IP2
FSAR UPDATE

TABLE 14.3-3
Key LOCA Parameters and Initial Transient Assumptions for Indian Point Unit 2

Parameter	Initial Transient	Range / Uncertainty
1.0 Plant Physical Description		
a. Dimensions	Nominal	Sample [3]
b. Flow resistance	Nominal	Sample [3]
c. Pressurizer location	Opposite broken loop	Bounded
d. Hot assembly location	Under limiting location	Bounded
e. Hot assembly type	15 x 15 upgraded, ZIRLO™ clad and Non-IFBA	Bounded
f. SG tube plugging level	High (10%)	Bounded[1]
2.0 Plant Initial Operating Conditions		
2.1 Reactor Power		
a. Core average linear heat rate (AFLUX)	Nominal – Based on 100% of uprated power (3216 MWt)	Sample [3]
b. Hot Rod Peak Linear heat rate (PLHR)	Derived from desired Tech Spec (TS) limit F_Q = 2.5 and maximum baseload F_Q = 2.0	Sample [3]
c. Hot rod average linear heat rate (HRFLUX)	Derived from TS $F_{\Delta H}$ = 1.7	Sample [3]
d. Hot assembly average heat rate (HAFLUX)	HRFLUX/1.04	Sample [3]
e. Hot assembly peak heat rate (HAPHR)	PLHR/1.04	Sample [3]
f. Axial power distribution (PBOT, PMID)	Figure 14.3-20	Sample [3]
g. Low power region relative power (PLOW)	0.3	Bounded [2]
h. Cycle burnup	~100 MWD/MTD	Sample [3]
i. Prior operating history	Equilibrium decay heat	Bounded
j. Moderator Temperature Coefficient (MTC)	Tech Spec Maximum (0)	Bounded
k. HFP boron	800 ppm	Generic

TABLE 14.3-3 (Cont.)
Key LOCA Parameters and Initial Transient Assumptions for Indian Point Unit 2

Parameter	Initial Transient	Range / Uncertainty
2.2 Fluid Conditions		
a. T_{avg}	High Nominal T_{avg} =572°F	Bounded (1), Sample (3)
b. Pressurizer pressure	Nominal (2250.0 psia)	Sample (3)
c. Loop flow	80,700 gpm	Bounded (4)
d. T_{UH}	T_{Hot}	0
e. Pressurizer level	Nominal at high Tavg	0
f. Accumulator temperature	Nominal (105 °F)	Sample (3)
g. Accumulator pressure	Nominal (656.2 psia)	Sample (3)
h. Accumulator liquid volume	Nominal (795 ft^3)	Sample (3)
i. Accumulator line resistance	Nominal	Sample (3)
j. Accumulator boron	Minimum (2000 ppm)	Bounded
3.0 Accident Boundary Conditions		
a. Break location	Cold leg	Bounded
b. Break type	Guillotine (DEGCL)	Sample (3)
c. Break size	Nominal (cold leg area)	Sample (3)
d. Offsite power	Available (RCS pumps running)	Bounded(2)
e. Safety injection flow	Minimum (Table 14.3-5B)	Bounded
f. Safety injection temperature	Nominal (72.5 °F)	Sample (3)
g. Safety injection delay	Max delay (38.0 sec)	Bounded
h. Containment pressure	Bounded – Lower (conservative) than pressure curve shown in figure 14.3-22	Bounded
i. Single failure	ECCS: Loss of 1 SI train; Containment pressure: all trains operational	Bounded
j. Control rod drop time	No control rods	Bounded

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TABLE 14.3-3 (Cont.)
Key LOCA Parameters and Initial Transient Assumptions for
Indian Point Unit 2

Parameter	Initial Transient	Range / Uncertainty
4.0 Model Parameters		
a. Critical Flow	Nominal (C_D = 1.0)	Sample (3)
b. Resistance uncertainties in broken loop	Nominal (as coded)	Sample (3)
c. Initial stored energy/fuel rod behavior	Nominal (as coded)	Sample (3)
d. Core heat transfer	Nominal (as coded)	Sample (3)
e. Delivery and bypassing of ECC	Nominal (as coded)	Conservative
f. Steam binding/entrainment	Nominal (as coded)	Conservative
g. Noncondensable gases/accumulator nitrogen	Nominal (as coded)	Conservative
h. Condensation	Nominal (as coded)	Sample (3)

Notes:
1. Confirmed to be limiting
2. High PLOW of 0.8 confirmed to be limiting; Loss-Of-Offsite-Power confirmed to be limiting
3. Sampling distribution defines in Table 5.2-1 of Reference 79
4. Assumed to be result of loop resistance uncertainty

TABLE 14.3-4
Limiting Large Break PCT and Oxidation Results for Indian Point Unit 2

Parameter	Result
95/95 Peak Clad Temperature (PCT)	1,962°F*
95/95 Maximum Cladding Oxidation (LMO)	<2152°F_1
95/95 Maximum Core-wide Oxidation (CWO)	<13%

* The PCT result provided do not reflect any individual PCT assessments discussed in Section 14.3.3..3.4

TABLE 14.3-5A
Plant Operating Range Allowed by the Best-Estimate Large Break LOCA Analysis for Indian Point Unit 2

Parameter			Operating Range
1.0	Plant Physical Description		
	a)	Dimensions	No in-board assembly grid deformation during LOCA + SSE
	b)	Flow resistance	N/A
	c)	Pressurizer location	N/A
	d)	Hot assembly location	Anywhere in core interior (149 locations)(1)
	e)	Hot assembly type	15 X 15 Upgraded fuel design
	f)	SG tube plugging level	≤ 10%
	g)	Fuel assembly type	15 X 15 upgraded fuel with ZIRLO™ cladding, non-IFBA or IFBA (2)
2.0	Plant Initial Operating Conditions		
	2.1	Reactor Power	
	a)	Core average linear heat rate	Core power ≤ 102% of 3216 MWt
	b)	Peak linear heat rate	$F_Q \leq 2.5$
	c)	Hot rod average linear heat rate	$F_{\Delta H} \leq 1.70$
	d)	Hot assembly average linear heat rate	$P_{HA} \leq 1.7 / 1.04$
	e)	Hot assembly peak linear heat rate	$F_{Q(HA)} \leq 2.5 / 1.04$
	f)	Axial power distribution (PBOT, PMID)	Figure 14.3-21
	g)	Low power region relative power (PLOW)	0.3 ≤ PLOW ≤ 0.8
	h)	Hot assembly burnup	≤ 75,000 MWD/MTU, lead rod
	i)	Prior operating history	All normal operating histories
	j)	MTC	≤ 0 at hot full power (HFP)
	k)	HFP boron (minimum)	800 ppm (at BOL)

TABLE 14.3-5A (Cont.)
Plant Operating Range Allowed by the Best-Estimate Large Break LOCA Analysis
for Indian Point Unit 2

Parameter		Operating Range
	2.2 Fluid Conditions	
	a) T_{avg}	$549 - 3.3°F \leq T_{avg} \leq 572 + 3.3°F^{(3)}$
	b) Pressurizer pressure	$2250 - 25$ psia $\leq P_{RCS} \leq 2250 + 25$ psia $^{(4)}$
	c) Loop flow	≥ 80,700 gpm/loop
	d) T_{UH}	Current upper internals, T_{Hot} UH
	e) Pressurizer level	Normal level, automatic control
	f) Accumulator temperature	$80°F \leq T_{ACC} \leq 130°F$
	g) Accumulator pressure	612.7 psia $\leq P_{ACC} \leq$ 699.7 psia
	h) Accumulator liquid volume	$723\ ft^3 \leq V_{acc} \leq 875\text{-}ft^3$
	i) Accumulator fL/D	Current line configuration
	j) Minimum ECC boron	≥ 2000 ppm
3.0	Accident Boundary Conditions	
	a) Break location	N/A
	b) Break type	N/A
	c) Break size	N/A
	d) Offsite power	Available or Loss-Of-Offsite-Power (LOOP)
	e) Safety injection flow	Table 14.3-5B
	f) Safety injection temperature	35°F ≤ SI Temp ≤110°F
	g) Safety injection delay	≤ 38 seconds (with offsite power) ≤ 45 seconds (with LOOP)
	h) Containment pressure	Figure 14.3-22, raw data in Table 14.3-2 and M&E releases in Table 14.3-2A
	i) Single failure	Loss of one ECCS train
	j) Control rod drop time	N/A

NOTE:
(1) 44 peripheral locations (Figure 3.2-8 from Reference 79) will not physically be lead power assembly.
(2) See Section 14.3.3.3.4 for associated transition core evaluation.

(3) Include -3 (bias); Bias sign correction: "+" means indicated value is higher than actual and "-" means indicated value is lower than actual.
(4) Include -3, + 12 (bias); Bias sign correction: "+" means indicated value is higher than actual and "-" means indicated value is lower than actual.

TABLE 14.3-5B
Total Minimum Injected Safety Injection Flow Used in Best-Estimate Large Break LOCA Analysis for Indian Point Unit 2

RCS Pressure (psig)	Flow Rate (gpm)
0	2330.03
10	1962.54
20	1636.46
30	1333.48
40	1041.40
50	770.92
60	691.73
100	678.21
200	641.35
300	603.25
400	564.49
500	525.07
600	469.87
700	396.91
800	335.54
900	304.38
1000	235.22
1100	134.33
1200	23.56
1300	0.0

TABLE 14.3-6
Broken Loop Accumulator and Safety Injection Spill to Containment During Blowdown
DELETED

TABLES 14.3-7 through 14.3-10
DELETED

TABLE 14.3-11
Initial Parameters For Small Break LOCA Analysis

Licensed Core Power (MWt) (includes 2% calorimetric uncertainty)	3281
Total Peaking Factor, Fq	2.5
Axial Offset, %	13
Hot Channel Enthalpy Rise Factor, FΔH	1.70
Maximum Assembly Average Power, PHA	1.51
Fuel Assembly Array	15 x 15 upgraded with IFMs
Nominal Accumulator Water Volume, ft^3	795
Accumulator Tank Volume, ft^3	1100
Minimum Accumulator Gas Pressure, psia	613
Loop Flow (gpm)	80700
Vessel Inlet Temperature, °F	537.451
Vessel Outlet Temperature, °F	606.549
RCS Pressure with Uncertainty, psia	2310
Steam Pressure, psia	735.645
Steam Generator Tube Plugging, %	10
Maximum Refueling Water Storage Tank Temperature, ºF	110
Maximum Condensate Storage Tank Temperature, ºF	120
Non-IFBA Fuel Backfill Pressure, psig	275
Reactor Trip Setpoint, psia	1860
Safety Injection Signal Setpoint, psia	1715
Safety Injection Delay Time, sec.	25
Signal Processing Delay and Rod Drop Time, sec.	4.7 (2.0 + 2.7)
Feedwater Trip Processing Delay Time, sec.	2
Time for Main Feedwater Flow Coastdown, sec.	8
Auxiliary Feedwater Flow – gpm (1)	380
Auxiliary Feedwater Pump Start Delay Time, sec.	60
Maximum Loop Specific Purge Volume, ft^3	268.8

NOTE:
(1) The flow from one motor-driven Auxiliary Feedwater Pump is modeled.

TABLE 14.3-12
Small - Break LOCA Time Sequence of Events

EVENT	Break Size		
	2.0 Inch	3.0 Inch	4.0 Inch
Break Initiation, sec.	0.0	0.0	0.0
Reactor Trip Signal, sec.	43.3	18.2	10.4
Safety Injection Signal, sec.	61.0	26.4	14.9
Top of Core Uncovered, sec.	1711	629	692
Accumulator Injection Begins, sec.	NA	1689	850
Peak Clad Temperature Occurs, sec.	1967	1308	955
Top of Core Recovered, sec.	3854	1924	1170

TABLE 14.3-13
Small Break LOCA Analysis Results

RESULT	Break Size		
	2.0 Inch	3.0 Inch	4.0 Inch
Peak Clad Temperature, °F	938	1028	878
Peak Clad Temperature Location, ft.	10.75	11.00	11.00
Local Zr/H_2O Reaction (max), %	<17	<17	<17
Local Zr/H_2O Reaction Location, ft.	11.25	11.00	11.25
Total Zr/H_2O Reaction, %	<1.0	<1.0	<1.0
Hot Rod Burst Time, seconds	NA	NA	NA
Hot Rod Burst Location, ft.	NA	NA	NA

TABLE 14.3-14
Internals Deflections Under Abnormal Operation

	Allowable Limit[1] (inches)	No Loss-of-Function Limit[1] (inches)
Upper barrel, expansion/compression (to ensure sufficient inlet flow area/and to prevent the barrel from touching any guide tube to avoid disturbing the rod cluster control guide structure)	Inward - 4.1 Outward - 1.0	8.2 1.0
Upper package, axial deflection (to maintain the control rod guide structure geometry)[2,3]	0.100	0.150
Rod cluster control guide tube, deflection as a beam (to be consistent with conditions under which ability to trip has been tested)[3]	1.0	1.60/1.75
Fuel assembly thimbles, cross-section distortion (to avoid interference between the control rods and the guides)[3]	0.036	0.072

Notes:

1. The deflection limit values given above correspond to stress levels for the internals structure well below the limiting criteria given by the collapse curves in WCAP-5890 (Reference 30). Consequently, for the internals the geometric limitations established to ensure safe shutdown capability are more restrictive than those given by the failure stress criteria.
2. See Reference 26.
3. See Reference 27.

TABLE 14.3-15
SYSTEM PARAMETERS FOR 3216 MWt

Parameters	**Value**
RCS Pressure (psia) (with 60 psi uncertainty)	2310
Core Thermal Power (MWt) (without uncertainties)	3216
Reactor Coolant System Total Flowrate (lbm/sec)	34,250
Vessel Outlet Temperature (°F) (with uncertainty)	613.3
Core Inlet Temperature (°F) (with uncertainty)	545.7
Vessel Average Temperature (°F)	579.5
Initial Steam Generator Steam Pressure (psia)	788
Steam Generator Tube Plugging (%)	0
Initial Steam Generator Secondary Side Mass (lbm)	104,300.1
Assumed Maximum Containment Backpressure (psia)	61.7
Accumulator	
Water Volume (ft^3) per accumulator (including line volume)	770
N_2 Cover Gas Pressure (psia)	700
Temperature (°F)	130
Safety Injection Delay, total (sec) (from beginning of event) (Minimum ECCS case)	49.1
(Maximum ECCS case)	45

TABLE 14.3-16 (Sheet 1 of 4)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MIN SI
BLOWDOWN MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATH NO.1*		BREAK PATH NO.2**	
	FLOW	ENERGY	FLOW	ENERGY
SECONDS	LBM/SEC	THOUSANDS BTU/SEC	LBM/SEC	THOUSANDS BTU/SEC
.00000	.0	.0	.0	.0
.00102	84849.3	45618.7	38460.5	20632.5
.00204	40171.1	21550.8	39870.6	21387.9
.00312	40159.2	21545.3	39615.5	21250.0
.101	39922.0	21501.5	19727.2	10572.6
.201	40974.9	22258.1	22318.8	11974.5
.302	44538.4	24465.2	23349.8	12534.5
.402	44682.9	24869.9	23496.8	12619.0
.502	43717.2	24675.3	23121.9	12423.6
.601	44127.3	25230.0	22645.7	12173.7
.701	43629.7	25226.5	22265.5	11975.3
.801	42265.6	24676.5	22065.9	11873.3
.902	40921.3	24115.0	21964.7	11823.2
1.00	39778.0	23661.6	21916.4	11800.6
1.10	38622.2	23215.4	21868.9	11777.7
1.20	37319.2	22690.8	21834.5	11761.1
1.30	35944.7	22103.1	21808.2	11748.2
1.40	34695.2	21548.2	21802.4	11746.0
1.50	33741.2	21128.7	21829.4	11761.1
1.60	32976.7	20806.2	21824.2	11758.5
1.70	32268.2	20512.2	21705.1	11693.9
1.80	31535.6	20200.6	21555.6	11612.9
1.90	30716.4	19828.7	21402.4	11530.0
2.00	29976.9	19501.2	21256.3	11451.0
2.10	29196.0	19140.5	21112.8	11373.8
2.20	28344.1	18723.1	20957.2	11290.1
2.30	27335.3	18191.3	20784.2	11197.1
2.40	26135.3	17523.8	20600.6	11098.5
2.50	24599.3	16613.7	20405.2	10993.7
2.60	22535.4	15316.1	20199.6	10883.6
2.70	21036.9	14396.0	19989.1	10771.0
2.80	20639.2	14205.3	19798.0	10668.9
2.90	19987.2	13800.9	19602.5	10564.7
3.00	19522.8	13516.0	19407.4	10460.8
3.10	19376.6	13446.0	19204.5	10352.8
3.20	19201.3	13342.5	18988.4	10237.7
3.30	18810.9	13089.4	18759.2	10115.5
3.40	18480.2	12877.9	18531.2	9994.0
3.50	18122.3	12639.8	18312.4	9877.7
3.60	17692.9	12347.4	18094.2	9761.8
3.70	17211.2	12017.4	17873.1	9644.3
3.80	16724.6	11684.5	17658.8	9530.6
3.90	16264.9	11369.3	17458.8	9424.7

TABLE 14.3-16 (Sheet 2 of 4)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MIN SI
BLOWDOWN MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATH NO.1*		BREAK PATH NO.2**	
SECONDS	FLOW LBM/SEC	ENERGY THOUSANDS BTU/SEC	FLOW LBM/SEC	ENERGY THOUSANDS BTU/SEC
4.00	15820.9	11062.9	17267.5	9323.6
4.20	14978.6	10480.2	16898.7	9128.8
4.40	14290.6	10002.9	16558.4	8949.6
4.60	13707.5	9594.2	16243.5	8784.0
4.80	13236.1	9259.0	15953.9	8632.0
5.00	12820.2	8956.5	15678.5	8487.5
5.20	12481.3	8705.1	15423.5	8353.9
5.40	12234.8	8509.6	15184.4	8228.7
5.60	12013.2	8329.5	14948.5	8105.1
5.80	11845.2	8184.2	14736.2	7994.2
6.00	11685.0	8040.9	14523.9	7883.0
6.20	11581.6	7932.9	14331.5	7782.7
6.40	11553.1	7869.2	14292.3	7767.5
6.60	12293.5	8327.7	14710.1	8000.1
6.80	11952.9	8084.8	14733.3	8016.3
7.00	10706.7	7749.8	14578.9	7935.9
7.20	9189.8	7146.8	14522.0	7909.0
7.40	8892.9	6975.6	14368.8	7828.6
7.60	8891.4	6931.8	14262.7	7774.8
7.75	8873.2	6896.3	14156.0	7719.6
7.80	8859.4	6880.4	14108.8	7694.8
8.00	8797.6	6810.4	13887.9	7577.7
8.20	8769.7	6749.4	13661.1	7457.0
8.40	8796.7	6713.6	13513.7	7379.2
8.60	8840.2	6682.9	13477.8	7360.1
8.80	8856.5	6634.0	13353.8	7289.4
9.00	8859.7	6593.2	13187.4	7194.4
9.20	8823.9	6536.6	13058.2	7120.2
9.40	8768.8	6472.5	12930.8	7047.5
9.60	8705.1	6398.9	12780.7	6962.8
9.80	8632.0	6315.4	12629.7	6878.0
10.0	8548.7	6227.9	12492.6	6801.4
10.2	8442.2	6132.4	12355.1	6724.5
10.401	8328.6	6042.5	12216.2	6646.9
10.402	8328.1	6042.1	12215.6	6646.6
10.403	8327.4	6041.6	12214.9	6646.2
10.6	8200.0	5951.8	12080.4	6571.1
10.8	8065.0	5865.6	11944.4	6495.3
11.0	7923.0	5780.9	11806.4	6418.6
11.2	7779.9	5700.5	11668.3	6342.2
11.4	7631.7	5620.8	11530.0	6265.9
11.6	7480.7	5541.8	11389.2	6188.4
11.8	7327.0	5463.6	11250.5	6112.2

TABLE 14.3-16 (Sheet 3 of 4)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MIN SI
BLOWDOWN MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATH NO.1*		BREAK PATH NO.2**	
	FLOW	ENERGY	FLOW	ENERGY
SECONDS	LBM/SEC	THOUSANDS BTU/SEC	LBM/SEC	THOUSANDS BTU/SEC
12.0	7176.5	5390.8	11111.5	6036.0
12.2	7026.3	5316.4	10968.4	5957.5
12.4	6883.8	5243.8	10826.9	5880.1
12.6	6747.1	5172.2	10685.1	5802.7
12.8	6615.8	5101.2	10544.3	5726.0
13.0	6488.9	5030.5	10403.6	5649.5
13.2	6366.6	4960.4	10263.5	5573.5
13.4	6249.0	4891.3	10125.0	5498.4
13.6	6135.2	4822.6	9987.3	5423.8
13.8	6026.2	4755.4	9853.5	5351.4
14.0	5919.5	4688.6	9716.7	5277.2
14.2	5816.8	4623.7	9595.4	5206.8
14.4	5713.0	4557.7	9502.1	5137.0
14.6	5602.6	4486.4	9411.0	5054.8
14.8	5476.2	4402.2	9352.2	4978.2
15.0	5328.9	4296.1	9293.2	4893.3
15.2	5176.5	4174.4	9247.0	4809.1
15.4	5038.0	4049.0	9247.1	4747.4
15.6	4932.8	3939.5	9212.9	4671.6
15.8	4851.8	3846.7	9144.7	4586.4
16.0	4778.1	3768.8	9017.4	4479.5
16.2	4704.7	3700.7	8935.1	4400.9
16.4	4630.2	3639.4	8875.9	4338.7
16.6	4554.4	3583.5	8757.9	4251.9
16.8	4479.1	3533.9	8641.2	4168.4
17.0	4403.7	3489.6	8576.6	4112.2
17.2	4326.9	3449.9	8497.4	4051.1
17.4	4248.8	3415.1	8359.4	3964.2
17.6	4169.2	3386.2	8225.0	3880.8
17.8	4088.8	3361.4	8059.9	3783.8
18.0	4003.3	3338.9	8074.0	3771.4
18.2	3911.2	3320.1	7968.5	3702.9
18.4	3816.0	3306.6	7735.9	3574.5
18.6	3711.0	3295.4	7557.1	3468.0
18.8	3599.3	3288.9	7489.2	3409.1
19.0	3476.9	3281.6	7426.3	3351.2
19.2	3339.5	3274.3	7291.6	3261.6
19.4	3112.8	3201.9	7025.2	3115.2
19.6	2872.0	3112.9	6504.2	2859.2
19.8	2656.5	3017.4	5888.0	2563.0
20.0	2468.0	2906.1	5468.7	2349.1
20.2	2308.0	2789.5	5535.0	2328.4

TABLE 14.3-16 (Sheet 4 of 4)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MIN SI
BLOWDOWN MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATH NO.1*		BREAK PATH NO.2**	
	FLOW	ENERGY	FLOW	ENERGY
SECONDS	LBM/SEC	THOUSANDS BTU/SEC	LBM/SEC	THOUSANDS BTU/SEC
20.4	2123.5	2598.3	6023.0	2465.5
20.6	1956.7	2408.2	6647.5	2649.6
20.8	1812.0	2238.1	6252.1	2446.3
21.0	1685.8	2087.7	5729.5	2214.5
21.2	1569.8	1948.2	5441.1	2075.4
21.4	1456.6	1811.1	5220.4	1957.8
21.6	1354.4	1686.8	5013.5	1843.9
21.8	1255.2	1565.8	4785.1	1723.3
22.0	1167.3	1458.1	4545.6	1601.6
22.2	1080.0	1351.1	4308.3	1484.2
22.4	1007.1	1261.7	4080.5	1374.5
22.6	925.4	1160.7	3859.9	1271.9
22.8	867.4	1089.4	3646.6	1176.7
23.0	825.3	1037.2	3444.0	1089.3
23.2	789.4	992.7	3240.0	1005.3
23.4	746.7	939.5	3027.4	922.4
23.6	698.4	879.3	2818.3	844.1
23.8	652.2	821.7	2632.9	775.9
24.0	605.7	763.5	2411.8	700.2
24.2	558.3	704.1	2167.0	620.5
24.4	510.1	643.7	1892.7	535.3
24.6	461.8	583.1	1579.6	442.0
24.8	413.7	522.6	1221.0	338.7
25.0	364.5	460.6	822.5	226.8
25.2	313.9	396.9	427.8	117.6
25.4	261.3	330.6	101.7	28.0
25.6	207.1	262.2	.0	.0
25.8	156.1	197.8	.0	.0
26.0	102.9	130.6	.0	.0
26.2	40.0	50.9	.0	.0
26.4	.0	.0	.0	.0

Notes:
- * mass and energy exiting the SG side of the break
- ** mass and energy exiting the pump side of the break

TABLE 14.3-16a (Sheets 1, 2, 3, & 4 of 4)
DELETED

TABLE 14.3-16b (Sheets 1, 2, 3, 4 & 5 of 5)
DELETED

TABLE 14.3-16c (Sheets 1 & 2 of 2)
DELETED

TABLE 14.3-16d
DELETED

TABLE 14.3-16e
DELETED

TABLE 14.3-16f (Sheets 1 & 2 of 2)
DELETED

TABLE 14.3-16g
DELETED

TABLE 14.3-16h
DELETED

TABLE 14.3-16i
DELETED

TABLE 14.3-17 (Sheet 1 of 5)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MIN SI
REFLOOD MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATH NO.1*		BREAK PATH NO.2**	
SECONDS	FLOW LBM/SEC	ENERGY THOUSAND SBTU/SEC	FLOW LBM/SEC	ENERGY THOUSAND S BTU/SEC
26.4	.0	.0	.0	.0
26.9	.0	.0	.0	.0
27.1	.0	.0	.0	.0
27.2	.0	.0	.0	.0
27.3	.0	.0	.0	.0
27.4	.0	.0	.0	.0
27.4	.0	.0	.0	.0
27.5	31.9	37.5	.0	.0
27.6	13.9	16.4	.0	.0
27.7	12.9	15.2	.0	.0
27.8	18.5	21.8	.0	.0
27.9	23.4	27.6	.0	.0
28.0	29.8	35.1	.0	.0
28.1	35.0	41.2	.0	.0
28.2	39.7	46.7	.0	.0
28.3	44.2	52.1	.0	.0
28.4	47.1	55.5	.0	.0
28.5	51.2	60.3	.0	.0
28.7	54.5	64.2	.0	.0
28.8	58.2	68.6	.0	.0
28.84	60.4	71.1	.0	.0
28.9	61.2	72.1	.0	.0
29.0	64.6	76.1	.0	.0
29.1	67.4	79.4	.0	.0
29.2	70.6	83.1	.0	.0
29.3	73.2	86.2	.0	.0
29.4	75.6	89.1	.0	.0
30.4	97.2	114.5	.0	.0
31.4	115.0	135.6	.0	.0
32.4	130.5	153.9	.0	.0
33.4	144.3	170.2	.0	.0
33.7	148.5	175.2	.0	.0
34.4	279.2	329.8	2803.8	441.0
35.5	382.8	453.1	4084.0	671.4
36.5	380.7	450.7	4057.5	673.4
37.5	374.3	443.1	3986.8	665.2
38.5	367.8	435.4	3914.7	656.5

