36 Large Pieces to fines, lbs	0	0.3024	0.1296
Marinite 36 Large Pieces, lbs	0.0864	0.1512	0
Min-K, lbs	0.512	0.704	0.832
Epoxy Paint (inside ZOI), lbs	69.12	95.04	112.32
Alkyd Paint (inside ZOI), lbs	0.608	0.836	0.988
Unqualified OEM Epoxy (outside ZOI), lbs	0	6.76	12.168

LOOP 4 RCS CROSSOVER LEG BREAK (DEGB) DEBRIS LOADS
AT THE MAIN STRAINER AND REMOTE STRAINER

Debris Type	Debris Load at Main Strainer at End of Pool Fill Phase	Overall Debris Load at Main Strainer	Overall Debris Load at Remote Strainer
Unqualified OEM Alkyd (outside ZOI), lbs	0	10.416	66.96
Unqualified Non-OEM Epoxy (outside ZOI), lbs	0	16.12	0
Unqualified Non-OEM Alkyd (outside ZOI), lbs	0	1.972	2.006
Unqualified Cold Galvanizing Compound, lbs	0	723.075	272.125
Dirt/Dust, lbs	40.8	88.4	95.2
Latent Fiber, ft^3	3.00	6.5	7
Fire Proof Tape Fines, ft^2	8.032	11.044	13.052
Fire Proof Tape Small Pieces, ft^2	1.296	1.872	0
Fire Proof Tape Large Pieces, ft^2	4.869	7.033	0
Ice Storage Bag Fibers, ft^3	0.0117	0.01638	0.01092
Ice Storage Bag Liner Shards, ft^3	0.000099	0.0001386	0.0000924
Pieces of Work Platform Rubber, ft^3	0.0009	0.00126	0.00084
Electromark Label (inside ZOI), ft^2	0.063	0.091	0.329
Electromark Label (outside ZOI), ft^2	0	1.188	27.324
Unqualified Labels – Paper, ft^2	0	0.2408	0.112
Unqualified Labels – Other, ft^2	0	22.0676	10.264
Flex Conduit PVC Jacketing, ft^2	0	1.57	0.471

LOOP 4 ALTERNATE RCS LOOP PIPING BREAK (DGBS) DEBRIS LOADS AT THE MAIN STRAINER AND REMOTE STRAINER

Debris Type	Debris Load at Main Strainer at End of Pool Fill Phase	Overall Debris Load at Main Strainer	Overall Debris Load at Remote Strainer
RMI Small Pieces, ft^2	2791.89	4032.73	0
RMI Large Pieces, ft^2	517.05	827.28	0
Cal-Sil Fines, lbs	23.2	31.9	34.684
Erosion of Cal-Sil Small Pieces to fines, lbs	0	4.64	3.712
Cal-Sil Small Pieces, lbs	2.32	4.64	0
Marinite I fines, lbs	0	0	0
Erosion of Marinite I Small Pieces to fines, lbs	0	0	0
Marinite I Small Pieces, lbs	0	0	0
Erosion of Marinite I Large Pieces to fines, lbs	0	0	0
Marinite I Large Pieces, lbs	0	0	0
Marinite 36 fines, lbs	0.2528	0.3476	0.4108
Erosion of Marinite 36 Small Pieces to fines, lbs	0	0.03	0.024
Marinite 36 Small Pieces, lbs	0.015	0.03	0
Erosion of Marinite 36 Large Pieces to fines, lbs	0	0.2268	0.0972
Marinite 36 Large Pieces, lbs	0.0648	0.1134	0
Min-K, lbs	0	0	0
Epoxy Paint (inside ZOI), lbs	1.824	2.508	2.964
Alkyd Paint (inside ZOI), lbs	0.608	0.836	0.988

LOOP 4 ALTERNATE RCS LOOP PIPING BREAK (DGBS) DEBRIS LOADS
AT THE MAIN STRAINER AND REMOTE STRAINER

Debris Type	Debris Load at Main Strainer at End of Pool Fill Phase	Overall Debris Load at Main Strainer	Overall Debris Load at Remote Strainer
Unqualified OEM Epoxy (outside ZOI), lbs	0	6.76	12.168
Unqualified OEM Alkyd (outside ZOI), lbs	0	10.416	66.96
Unqualified Non-OEM Epoxy (outside ZOI), lbs	0	16.12	0
Unqualified Non-OEM Alkyd (outside ZOI), lbs	0	1.972	2.006
Unqualified Cold Galvanizing Compound, lbs	0	723.075	272.125
Dirt/Dust, lbs	40.8	88.4	95.2
Latent Fiber, ft^3	3	6.5	7
Fire Proof Tape Fines, ft^2	8.032	11.044	13.052
Fire Proof Tape Small Pieces, ft^2	1.296	1.872	0
Fire Proof Tape Large Pieces, ft^2	4.869	7.033	0
Ice Storage Bag Fibers, ft^3	0.0117	0.01638	0.01092
Ice Storage Bag Liner Shards, ft^3	0.000099	0.0001386	0.0000924
Pieces of Work Platform Rubber, ft^3	0.0009	0.00126	0.00084
Electromark Label (inside ZOI), ft^2	0.063	0.091	0.329
Electromark Label (outside ZOI), ft^2	0	1.188	27.324
Unqualified Labels – Paper, ft^2	0	0.2408	0.112
Unqualified Labels – Other, ft^2	0	22.0676	10.264
Flex Conduit PVC Jacketing, ft^2	0	1.57	0.471

QUANTITY OF DEBRIS AT MAIN STRAINER FOR LARGE SCALE TESTING FOR DEGB AND DGBS

Debris Type	Units	DEGB Test Quantity	DGBS Test Quantity
RMI	ft^2	221.09	118.98
Cal-Sil Fines	lbs	3.50	0.87
Marinite I Fines	lbs	0.002	0
Marinite 36 Fines	lbs	0.02	0.01
Min-K	lbs	0.02	0
Epoxy Paint (inside ZOI)	lbs	2.25	0.04
Alkyd Paint (inside ZOI)	lbs	0.01	0.00
Unqualified OEM Epoxy (outside ZOI)	lbs	0.17	0.17
Unqualified OEM Alkyd (outside ZOI)	lbs	0.26	0.26
Unqualified Non-OEM Epoxy (outside ZOI)	lbs	0.20	0.20
Unqualified Non-OEM Alkyd (outside ZOI)	lbs	0.05	0.05
Unqualified Cold Galvanizing Compound	lbs	17.64	18
Dirt/Dust	lbs	2.57	2.57
Latent Fiber	ft^3	0.19	0.19
Fire Proof Tape Fines	ft^3	0.001	0.001
Ice Storage Bag Fibers	ft^3	0.0004	0.0004
Ice Storage Bag Liner Shards	ft^3	0.0000	0.0000
Pieces of Work Platform Rubber	ft^3	0.0000	0.0000
Fire Proof Tape Pieces [1]	ft^3	0.002	0.002
Electromark Label (inside ZOI) [(1)]	ft^2	0.003	0.003
Electromark Label (outside ZOI) [(1)]	ft^2	0.07	0.07
Unqualified Labels [(1)]	ft^2	0.61	0.61
Flex Conduit PVC Jacketing [(1)]	ft^2	0.04	0.04

[1] These debris materials were included in the sacrificial strainer area.

QUANTITY OF DEBRIS AT REMOTE STRAINER FOR LARGE SCALE TESTING FOR DEGB AND DGBS

Debris Type	Units	DEGB Test Quantity	DGBS Test Quantity
RMI	ft^2	0	0
Cal-Sil Fines	lbs	4.003	1.010
Marinite I Fines	lbs	0.002	0
Marinite 36 Fines	lbs	0.018	0.013
Min-K	lbs	0.020	0
Epoxy Paint (inside ZOI)	lbs	2.718	0.051
Alkyd Paint (inside ZOI)	lbs	0.008	0.008
Unqualified OEM Epoxy (outside ZOI)	lbs	0.309	0.309
Unqualified OEM Alkyd (outside ZOI)	lbs	1.655	1.655
Unqualified Non-OEM Epoxy (outside ZOI)	lbs	0	0
Unqualified Non-OEM Alkyd (outside ZOI)	lbs	0.052	0.052
Unqualified Cold Galvanizing Compound	lbs	6.637	6.637
Dirt/Dust	lbs	1.783	1.783
Latent Fiber	ft^3	0.131	0.131
Fire Proof Tape Fines	ft^3	0.001	0.001
Ice Storage Bag Fibers	ft^3	0.0003	0.0003
Ice Storage Bag Liner Shards	ft^3	0.0000	0.0000
Pieces of Work Platform Rubber	ft^3	0.0000	0.0000
Fire Proof Tape Pieces [1]	ft^3	0.010	0.010
Electromark Label (inside ZOI) (1)	ft^2	0.010	0.010
Electromark Label (outside ZOI) (1)	ft^2	0.453	0.453
Unqualified Labels (1)	ft^2	0.209	0.209
Flex Conduit PVC Jacketing(1)	ft^2	0.011	0.011

[1] These debris materials were included in the sacrificial strainer area.