TABLE 14.3-17 (Sheet 2 of 5)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MIN SI
REFLOOD MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATH NO.1*		BREAK PATH NO.2**	
SECONDS	FLOW LBM/SEC	ENERGY THOUSAND SBTU/SEC	FLOW LBM/SEC	ENERGY THOUSAND S BTU/SEC
38.7	366.6	433.8	3900.4	654.8
39.5	361.5	427.8	3843.7	647.9
40.5	355.4	420.5	3774.2	639.4
41.5	349.5	413.5	3706.6	631.0
42.5	343.8	406.7	3640.9	622.9
43.5	338.3	400.2	3577.1	614.9
44.5	333.0	393.9	3515.2	607.2
44.7	332.0	392.6	3503.0	605.7
45.5	327.9	387.8	3455.1	599.8
46.5	412.6	487.9	233.8	276.9
47.5	566.9	673.5	318.8	379.0
48.5	551.8	655.3	310.6	369.1
49.5	470.2	557.7	326.3	288.5
50.3	446.6	529.3	314.3	272.8
50.5	444.3	526.6	313.1	271.3
51.5	434.2	514.5	307.9	264.6
52.5	424.5	502.9	302.9	258.3
53.5	415.1	491.7	298.1	252.1
54.5	405.9	480.7	293.3	246.1
55.5	397.0	470.1	288.7	240.3
56.5	388.2	459.7	284.2	234.6
56.6	387.4	458.6	283.8	234.0
57.5	379.7	449.5	279.8	229.0
58.5	371.4	439.5	275.6	223.6
59.5	363.2	429.8	271.4	218.4
60.5	355.2	420.3	267.3	213.2
61.5	347.4	411.0	263.3	208.2
62.5	339.8	401.9	259.4	203.3
63.5	332.3	393.0	255.5	198.5
64.5	324.9	384.3	251.8	193.8
65.5	317.8	375.7	248.2	189.2
66.5	310.8	367.4	244.6	184.8
67.5	303.9	359.3	241.1	180.4
68.5	297.2	351.3	237.7	176.2
69.5	290.7	343.5	234.4	172.0
70.5	284.3	336.0	231.1	168.0
71.5	278.1	328.6	228.0	164.1
72.4	272.6	322.1	225.2	160.7

TABLE 14.3-17 (Sheet 3 of 5)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MIN SI
REFLOOD MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	**BREAK PATH NO.1***		**BREAK PATH NO.2****	
SECONDS	FLOW LBM/SEC	ENERGY THOUSAND SBTU/SEC	FLOW LBM/SEC	ENERGY THOUSAND S BTU/SEC
72.5	272.0	321.4	224.9	160.3
73.5	266.1	314.3	221.9	156.6
74.5	260.3	307.5	219.0	153.0
75.5	254.7	300.9	216.2	149.5
76.5	249.3	294.4	213.5	146.2
77.5	244.0	288.2	210.8	142.9
78.5	238.9	282.0	208.2	139.7
79.5	233.9	276.1	205.7	136.6
80.5	229.0	270.3	203.3	133.6
81.5	224.2	264.7	200.9	130.7
82.5	219.6	259.2	198.6	127.9
83.5	215.1	253.9	196.4	125.2
84.5	210.8	248.8	194.3	122.5
85.5	206.6	243.8	192.2	120.0
86.5	202.5	239.0	190.2	117.5
87.5	198.6	234.3	188.2	115.1
89.5	191.0	225.4	184.5	110.6
91.5	184.0	217.0	181.0	106.4
93.5	177.4	209.3	177.8	102.4
94.6	174.0	205.2	176.2	100.4
95.5	171.3	202.0	174.9	98.8
97.5	165.6	195.3	172.1	95.5
99.5	160.3	189.1	169.6	92.4
101.5	155.5	183.3	167.2	89.5
103.5	151.0	178.0	165.1	86.9
105.5	146.8	173.1	163.1	84.5
107.5	143.0	168.6	161.3	82.3
109.5	139.5	164.5	159.7	80.3
111.5	136.4	160.8	158.2	78.5
113.5	133.5	157.4	156.8	76.9
115.5	130.8	154.3	155.6	75.4
117.5	128.5	151.4	154.5	74.0
119.5	126.3	148.9	153.5	72.8
121.5	124.4	146.6	152.6	71.7
123.5	122.6	144.6	151.8	70.8
125.0	121.5	143.2	151.2	70.1
125.5	121.1	142.8	151.1	69.9
127.5	119.7	141.1	150.4	69.1

TABLE 14.3-17 (Sheet 4 of 5)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MIN SI
REFLOOD MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATH NO.1*		BREAK PATH NO.2**	
SECONDS	FLOW LBM/SEC	ENERGY THOUSAND SBTU/SEC	FLOW LBM/SEC	ENERGY THOUSAND S BTU/SEC
129.5	118.5	139.7	149.8	68.4
131.5	117.4	138.4	149.3	67.8
133.5	116.4	137.2	148.9	67.3
135.5	115.6	136.3	148.5	66.8
137.5	114.9	135.4	148.2	66.4
139.5	114.2	134.6	147.9	66.0
141.5	113.7	134.0	147.6	65.7
143.5	113.2	133.4	147.4	65.4
145.5	112.8	133.0	147.2	65.2
147.5	112.5	132.6	147.0	65.0
149.5	112.3	132.4	146.9	64.9
151.5	112.1	132.2	146.8	64.8
153.5	112.0	132.0	146.8	64.7
155.5	111.9	131.9	146.7	64.6
157.5	111.8	131.8	146.7	64.6
159.5	111.8	131.8	146.6	64.5
161.1	111.8	131.7	146.6	64.5
161.5	111.8	131.8	146.6	64.5
163.5	111.8	131.8	146.6	64.5
165.5	111.8	131.8	146.6	64.5
167.5	111.9	131.9	146.7	64.6
169.5	112.0	132.0	146.7	64.6
171.5	112.1	132.2	146.7	64.6
173.5	112.2	132.3	146.8	64.7
175.5	112.4	132.5	146.8	64.8
177.5	112.5	132.6	146.9	64.8
179.5	112.7	132.8	146.9	64.9
181.5	112.9	133.0	147.0	65.0
183.5	113.0	133.3	147.1	65.1
185.5	113.2	133.5	147.1	65.1
187.5	113.4	133.7	147.2	65.2
189.5	113.6	133.9	147.3	65.3
191.5	113.8	134.2	147.4	65.4
193.5	114.0	134.4	147.4	65.5
195.5	114.3	134.7	147.5	65.6
197.5	114.5	134.9	147.6	65.7
199.5	114.7	135.2	147.7	65.8
201.5	114.9	135.4	147.8	65.9

TABLE 14.3-17 (Sheet 5 of 5)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MIN SI
REFLOOD MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATH NO.1*		BREAK PATH NO.2**	
SECONDS	FLOW LBM/SEC	ENERGY THOUSAND SBTU/SEC	SECONDS	FLOW LBM/SEC
203.5	115.1	135.7	147.9	66.0
205.5	115.3	135.9	147.9	66.1
207.5	115.5	136.1	148.0	66.2
209.5	115.7	136.4	148.1	66.3
211.5	115.9	136.6	148.2	66.4
213.5	116.1	136.9	148.3	66.5
215.5	116.3	137.1	148.4	66.6
217.5	116.5	137.4	148.4	66.7
219.5	116.8	137.6	148.5	66.8
221.5	117.0	137.9	148.6	66.9
223.5	117.2	138.1	148.7	67.0
225.5	117.4	138.4	148.8	67.1
227.5	117.6	138.7	148.9	67.2
229.5	117.9	138.9	149.0	67.4
231.5	118.1	139.2	149.1	67.5
233.5	118.3	139.5	149.1	67.6
235.5	118.5	139.7	149.2	67.7
237.5	118.8	140.0	149.3	67.8
239.5	119.0	140.3	149.4	67.9
239.7	119.0	140.3	149.4	67.9

Notes:
- * mass and energy exiting the SG side of the break
- ** mass and energy exiting the pump side of the break

TABLE 14.3-18
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MIN SI
POST-REFLOOD MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	**BREAK PATH NO.1***		**BREAK PATH NO.2****	
SECONDS	FLOW LBM/SEC	ENERGY THOUSANDS BTU/SEC	FLOW LBM/SEC	ENERGY THOUSANDS BTU/SEC
239.8	218.7	272.7	208.8	137.2
244.8	218.2	272.0	208.5	136.8
249.8	217.7	271.4	208.2	136.4
254.8	217.1	270.7	207.9	136.0
259.8	216.5	269.9	207.5	135.6
264.8	216.6	270.0	207.2	135.2
269.8	215.9	269.2	206.9	134.8
274.8	215.2	268.3	206.5	134.4
279.8	215.2	268.3	206.2	134.0
284.8	214.4	267.3	205.9	133.6
289.8	214.3	267.1	205.5	133.2
294.8	213.4	266.1	205.2	132.9
299.8	213.2	265.8	204.9	132.5
304.8	212.9	265.4	204.5	132.1
309.8	211.9	264.2	204.2	131.7
314.8	211.5	263.7	203.8	131.3
319.8	211.0	263.1	203.5	130.9
324.8	210.5	262.4	203.2	130.4
329.8	210.5	262.4	202.8	130.0
334.8	209.8	261.5	202.5	129.6
339.8	209.6	261.3	202.1	129.2
344.8	208.7	260.2	201.8	128.8
349.8	208.3	259.7	201.4	128.4
354.8	207.8	259.1	201.1	128.0
359.8	207.2	258.3	200.7	127.6
364.8	207.0	258.0	200.4	127.2
369.8	206.6	257.6	200.0	126.8
374.8	206.0	256.9	199.7	126.3
379.8	205.3	255.9	199.3	125.9
384.8	204.8	255.3	199.0	125.5
389.8	204.6	255.0	198.6	125.1
394.8	204.0	254.3	198.3	124.7
399.8	203.5	253.8	197.9	124.2
404.8	202.8	252.8	197.5	123.8
409.8	202.4	252.4	197.2	123.4
414.8	202.3	252.2	196.8	123.0
419.8	201.6	251.4	196.5	122.6
424.8	201.1	250.7	196.1	122.2
429.8	205.4	256.1	199.9	126.6

TABLE 14.3-18 (Cont.)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MIN SI
POST-REFLOOD MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATH NO.1*		BREAK PATH NO.2**	
	FLOW	ENERGY		FLOW
SECONDS	LBM/SEC	THOUSANDS BTU/SEC	SECONDS	LBM/SEC
434.8	205.1	255.7	199.5	126.1
439.8	204.6	255.1	199.1	125.7
444.8	204.0	254.3	198.8	125.3
449.8	203.4	253.6	198.4	124.8
454.8	85.7	106.9	310.3	154.0
627.6	85.7	106.9	310.3	154.0
627.7	87.5	108.4	308.4	147.8
629.8	87.5	108.3	308.5	147.6
1262.4	87.5	108.3	308.5	147.6
1262.5	74.8	86.1	321.1	31.0
1500.5	71.4	82.2	324.5	31.6
1500.6	71.4	82.2	167.3	63.8
2334.0	64.4	74.1	174.3	65.0
2334.1	64.4	74.1	174.3	65.0
3600.0	57.2	65.8	181.5	66.3
3600.1	54.3	62.5	184.3	48.7
10000.0	39.5	45.5	199.2	52.6
23400.0	31.9	36.7	206.8	54.6
23400.1	31.9	36.7	73.3	19.4
100000.0	21.1	24.3	84.1	22.2
1000000.0	9.1	10.4	96.1	25.4
10000000.0	2.8	3.3	102.4	27.0

* mass and energy exiting the SG side of the break
** mass and energy exiting the pump side of the break

TABLE 14.3-19
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MIN SI
MASS BALANCE FOR 3216 MWt

		Mass Balance						
Time (Seconds)		.00	26.40	26.4+δ	239.71	627.68	1262.40	3600.00
		Mass (Thousand lbm)						
Initial	In RCS and ACC	714.25	714.25	714.25	714.25	714.25	714.25	714.25
Added Mass	Pumped Injection	.00	.00	.00	74.24	227.83	479.16	1074.54
	Total Added	.00	.00	.00	74.24	227.83	479.16	1074.54
*** TOTAL AVAILABLE ***		714.25	714.25	714.25	788.50	942.08	1193.41	1788.79
Distribution	Reactor Coolant	524.25	58.26	84.53	144.26	144.26	144.26	144.26
	Accumulator	190.00	126.74	100.47	.00	.00	.00	.00
	Total Contents	714.25	185.00	185.00	144.26	144.26	144.26	144.26
Effluent	Break Flow	.00	529.24	529.24	644.22	801.15	1052.40	1647.79
	ECCS Spill	.00	.00	.00	.00	.00	.00	.00
	Total Effluent	.00	529.24	529.24	644.22	801.15	1052.40	1647.79
*** TOTAL ACCOUNTABLE ***		714.25	714.24	714.24	788.48	945.41	1196.65	1792.04

TABLE 14.3-20
DOUBLE-ENDED PUMP SUCTION BREAK GUILLOTINE MIN SI
ENERGY BALANCE FOR 3216 MWt

		Energy Balance						
Time (Seconds)		.00	26.40	26.4+δ	239.71	627.68	1262.40	3600.00
		Energy (Million Btu)						
Initial Energy	In RCS, ACC, Steam Gen	781.41	781.41	781.41	781.41	781.41	781.41	781.41
Added Energy	Pumped Injection	.00	.00	.00	5.79	17.78	37.38	177.08
	Decay Heat	.00	7.52	7.52	30.60	63.24	107.96	235.94
	Heat From Secondary	.00	8.54	8.54	8.54	8.54	8.54	8.54
	Total Added	.00	16.07	16.07	44.94	89.56	153.89	421.56
*** TOTAL AVAILABLE ***		781.41	797.48	797.48	826.35	870.98	935.30	
Distribution	Reactor Coolant	305.58	13.36	15.98	38.17	38.17	38.17	38.17
	Accumulator	18.95	12.64	10.02	.00	.00	.00	.00
	Core Stored	27.00	13.89	13.89	3.95	3.78	3.55	2.71
	Primary Metal	166.68	158.73	158.73	131.10	92.65	69.95	53.20
	Secondary Metal	40.99	41.26	41.26	38.20	29.44	20.05	15.21
	Steam Generator	222.23	237.68	237.68	217.15	162.06	107.20	80.60
	Total Contents	781.41	477.56	477.56	428.56	326.09	238.91	189.88
Effluent	Break Flow	.00	319.44	319.44	389.59	537.57	680.69	998.74
	ECCS Spill	.00	.00	.00	.00	.00	.00	.00
	Total Effluent	.00	319.44	319.44	389.59	537.57	680.69	998.74
*** TOTAL ACCOUNTABLE ***		781.41	797.01	797.01	818.15	863.66	919.61	1188.62

TABLE 14.3-21
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MIN SI
PRINCIPLE PARAMETERS DURING REFLOOD FOR 3216 MWt

Time	Flooding		Carry-over	Core	Downcomer	Flow	Injection			
	Temp	Rate	Fraction	Height	Height	Fraction	Total	Accum	Spill	Enthalpy
Seconds	(°F)	(in/sec)	(-----)	(Feet)	(Feet)	(-----)	(Pounds Mass Per Second)			Btu/Lbm
26.4	190.0	.000	.000	.00	.00	.250	.0	.0	.0	.00
27.1	188.6	20.878	.000	.50	1.17	.000	6713.2	6713.2	.0	99.50
27.4	187.2	24.643	.000	1.09	1.23	.000	6647.4	6647.4	.0	99.50
27.8	186.9	2.520	.126	1.34	2.09	.225	6528.7	6528.7	.0	99.50
28.1	187.0	2.568	.184	1.39	2.78	.288	6457.6	6457.6	.0	99.50
28.8	187.3	2.426	.300	1.50	4.37	.322	6325.9	6325.9	.0	99.50
29.4	187.5	2.365	.373	1.58	5.66	.333	6214.4	6214.4	.0	99.50
33.7	189.4	2.656	.616	2.00	14.86	.353	5534.7	5534.7	.0	99.50
35.5	190.2	4.041	.665	2.18	16.12	.552	4887.5	4887.5	.0	99.50
37.5	191.2	3.817	.693	2.39	16.12	.548	4666.9	4666.9	.0	99.50
38.7	191.8	3.708	.703	2.51	16.12	.545	4554.1	4554.1	.0	99.50
44.7	195.4	3.354	.726	3.00	16.12	.529	4072.9	4072.9	.0	99.50
45.5	195.9	3.319	.727	3.06	16.12	.527	4017.0	4017.0	.0	99.50
46.5	196.5	3.905	.732	3.14	16.05	.638	.0	.0	.0	.00
47.5	197.3	4.688	.732	3.24	15.59	.640	.0	.0	.0	.00
50.3	199.4	3.866	.735	3.51	14.51	.608	358.5	.0	.0	78.02
56.6	204.5	3.371	.738	4.00	13.08	.603	367.3	.0	.0	78.02
64.5	211.7	2.865	.737	4.54	11.70	.596	375.5	.0	.0	78.02
72.4	219.2	2.447	.735	5.00	10.70	.587	381.4	.0	.0	78.02
83.5	229.1	1.994	.731	5.54	9.81	.571	386.6	.0	.0	78.02
94.6	236.8	1.674	.727	6.00	9.37	.554	389.8	.0	.0	78.02
109.5	244.9	1.407	.723	6.52	9.23	.532	392.0	.0	.0	78.02
125.0	251.7	1.265	.721	7.00	9.42	.516	393.0	.0	.0	78.02

TABLE 14.3-21 (Cont.)

DOUBLE-ENDED PUMP SUCTION GUILLOTINE MIN SI
PRINCIPLE PARAMETERS DURING REFLOOD FOR 3216 MWt

Time	Flooding		Carry-over	Core	Downcomer	Flow	Injection			
	Temp	Rate	Fraction	Height	Height	Fraction	Total	Accum	Spill	Enthalpy
Seconds	(°F)	(in/sec)	(-----)	(Feet)	(Feet)	(-----)	(Pounds Mass Per Second)			Btu/Lbm
143.5	258.3	1.196	.724	7.52	9.83	.508	393.4	.0	.0	78.02
161.1	263.8	1.177	.728	8.00	10.30	.506	393.5	.0	.0	78.02
173.5	267.2	1.174	.732	8.33	10.64	.507	393.4	.0	.0	78.02
181.5	269.2	1.175	.734	8.54	10.86	.508	393.4	.0	.0	78.02
199.5	273.4	1.179	.740	9.00	11.35	.510	393.3	.0	.0	78.02
219.5	277.5	1.183	.747	9.50	11.89	.513	393.3	.0	.0	78.02
239.7	281.2	1.188	.755	10.00	12.42	.515	393.2	.0	.0	78.02

TABLE 14.3-22 (Sheet 1 of 5)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MAXIMUM ECCS FLOWS
BLOWDOWN MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATH NO.1*		BREAK PATH NO.2**	
SECONDS	FLOW LBM/SEC	ENERGY THOUSANDS BTU/SEC	FLOW LBM/SEC	ENERGY THOUSANDS BTU/SEC
.00000	.0	.0	.0	.0
.00102	84849.3	45618.7	38460.5	20632.5
.00204	40171.1	21550.8	39870.6	21387.9
.00312	40159.2	21545.3	39615.5	21250.0
.101	39922.8	21502.1	19730.1	10574.2
.201	40979.6	22261.5	22314.8	11972.4
.301	44573.7	24485.7	23347.7	12533.3
.401	44733.5	24903.4	23497.2	12619.1
.502	43754.1	24707.6	23117.1	12420.9
.602	44173.0	25273.0	22640.6	12170.9
.701	43682.7	25278.5	22266.0	11975.5
.802	42297.2	24725.0	22065.4	11873.0
.901	40947.3	24164.9	21967.8	11824.8
1.00	39767.1	23698.6	21919.4	11802.2
1.10	38584.1	23240.8	21873.8	11780.4
1.20	37249.5	22702.1	21840.4	11764.4
1.30	35816.5	22086.0	21815.1	11752.1
1.40	34574.8	21534.6	21810.6	11750.5
1.50	33613.4	21111.2	21839.1	11766.5
1.60	32853.5	20790.6	21835.5	11764.7
1.70	32154.3	20501.2	21717.1	11700.6
1.80	31432.8	20195.4	21569.0	11620.3
1.90	30640.2	19839.4	21417.8	11538.5
2.00	29904.6	19514.1	21273.0	11460.3
2.10	29142.5	19163.4	21131.5	11384.2
2.20	28311.2	18759.2	20976.6	11300.9
2.30	27339.3	18251.3	20805.2	11208.8
2.40	26109.9	17561.4	20624.4	11111.9
2.50	24628.0	16684.9	20436.4	11011.2
2.60	22707.6	15483.7	20235.9	10904.1
2.70	21119.5	14495.7	20024.8	10791.3
2.80	20677.2	14277.7	19830.0	10687.6
2.90	20092.1	13921.6	19641.2	10587.2
3.00	19618.0	13629.3	19452.2	10486.9
3.10	19439.5	13538.0	19253.4	10381.6

TABLE 14.3-22 (Sheet 2 of 5)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MAXIMUM ECCS FLOWS
BLOWDOWN MASS AND ENERGY RELEASES FOR 3216 MWt

TIME SECONDS	BREAK PATH NO.1* FLOW LBM/SEC	ENERGY THOUSANDS BTU/SEC	BREAK PATH NO.2** SECONDS	FLOW LBM/SEC
3.20	19277.2	13446.3	19038.5	10267.5
3.30	18887.7	13195.0	18811.0	10146.7
3.40	18582.5	13000.8	18590.3	10029.7
3.50	18234.9	12768.3	18376.3	9916.6
3.60	17794.6	12467.4	18158.9	9801.7
3.70	17321.2	12144.4	17944.9	9688.6
3.80	16848.6	11822.4	17737.4	9579.2
3.90	16396.6	11512.6	17538.0	9474.3
4.00	15955.2	11206.7	17348.5	9374.9
4.20	15135.8	10639.0	16986.7	9185.4
4.40	14450.3	10162.8	16655.3	9012.6
4.60	13877.1	9759.9	16344.2	8850.7
4.80	13404.7	9422.8	16060.8	8703.8
5.00	13011.8	9135.4	15789.2	8563.0
5.20	12732.5	8922.1	15540.3	8434.4
5.40	12478.1	8723.0	15299.7	8310.1
5.60	12276.0	8558.7	15078.5	8196.2
5.80	12100.2	8407.6	14860.7	8083.8
6.00	11970.8	8286.4	14662.3	7982.1
6.20	11897.3	8198.2	14466.7	7881.5
6.40	11941.5	8184.6	14308.5	7801.8
6.60	12573.4	8577.2	14836.8	8099.2
6.80	12267.5	8335.5	14923.1	8152.2
7.00	11115.9	8022.4	14778.1	8077.9
7.20	9516.4	7395.4	14698.4	8039.6
7.40	9167.6	7210.5	14540.2	7957.4
7.60	9127.7	7152.4	14376.2	7872.8
7.80	9064.7	7090.9	14232.0	7799.4
8.00	8976.5	7009.1	13995.3	7674.5
8.20	8938.7	6944.0	13762.8	7551.6
8.40	8944.4	6890.1	13558.1	7442.5
8.60	8964.5	6847.8	13401.7	7357.6
8.80	8988.7	6815.2	13346.4	7326.0
9.00	8943.5	6738.5	13265.6	7276.9

TABLE 14.3-22 (Sheet 3 of 5)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MAXIMUM ECCS FLOWS
BLOWDOWN MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATH NO.1*		BREAK PATH NO.2**	
	FLOW	ENERGY		FLOW
SECONDS	LBM/SEC	THOUSANDS BTU/SEC	SECONDS	LBM/SEC
9.20	8873.3	6665.8	13116.3	7188.5
9.40	8771.5	6589.3	12977.4	7107.1
9.60	8643.0	6499.3	12853.6	7035.2
9.80	8522.7	6406.2	12713.2	6954.8
10.0	8413.6	6305.9	12565.4	6870.7
10.2	8325.3	6213.6	12425.6	6791.3
10.4	8236.9	6121.7	12287.2	6712.8
10.6	8147.1	6034.8	12149.6	6634.7
10.8	8049.5	5950.5	12013.2	6557.5
11.0	7943.5	5868.5	11876.1	6480.1
11.2	7827.4	5787.9	11739.4	6403.4
11.4	7703.1	5708.8	11602.8	6327.0
11.6	7571.4	5630.8	11466.2	6251.0
11.8	7432.6	5552.9	11327.9	6174.2
12.0	7287.4	5475.4	11190.3	6098.1
12.2	7143.9	5404.4	11053.9	6022.8
12.4	6998.6	5332.3	10913.4	5945.4
12.6	6857.7	5261.2	10773.8	5868.7
12.8	6722.4	5191.7	10634.2	5792.3
13.0	6590.5	5122.9	10494.3	5715.9
13.2	6461.5	5054.6	10355.0	5640.1
13.4	6336.3	4987.1	10215.8	5564.4
13.6	6213.6	4920.1	10076.1	5488.5
13.8	6095.2	4854.0	9939.9	5414.5
14.0	5981.4	4789.2	9804.5	5341.0
14.2	5870.0	4725.2	9667.8	5266.6
14.4	5762.4	4663.0	9548.5	5195.8
14.6	5651.0	4597.9	9450.6	5121.3
14.8	5528.1	4523.8	9346.8	5029.6
15.0	5387.0	4432.0	9292.2	4951.8
15.2	5233.8	4321.4	9221.7	4856.4
15.4	5084.6	4200.2	9195.7	4779.9
15.6	4953.8	4082.5	9185.0	4710.7
15.8	4851.5	3981.3	9150.7	4634.3
16.0	4763.9	3896.2	9065.1	4540.5

TABLE 14.3-22 (Sheet 4 of 5)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MAXIMUM ECCS FLOWS
BLOWDOWN MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATH NO.1*		BREAK PATH NO.2**	
	FLOW	ENERGY		FLOW
SECONDS	LBM/SEC	THOUSANDS BTU/SEC	SECONDS	LBM/SEC
16.2	4679.7	3824.4	8924.7	4427.4
16.4	4594.8	3761.2	8849.9	4352.3
16.6	4509.0	3704.4	8774.1	4281.8
16.8	4423.0	3654.2	8624.3	4179.2
17.0	4338.2	3611.9	8508.6	4095.2
17.2	4249.9	3574.2	8449.4	4040.2
17.4	4161.1	3542.1	8334.7	3961.4
17.6	4070.4	3517.3	8134.0	3843.5
17.8	3977.6	3498.7	7692.7	3611.5
18.0	3879.6	3483.8	7925.8	3695.0
18.2	3766.4	3467.4	8408.4	3898.6
18.4	3647.5	3459.9	7772.1	3588.3
18.6	3523.9	3459.4	6787.4	3115.0
18.8	3316.3	3392.0	6792.5	3085.4
19.0	3075.5	3296.5	6861.7	3076.2
19.2	2851.5	3194.6	6591.0	2917.6
19.4	2653.8	3085.2	6186.4	2705.8
19.6	2481.6	2968.9	5760.6	2488.9
19.8	2319.3	2822.8	5425.6	2309.7
20.0	2157.3	2647.7	5521.7	2301.1
20.2	1997.9	2463.6	5978.1	2425.4
20.4	1849.6	2288.4	6479.4	2560.5
20.6	1720.9	2134.5	6024.8	2338.2
20.8	1601.7	1991.3	5615.7	2151.8
21.0	1491.6	1857.6	5333.2	2015.1
21.2	1391.2	1735.8	5105.3	1895.5
21.4	1296.0	1619.3	4883.9	1777.2
21.6	1207.7	1511.3	4646.3	1654.6
21.8	1116.9	1399.1	4398.9	1531.3
22.0	1047.8	1314.8	4158.4	1414.7
22.2	968.7	1216.9	3926.8	1305.8
22.4	922.7	1160.5	3713.1	1207.8
22.6	883.2	1111.8	3507.5	1116.8
22.8	840.3	1058.5	3309.9	1032.7
23.0	800.0	1008.2	3105.1	950.2