DEBRIS QUANTITIES FOR MFTL HEAD LOSS TESTS

Debris Type	Units	Mass Test 1 (DEGB)	Mass Test 2 (DGBS)
Fibrous Debris			
Nukon	kg	0.447	0.447
Particulate Debris			
RMI	kg	17.590	9.466
Cal-Sil	kg	3.402	0.855
Marinite I	kg	0.002	0.000
Wollastonite	kg	0.006	0.004
Min-K	kg	0.016	0.000
Unqualified Non-OEM Epoxy	kg	0.196	0.083
Unqualified Non-OEM Alkyd	kg	0.049	0.249
Stone Flour	kg	17.766	14.564

CHEMICAL QUANTITIES FOR DEGB CHEMICAL EFFECTS TESTING

Chemical	Units	Mass DEGB Test
Boric Acid	kg	25.311
Sodium Tetraborate (Borax)	kg	12.753
Sodium Aluminate Solution 36%	kg	35.666
Calcium Chloride Solution 34%	kg	39.550
Sodium Silicate Solution 38%	kg	26.926

CHEMICAL QUANTITIES FOR DGBS CHEMICAL EFFECTS TESTING

Chemical	Units	Mass DGBS Test
Boric Acid	kg	25.311
Sodium Tetraborate (Borax)	kg	12.753
Sodium Aluminate Solution 36%	kg	35.666
Calcium Chloride Solution 34%	kg	39.550
Sodium Silicate Solution 38%	kg	26.926

VUEZ CHEMICAL EFFECTS TESTING DEBRIS QUANTITIES

Debris Source	Plant	Units	Test	Units	Test	Units (SI)
Latent Fiber[1]	6.5	ft^3	0.096	lbs	43.5	g
Epoxy (inside ZOI, 10 mil)	95.04	lbs	0.5873	lbs	266.4	g
Epoxy (OEM, outside ZOI)	6.76	lbs	0.0418	lbs	18.96	g
Epoxy (non-OEM, outside ZOI)	16.12	lbs	0.0996	lbs	45.2	g
Alkyd (inside ZOI, 10 mil)	0.836	lbs	0.0052	lbs	2.359	g
Alkyd (OEM, outside ZOI)	10.416	lbs	0.0644	lbs	29.2	g
Alkyd (non-OEM, outside ZOI)	1.972	lbs	0.0122	lbs	5.53	g
Marinite I	0.1199	lbs	0.000741	lbs	0.336	g
Marinite 36	1.00	lbs	0.006185	lbs	2.805	g
Min-K	0.704	lbs	0.00435	lbs	1.973	g
Cal-Sil	169.56	lbs	1.048	lbs	475.4	g
Dirt/Dust	88.4	lbs	0.546	lbs	247.7	g

[1] (Plant fiber volume) x (2.4 lb/ft^3) x (strainer scaling factor) = test fiber mass

VUEZ CHEMICAL EFFECTS TESTING

MATERIAL QUANTITIES SUBMERGED IN CONTAINMENT SUMP

Material	Source	Quantity
Metallic Aluminum	Miscellaneous Components	10.9 ft^2
Galvanized Steel, Cold Zinc Coated Steel	Structural Material	71,162.6 ft^2
Copper	Wires, tubing	1,021.6 ft^2
Concrete	Containment Building Structure	6,412.8 ft^2
Glycol (undiluted)	Cooling System	93.58 ft^3
Oil	Lubricant	32.76 ft^3

VUEZ CHEMICAL EFFECTS TESTING

NON-SUBMERGED MATERIAL QUANTITIES

Material	Source	Quantity
Metallic Aluminum	HVAC Equipment	8,013.4 ft^2
Galvanized Steel, Cold Zinc Coated Steel	Structural Material	504,729 ft^2
Carbon Steel	Structural Material	32,666.2 ft^2
Copper	Wires, Tubing, HVAC Equipment	39,735.24 ft^2
Concrete	Containment Structure	1,077.1 ft^2
Grease[1]	Lubricant	420.9 ft^2

[1] 0.175 ft^3 spread over the 420 ft^2 area.

STRAINER MINIMUM SUBMERGENCE DETERMINATION

Break Size	Containment Water Level at Initiation of Recirculation, ft	Minimum Water Level During Recirculation, ft	Time from Event Initiation until Minimum Water Level, ~ hours	Minimum Submergence Main Strainer, ft	Minimum Submergence Remote Strainer, ft
DEGB	7.7	5.9	9.1	0.9	1.3
DGBS[1]	6.9	5.6	2.5	0.6	1.0
SBLOCA (2 in)	6.8	5.1	9.5	0.1	0.5

[1] This break was analyzed as occurring in the reactor cavity at the reactor vessel nozzle, resulting in 30% of the break flow going to the reactor cavity and 70% going to the loop compartment.

IN-VESSEL FUEL ROD DEBRIS DEPOSITION

Case	Scale Thickness (µm)	Total Deposition Thickness (µm)	Total Deposition Thickness (mils)	Max Clad Temperature (°F)
Unit 1 (min sump volume)	151	443	17	365.71
Unit 1 (max sump volume)	61	353	14	365.71
Unit 2 (min sump volume)	122	414	16	358.10
Unit 2 (max sump volume)	54	346	14	358.09

BOUNDING DEBRIS AT MAIN STRAINER FOR SACRIFICIAL STRAINER AREA CONSIDERATION FOR DEGB AND DGBS

Debris Type	Debris Generated	Transport Fraction	Debris at Strainer
Electromark Labels (inside ZOI), ft^2	0.7	0.13	0.091
Electromark Labels (outside ZOI), ft^2	39.6	0.03	1.188
Unqualified Labels (all of containment), ft^2	25.94	0.86	22.308
Fire Barrier Tape Small Pieces (< 4 in), ft^2	14.4	0.13	1.872
Fire Barrier Tape Large Pieces (≥ 4 in), ft^2	54.1	0.13	7.033
Flexible Conduit PVC Jacketing, ft^2	1.57	1	1.57
Ice Storage Bag Liner Shards, ft^2	0.87	0.63	0.548
Pieces of Work Platform Rubber, ft^2	0.22	0.63	0.139
Total, ft^2	**137.4**	**-**	**34.75**

BOUNDING DEBRIS AT REMOTE STRAINER FOR SACRIFICIAL STRAINER AREA CONSIDERATION FOR DEGB AND DGBS

Debris Type	Debris Generated	Transport Fraction	Debris at Strainer
Electromark Labels (inside ZOI), ft^2	0.7	0.47	0.329
Electromark Labels (outside ZOI), ft^2	39.6	0.69	27.324
Unqualified Labels (all of containment), ft^2	25.94	0.4	10.38
Fire Barrier Tape Small Pieces (< 4 in), ft^2	14.4	0	0
Fire Barrier Tape Large Pieces (≥ 4 in), ft^2	54.1	0	0
Flexible Conduit PVC Jacketing, ft^2	1.57	0.3	0.471
Ice Storage Bag Liner Shards, ft^2	0.87	0.42	0.365
Pieces of Work Platform Rubber, ft^2	0.22	0.42	0.092
Total, ft^2	**137.4**	**-**	**38.96**