TABLE 14.3-22 (Sheet 5 of 5)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MAXIMUM ECCS FLOWS
BLOWDOWN MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATH NO.1*		BREAK PATH NO.2**	
	FLOW	ENERGY		FLOW
SECONDS	LBM/SEC	THOUSANDS BTU/SEC	SECONDS	LBM/SEC
23.2	755.0	952.2	2893.1	869.5
23.4	706.2	891.1	2726.2	805.7
23.6	656.7	829.2	2523.1	734.2
23.8	606.2	765.9	2294.3	658.1
24.0	555.7	702.5	2035.7	576.5
24.2	504.9	638.5	1740.4	487.3
24.4	454.2	574.8	1396.2	387.3
24.6	403.2	510.5	1003.6	276.4
24.8	350.6	444.2	589.7	161.7
25.0	296.1	375.3	226.7	62.1
25.2	239.7	303.9	.0	.0
25.4	183.3	232.7	.0	.0
25.6	130.6	165.9	.0	.0
25.8	75.7	96.4	.0	.0
26.0	.0	.0	.0	.0

* mass and energy exiting the SG side of the break
** mass and energy exiting the pump side of the break

TABLE 14.3-23
[DELETED]

TABLE 14.3-24
[DELETED]

TABLE 14.3-25
[DELETED]

TABLE 14.3-26
[DELETED]

TABLE 14.3-27 (Sheet 1 of 2)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MAXSI
PRINCIPLE PARAMETERS DURING REFLOOD FOR 3216 MWt

Time Seconds	**Flooding**		**Carryover Fraction**	**Core Height (ft)**	**Downcomer Height (ft)**	**Flow Frac**	**Total**	**Injection Accum**	**Spill**	**Enthalpy Btu/lbm**
	Temp °F	Rate in/sec					(Pounds Mass per Second)			
26.0	189.3	.000	.000	.00	.00	.250	.0	.0	.0	.00
26.7	187.9	20.997	.000	.50	1.18	.000	6759.0	6759.0	.0	99.50
27.0	186.5	24.771	.000	1.10	1.24	.000	6692.1	6692.1	.0	99.50
27.4	186.3	2.530	.127	1.34	2.12	.228	6571.3	6571.3	.0	99.50
27.7	186.4	2.571	.171	1.38	2.64	.279	6514.3	6514.3	.0	99.50
28.4	186.6	2.434	.294	1.50	4.35	.321	6369.9	6369.9	.0	99.50
29.1	186.9	2.368	.379	1.59	5.82	.333	6242.7	6242.7	.0	99.50
33.3	188.8	2.663	.616	2.00	14.96	.353	5562.9	5562.9	.0	99.50
35.2	189.6	4.048	.667	2.19	16.12	.553	4902.2	4902.2	.0	99.50
37.2	190.6	3.818	.694	2.40	16.12	.549	4684.2	4684.2	.0	99.50
38.3	191.2	3.718	.703	2.50	16.12	.546	4579.7	4579.7	.0	99.50
44.3	194.8	3.360	.726	3.00	16.12	.530	4093.2	4093.2	.0	99.50
45.2	195.4	3.530	.727	3.08	16.12	.553	4511.9	3864.4	.0	96.42
46.2	196.1	2.828	.729	3.15	16.12	.410	1858.2	1183.4	.0	91.70
47.2	196.8	3.885	.733	3.23	16.00	.581	629.7	.0	.0	78.02
50.4	199.3	3.715	.737	3.50	15.54	.579	635.3	.0	.0	78.02
56.9	205.1	3.407	.741	4.00	14.78	.573	647.7	.0	.0	78.02
64.2	212.5	3.145	.743	4.52	14.17	.566	658.0	.0	.0	78.02
71.7	220.5	2.923	.745	5.00	13.75	.560	666.2	.0	.0	78.02
80.2	229.4	2.716	.747	5.51	13.47	.552	674.5	.0	.0	78.02
89.1	237.4	2.544	.749	6.00	13.38	.544	682.4	.0	.0	78.02

TABLE 14.3-27 (Sheet 2 of 2)
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MAXSI
PRINCIPLE PARAMETERS DURING REFLOOD FOR 3216 MWt

Time Seconds	Flooding Temp °F	Flooding Rate in/sec	Carryover Fraction	Core Height (ft)	Downcomer Height (ft)	Flow Frac	Total (Pounds Mass per Second)	Injection Accum (Pounds Mass per Second)	Spill (Pounds Mass per Second)	Enthalpy Btu/lbm
99.2	245.0	2.401	.751	6.52	13.46	.537	688.5	.0	.0	78.02
109.1	251.4	2.305	.754	7.00	13.67	.531	692.3	.0	.0	78.02
121.2	258.0	2.230	.757	7.56	14.04	.527	695.0	.0	.0	78.02
131.2	262.8	2.194	.761	8.00	14.41	.525	696.1	.0	.0	78.02
143.2	267.8	2.170	.765	8.52	14.90	.524	696.7	.0	.0	78.02
147.2	269.3	2.165	.767	8.69	15.06	.524	696.7	.0	.0	78.02
154.7	272.0	2.179	.770	9.00	15.37	.528	695.5	.0	.0	78.02
165.2	275.4	2.200	.773	9.44	15.70	.536	693.0	.0	.0	78.02
167.2	276.0	2.200	.774	9.52	15.74	.538	692.6	.0	.0	78.02
178.9	279.3	2.168	.778	10.00	15.95	.544	692.1	.0	.0	78.02

TABLE 14.3-28 (Sheet 1 of 5)
DOUBLE-ENDED HOT LEG GUILLOTINE
BLOWDOWN MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATHNO.1*		BREAK PATH NO.2**	
SECONDS	FLOW LBM/SEC	ENERGY THOUSANDS BTU/SEC	FLOW LBM/SE	ENERGY THOUSANDS BTU/SEC
.00000	.0	.0	.0	.0
.00107	45431.7	28592.9	45428.6	28589.4
.00213	44959.4	28295.7	44682.5	28114.2
.102	45793.5	29109.1	25686.4	16129.1
.201	33239.6	21496.0	22659.2	14136.4
.301	32619.6	21083.9	20264.4	12470.7
.401	31885.0	20590.9	19026.0	11515.6
.502	31493.9	20329.6	18206.6	10840.9
.601	31480.4	20318.8	17625.0	10345.0
.701	31467.6	20326.8	17235.4	9988.6
.801	31177.0	20177.2	16891.0	9682.4
.902	30811.3	19992.6	16655.5	9455.9
1.00	30442.3	19816.4	16457.2	9266.0
1.10	30178.5	19718.7	16334.0	9128.3
1.20	29985.2	19679.7	16264.2	9030.1
1.30	29765.5	19624.5	16277.2	8984.8
1.40	29462.3	19513.9	16329.9	8966.8
1.50	29085.4	19347.4	16416.8	8972.9
1.60	28711.1	19176.2	16524.2	8994.9
1.70	28394.9	19041.5	16647.5	9030.0
1.80	28092.0	18914.9	16773.3	9071.1
1.90	27710.5	18731.3	16894.8	9114.1
2.00	27250.2	18485.7	17006.0	9155.3
2.10	26796.9	18239.2	17106.1	9193.9
2.20	26405.9	18037.0	17195.7	9229.7
2.30	26026.9	17844.1	17274.6	9262.1
2.40	25597.1	17606.7	17340.4	9289.5
2.50	25129.9	17331.2	17393.6	9311.9
2.60	24686.1	17068.7	17437.0	9330.3
2.70	24290.3	16839.1	17470.2	9344.3
2.80	23893.3	16603.8	17493.4	9353.7
2.90	23492.6	16354.8	17505.6	9358.0
3.00	23104.3	16107.1	17508.7	9357.8
3.10	22737.0	15867.2	17504.4	9354.2
3.20	22389.3	15634.4	17493.1	9347.1
3.30	22077.7	15422.8	17476.1	9337.2
3.40	21783.4	15217.4	17454.0	9324.9
3.50	21490.5	15003.4	17426.7	9310.0
3.60	21223.8	14801.9	17394.4	9292.6
3.70	20991.8	14622.4	17358.7	9273.7

TABLE 14.3-28 (Sheet 2 of 5)
DOUBLE-ENDED HOT LEG GUILLOTINE
BLOWDOWN MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATHNO.1*		BREAK PATH NO.2**	
SECONDS	FLOW LBM/SEC	ENERGY THOUSANDS BTU/SEC	SECONDS	FLOW LBM/SEC
3.80	20770.1	14444.9	17319.3	9253.0
3.90	20560.5	14270.0	17275.4	9230.1
4.00	20383.2	14116.6	17227.8	9205.6
4.20	20059.6	13822.3	17120.7	9150.8
4.40	19813.2	13575.6	16995.4	9087.4
4.60	19604.3	13349.2	16852.0	9015.4
4.80	19455.3	13162.8	16689.9	8934.5
5.00	19357.0	13009.0	16509.6	8845.2
5.20	19365.9	12932.0	16313.3	8748.6
5.40	19406.3	12882.9	16099.0	8643.5
5.60	19468.9	12860.5	15867.0	8530.1
5.80	19556.2	12870.9	15615.7	8407.4
6.00	19707.4	12910.1	15356.3	8281.5
6.20	11028.8	8300.7	15067.3	8140.3
6.40	14455.2	10617.0	14672.0	7941.4
6.60	14508.9	10566.7	14237.6	7722.0
6.80	14629.0	10544.4	13845.1	7525.9
7.00	14807.5	10579.1	13465.1	7335.8
7.20	14990.4	10601.2	13051.2	7125.5
7.40	15147.5	10624.3	12651.4	6922.1
7.60	15324.6	10652.1	12283.8	6735.6
7.80	15406.3	10588.1	11920.3	6549.8
8.00	15644.1	10638.4	11545.0	6356.1
8.20	15556.0	10536.5	11181.0	6167.9
8.40	15808.7	10588.4	10841.7	5992.4
8.60	16038.3	10635.9	10516.7	5824.0
8.80	16243.1	10677.0	10199.7	5659.1
9.00	16434.6	10716.8	9899.8	5502.5
9.20	16619.4	10756.8	9613.9	5352.9
9.40	16808.2	10802.1	9342.8	5210.8
9.60	17018.1	10862.2	9081.5	5073.5
9.80	17302.6	10968.3	8833.8	4943.2
10.0	17347.4	10951.5	8587.4	4813.4
10.2	17122.8	10772.8	8345.5	4686.2
10.4	15365.1	9795.4	8104.7	4559.7
10.602	14402.9	9265.0	7870.3	4437.2
10.604	14399.0	9262.5	7866.6	4435.2
10.607	14396.3	9260.9	7864.2	4433.9
10.609	14394.2	9259.5	7862.2	4432.9

TABLE 14.3-28 (Sheet 3 of 5)
DOUBLE-ENDED HOT LEG GUILLOTINE
BLOWDOWN MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATHNO.1*		BREAK PATH NO.2**	
	FLOW	ENERGY		FLOW
SECONDS	LBM/SEC	THOUSANDS BTU/SEC	SECONDS	LBM/SEC
10.8	14314.8	9194.1	7642.1	4318.4
11.0	14303.2	9168.8	7427.1	4207.3
11.2	14286.7	9144.1	7231.0	4106.7
11.4	14268.5	9117.2	7039.7	4008.3
11.6	14235.3	9078.9	6850.8	3911.2
11.8	14133.9	9001.0	6665.1	3816.0
12.0	13860.2	8831.1	6483.7	3723.3
12.2	13361.0	8543.6	6304.3	3632.2
12.4	12862.1	8261.1	6126.6	3542.6
12.6	12547.5	8079.7	5955.6	3457.0
12.8	12329.5	7951.6	5788.3	3373.8
13.0	12138.1	7840.4	5628.4	3294.8
13.2	11932.6	7723.9	5474.2	3219.1
13.4	11697.7	7593.9	5327.5	3147.3
13.6	11418.6	7442.6	5182.9	3076.7
13.8	11117.0	7281.9	5044.5	3009.5
14.0	10808.3	7119.7	4908.8	2944.0
14.2	10513.3	6967.5	4777.7	2881.1
14.4	10232.1	6825.1	4650.0	2820.0
14.6	9944.6	6681.6	4522.3	2759.0
14.8	9642.7	6534.6	4391.9	2696.5
15.0	9312.3	6377.9	4248.5	2627.8
15.2	8962.9	6217.0	4092.0	2554.0
15.4	8607.5	6059.7	3918.8	2473.7
15.6	8230.6	5898.9	3734.6	2389.4
15.8	7823.9	5728.2	3547.8	2303.4
16.0	7408.1	5558.9	3361.8	2216.0
16.2	7003.5	5399.7	3189.1	2131.5
16.4	6605.4	5247.9	3034.3	2052.1
16.6	6205.0	5096.2	2898.8	1978.6
16.8	5809.6	4945.4	2784.2	1913.1
17.0	5418.6	4794.4	2687.3	1855.1
17.2	5037.9	4645.9	2604.3	1803.6
17.4	4654.9	4468.2	2532.0	1757.9
17.6	4317.7	4214.3	2465.5	1715.5
17.8	4092.9	4020.9	2404.2	1676.5
18.0	3912.3	3859.9	2346.2	1640.3
18.2	3471.5	3595.3	2289.7	1606.7
18.4	3010.9	3305.0	2234.0	1575.2

TABLE 14.3-28 (Sheet 4 of 5)
DOUBLE-ENDED HOT LEG GUILLOTINE
BLOWDOWN MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATHNO.1*		BREAK PATH NO.2**	
	FLOW	ENERGY		FLOW
SECONDS	LBM/SEC	THOUSANDS BTU/SEC	SECONDS	LBM/SEC
18.6	2713.6	3107.4	2178.1	1544.9
18.8	2476.1	2875.7	2123.0	1515.5
19.0	2277.1	2699.9	2073.9	1487.3
19.2	2102.0	2522.1	2025.1	1455.8
19.4	1987.8	2406.6	1972.2	1422.9
19.6	1858.1	2262.5	1904.6	1390.6
19.8	1732.1	2117.2	1821.2	1366.2
20.0	1620.5	1990.4	1718.2	1345.1
20.2	1508.6	1860.9	1595.9	1316.2
20.4	1405.8	1743.3	1474.1	1276.4
20.6	1309.4	1633.1	1369.7	1240.5
20.8	1222.1	1531.5	1267.3	1214.7
21.0	1146.3	1445.3	1143.8	1196.4
21.2	1074.3	1361.7	1014.4	1163.9
21.4	1011.3	1284.7	856.4	1034.6
21.6	959.8	1221.2	744.5	912.0
21.8	916.3	1166.8	642.3	790.3
22.0	877.2	1117.9	575.6	710.2
22.2	825.8	1053.1	520.8	643.3
22.4	774.8	989.3	442.9	548.5
22.6	726.6	929.0	403.6	500.8
22.8	654.6	838.1	374.4	464.9
23.0	611.8	785.3	360.8	448.2
23.2	580.1	746.3	343.4	427.4
23.4	545.2	702.3	325.1	404.9
23.6	504.4	650.4	317.1	395.2
23.8	509.9	654.9	295.6	368.6
24.0	522.0	673.2	269.9	337.2
24.2	514.7	663.5	275.4	344.2
24.4	509.9	657.6	278.5	348.3
24.6	504.6	650.7	274.1	342.8
24.8	493.8	636.8	256.7	321.2
25.0	484.3	624.5	254.1	318.3
25.2	474.5	611.6	241.9	303.2
25.4	470.6	606.4	238.5	299.0
25.6	462.9	596.3	227.1	285.0
25.8	450.9	580.8	189.6	238.2
26.0	423.4	545.3	167.1	210.4

TABLE 14.3-28 (Sheet 5 of 5)
DOUBLE-ENDED HOT LEG GUILLOTINE
BLOWDOWN MASS AND ENERGY RELEASES FOR 3216 MWt

TIME	BREAK PATHNO.1*		BREAK PATH NO.2**	
	FLOW	ENERGY		FLOW
SECONDS	LBM/SEC	THOUSANDS BTU/SEC	SECONDS	LBM/SEC
26.2	388.3	500.6	178.8	225.3
26.4	381.0	487.6	153.7	193.7
26.6	407.2	521.4	136.6	172.6
26.8	395.8	499.9	156.5	197.7
27.0	430.6	530.6	174.5	220.1
27.2	408.0	513.6	186.8	235.5
27.4	450.7	557.4	175.5	221.5
27.6	432.8	543.9	200.1	252.3
27.8	436.3	542.5	181.9	229.3
28.0	513.0	630.5	183.0	230.9
28.2	537.6	661.0	216.2	272.5
28.4	552.1	677.6	224.9	283.2
28.6	492.9	615.3	203.0	256.0
28.8	316.7	407.5	201.8	254.4
29.0	89.2	116.7	60.2	76.2
29.2	.0	.0	.0	.0

* mass and energy exiting from the reactor vessel side of the break
** mass and energy exiting from the SG side of the break

TABLE 14.3-29
DOUBLE-ENDED HOT LEG GUILLOTINE
MASS BALANCE FOR 3216 MWt

Time (Seconds)		.00	29.20	29.20+δ
		Mass (Thousand lbm)		
Initial	In RCS and ACC	731.97	731.97	731.97
Added Mass	Pumped Injection	.00	.00	.00
	Total Added	.00	.00	.00
TOTAL AVAILABLE		731.97	731.97	731.97
Distribution	Reactor Coolant	524.25	96.33	123.07
	Accumulator	207.72	129.91	103.17
	Total Contents	731.97	226.24	226.24
Effluent	Break Flow	.00	505.71	505.71
	ECCS Spill	.00	.00	.00
	Total Effluent	.00	505.71	505.71
TOTAL ACCOUNTABLE		731.97	731.95	731.95

TABLE 14.3-30
DOUBLE-ENDED HOT LEG GUILLOTINE
ENERGY BALANCE FOR 3216 MWt

	Time (Seconds)	.00	29.20	29.20+δ
			Energy (Million Btu)	
Initial Energy	In RCS, ACC, Steam Gen	784.57	784.57	784.57
Added Energy	Pumped Injection	.00	.00	.00
	Decay Heat	.00	8.37	8.37
	Heat From Secondary	.00	-.23	-.23
	Total Added	.00	8.14	8.14
	TOTAL AVAILABLE	784.57	792.72	792.72
Distribution	Reactor Coolant	305.58	22.91	25.57
	Accumulator	20.67	12.93	10.27
	Core Stored	27.00	10.30	10.30
	Primary Metal	166.68	155.81	155.81
	Secondary Metal	40.99	40.76	40.76
	Steam Generator	223.66	222.24	222.24
	Total Contents	784.57	464.94	464.94
Effluent	Break Flow	.00	327.28	327.28
	ECCS Spill	.00	.00	.00
	Total Effluent	.00	327.28	327.28
	TOTAL ACCOUNTABLE	784.57	792.23	792.23

TABLE 14.3-31
DOUBLE-ENDED PUMP SUCTION GUILLOTINE MIN SI
SEQUENCE OF EVENTS FOR 3216 MWt

Time (sec)	Event Description
0.0	Break occurs, reactor trip and LOOP power are assumed
0.604	Reactor trip on pressurizer low pressure of 1860 psia
1.75	Containment HI-1 pressure setpoint reached
4.1	Low pressurizer pressure SI setpoint @ 1695 psia reached (SI begins coincident with low pressurizer pressure SI setpoint)
7.75	Main Feedwater Flow Control Valve closed
11.43	Containment HI-3 pressure setpoint reached
13.9	Broken-loop accumulator begins injecting water
14.2	Intact-loop accumulator begins injecting water
26.40	End-of-blowdown phase
45.806	Broken-loop accumulator water injection ends
46.256	Intact-loop accumulator water injection ends
49.1	SI begins
61.75	Reactor containment air recirculation fan coolers actuate
71.48	Containment spray pump(s) (RWST) start
239.706	End-of-reflood for MIN SI Case
1264.1	Peak pressure and temperature occur
1500.46	RHR/HHSI alignment for recirculation
2354	Containment spray is terminated due to RWST LO-LO signal
23400	Hot leg recirculation
$1.0x10^7$	Transient modeling terminated

TABLE 14.3-32
DOUBLE-ENDED PUMP GUILLOTINE MAX SI
SEQUENCE OF EVENTS FOR 3216 MWt

Time (sec)	Event Description
0.0	Break Occurs, and Loss of Offsite Power are assumed
1.75	Containment HI-1 Pressure Setpoint Reached
4.1	Low Pressurizer Pressure SI Setpoint - 1695 psia reached in blowdown
11.32	Containment HI-3 Pressure Setpoint Reached
14.0	Broken Loop Accumulator Begins Injecting Water
14.3	Intact Loop Accumulator Begins Injecting Water
26.0	End of Blowdown Phase
45.0	Safety Injection Begins
45.6	Broken Loop Accumulator Water Injection Ends
46.15	Intact Loop Accumulator Water Injection Ends
61.75	Reactor Containment Air Recirculation Fan Coolers Actuate
71.32	Containment Spray Pump(s) (RWST) start
178.9	End of Reflood Phase
319.0	Peak Pressure and Temperature Occur
1085.	Cold Leg Recirculation Begins
1536.	Containment Spray is terminated due to RWST LO-LO Signal
23400.	Hot Leg Recirculation Begins
1.0E+07	Transient Modeling Terminated

TABLE 14.3-33
DOUBLE-ENDED HOT LEG GUILLOTINE
SEQUENCE OF EVENTS FOR 3216 MWt

Time (sec)	Event Description
0.0	Break Occurs, and Loss of Offsite Power are assumed
1.86	Containment HI-1 Pressure Setpoint Reached
3.8	Low Pressurizer Pressure SI Setpoint - 1695 psia reached in blowdown
9.87	Containment HI-3 Pressure Setpoint Reached
14.0	Broken Loop Accumulator Begins Injecting Water
14.2	Intact Loop Accumulator Begins Injecting Water
23.5	Peak Pressure and Temperature Occur
29.2	End of Blowdown Phase and Transient Modeling Terminated

TABLE 14.3-34
CONTAINMENT PEAK PRESSURE AND TEMPERATURE
FOR 3216 MWt

Case	Peak Press. (psig)	Peak Steam Temp. (°F)	Pressure (psig) @ 24 hours	Steam Temperature (°F) @ 24 hours
Double-Ended Pump Suction Min SI	45.71 @ 1264.1 sec	266.81 @ 1264.1 sec	17.05 @ 24 hrs	204.97 @ 24 hrs
Double-Ended Pump Suction Max SI	39.67 @ 319 sec	257.596 @ 319 sec	21.38 @ 24 hrs	216.192 @ 24 hrs
Double-Ended Hot Leg	40.62 @ 23.50 sec	259.98 @ 23.49 sec	NA	NA

TABLE 14.3-35

CONTAINMENT HEAT SINKS

NO.	MATERIAL	HEAT TRANSFER AREA (FT^2)	THICKNESS IN
1.	Carbon Steel	41530	0.375
	Concrete		54.0
2.	Carbon Steel	26012	0.5
	Concrete		42.0
3.	Concrete	13636	12.0
4.	Concrete	55454	12.0
5.	Stainless Steel	9091	0.375
	Concrete		12.0
6.	Carbon Steel	62538	0.5
7.	Carbon Steel	74276	0.375
8.	Carbon Steel	25407	0.25
9.	Carbon Steel	63454	0.1875
10.	Carbon Steel	2727	0.125
11.	Carbon Steel	20000	0.138
12.	Carbon Steel	9090	0.0625
13.	Stainless Steel	714	0.019
	PVC Insulation		1.25
	Carbon Steel		0.75
	Concrete		54.0

TABLE 14.3-35 (CONT.)

CONTAINMENT HEAT SINKS

NO.	MATERIAL	HEAT TRANSFER AREA (FT^2)	THICKNESS IN
14.	Stainless Steel	6226	0.019
	PVC Insulation		1.25
	Carbon Steel		0.5
	Concrete		54.0
15.	Stainless Steel	3469	0.025
	Foam Insulation		1.5
	Carbon Steel		0.5
	Concrete		54.0
16.	Stainless Steel	3965	0.025
	Foam Insulation		1.5
	Carbon Steel		0.375
	Concrete		54.0

Note:

1. All carbon steel exterior surfaces are modeled with 0.00033-ft layer of paint on top of a 0.000258-ft layer of carbozinc primer.
2. Approximately 25-ft² of the PVC insulation was replaced with fiberglass. As described in Section 14.3.5.1.1, modeling the PVC insulation, instead of the fiberglass insulation was determined to be conservative and bounding.
3. Approximately 7100-ft² of the liner top coat material (Phenoline 305) was replaced with Carboline 890. As described in Section 14.3.5.1.1, modeling the Phenoline 305 top coat material, instead of the Carboline 890 top coat material was determined to be conservative and bounding.
4. Installation of the Sump Strainer Modification resulted in an overall increase in metal mass in the Containment. For the containment pressure analyses it is conservative not to include this.

TABLE 14.3-36
THERMOPHYSICAL PROPERTIES OF CONTAINMENT HEAT SINKS

Material	Thermal Conductivity (Btu/hr-ft - °F)	Volumetric Heat Capacity (Btu/ft^3 - °F)
Paint layer 1, Phenoline	0.08	28.8
Paint layer 2, Carbozinc	0.9	28.8
Carbon Steel	26.0	56.35
Stainless Steel	8.6	56.35
Concrete	0.8	28.8
PVC Insulation	0.0208	1.20
Foam Insulation	0.0417	1.53

TABLE 14.3-37
LOCA CONTAINMENT RESPONSE ANALYSIS PARAMETERS

Service water temperature (°F)	95
RWST water temperature (°F)	110
Initial containment temperature (°F)	130
Initial containment pressure (psia)	16.7
Initial relative humidity (%)	20
Net free volume (ft^3)	$2.61x 10^6$
Reactor Containment Air Recirculation Fan Coolers	
Total	5
Analysis maximum	4
Analysis minimum	3
Containment Hi-1 setpoint (psig)	10.0
Delay time (sec)	
With Offsite Power	NA
Without Offsite Power	60.0
Containment Spray Pumps	
Total	2
Analysis maximum	1
Analysis minimum	1
Flowrate (gpm)	
Injection phase (per pump)- see Table 14.3-40	2180
Recirculation phase (total)	0
Containment Hi-3 setpoint (psig)	30.
Delay time (sec)	
With Offsite Power (delay after High High setpoint)	NA
Without Offsite Power (total time from t=0)	60.0
ECCS Recirculation Switchover, sec	
Minimum Safeguards	1500.
Maximum Safeguards	1085.
Containment Spray Termination on LO-LO RWST Level, (sec)	
Minimum Safeguards	2345.
Maximum Safeguards	1536.