Core Activities for Radiological Consequence Analysis

Nuclide	Activity (Curies)	Nuclide	Activities (Curies)
Co-58	8.884E+05	Pr-143	1.398E+08
Co-60	6.796E+05	Nd-147	6.178E+07
Kr-85	1.280E+06	Np-239	2.609E+09
Kr-85m	2.364E+07	Pu-238	4.130E+05
Kr-87	4.661E+07	Pu-239	3.727E+04
Kr-88	6.222E+07	Pu-240	6.637E+04
Rb-86	2.272E+05	Pu-241	1.603E+07
Sr-89	8.677E+07	Am-241	1.707E+04
Sr-90	1.002E+07	Cm-242	7.417E+06
Sr-91	1.100E+08	Cm-244	1.838E+06
Sr-92	1.184E+08	Kr-83m	1.119E+07
Y-90	1.038E+07	Br-82	3.972E+05
Y-91	1.142E+08	Br-83	1.106E+07
Y-92	1.197E+08	Br-84	2.009E+07
Y-93	1.358E+08	Rb-89	8.303E+07
Zr-95	1.566E+08	Y-91m	6.384E+07
Zr-97	1.586E+08	Y-95	1.496E+08
Nb-95	1.578E+08	Nb-95m	1.795E+06
Mo-99	1.742E+08	Nb-97	1.596E+08
Tc-99m	1.546E+08	Rh-103m	1.849E+08
Ru-103	1.850E+08	Pd-109	5.749E+07
Ru-105	1.491E+08	Sb-124	1.434E+05
Ru-106	9.480E+07	Sb-125	1.231E+06
Rh-105	1.309E+08	Sb-126	5.873E+04
Sb-127	1.067E+07	Te-125m	2.725E+05
Sb-129	3.215E+07	Te-131	8.174E+07
Te-127	1.054E+07	Te-133	1.024E+08
Te-127m	1.841E+06	Te-133m	8.990E+07
Te-129	3.017E+07	Te-134	1.700E+08
Te-129m	5.821E+06	I-130	3.945E+06
Te-131m	2.119E+07	Xe-131m	1.385E+06
Te-132	1.374E+08	Xe-133m	6.099E+06
I-131	9.814E+07	Xe-135m	4.335E+07
I-132	1.420E+08	Xe-138	1.627E+08
I-133	1.916E+08	Cs-134m	5.865E+06

Core Activities for Radiological Consequence Analysis

Nuclide	Activity (Curies)	Nuclide	Activities (Curies)
I-134	2.148E+08	Cs-138	1.776E+08
I-135	1.832E+08	Ba-141	1.522E+08
Xe-133	1.919E+08	La-143	1.419E+08
Xe-135	5.900E+07	Pm-147	1.944E+07
Cs-134	2.523E+07	Pm-148	1.841E+07
Cs-136	6.388E+06	Pm-148m	4.711E+06
Cs-137	1.325E+07	Pm-149	6.245E+07
Ba-139	1.693E+08	Pm-151	2.177E+07
Ba-140	1.639E+08	Sm-153	6.797E+07
La-140	1.700E+08	Eu-154	9.557E+05
La-141	1.533E+08	Eu-155	4.427E+05
La-142	1.475E+08	Eu-156	4.798E+07
Ce-141	1.548E+08	Np-238	5.165E+07
Ce-143	1.430E+08	Pu-243	1.153E+08
Ce-144	1.296E+08	Am-242	1.148E+07

Core Activities in the Highest Discharge Assembly for Radiological Consequence Analysis

Nuclide	Activity (Ci)	Nuclide	Activities (Ci)
Co-58	7.595E+03	Pr-143	1.195E+06
Co-60	5.810E+03	Nd-147	5.282E+05
Kr-85	2.189E+04	Np-239	2.230E+07
Kr-85m	2.021E+05	Pu-238	3.531E+03
Kr-87	3.985E+05	Pu-239	3.186E+02
Kr-88	5.319E+05	Pu-240	5.674E+02
Rb-86	1.942E+03	Pu-241	1.370E+05
Sr-89	7.418E+05	Am-241	1.459E+02
Sr-90	8.566E+04	Cm-242	6.341E+04
Sr-91	9.404E+05	Cm-244	1.571E+04
Sr-92	1.012E+06	Kr-83m	9.567E+04
Y-90	8.874E+04	Br-82	3.396E+03
Y-91	9.763E+05	Br-83	9.455E+04
Y-92	1.023E+06	Br-84	1.718E+05
Y-93	1.161E+06	Rb-89	7.098E+05
Zr-95	1.339E+06	Y-91m	5.458E+05
Zr-97	1.356E+06	Y-95	1.279E+06
Nb-95	1.349E+06	Nb-95m	1.535E+04
Mo-99	1.489E+06	Nb-97	1.364E+06
Tc-99m	1.322E+06	Rh-103m	1.581E+06
Ru-103	1.582E+06	Pd-109	4.915E+05
Ru-105	1.275E+06	Sb-124	1.226E+03
Ru-106	8.105E+05	Sb-125	1.052E+04
Rh-105	1.119E+06	Sb-126	5.021E+02
Sb-127	9.122E+04	Te-125m	2.330E+03
Sb-129	2.749E+05	Te-131	6.988E+05
Te-127	9.011E+04	Te-133	8.754E+05
Te-127m	1.574E+04	Te-133m	7.686E+05
Te-129	2.574E+05	Te-134	1.453E+06
Te-129m	4.977E+04	I-130	3.373E+04
Te-131m	1.812E+05	Xe-131m	1.184E+04
Te-132	1.175E+06	Xe-133m	5.214E+04
I-131	1.342E+06	Xe-135m	3.706E+05
I-132	1.214E+06	Xe-138	1.391E+06
I-133	1.638E+06	Cs-134m	5.014E+04