TABLE 14.3-37 (CONT.)
LOCA CONTAINMENT RESPONSE ANALYSIS PARAMETERS

Emergency Core Cooling System (ECCS) Flows (GPM)	
Minimum ECCS	
Injection alignment	2871.2
Recirculation alignment	1864.0
Maximum ECCS	
Injection alignment	5394.5
Recirculation alignment	6320.5
Residual Heat Removal System	
RHR Heat Exchangers	
Modeled in analysis *	1
Recirculation switchover time, sec	
Minimum Safeguard	1500.
Maximum Safeguard	1085.
UA, 10^6 *	
BTU/hr-°F	0.767
Flows - Tube Side and Shell Side - gpm	
Minimum Safeguard	4936.
Maximum Safeguard	9871.
Component Cooling Water Heat Exchangers	
Modeled in analysis	2
UA, 10^6 *	
BTU/hr-°F	2.40
Flows - Shell Side and Tube Side - gpm	
Shellside *	4936.
Tubeside *	
(service water)	5000.
Additional heat loads, (BTU/hr)	19.675×10^6

*Minimum safeguard data representing 1 EDG

TABLE 14.3-38
SAFETY INJECTION FLOW MINIMUM SAFEGUARDS

RCS Pressure (psia)	**Total Flow (gpm)**
INJECTION MODE (Reflood Phase)	
14.7	3250.0
34.7	3097.8
54.7	2932.7
61.7	2871.2
74.7	2753.6
94.7	2558.3
114.7	2330.3
214.7.	872.1
INJECTION MODE (Post-Reflood Phase)	
61.7	2871.2
COLD LEG RECIRCULATION MODE	
61.7	1864.0
HOT LEG RECIRCULATION MODE	
61.7	822.0

TABLE 14.3-39
SAFETY INJECTION FLOW MAXIMUM SAFEGUARDS

RCS Pressure (psia)	**Total Flow (gpm)**
INJECTION MODE (Reflood Phase)	
14.7	6320.50
34.7	5996.18
54.7	5652.86
74.7	5283.84
94.7	4862.22
114.7	4389.80
174.7	1865.02
214.7	1651.00
INJECTION MODE (Post-Reflood Phase)	
61.7	5523.7
COLD LEG RECIRCULATION MODE	
61.7	6320.5
HOT LEG RECIRCULATION MODE	
61.7	6320.5

TABLE 14.3-40
CONTAINMENT SPRAY PERFORMANCE

Containment Pressure (psig)	with 1 Pump(gpm)
0 - 47	2180
Containment Pressure (psig)	with 2 Pumps(gpm)
0 - 47	4200

TABLE 14.3-41
DELETED

TABLE 14.3-42
DELETED

TABLE 14.3-43
Core Fission Product Inventory

Nuclide	Inventory (Ci)
I-130	3.80E+06
I-131	9.16E+07
I-132	1.33E+08
I-133	1.88E+08
I-134	2.06E+08
I-135	1.75E+08
Kr-85M	2.43E+07
Kr-85	1.10E+06
Kr-87	4.66E+07
Kr-88	6.56E+07
Xe-131M	1.01E+06
Xe-133M	5.87E+06
Xe-133	1.80E+08
Xe-135M	3.68E+07
Xe-135	4.77E+07
Xe-138	1.55E+08
Cs-134	2.06E+07
Cs-136	6.01E+06
Cs-137	1.19E+07
Cs-138	1.71E+08
Rb-86	2.38E+05
Te-127	9.84E+06
Te-127M	1.29E+06
Te-129	2.92E+07
Te-129M	4.30E+06
Te-131M	1.33E+07
Te-132	1.31E+08
Sb-127	9.95E+06
Sb-129	2.97E+07
Sr-89	8.83E+07
Sr-90	8.75E+06
Sr-91	1.11E+08
Sr-92	1.20E+08
Ba-139	1.67E+08
Ba-140	1.61E+08
Ru-103	1.40E+08
Ru-105	9.62E+07

Nuclide	Inventory (Ci)
Ru-106	4.89E+07
Rh-105	8.86E+07
Mo-99	1.75E+08
Tc-99M	1.53E+08
Ce-141	1.52E+08
Ce-143	1.42E+08
Ce-144	1.20E+08
Pu-238	4.13E+05
Pu-239	3.50E+04
Pu-240	5.23E+04
Pu-241	1.18E+07
Np-239	1.88E+09
Y-90	9.11E+06
Y-91	1.14E+08
Y-92	1.20E+08
Y-93	1.39E+08
Nb-95	1.56E+08
Zr-95	1.54E+08
Zr-97	1.55E+08
La-140	1.73E+08
La-141	1.53E+08
La-142	1.48E+08
Nd-147	6.11E+07
Pr-143	1.37E+08
Am-241	1.41E+04
Cm-242	3.52E+06
Cm-244	3.82E+05

TABLE 14.3-43a
Core Fission Product Release Fractions

	Gap Release (1)	Early In-Vessel (2)
Noble gases	0.05	0.95
Halogens	0.05	0.35
Alkali Metals	0.05	0.25
Tellurium group	0	0.05
Barium, Strontium	0	0.02
Noble Metals (Ruthenium group)	0	0.0025
Cerium group	0	0.0005
Lanthanides	0	0.0002

Note:
(1) Release is initiated at 30 seconds and is terminated at 0.5 hours.
(2) Released over a 1.3 hour period starting at the end of the gap release phase.

TABLE 14.3-44
(DELETED)

TABLE 14.3-45
Data Used in Evaluating Offsite Doses
(Isotope Dependent Data)

COMMITTED EFFECTIVE DOSE EQUIVALENT DOSE CONVERSION FACTORS

Isotope	DCF (rem/curie)	Isotope	DCF (rem/curie)
I-130	2.64E3	Cs-138	1.01E2
I-131	3.29E4	Cs-134	4.63E4
I-132	3.81E2	Cs-136	7.33E3
I-133	5.85E3	Cs-137	3.19E4
I-134	1.31E2	Rb-86	6.62E3
I-135	1.23E3		
		Ru-103	8.95E3
Kr-85m	N/A	Ru-105	4.55E2
Kr-85	N/A	Ru-106	4.77E5
Kr-87	N/A	Rh-105	9.55E2
Kr-88	N/A	Mo-99	3.96E3
Xe-131m	N/A	Tc-99m	3.26E1
Xe-133m	N/A		
Xe-133	N/A	Y-90	8.44E3
Xe-135m	N/A	Y-91	4.89E4
Xe-135	N/A	Y-92	7.81E2
Xe-138	N/A	Y-93	2.15E3
		Nb-95	5.81E3
Te-127	3.18E2	Zr-95	2.36E4
Te-127m	2.15E4	Zr-97	4.33E3
Te-129m	2.39E4	La-140	4.85E3
Te-129	8.95E1	La-141	5.81E2
Te-131m	6.4E3	La-142	2.53E2
Te-132	9.44E3	Nd-147	6.85E3
Sb-127	6.03E3	Pr-143	8.10E4
Sb-129	6.44E2	Am-241	4.44E8
		Cm-242	1.73E7
Ce-141	8.95E3	Cm-244	2.48E8
Ce-143	3.39E3		
Ce-144	3.74E5	Sr-89	4.14E4
Pu-238	3.92E8	Sr-90	1.3E6
Pu-239	4.29E8	Sr-91	1.66E3
Pu-240	4.29E8	Sr-92	8.07E2
Pu-241	8.25E6	Ba-139	1.7E2
Np-239	2.51E3	Ba-140	3.74E3

TABLE 14.3-45 (Cont.)
Data Used in Evaluating Offsite Doses
(Isotope Dependent Data)

EFFECTIVE DOSE EQUIVALENT DOSE CONVERSION FACTORS			
Nuclide	DCF (rem-m^3/Ci-sec)	Nuclide	DCF (rem-m^3/Ci-sec)
I-130	3.848E-01	Cs-134	2.801E-01
I-131	6.734E-02	Cs-136	3.922E-01
I-132	4.144E-01	Cs-137(1)	1.066E-01
I-133	1.088E-01	Cs-138	4.477E-01
I-134	4.810E-01	Rb-86	1.780E-02
I-135	2.953E-01		
		Ru-103	8.325E-02
Kr-85m	2.768E-02	Ru-105	1.410E-01
Kr-85	4.403E-04	Ru-106	0.00E+00
Kr-87	1.524E-01	Rh-105	1.376E-02
Kr-88	3.774E-01	Mo-99	2.694E-02
Xe-131m	1.439E-03	Tc-99m	2.179E-02
Xe-133m	5.069E-03		
Xe-133	5.772E-03	Y-90	7.030E-04
Xe-135m	7.548E-02	Y-91	9.620E-04
Xe-135	4.403E-02	Y-92	4.810E-02
Xe-138	2.135E-01	Y-93	1.776E-02
		Nb-95	1.384E-01
Te-127	8.954E-04	Zr-95	1.332E-01
Te-127m	5.439E-04	Zr-97	3.337E-02
Te-129m	5.735E-03	La-140	4.329E-01
Te-129	1.018E-02	La-141	8.843E-03
Te-131m	2.594E-01	La-142	5.328E-01
Te-132	3.811E-02	Nd-147	2.290E-02
Sb-127	1.232E-01	Pr-143	7.770E-05
Sb-129	2.642E-01	Am-241	3.027E-03
		Cm-242	2.105E-05
Ce-141	1.269E-02	Cm-244	1.817E-05
Ce-143	4.773E-02		
Ce-144	3.156E-03	Sr-89	2.860E-04
Pu-238	1.806E-05	Sr-90	2.786E-05
Pu-239	1.569E-05	Sr-91	1.277E-01
Pu-240	1.758E-05	Sr-92	2.512E-01
Pu-241	2.683E-07	Ba-139	8.029E-03
Np-239	2.845E-02	Ba-140	3.175E-02

Note:
1. Decay of Cs-137 does not result in gamma radiation. The EDE DCF listed for Cs-137 is actually the value associated with the decay of the short-lived daughter product Ba-137m.

TABLE 14.3-46
Input Values for Doses

Atmospheric Dilution

Time Period (hr)	χ/Q (520m) (sec/m^3)	χ/Q (1100m) (sec/m^3)
0-8	7.5×10^{-4}	3.5×10^{-4}
8-24	--	1.2×10^{-4}
24-96	--	4.2×10^{-5}
96-720	--	9.3×10^{-6}

Containment Leakage

Time Period (hr)	Leak Rate (percent/day)
0-24	0.1
24-720	0.05

Breathing Rate Offsite

Time Period (hr)	Breathing Rate (m^3/sec)
0-8	3.5×10^{-4}
8-24	1.8×10^{-4}
24-720	2.3×10^{-4}

TABLE 14.3-47
DELETED

TABLE 14.3-48
DELETED

TABLE 14.3-49
ASSUMPTIONS USED FOR LARGE LOCA DOSE ANALYSIS

Iodine Chemical Species	
Elemental	4.85%
Methyl	0.15%
Particulate	95%
Iodine Removal in Containment	
Containment Spray	
Spray Start Delay	60 sec
Injection spray flowrate	2135 gpm
Injection spray duration	37.8 min
Recirculation spray flowrate	1080 gpm
Recirculation spray duration	Note 1
Iodine removal coefficient	
Elemental, λ_s	
during spray injection	20.0/hr DF < 200
during spray recirculation	5.0/hr DF < 200
Particulate λ_p	
during spray injection	4.4/hr DF $\leq$ 50
during spray recirculation	2.25/hr DF $\leq$ 50
Sedimentation Particulate Removal	0.1/hr DF < 1000 (Note 2)
Fan Cooler Units Containment Filters	
Start Delay Time	60 sec
Number of Units	3
Flow Rate per Unit	64,500 cfm
Containment Free Volume	2.61×10^6-ft^3
Containment Leak Rate	
0-24 hr	0.10%/day
> 24 hr	0.05%/day

Notes:
1. Total spray duration assumed is 3.4 hours following the initiation of the event.
2. Credit for sedimentation removal is limited to the unsprayed portion of the containment until sprays are terminated (at 3.4 hours).

TABLE 14.3-49a
DELETED

TABLE 14.3-50
ASSUMPTIONS USED FOR ANALYSIS OF
CONTROL ROOM DOSES

Volume	102,400-ft^3
Unfiltered Inleakage	700 cfm
Filtered Makeup	1800 cfm
Filtered Recirculation	0 cfm
Filter Efficiency	
Elemental	95%
Organic	90%
Particulate	99%
Breathing Rate	3.5 x 10^{-4} m^3/sec
Atmospheric Dispersion Factors	See Table 14.3-51
Occupancy Factors	
0-1 day	1.0
1-4 days	0.6
4-30 days	0.4

TABLE 14.3-51
ATMOSPHERIC DISPERSION FACTORS USED
FOR ANALYSIS OF CONTROL ROOM DOSES

Release Point	Atmospheric Dispersion Factors (sec/m^3)
Containment Surface Leak (1)	
0-2 hr	3.82×10^{-4}
2-8 hr	2.81×10^{-4}
8-24 hr	1.05×10^{-4}
24-96 hr	8.31×10^{-5}
96-720 hr	7.04×10^{-5}
Side of the Auxiliary Boiler Feedwater Building (2)	
0-2 hr	1.09×10^{-3}
2-8 hr	1.02×10^{-3}
8-24 hr	4.99×10^{-4}
24-96 hr	3.86×10^{-4}
96-720 hr	2.99×10^{-4}
Vent Stacks on the Roof of the Auxiliary Boiler Feedwater Building (3)	
0-2 hr	9.49×10^{-4}
2-8 hr	8.65×10^{-4}
8-24 hr	4.17×10^{-4}
24-96 hr	3.30×10^{-4}
96-720 hr	2.54×10^{-4}
Containment Vent (4)	
0-2 hr	6.44×10^{-4}
2-8 hr	4.69×10^{-4}
8-24 hr	1.72×10^{-4}
24-96 hr	1.37×10^{-4}
96-720 hr	1.17×10^{-4}

Notes:

1. Used for Containment Leakage Releases in Rod Ejection (14.2.6.9), Large Break LOCA (14.3.6.5) and Small Break LOCA (14.3.6.7).
2. Used for Steamline Break (14.2.5.7).
3. Used for Locked Rotor (14.1.6.5.3) and Steam Generator Tube Rupture (14.2.4) and Secondary Side Releases for Rod Ejection (14.2.6.9) and Small Break LOCA (14.3.6.7).
4. Used for Fuel Handling Accident (14.2.1.1) and Large Break LOCA ECCS Recirculation Leakage (14.3.6.6).

TABLE 14.3-52
CALCULATED CONTROL ROOM DOSES

Event	TEDE Dose (rem)
Large Break LOCA	
Containment Leakage	3.5
Direct Dose from Activity in Containment	0.02
ECCS Recirculation Leakage With Boundary Layer Effects	0.14
ECCS Recirculation Leakage Without Boundary Layer Effects	1.36
Total With Boundary Layer Effects	3.68
Total Without Boundary Layer Effects	4.90
Small Break LOCA	3.5
Locked Rotor	0.65
Rod Ejection	1.4
Fuel Handling Accident	3.0
Steamline Break	
Pre-Existing Iodine Spike	0.18
Accident-Initiated Iodine Spike	0.52
Steam Generator Tube Rupture	
Pre-Existing Iodine Spike	1.4
Accident-Initiated Iodine Spike	0.48
Volume Control Tank Rupture	0.12
Holdup Tank Rupture	0.06
Gas Decay Tank Rupture	0.05

14.3 FIGURES

14.4 ANTICIPATED TRANSIENTS WITHOUT SCRAM

An anticipated transient without scram (ATWS) is an anticipated operational occurrence (such as loss of feedwater, loss of load, or loss of offsite power) that is assumed to be accompanied by a failure of the reactor trip system to shut down the reactor. As presented in Reference 1, the reactor is adequately protected against anticipated plant transients by the reactor protection system in the Westinghouse design, which is both redundant and diverse. As a result, failure to trip was not considered a credible event and the effects of ATWS were not considered part of the design basis for transients analyzed for Westinghouse plants. Nevertheless, in response to an AEC request for further information at the time of Indian Point Unit 2 initial licensing, the hypothetical effects of anticipated transients with no credit taken for reactor trip were provided in Supplement 6 to the original Indian Point Unit 2 FSAR. Those assessments were historical and were superseded by a later series of generic studies on ATWS (References 2 & 3) that showed acceptable consequences would result for Westinghouse designed plants provided that the turbine trips and auxiliary feedwater flow is initiated in a timely manner. The final USNRC ATWS Rule (Reference 4) requires that all US Westinghouse-designed plants install ATWS Mitigation System Actuation Circuitry (AMSAC) to initiate a turbine trip and actuate auxiliary feedwater independent of the reactor trip system. The Indian Point Unit 2 AMSAC is described in Section 7.10.

REFERENCES FOR SECTION 14.4

1. T. W. T. Burnett, et al., Reactor Protection System Diversity in W PWRs, WCAP-7306, Westinghouse Electric Corporation, April 1969.

2. Burnett, T.W.T, et al., "Westinghouse Anticipated Transients Without Trip Analysis," WCAP-8330, August 1974.

3. Letter from T.M. Anderson (Westinghouse) to S.H. Hanauer (USNRC), "ATWS Submittal," NS-TMA-2182, December 1979.

4. ATWS Final Rule, Code of Federal Regulations 10 CFR 50.62, "Requirements for Reduction of Risk from Anticipated Transients Without Scram (ATWS) Events for Light-Water-Cooled Nuclear Power Plants.

TABLE 14.4-1
DELETED

TABLE 14.4-2
DELETED

TABLE 14.4-3
DELETED

TABLE 14.4-4
DELETED

TABLE 14.4-5
DELETED

TABLE 14.4-6
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TABLE 14.4-7
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TABLE 14.4-8
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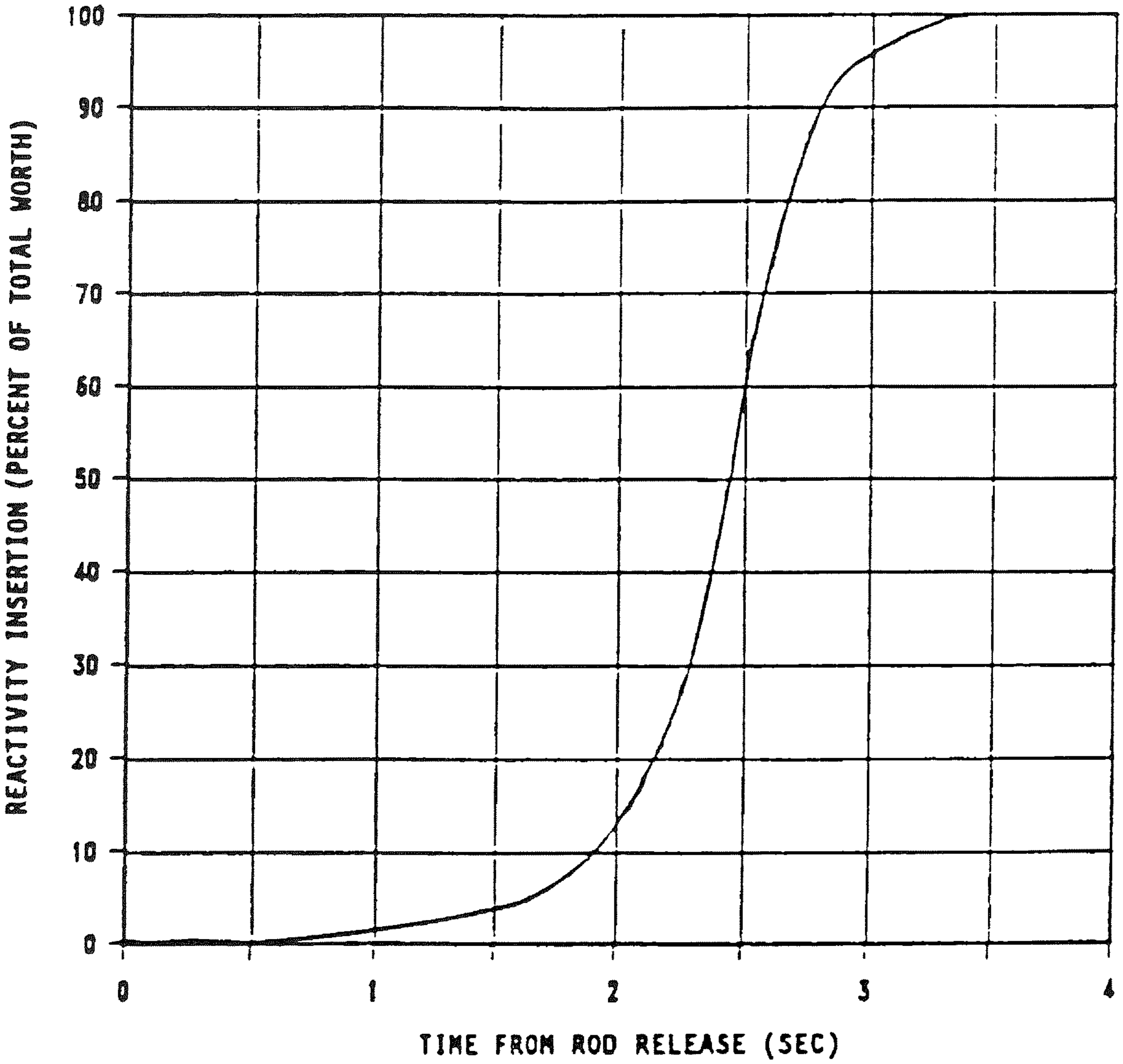
14.4 FIGURES

APPENDIX 14A
DELETED

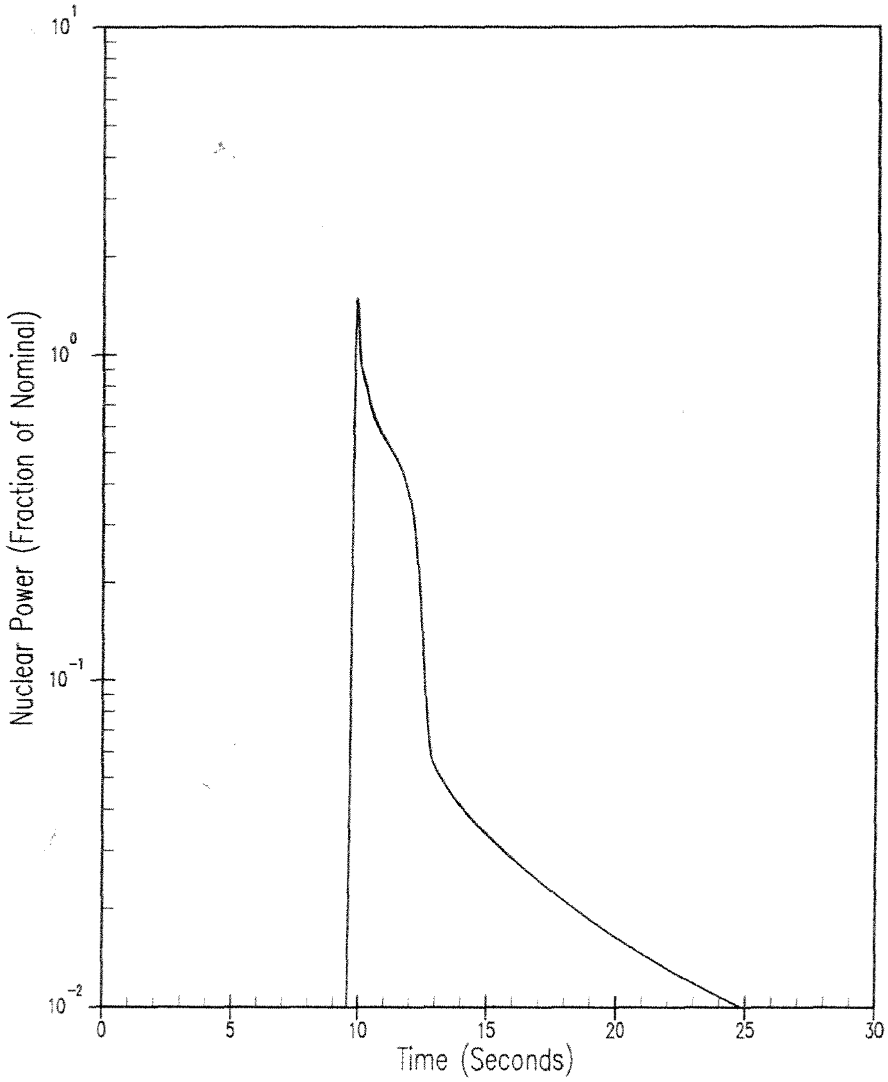


INDIAN POINT UNIT No. 2

UFSAR FIGURE 14.0-1

REACTIVITY INSERTION vs
TIME FOR REACTOR TRIP

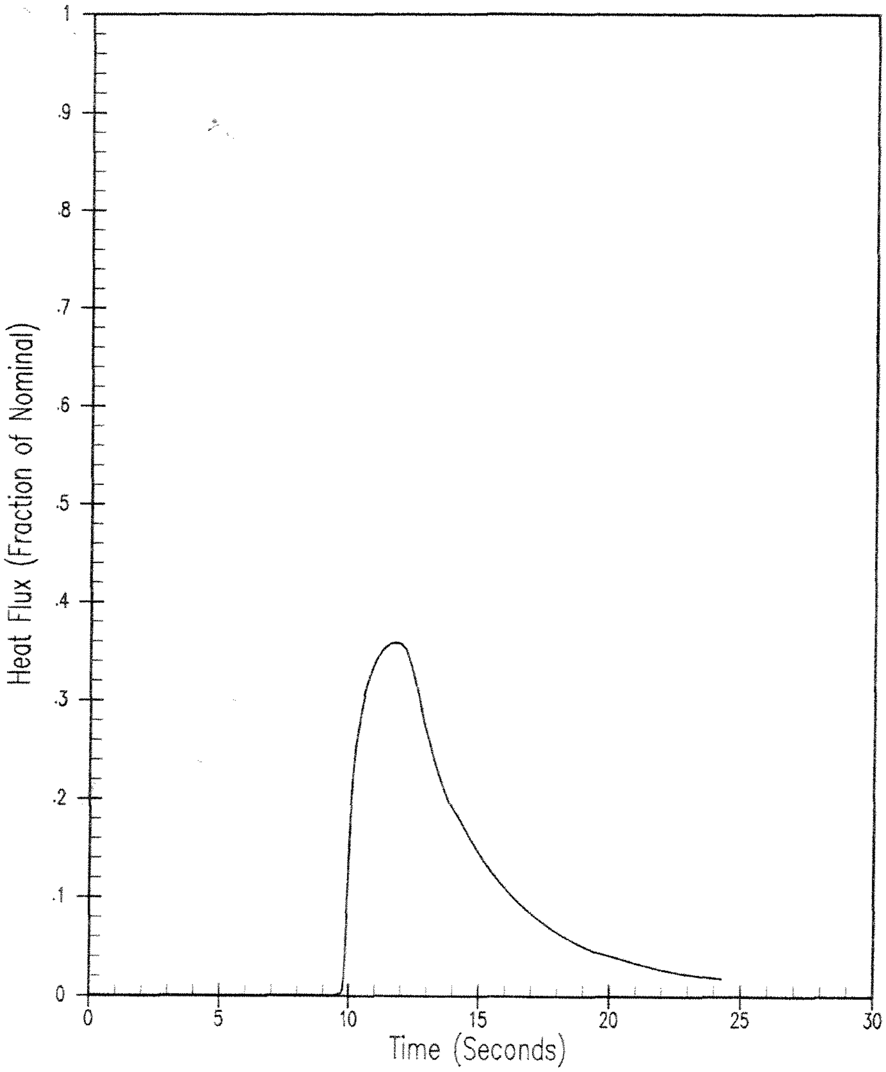
MIC. No. 1999MC3969	REV. No. 17A



INDIAN POINT UNIT No. 2

UNCONTROLLED RCCA WITHDRAWAL
FROM A SUBCRITICAL CONDITION
NUCLEAR POWER vs TIME

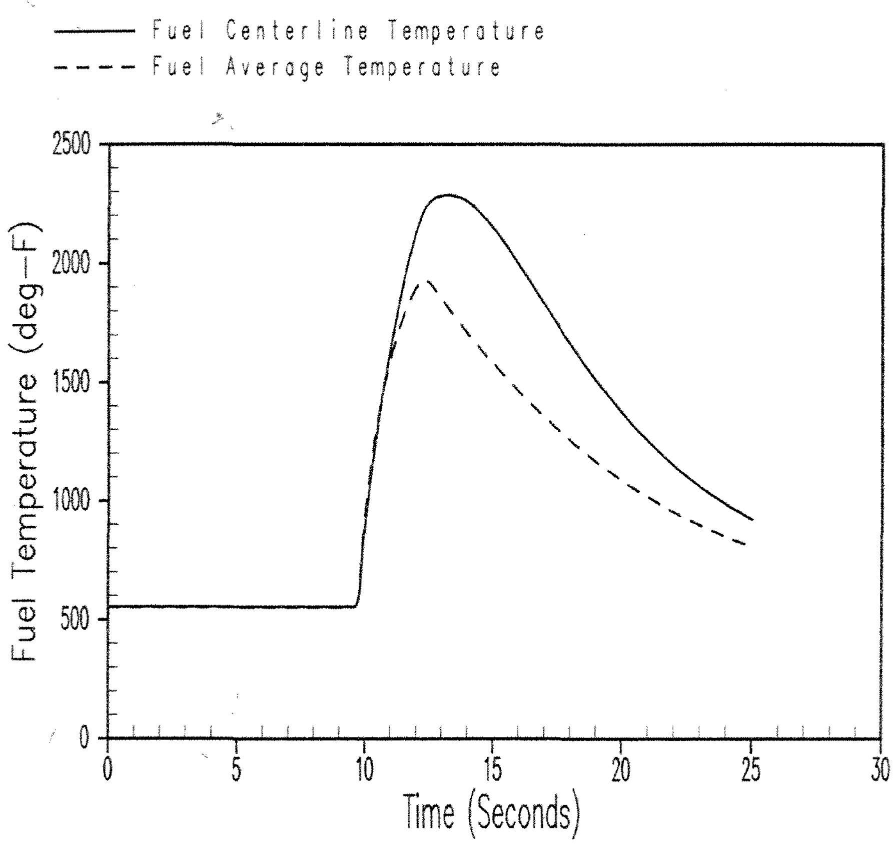
UFSAR FIGURE 14.1-1	REV. No. 19



INDIAN POINT UNIT No. 2

UNCONTROLLED RCCA WITHDRAWAL FROM A SUBCRITICAL CONDITION HEAT FLUX vs TIME, AVG. CHANNEL

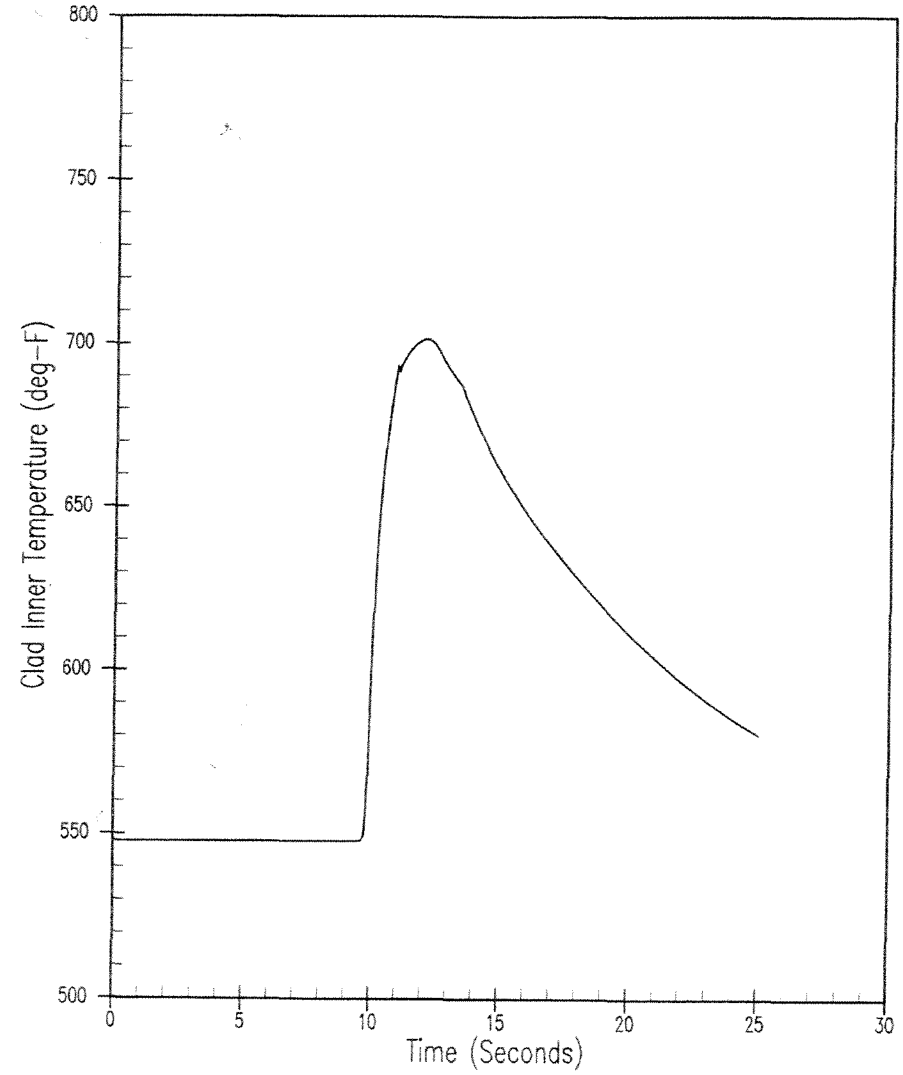
UFSAR FIGURE 14.1–2 | REV. No. 19



INDIAN POINT UNIT No. 2

UNCONTROLLED RCCA WITHDRAWAL FROM A SUBCRITICAL CONDITION FUEL AVERAGE TEMPERATURE vs TIME AT HOT SPOT

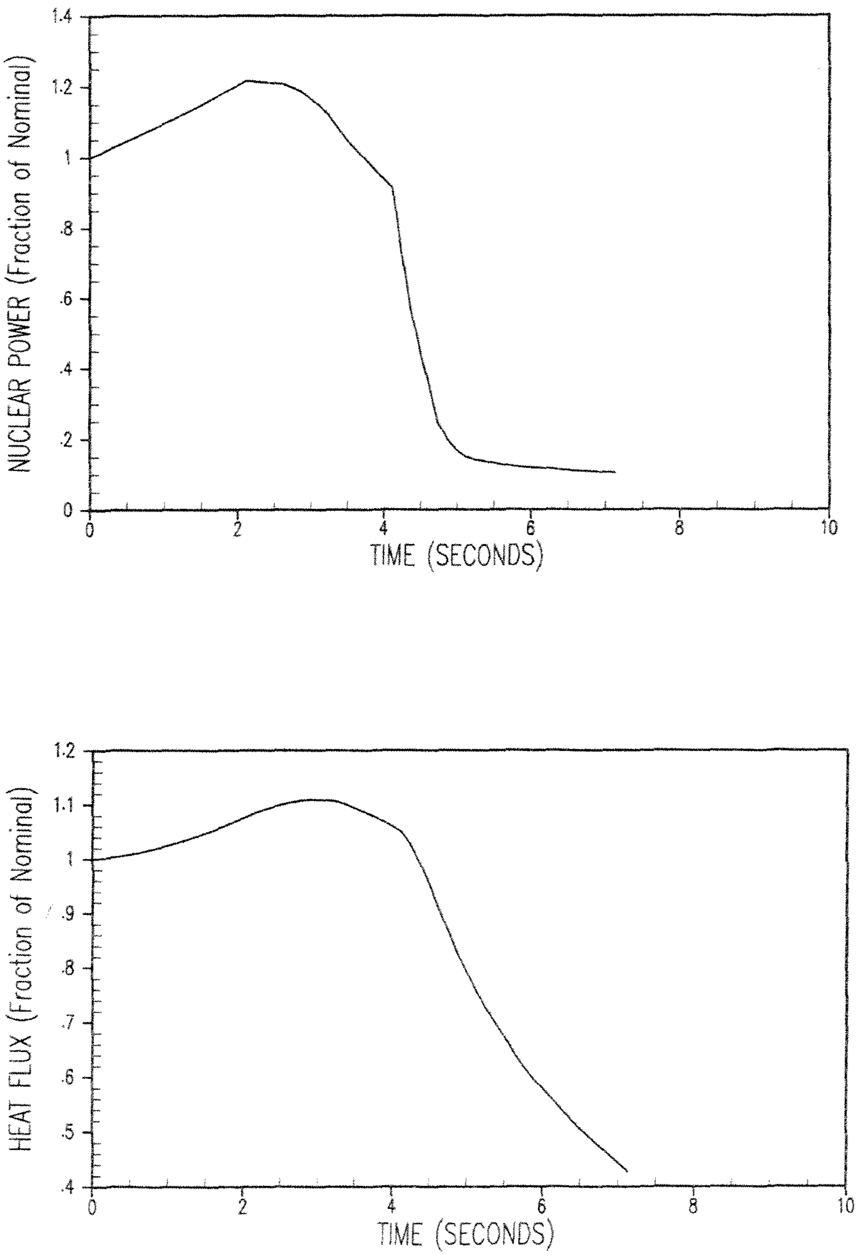
UFSAR FIGURE 14.1-3	REV. No. 19



INDIAN POINT UNIT No. 2

UNCONTROLLED RCCA WITHDRAWAL FROM A SUBCRITICAL CONDITION CLAD INNER TEMPERATURE vs TIME AT HOT SPOT

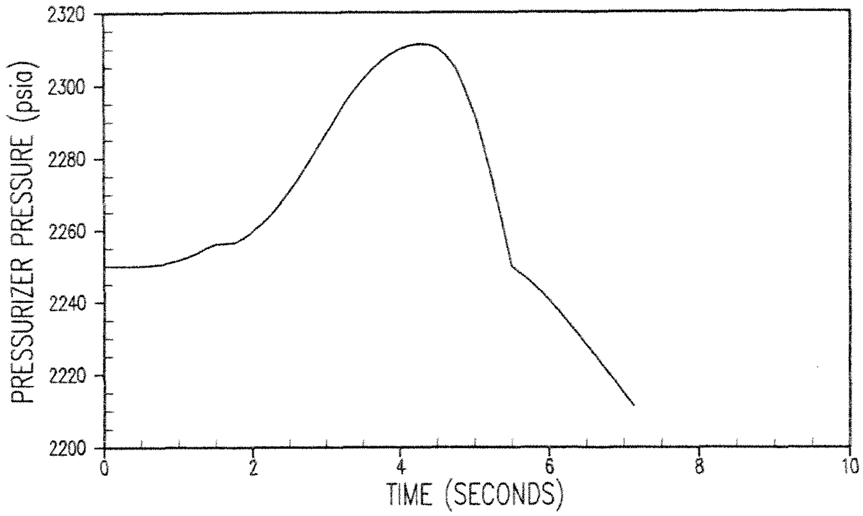
UFSAR FIGURE 14.1-4	REV. No. 19

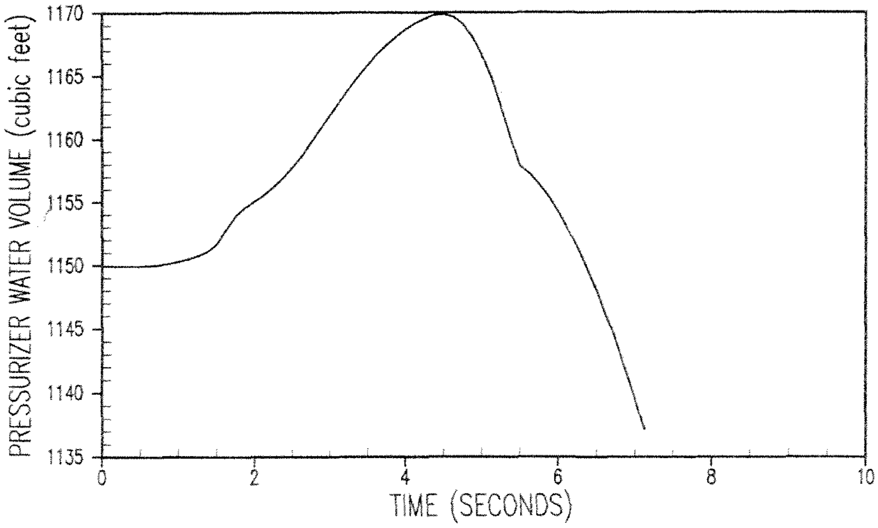


INDIAN POINT UNIT No. 2

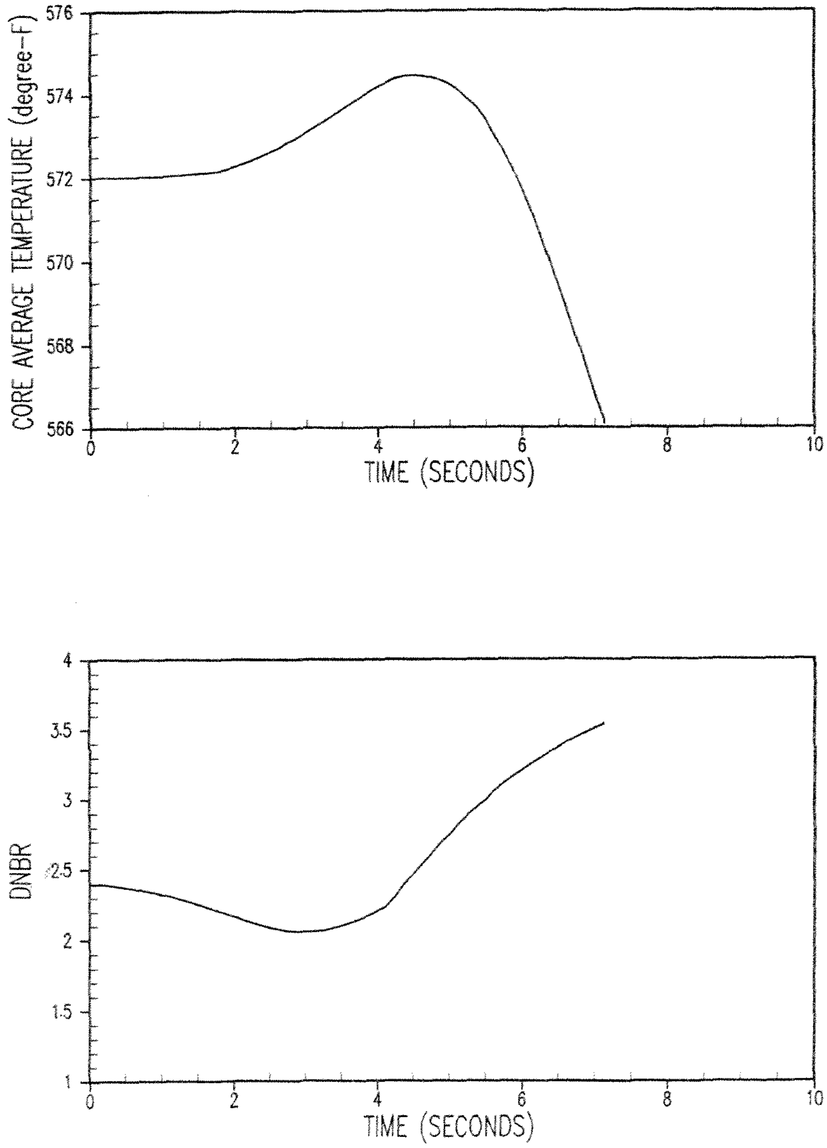
UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK (70 pcm/sec WITHDRAWAL RATE), NUCLEAR POWER AND CORE HEAT FLUX vs TIME

UFSAR FIGURE 14.1–5 | REV. No. 19





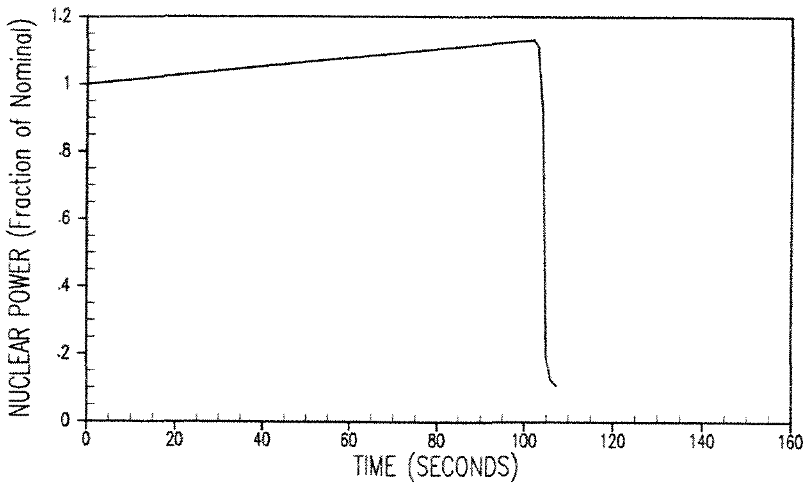
INDIAN POINT UNIT No. 2	
UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK (70 pcm/sec WITHDRAWAL RATE), PRESSURIZER PRESSURE AND WATER VOLUME vs TIME	
UFSAR FIGURE 14.1-6	REV. No. 19

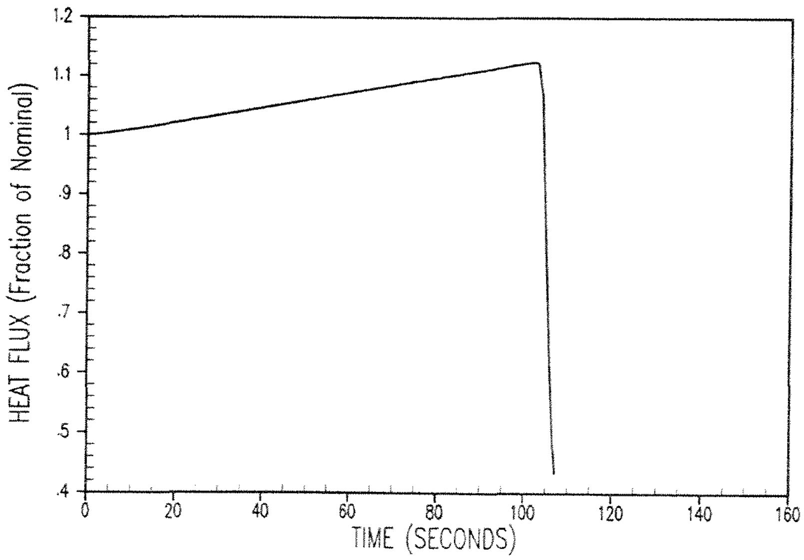


INDIAN POINT UNIT No. 2

UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK (70 pcm/sec WITHDRAWAL RATE), CORE WATER AVERAGE TEMPERATURE AND DNBR vs TIME

UFSAR FIGURE 14.1-7	REV. No. 19

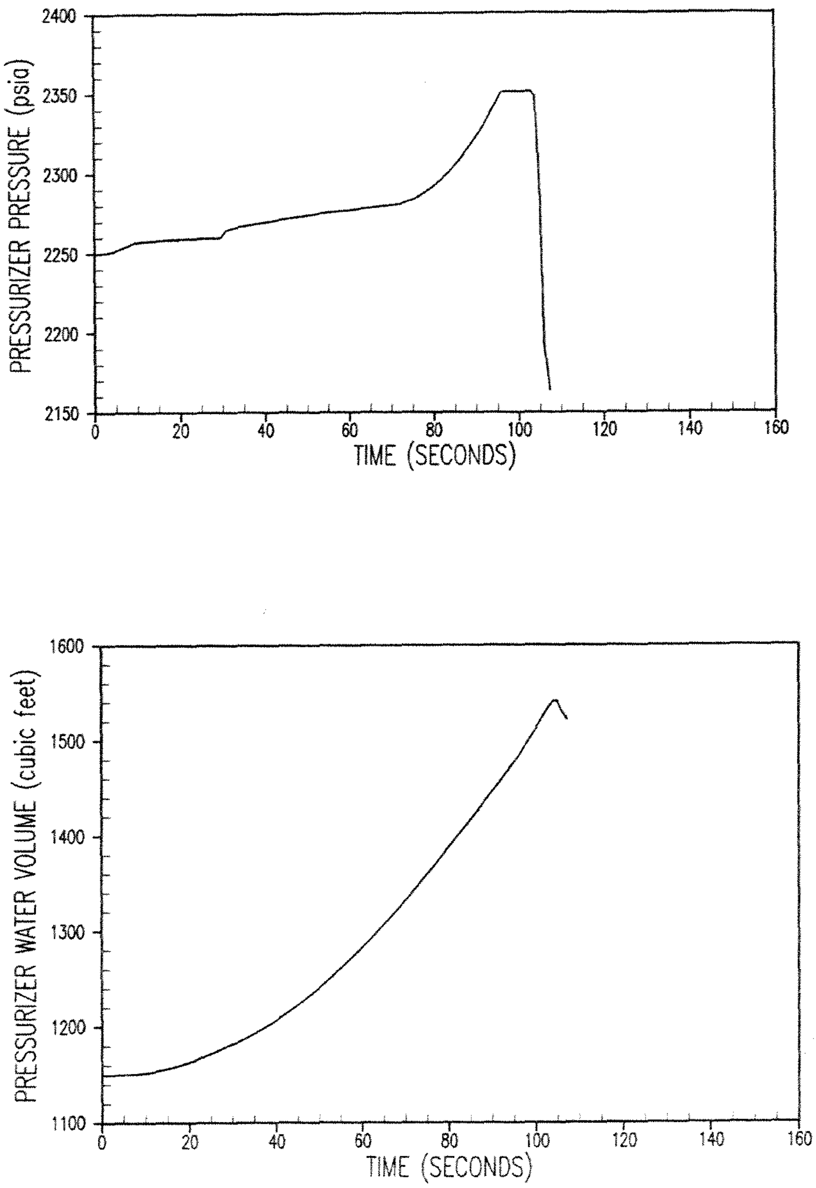




INDIAN POINT UNIT No. 2

UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK (1 pcm/sec WITHDRAWAL RATE), NUCLEAR POWER AND CORE HEAT FLUX vs TIME

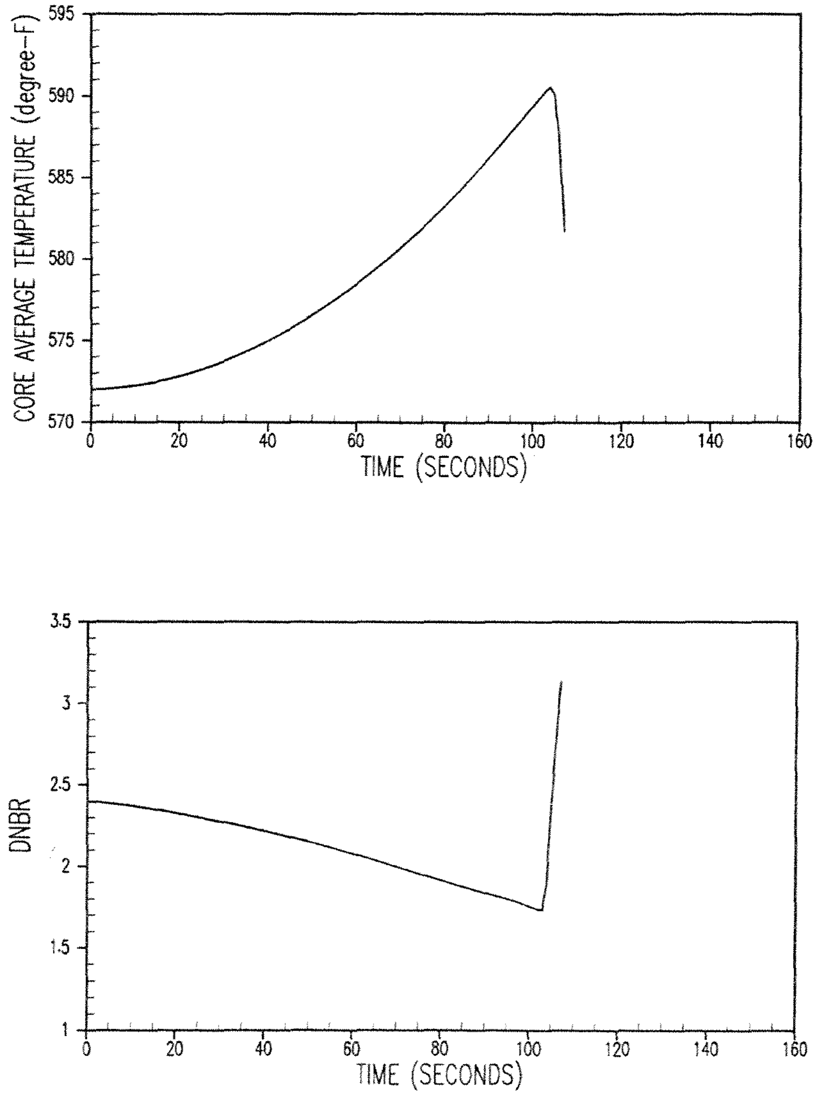
UFSAR FIGURE 14.1-8 | REV. No. 19



INDIAN POINT UNIT No. 2

UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK (1 pcm/sec WITHDRAWAL RATE), PRESSURIZER PRESSURE AND WATER VOLUME vs TIME

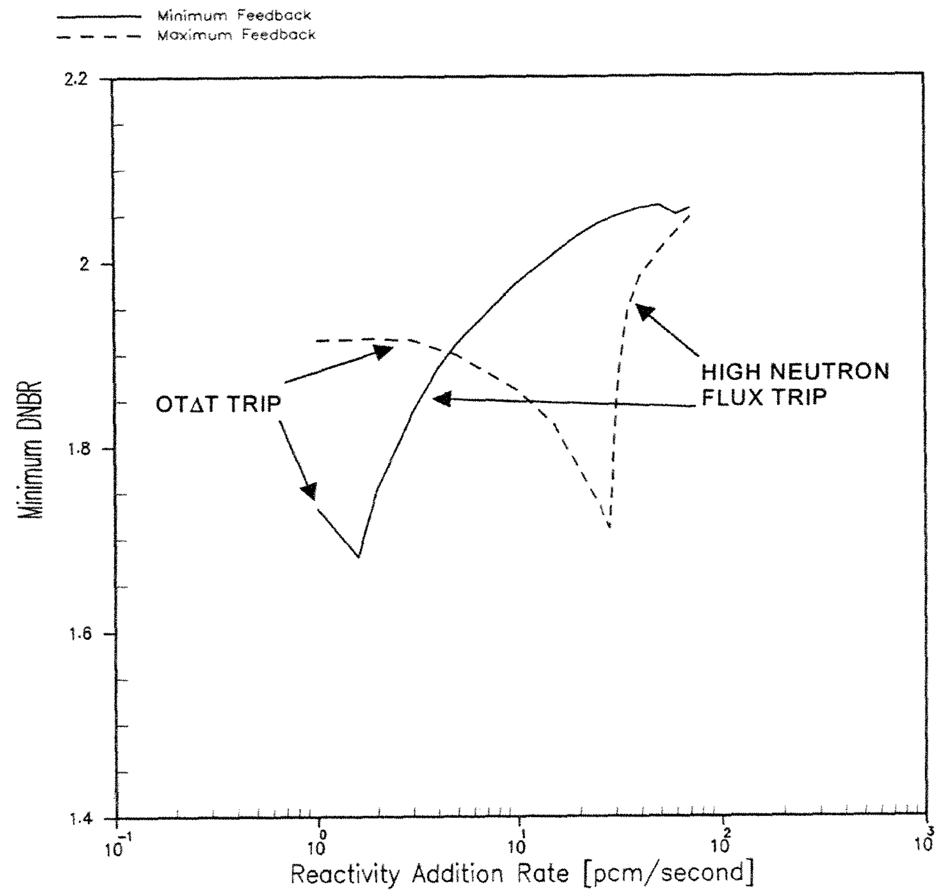
UFSAR FIGURE 14.1-9	REV. No. 19



INDIAN POINT UNIT No. 2

UNCONTROLLED RCCA BANK WITHDRAWAL FROM FULL POWER WITH MINIMUM REACTIVITY FEEDBACK (1 pcm/sec WITHDRAWAL RATE), CORE WATER AVERAGE TEMPERATURE AND DNBR vs TIME