Core Activities in the Highest Discharge Assembly for Radiological Consequence Analysis

Nuclide	Activity (Ci)	Nuclide	Activities (Ci)
I-134	1.836E+06	Cs-138	1.518E+06
I-135	1.566E+06	Ba-141	1.301E+06
Xe-133	1.641E+06	La-143	1.213E+06
Xe-135	5.044E+05	Pm-147	1.662E+05
Cs-134	2.157E+05	Pm-148	1.574E+05
Cs-136	5.461E+04	Pm-148m	4.028E+04
Cs-137	1.133E+05	Pm-149	5.339E+05
Ba-139	1.447E+06	Pm-151	1.861E+05
Ba-140	1.401E+06	Sm-153	5.811E+05
La-140	1.453E+06	Eu-154	8.170E+03
La-141	1.311E+06	Eu-155	3.785E+03
La-142	1.261E+06	Eu-156	4.102E+05
Ce-141	1.323E+06	Np-238	4.416E+05
Ce-143	1.223E+06	Pu-243	9.857E+05
Ce-144	1.108E+06	Am-242	9.815E+04

Parameters Used in the Calculation of Reactor Coolant Fission Product Concentrations

Parameter	Value
Core Thermal Power	3480 MWt
Fraction of Fuel Rods Containing Cladding Defects	0.01
Reactor Coolant Liquid Volume	10,309.9 ft^3
Reactor Coolant Average Temperature	574°F
Purification Flow Rate	75 gpm
Cation Bed Flow Rate	800 gpd
Boron Dilution/Makeup Flow Rate	400 gpd
Fission Product Escape Rate Coefficients:	
Kr, Xe	6.5E-08
I, Br, Rb, Cs	1.3E-08
Mo, Tc	2.0E-09
Te Isotopes	1.0E-09
Sr, Ba Isotopes	1.0E-11
Y, Zr, Nb, Ru, Rh, La, Ce, Pr	1.6E-12
Mixed Bed Demineralizer Decontamination Factors:	
Noble Gases	1
I, Br Isotopes	10
Sr, Ba Isotopes	10
All Other Isotopes	1
Cation Bed Demineralizer Decontamination Factors:	
Kr, Xe	1
Sr, Ba Isotopes	1
Rb-86, Cs-134, Cs-137	10
Rb-88, Rb-89, Cs-136, Cs-138	1
All Other Isotopes	1
Volume Control Tank Noble Gas Stripping Fractions	
Kr-83m	0.78
Kr-85m	0.61
Kr-85	7.3E-05
Kr-87	0.84

Parameters Used in the Calculation of Reactor Coolant Fission Product Concentrations

Parameter	Value
Kr-88	0.71
Xe-131m	0.017
Xe-133m	0.085
Xe-133	0.037
Xe-135m	0.95
Xe-135	0.35
Xe-138	0.95
Volume Control Tank Purge Flow Rate	0 cfm