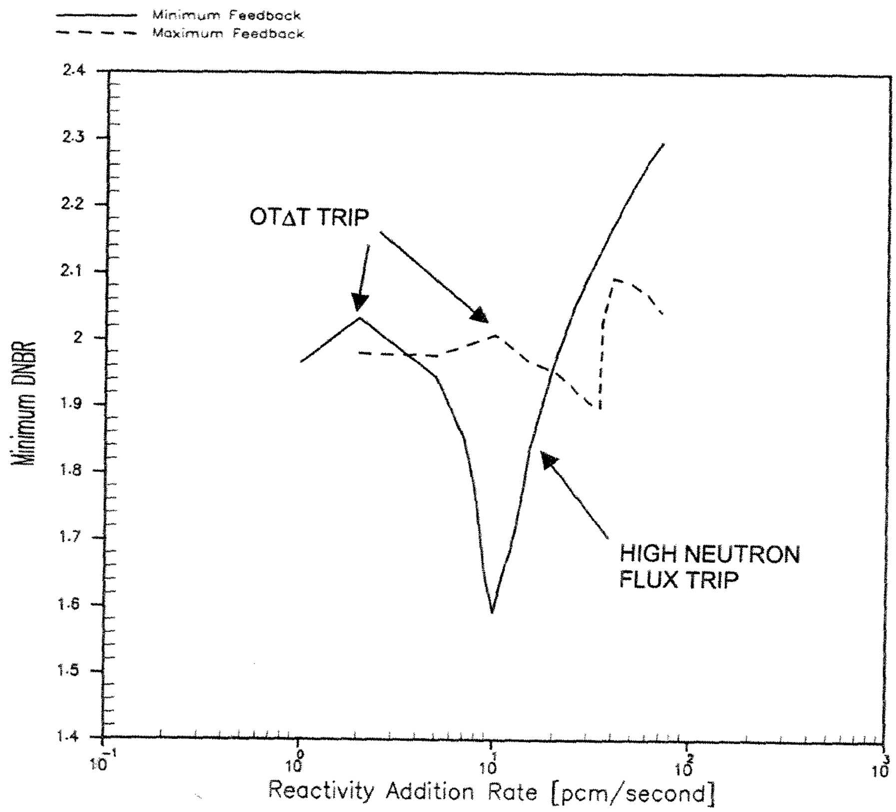
UFSAR FIGURE 14.1-10 | REV. No. 19



INDIAN POINT UNIT No. 2

MINIMUM DNBR VERSUS REACTIVITY INSERTION RATE, ROD WITHDRAWAL FROM 100 PERCENT POWER

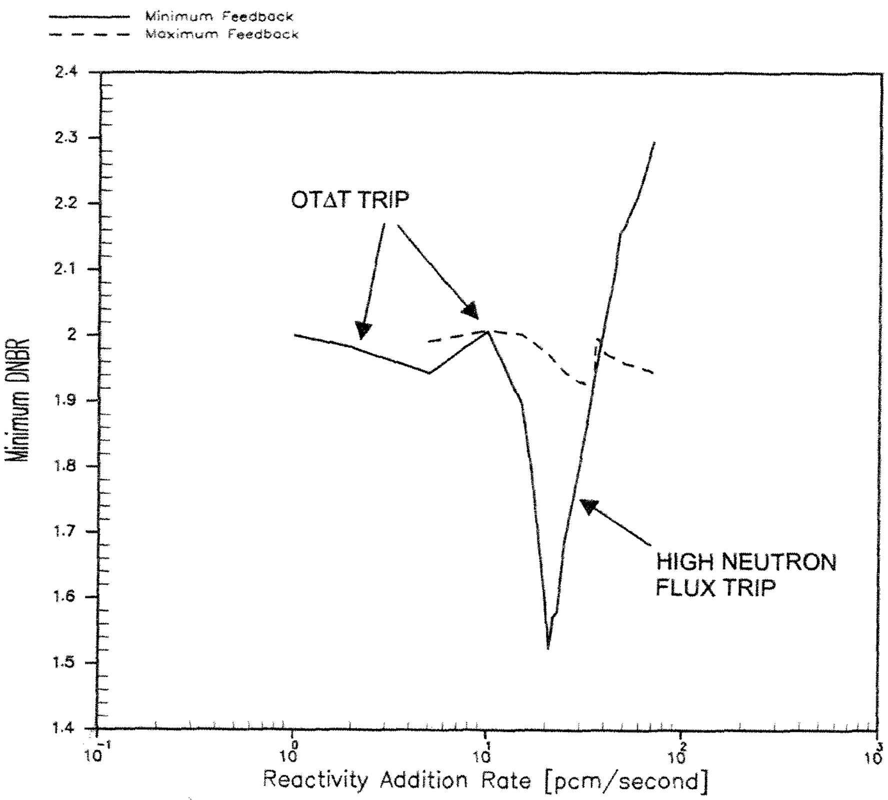
UFSAR FIGURE 14.1-11	REV. No. 19



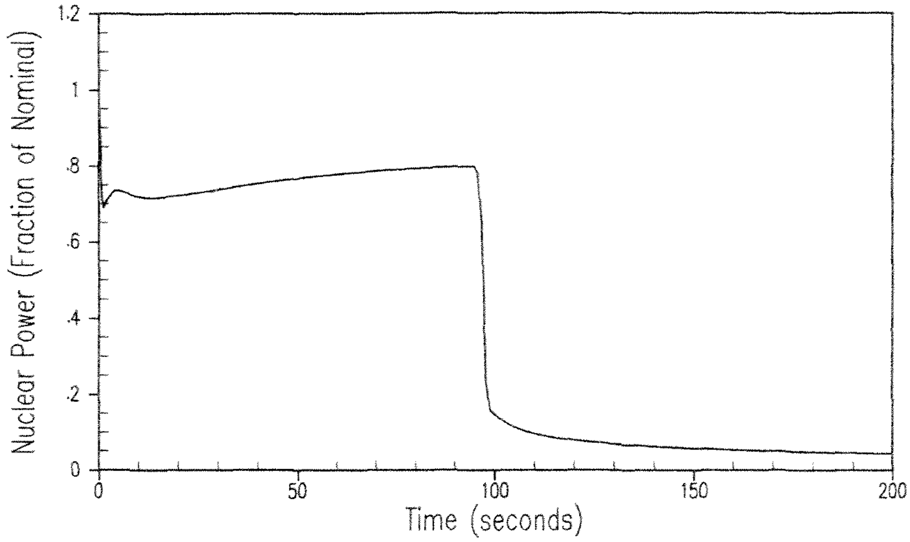
INDIAN POINT UNIT No. 2

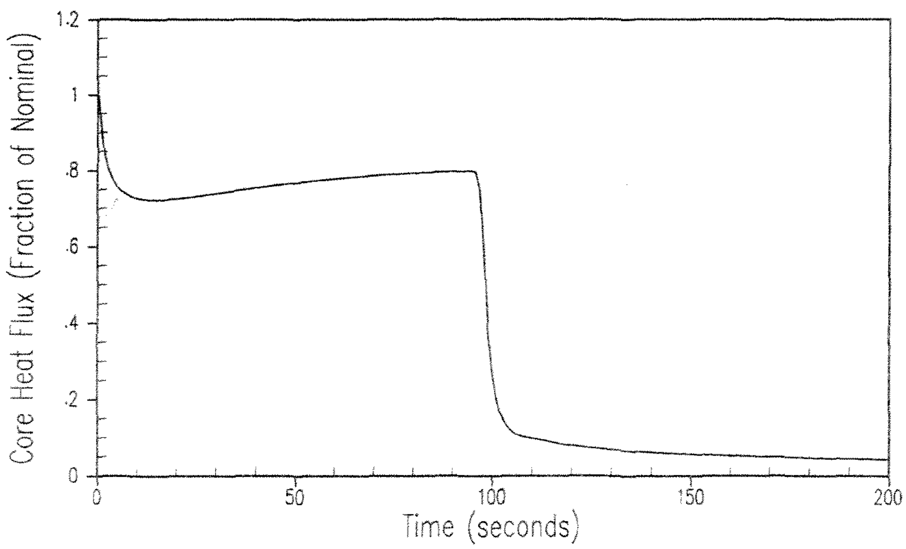
MINIMUM DNBR VERSUS REACTIVITY INSERTION RATE, ROD WITHDRAWAL FROM 60 PERCENT POWER

UFSAR FIGURE 14.1-12 | REV. No. 19



INDIAN POINT UNIT No. 2	
MINIMUM DNBR VERSUS REACTIVITY INSERTION RATE, ROD WITHDRAWAL FROM 10 PERCENT POWER	
UFSAR FIGURE 14.1-13	REV. No. 19

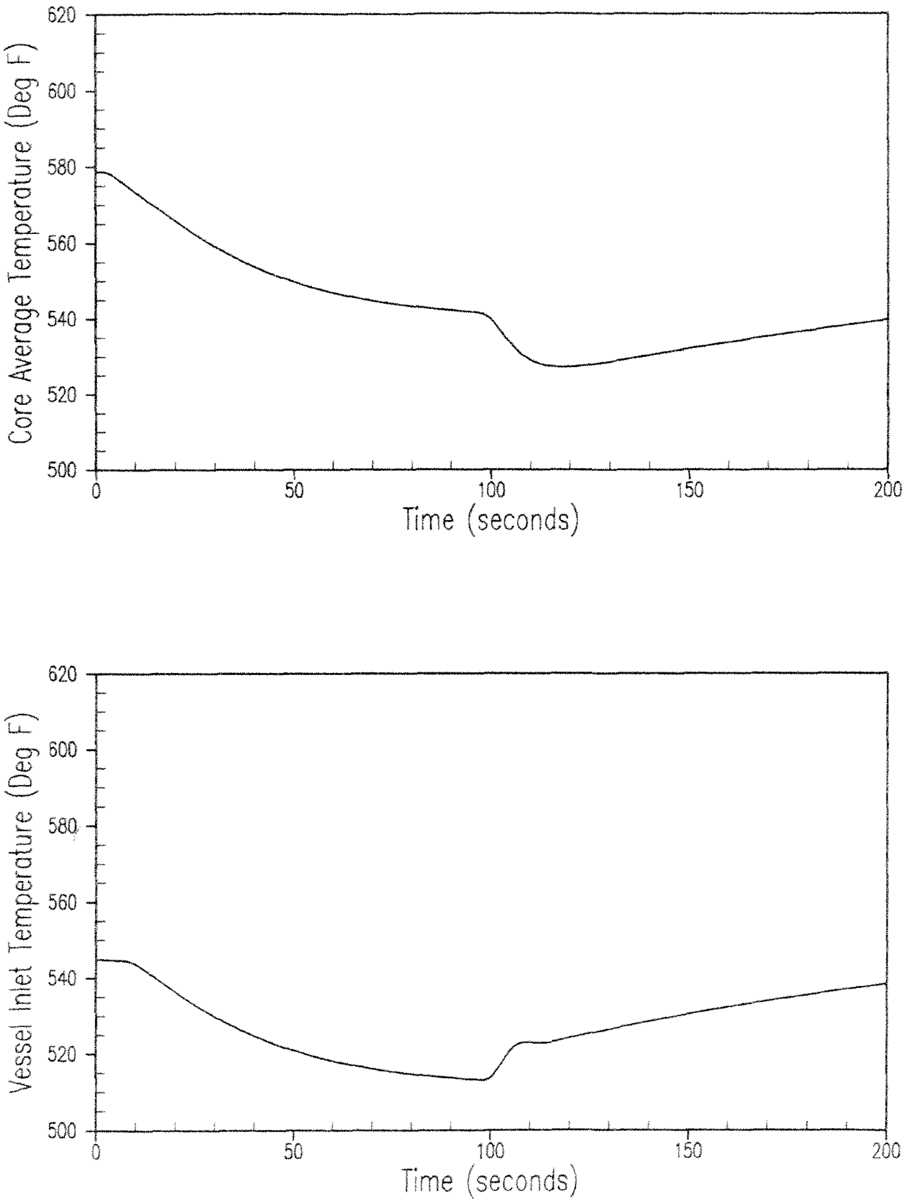




INDIAN POINT UNIT No. 2

DROPPED ROD INCIDENT MANUAL ROD CONTROL NUCLEAR POWER AND CORE HEAT FLUX AT BOL (SMALL NEGATIVE MTC) FOR DROPPED RCCA OF WORTH – 400 PCM

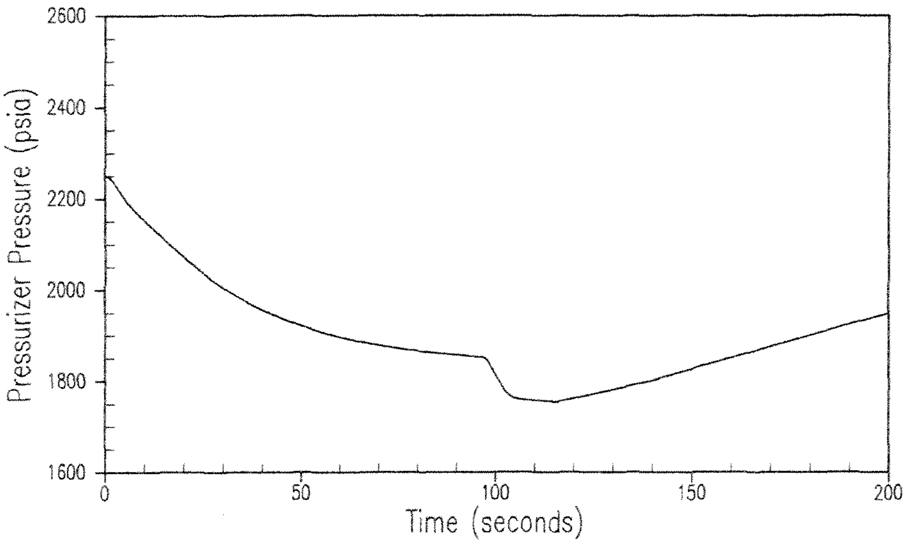
UFSAR FIGURE 14.1–14 | REV. No. 19



INDIAN POINT UNIT No. 2

DROPPED ROD INCIDENT MANUAL ROD CONTROL
CORE AVERAGE AND VESSEL INLET TEMPERATURE
AT BOL (SMALL NEGATIVE MTC) FOR
DROPPED RCCA OF WORTH – 400 PCM

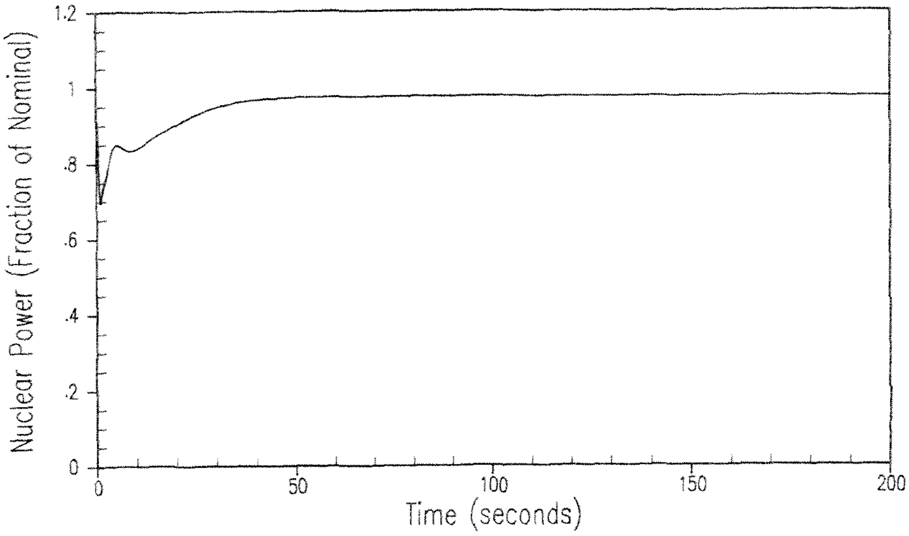
UFSAR FIGURE 14.1–15	REV. No. 19

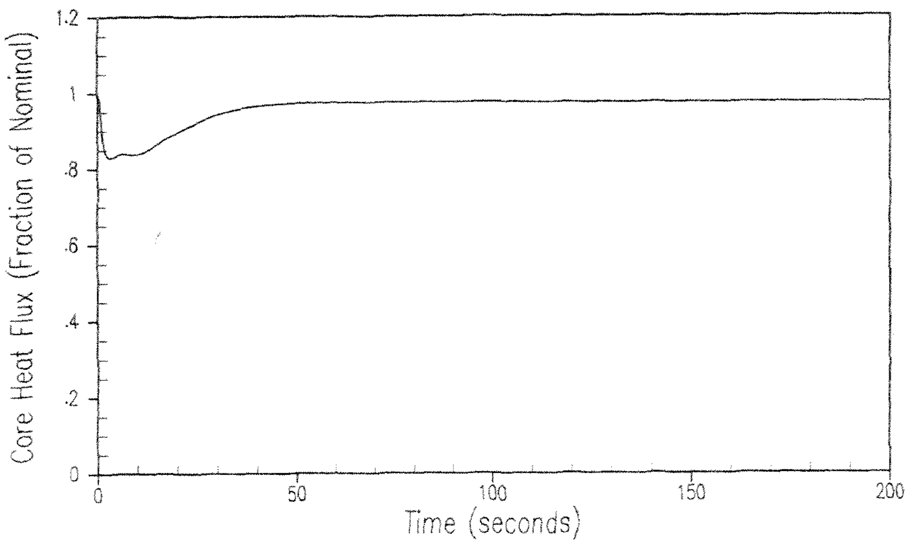


INDIAN POINT UNIT No. 2

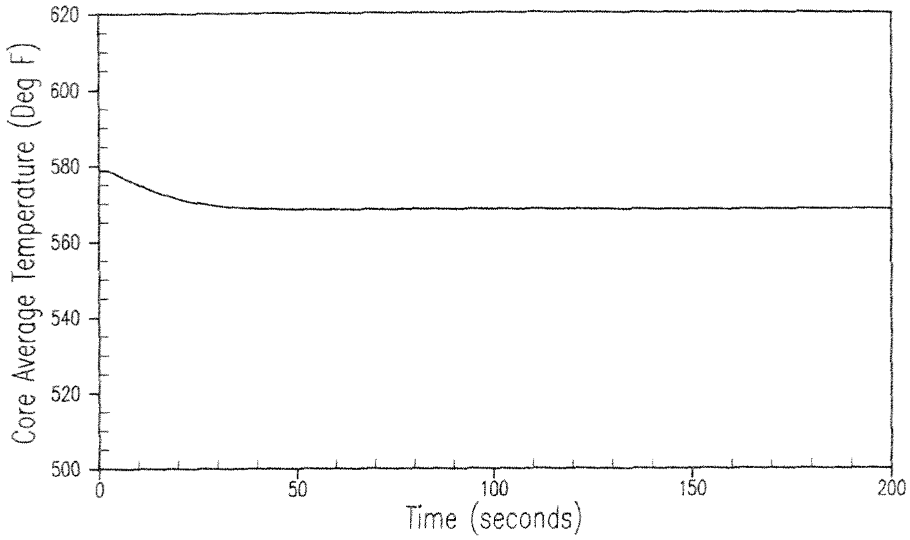
DROPPED ROD INCIDENT MANUAL ROD CONTROL
PRESSURIZER PRESSURE
AT BOL (SMALL NEGATIVE MTC) FOR
DROPPED RCCA OF WORTH – 400 PCM

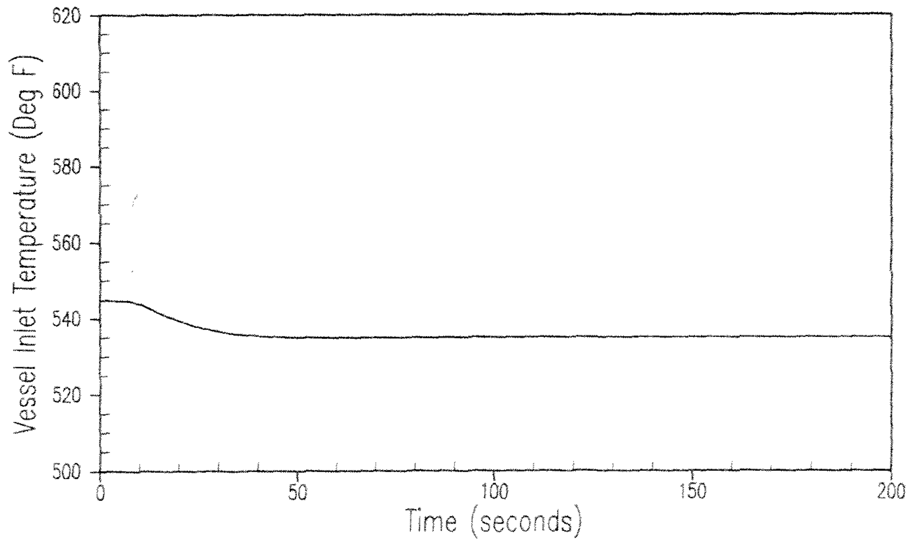
UFSAR FIGURE 14.1–16	REV. No. 19



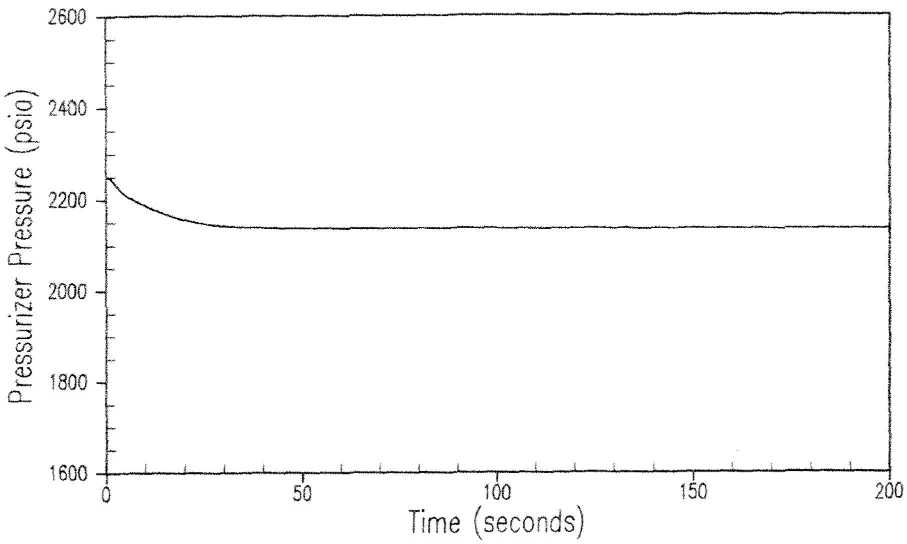


INDIAN POINT UNIT No. 2	
DROPPED ROD INCIDENT MANUAL ROD CONTROL NUCLEAR POWER AND CORE HEAT FLUX AT EOL (LARGE NEGATIVE MTC) FOR DROPPED RCCA OF WORTH – 400 PCM	
UFSAR FIGURE 14.1–17	REV. No. 19

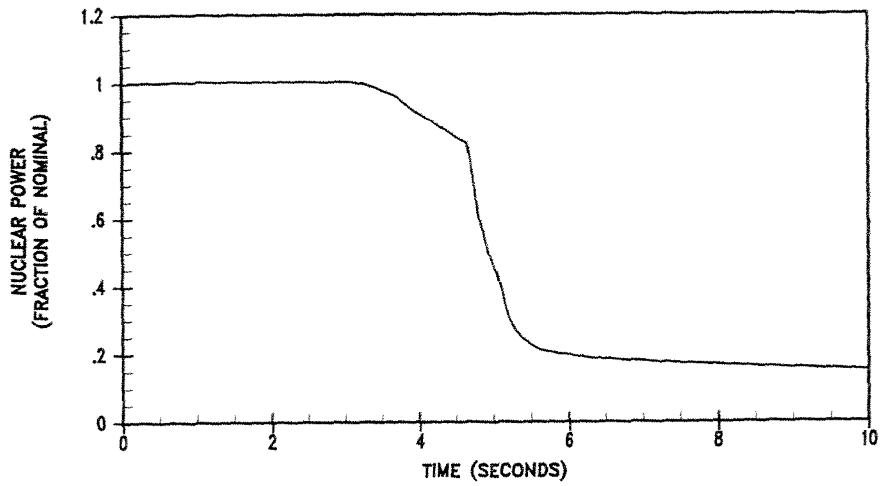


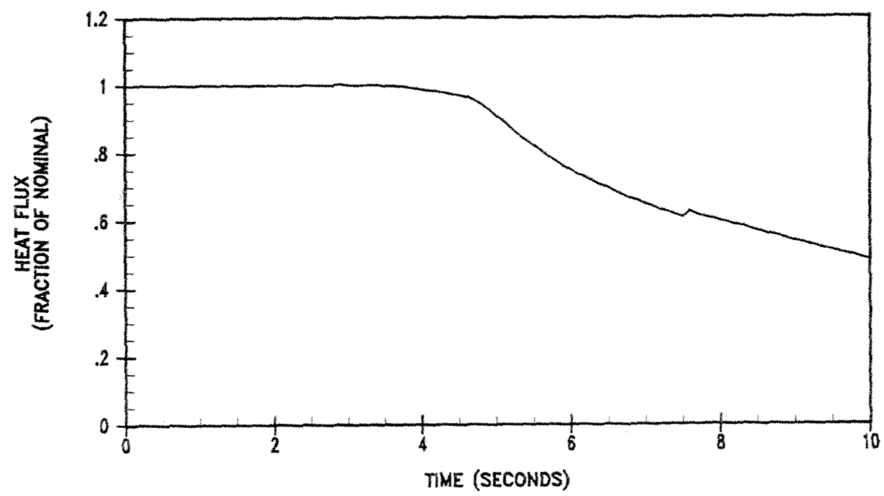


INDIAN POINT UNIT No. 2	
DROPPED ROD INCIDENT MANUAL ROD CONTROL CORE AVERAGE AND VESSEL INLET TEMPERATURE AT EOL (LARGE NEGATIVE MTC) FOR DROPPED RCCA OF WORTH – 400 PCM	
UFSAR FIGURE 14.1–18	REV. No. 19

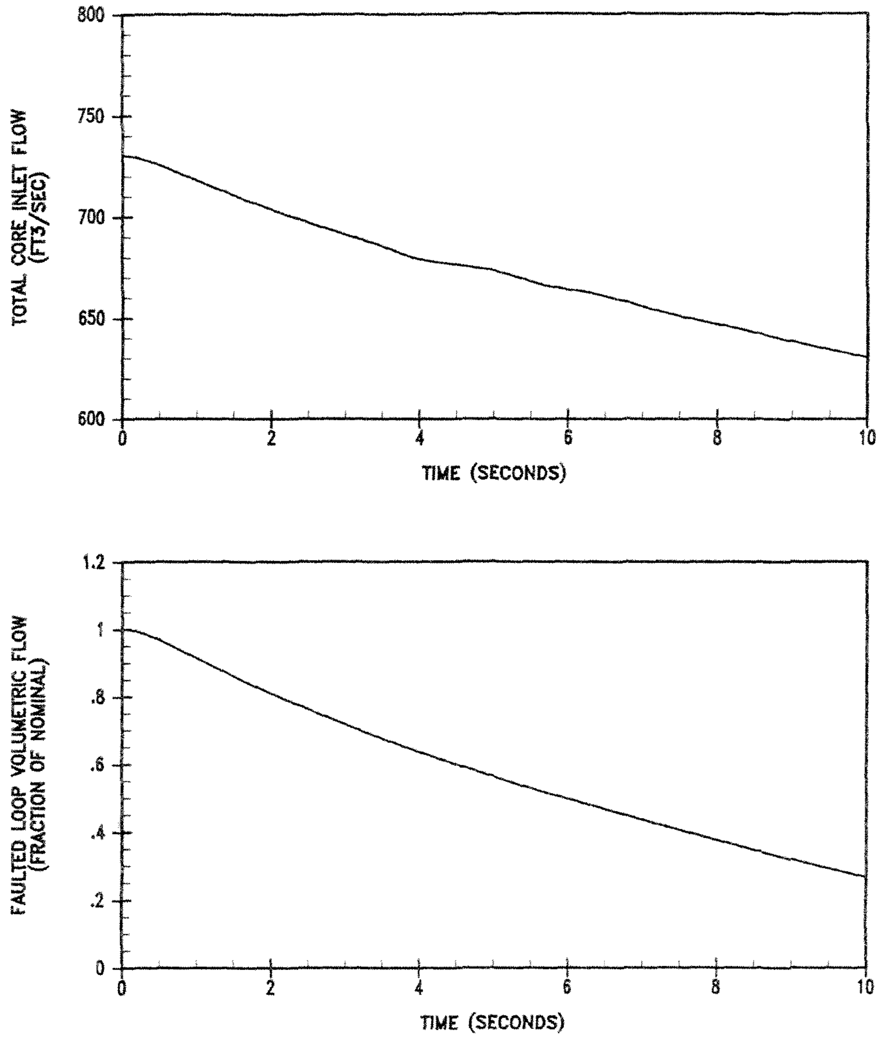


INDIAN POINT UNIT No. 2	
DROPPED ROD INCIDENT MANUAL ROD CONTROL PRESSURIZER PRESSURE AT EOL (LARGE NEGATIVE MTC) FOR DROPPED RCCA OF WORTH – 400 PCM	
UFSAR FIGURE 14.1–19	REV. No. 19