Reactor Coolant Equilibrium Fission Product Concentrations

Nuclide	Activity (µCi/g)	Nuclide	Activities (µCi/g)
Kr-85	2.385E+01	Xe-135	3.361E+00
Kr-85m	5.204E-01	Cs-134	3.327E+01
Kr-87	3.299E-01	Cs-136	2.188E+00
Kr-88	9.148E-01	Cs-137	1.852E+01
Rb-86	8.797E-02	Ba-139	1.975E-04
Sr-89	1.335E-03	Ba-140	1.940E-03
Sr-90	1.237E-04	La-140	2.878E-03
Sr-91	5.681E-04	La-141	1.301E-04
Sr-92	2.488E-04	La-142	3.346E-05
Y-90	2.152E-04	Ce-141	1.445E-02
Y-91	1.692E-02	Ce-143	6.911E-04
Y-92	3.067E-04	Ce-144	4.229E-02
Y-93	2.010E-04	Pr-143	6.713E-03
Zr-95	2.409E-02	Kr-83m	1.350E-01
Zr-97	3.920E-04	Br-82	4.641E-03
Nb-95	3.478E-02	Br-83	2.720E-02
Mo-99	2.070E+00	Br-84	1.244E-02
Tc-99m	1.980E+00	Rb-89	2.530E-02
Ru-103	1.991E-02	Y-91m	3.314E-04
Ru-105	9.723E-05	Nb-95m	1.867E-04
Ru-106	3.340E-02	Nb-97	4.900E-05
Rh-105	7.689E-04	Rh-103m	1.988E-02
Te-127	2.489E-01	Kr-83m	1.350E-01
Te-127m	2.465E-01	Te-125m	2.449E-02
Te-129	2.281E-01	Te-131	1.599E-02
Te-129m	3.463E-01	Te-133m	7.643E-03
Te-131m	5.787E-02	Te-134	1.092E-02
Te-132	9.639E-01	Xe-131m	1.600E+00
I-131	8.087E-01	Xe-133m	1.423E+00
I-132	6.411E-01	Xe-135m	2.138E-01
I-133	1.0304E+00	Xe-138	2.292E-01
I-134	1.231E-01	Cs-134m	2.031E-02
I-135	5.365E-01	Cs-138	3.420E-01
Xe-133	1.037E+02	Ba-141	4.233E-05

Reactor Coolant Iodine Appearance Rates (Ci/min)

Isotope	Appearance Rate (Ci/min)
I-131	0.4469
I-132	1.2307
I-133	0.7099
I-134	0.5128
I-135	0.5459

TRITIUM PRODUCTION IN THE REACTOR COOLANT (ci/yr) [1]

		RELEASED TO THE COOLANT	
Tritium Source	**Total Produced**	**Design Value**	**Expected Value**
Ternary Fissions	10,420	3126	104
Burnable Poison Rods (Initial Cycle)	922	277	9
Soluble Poison Boron (Initial Cycle) (Equilibrium Cycle)	378 525	378 525	378 525
Li-7 Reaction	11	11	11
Li-6 Reaction	6	6	6
Deuterium Reaction	1	1	1
Totals Initial Cycle	11,738	3799	509
Totals Equilibrium	10,963	3669	647

[1] This table was applicable at the time Unit 1 was licensed.

REVISED TRITIUM PRODUCTION IN THE REACTOR COOLANT [1]

Tritium Source	Total Produced (curies/yr)	Expected Release to Reactor Coolant (curies/yr)
Ternary Fission	10,000	1000
Burnable Poison Rods (Initial Cycle)	1420	142
Soluble Boron (Initial Cycle) (Equilibrium Cycle)	206 294	206 294
Lithium and Deuterium Reactions	105	105
Total Initial Cycle	11,730	1453
Total Equilibrium Cycle	10,400	1400

Basis:

Release Fraction from Fuel	10%
Release Fraction from Burnable Poison Rods	10%
Burnable Poison Rod B-10 Mass	6160 gpm

[1] This table was included in the Original FSAR in May, 1976.

Volume Control Tank Activities for Offsite Dose Consequence Analysis

Nuclide	VCT Gas Phase Activity (Ci)	VCT Liquid Phase Activity (Ci)	Letdown Activity (Ci)	Total Activity (Ci)
Kr-85	2.793E+03	1.780E+02	2.231E+02	3.194E+03
Kr-85m	3.923E+01	4.484E+00	5.619E+00	4.933E+01
Kr-87	1.359E+01	2.462E+00	3.085E+00	1.913E+01
Kr-88	6.477E+01	7.334E+00	9.191E+00	8.129E+01
Xe-133	1.668E+04	1.146E+03	1.436E+03	1.926E+04
Xe-133m	2.176E+02	1.547E+01	1.939E+01	2.524E+02
Xe-135	2.779E+02	2.335E+01	2.927E+01	3.305E+02
Xe-135m	2.705E+00	1.835E+00	2.299E+00	6.837E+00