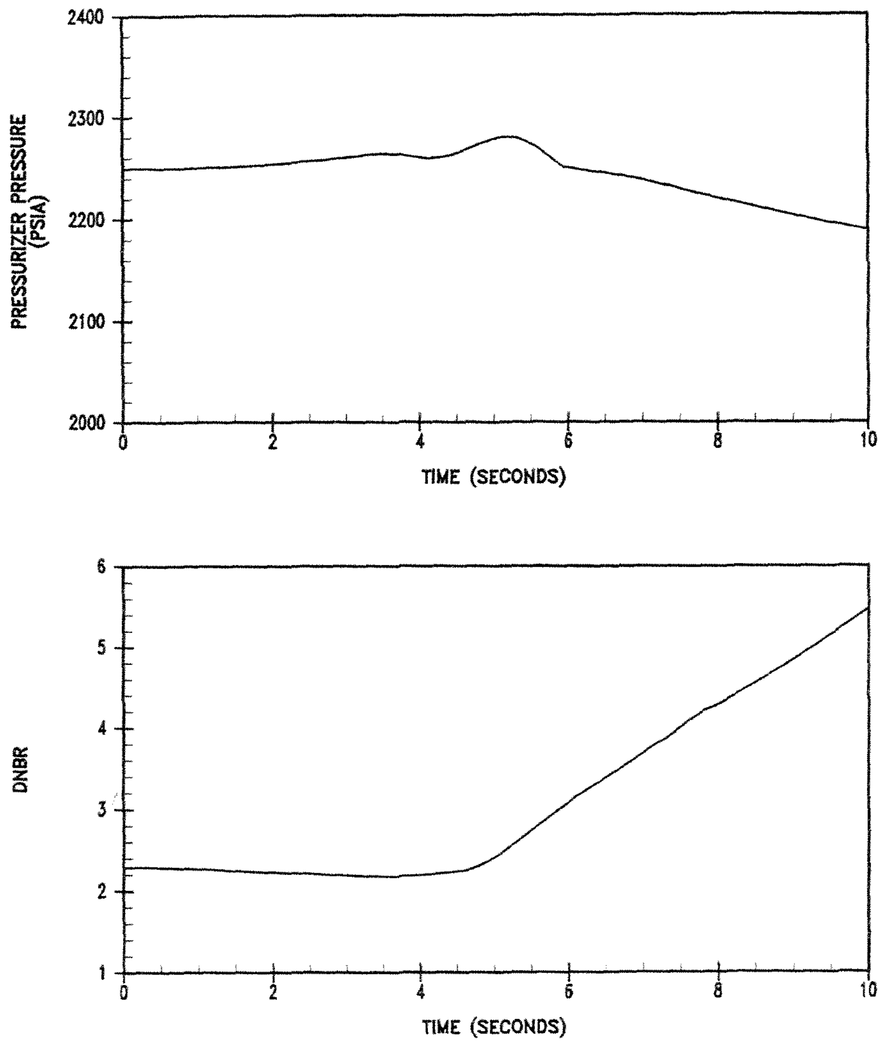
INDIAN POINT UNIT No. 2	
LOSS OF ONE PUMP OUT OF FOUR NUCLEAR POWER AND CORE HEAT FLUX vs TIME	
UFSAR FIGURE 14.1-20	REV. No. 19



INDIAN POINT UNIT No. 2

LOSS OF ONE PUMP OUT OF FOUR
TOTAL CORE FLOW AND FAULTED
LOOP FLOW vs TIME

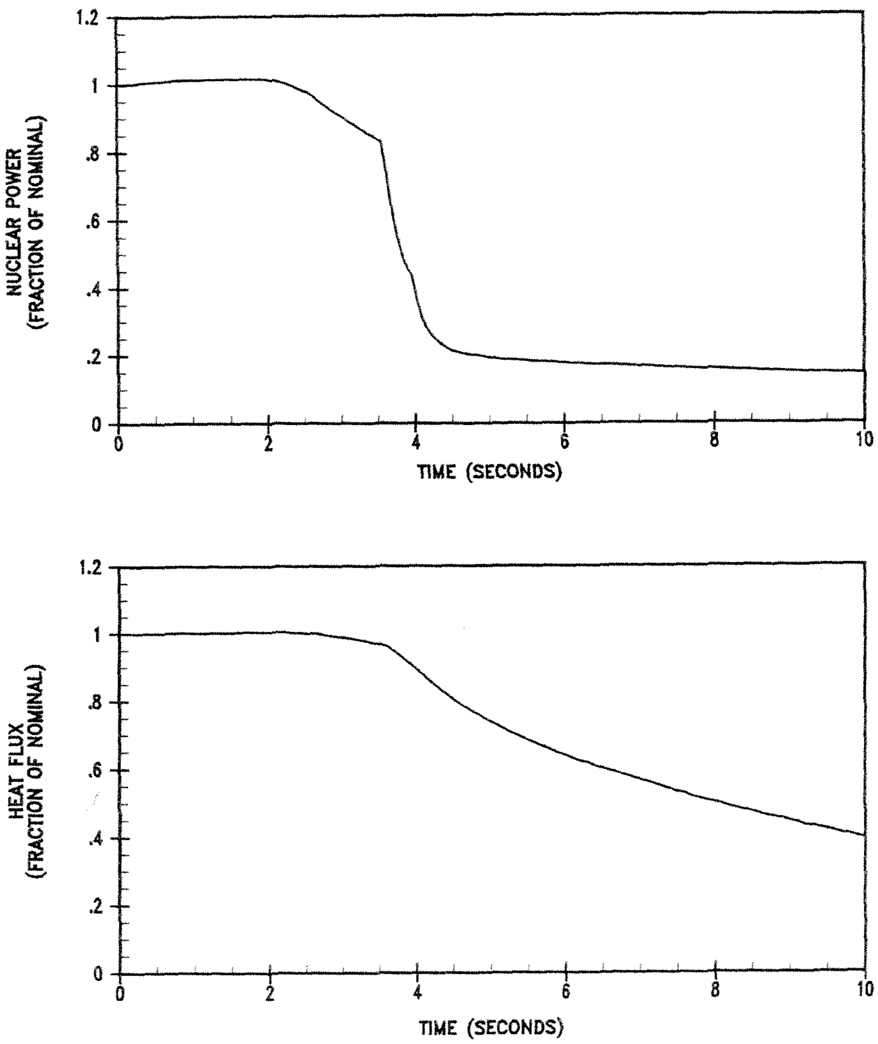
UFSAR FIGURE 14.1-21 | REV. No. 19



INDIAN POINT UNIT No. 2

LOSS OF ONE PUMP OUT OF FOUR
PRESSURIZER PRESSURE AND
DNBR vs TIME

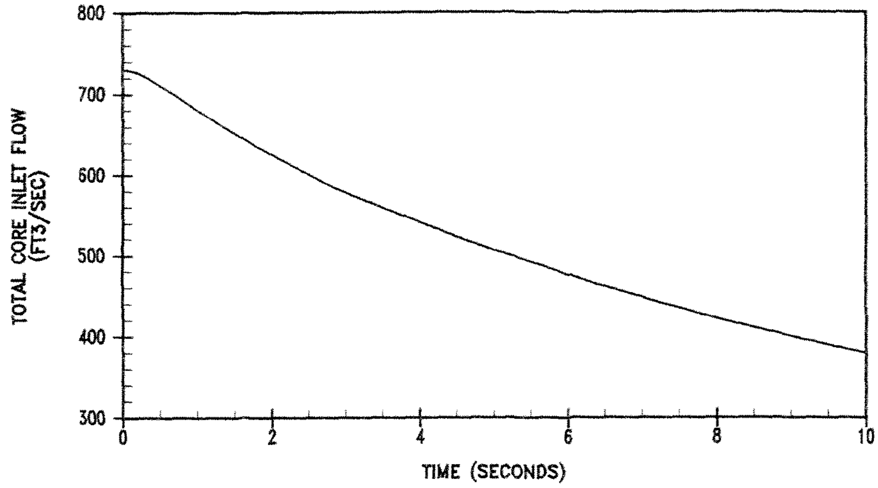
UFSAR FIGURE 14.1-22 | REV. No. 19

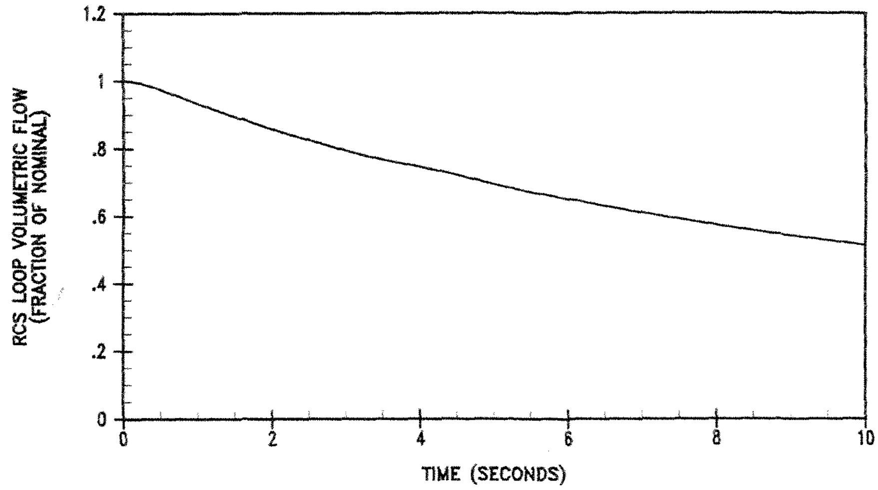


INDIAN POINT UNIT No. 2

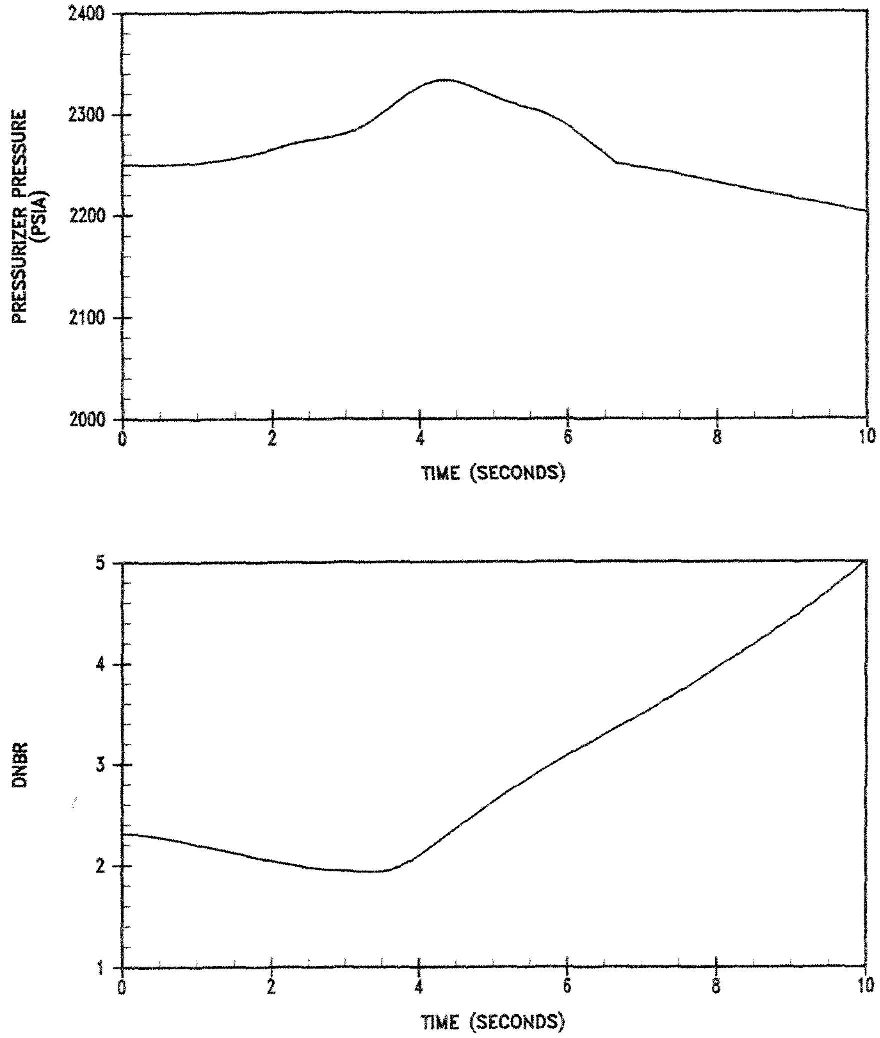
FOUR PUMP LOSS OF FLOW – UNDERVOLTAGE NUCLEAR POWER AND CORE HEAT FLUX vs TIME

UFSAR FIGURE 14.1–23 | REV. No. 19





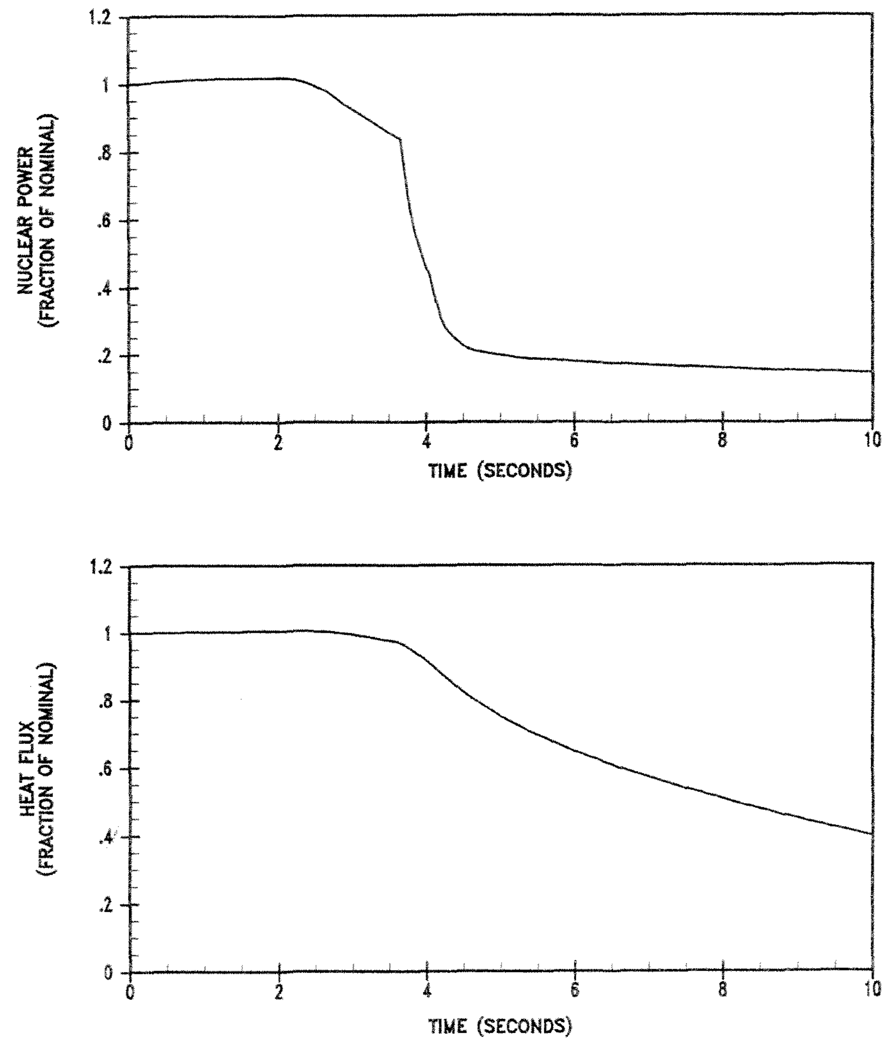
INDIAN POINT UNIT No. 2	
FOUR PUMP LOSS OF FLOW – UNDERVOLTAGE TOTAL CORE FLOW AND RCS LOOP FLOW vs TIME	
UFSAR FIGURE 14.1–24	REV. No. 19



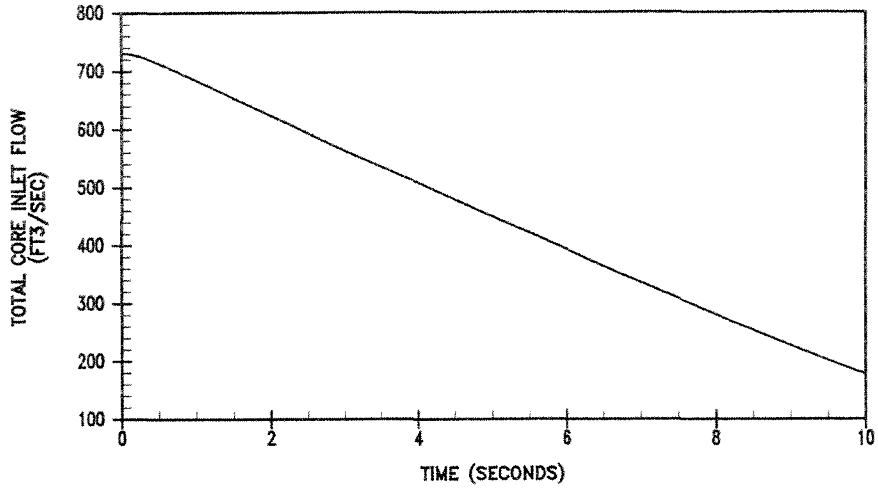
INDIAN POINT UNIT No. 2

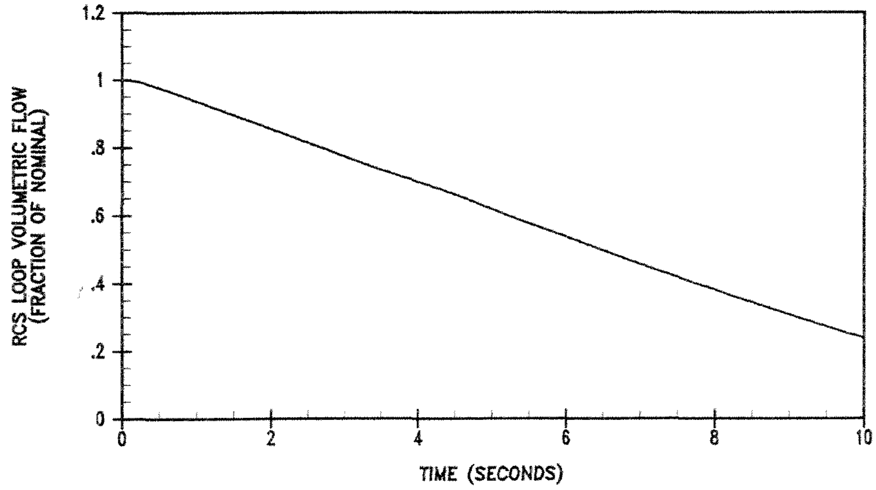
FOUR PUMP LOSS OF FLOW – UNDERVOLTAGE PRESSURIZER PRESSURE AND DNBR vs TIME

UFSAR FIGURE 14.1–25	REV. No. 19



INDIAN POINT UNIT No. 2	
FOUR PUMP LOSS OF FLOW – UNDERFREQUENCY NUCLEAR POWER AND HEAT FLUX vs TIME	
UFSAR FIGURE 14.1–26	REV. No. 19