Volume Control Tank Activities for Control Room Dose Consequence Analysis

Nuclide	VCT Gas Phase Activity (Ci)	VCT Liquid Phase Activity (Ci)	Letdown Flow Activity (Ci)	Total Activity (Ci)
Kr-85m	1.596E+02	1.021E+01	1.012E+01	1.799E+02
Kr-85	1.835E+04	4.679E+02	4.639E+02	1.929E+04
Kr-87	3.955E+01	6.472E+00	6.416E+00	5.244E+01
Kr-88	2.070E+02	1.794E+01	1.779E+01	2.427E+02
Xe-131m	8.716E+02	3.138E+01	3.111E+01	9.341E+02
Xe-133m	7.125E+02	2.791E+01	2.766E+01	7.681E+02
Xe-133	5.421E+04	2.035E+03	2.017E+03	5.826E+04
Xe-135m	5.806E+00	4.194E+00	4.158E+00	1.4160E+01
Xe-135	1.200E+03	6.593E+01	6.535E+01	1.331E+03
Xe-138	5.770E+00	4.497E+00	4.458E+00	1.473E+01

Waste Gas Decay Tank Activity

Nuclide	Total Activity (Ci)
Kr-85m	1.433E+02
Kr-85	6.570E+03
Kr-87	9.087E+01
Kr-88	2.520E+02
Xe-131m	4.407E+02
Xe-133m	3.920E+02
Xe-133	2.857E+04
Xe-135m	5.889E+01
Xe-135	9.258E+02
Xe-138	6.314E+01

COMPONENTS NOMENCLATURE

COMPONENT	ELEMENT
Vessel Supports	Number 1 and 49
Barrel Flange and Hold-Down Spring	Numbers 2 thru 6
Barrel	Numbers 7 thru 10
Lower Core Supports	Numbers 11 thru 15
Major Fuel Assemblies	Even Numbers 16 thru 38
Minor Fuel Assemblies	Odd Numbers 17 thru 39
Upper Internals	Numbers 40 thru 48

HISTORICAL

MAXIMUM DEFLECTIONS UNDER BLOWDOWN (INCHES)

(1-MILLISECOND DOUBLE-ENDED BREAK)

Component	Hot Leg	Cold Leg	Seismic Horizontal	Maximum Total	Allowable	No Loss Of Function
Upper Barrel						
Radial inward	0.057	0.0	0.002	0.059	5	10
Radial outward	0.029	0.431	0.002	0.460	4.125	8.25
Upper core plant	0.015	0.016	0	0.016	0.100 [1]	0.150
RCC Guide Tubes (deflection as a beam)	(54)<Allowable		0.010	<Allowable	1.0	1.60 to 1.75
	(2)<N.L.F.		0.010	<N.L.F.	1.0	1.60 to 1.75
	>Allowable			>Allowable		1.60 to 1.75
	(5)>N.L.F		0.010	>N.L.F.	1.0	
Fuel Assembly Thimbles (cross-section distortion)	0	0	0	0	0.036	0.072

[1] Only to assure that the plate will not touch a guide tube.

INDIANA MICHIGAN POWER An AEP Company	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revision: 16.1 Table: 14.G-3 Page: 1 of 1

HISTORICAL

SUMMARY OF MAXIMUM STRESS INTENSITIES (PSI)

(1-MILLISECOND PIPE BREAK AND SEISMICS)

	Hot Leg Break		Cold Leg Break		Maximum Total Seismic		
Component	**Maximum Membrane**	**Maximum Total**	**Maximum Membrane**	**Maximum Total**	**Vertical**	**Horizontal**	**Maximum Total Blowdown Plus Seismic**
Barrel (Girth weld)	21,440	31,340	38,900	46,200	133	533	46,733
Barrel-Flange (weld)	19,820	29,720	18,430	47,700	545	800	49,045
Fuel Assembly Top Nozzle Plate		28,700	0	8,000	0	0	28,700
Fuel Assembly Bottom Nozzle Plate		38,700		40,800	533		41,333
Fuel Assembly Thimbles	6,600	6,600	2,300	2,300			6,600

Allowable Stress, Sm:

Sm at 588°F = 16,600 psi [1]
Maximum Membrane Stress = Pm = 2.4 Sm = 39,800 psi
Maximum Total Stress = Pm + Pb = 49,800 psi

[1] Per Winter 1969 Addenda ASME Section III Code