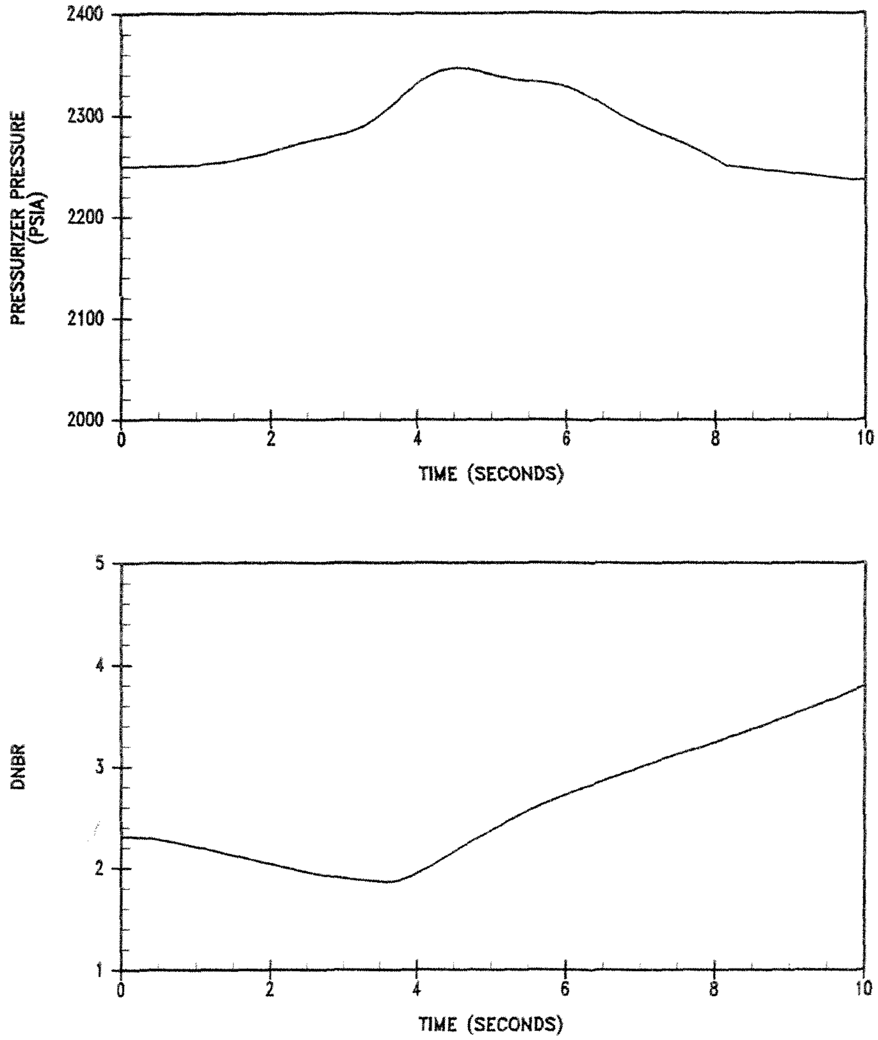


INDIAN POINT UNIT No. 2

FOUR PUMP LOSS OF FLOW – UNDERFREQUENCY TOTAL CORE FLOW AND RCS LOOP FLOW vs TIME

UFSAR FIGURE 14.1–27	REV. No. 19

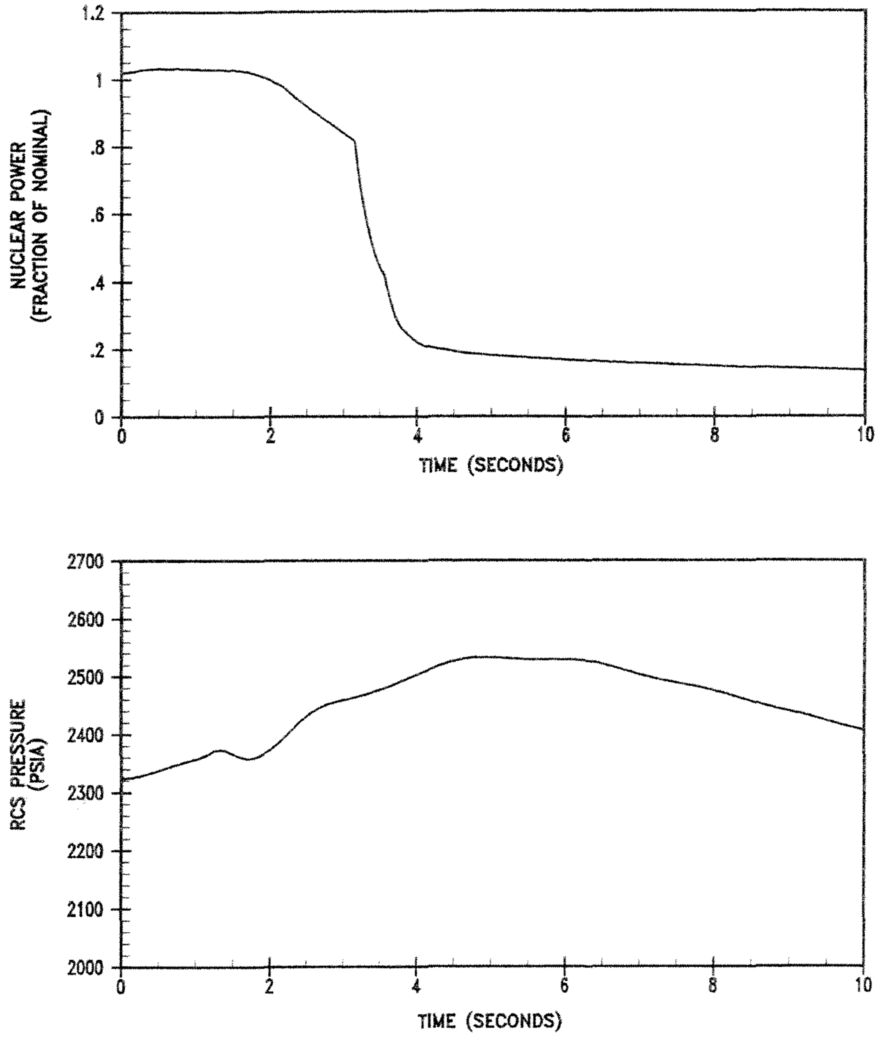
OAGI0000215_1601



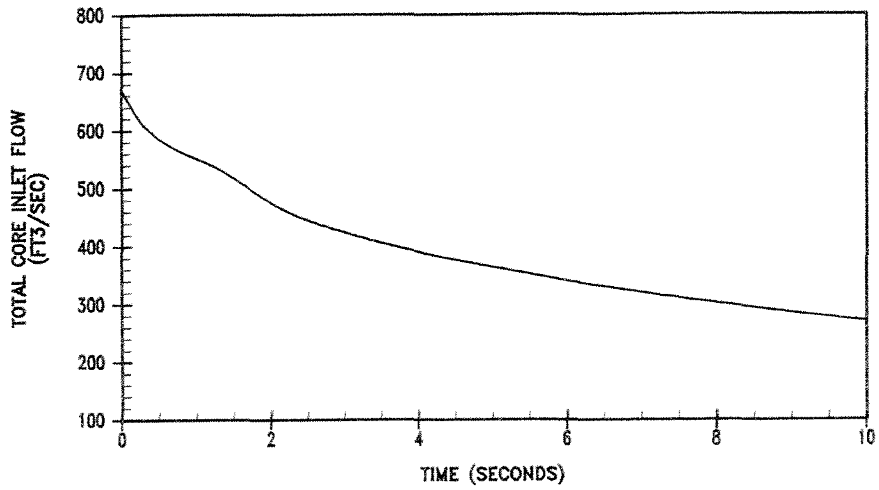
INDIAN POINT UNIT No. 2

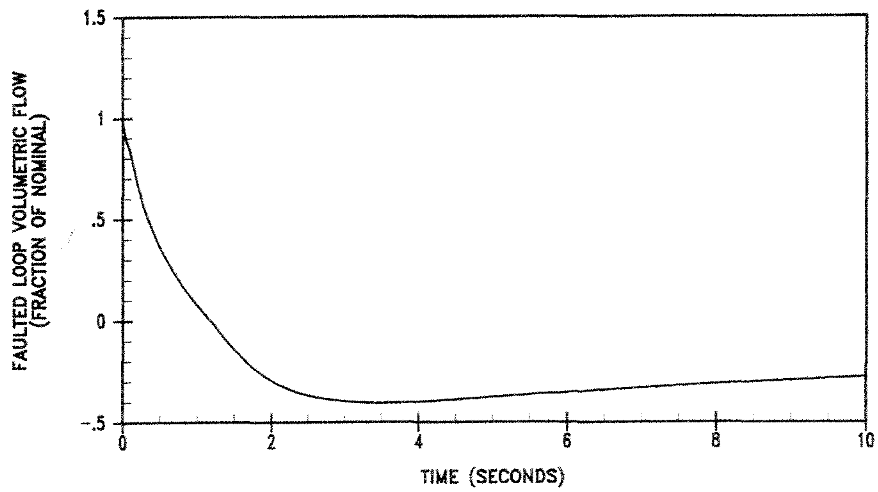
FOUR PUMP LOSS OF FLOW – UNDERFREQUENCY PRESSURIZER PRESSURE AND DNBR vs TIME

UFSAR FIGURE 14.1–28 | REV. No. 19

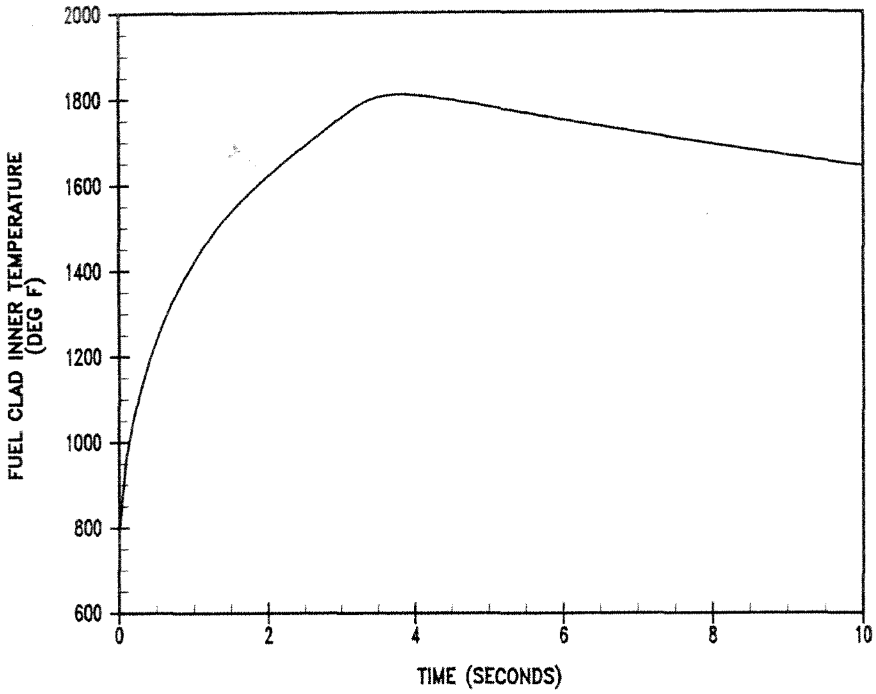


INDIAN POINT UNIT No. 2	
LOCKED ROTOR NUCLEAR POWER AND RCS PRESSURE vs TIME	
UFSAR FIGURE 14.1-29	REV. No. 19





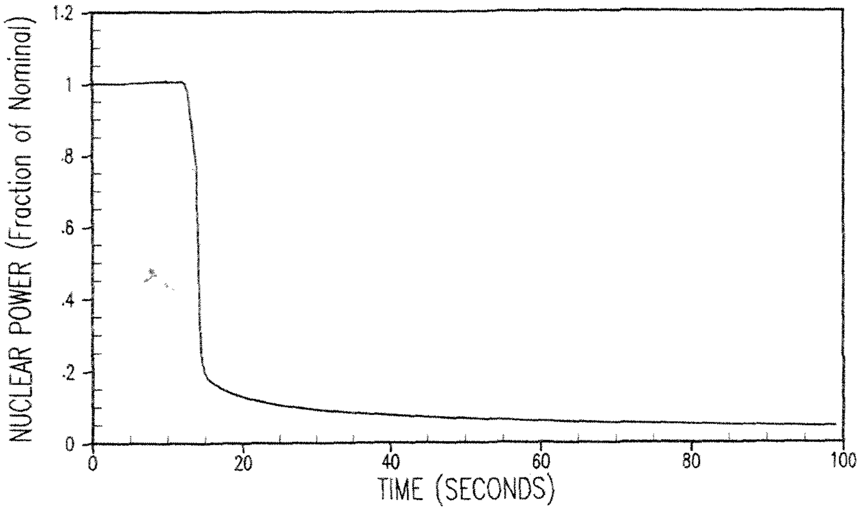
INDIAN POINT UNIT No. 2	
LOCKED ROTOR TOTAL CORE FLOW AND FAULTED LOOP FLOW vs TIME	
UFSAR FIGURE 14.1-30	REV. No. 19

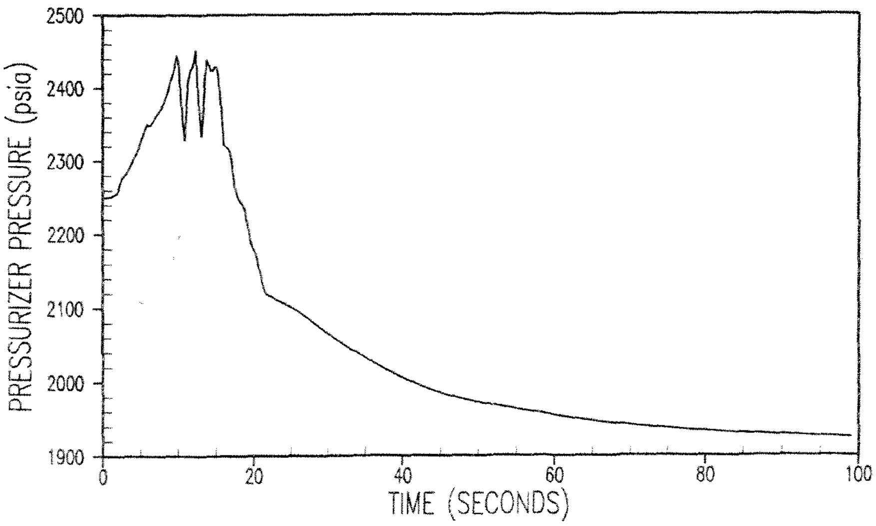


INDIAN POINT UNIT No. 2

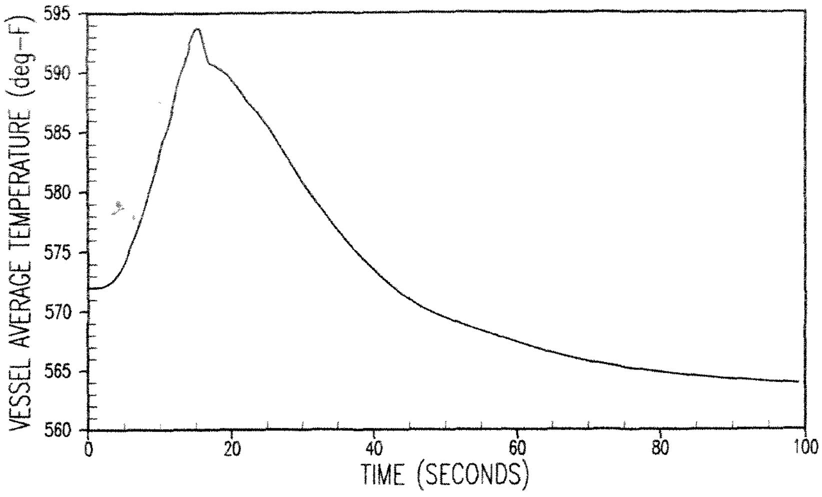
LOCKED ROTOR FUEL CLAD
INNER TEMPERATURE vs TIME

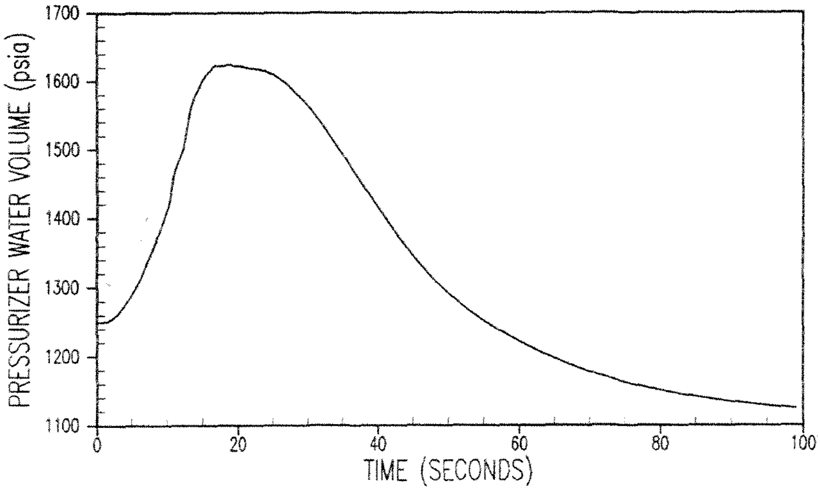
UFSAR FIGURE 14.1-30A	REV. No. 19



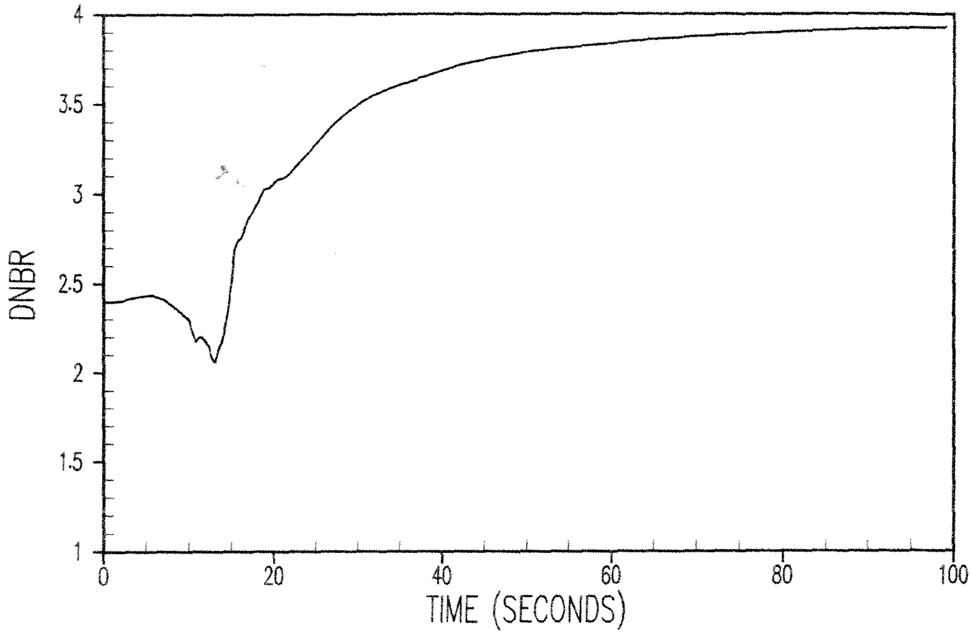


INDIAN POINT UNIT No. 2	
LOSS OF LOAD WITH PRESSURIZER SPRAY AND PORV, NUCLEAR POWER AND PRESSURIZER PRESSURE vs TIME	
UFSAR FIGURE 14.1-31	REV. No. 19





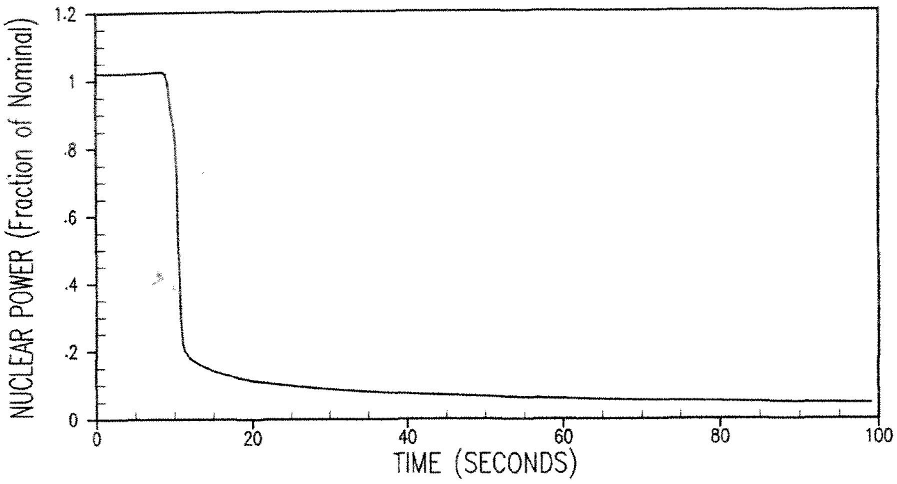
INDIAN POINT UNIT No. 2	
LOSS OF LOAD WITH PRESSURIZER SPRAY AND PORV, AVERAGE COOLANT TEMPERATURE AND PRESSURIZER WATER VOLUME vs TIME	
UFSAR FIGURE 14.1–32	REV. No. 19

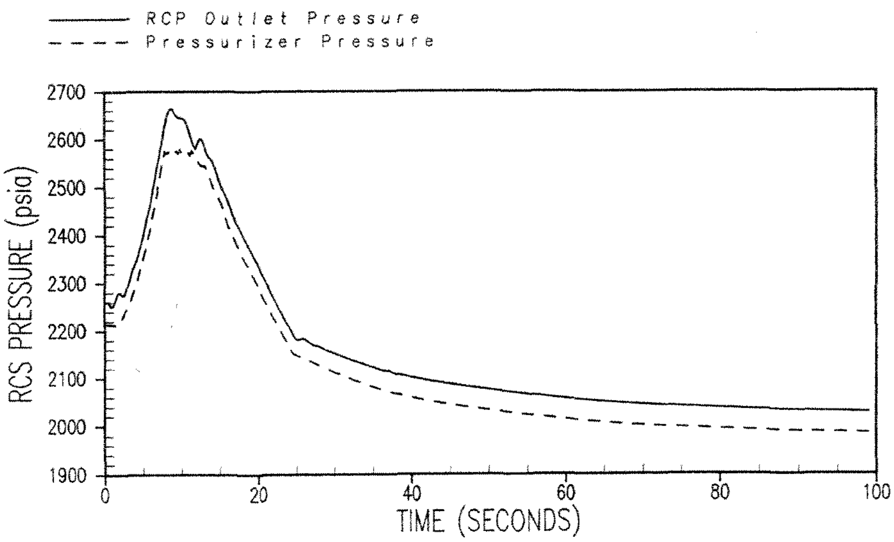


INDIAN POINT UNIT No. 2

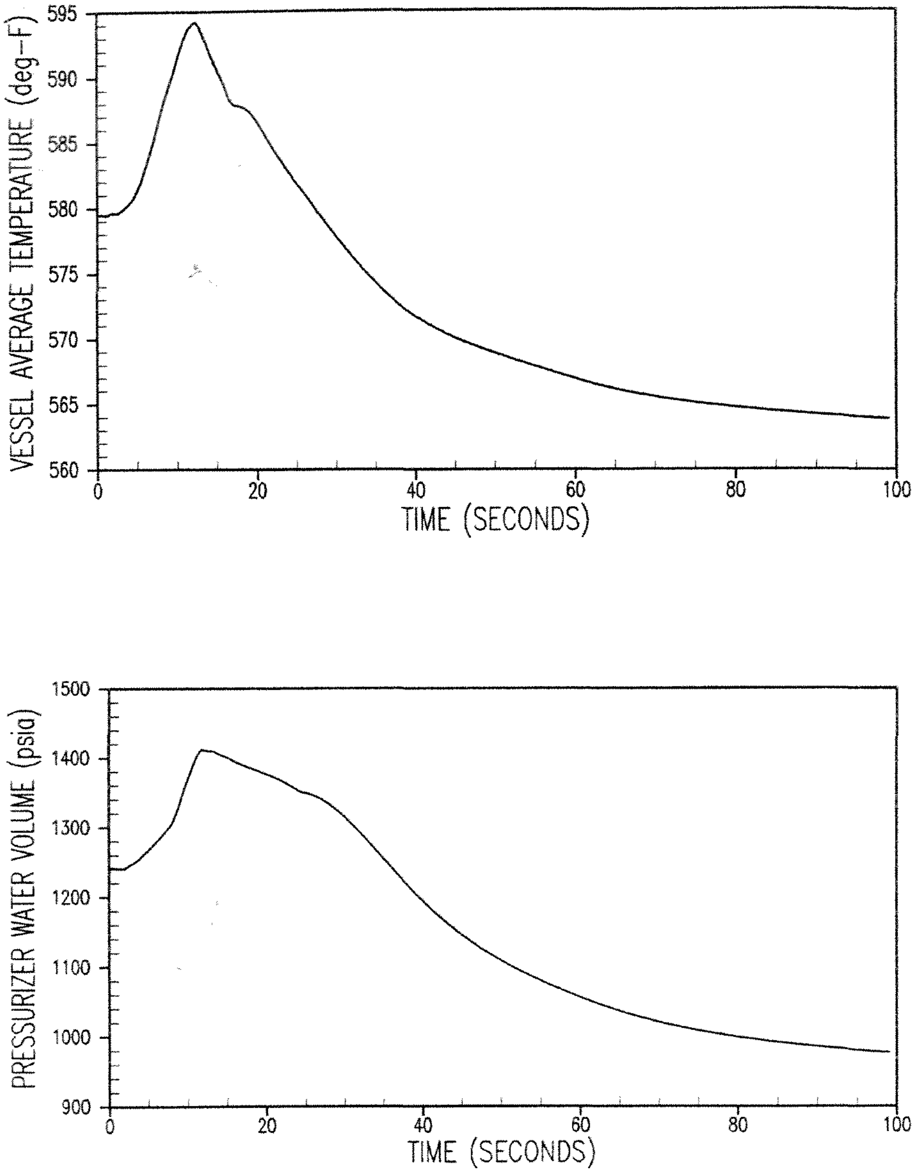
LOSS OF LOAD WITH PRESSURIZER SPRAY AND POWER OPERATED RELIEF VALVES DNBR vs TIME

UFSAR FIGURE 14.1-33 | REV. No. 19

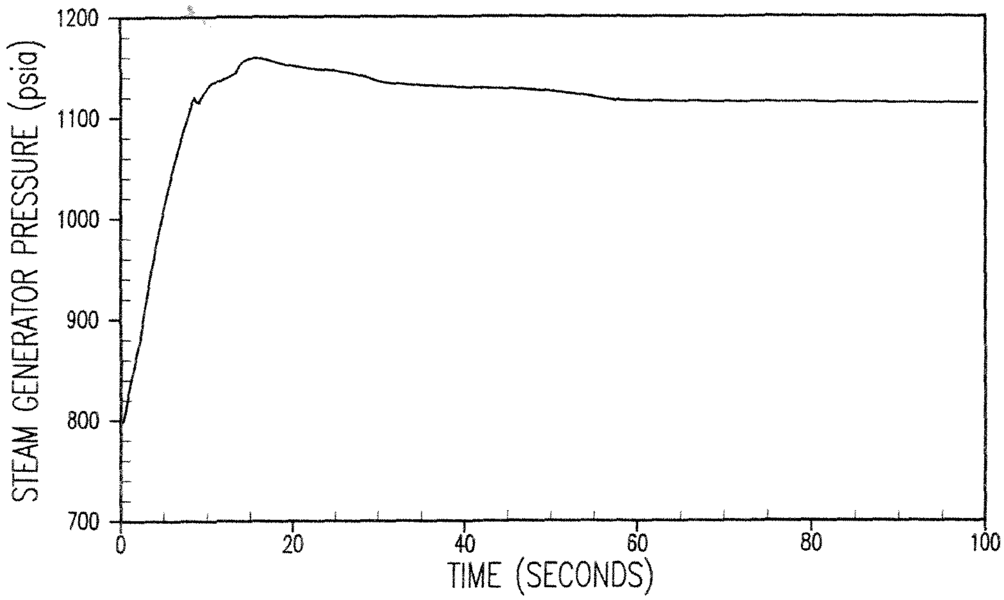




INDIAN POINT UNIT No. 2	
LOSS OF LOAD WITHOUT PRESSURIZER SPRAY AND PORV, NUCLEAR POWER AND PRESSURIZER PRESSURE vs TIME	
UFSAR FIGURE 14.1-37	REV. No. 19



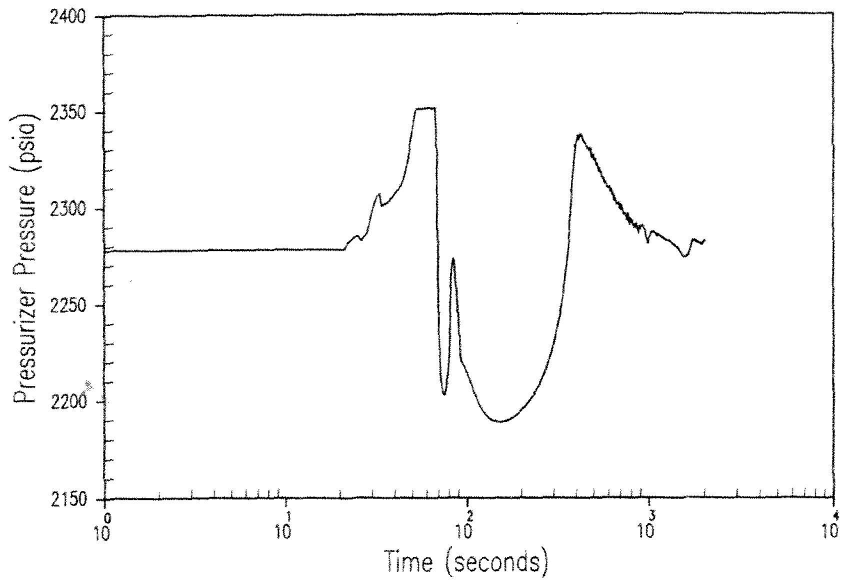
INDIAN POINT UNIT No. 2	
LOSS OF LOAD WITHOUT PRESSURIZER SPRAY AND POWER OPERATED RELIEF VALVES, AVERAGE COOLANT TEMPERATURE AND PRESSURIZER WATER VOLUME vs TIME	
UFSAR FIGURE 14.1-38	REV. No. 19

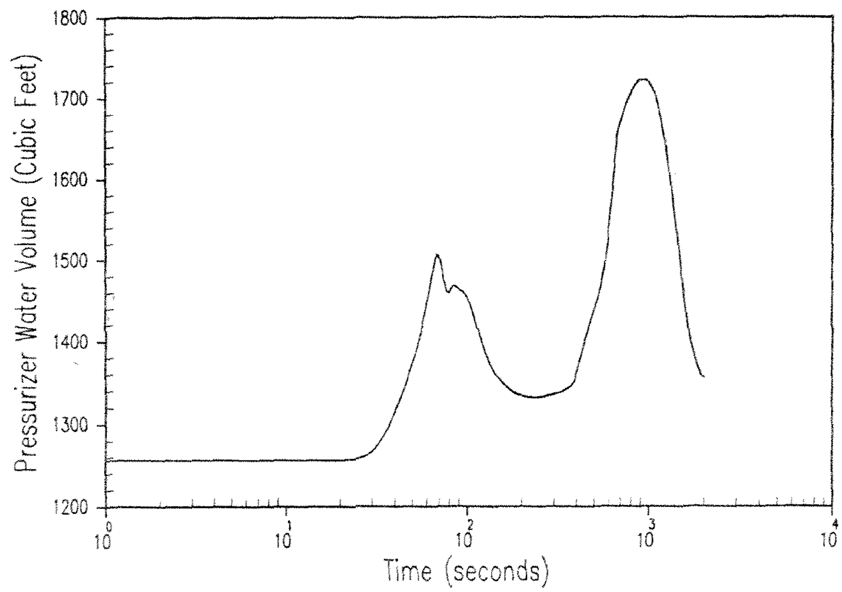


INDIAN POINT UNIT No. 2

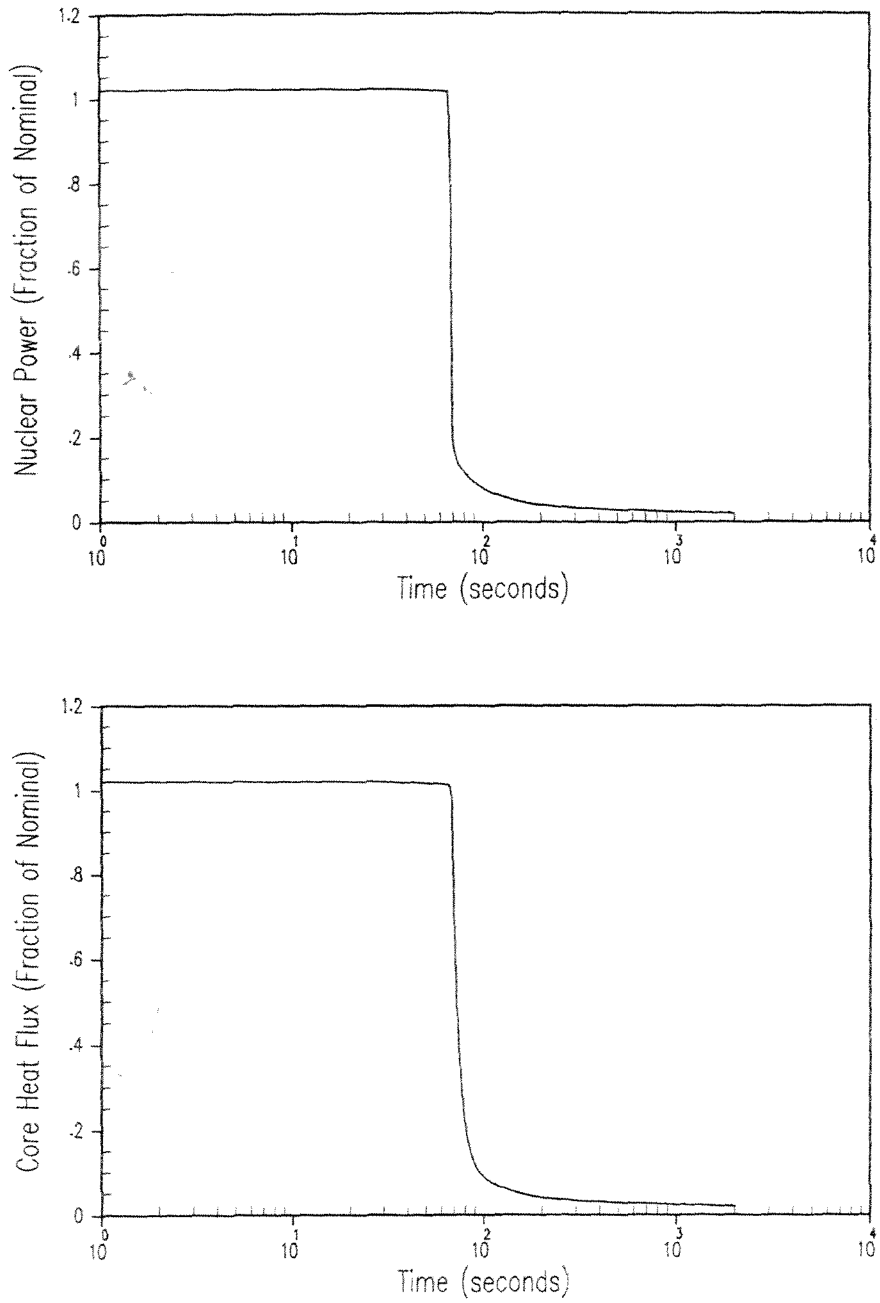
LOSS OF LOAD WITHOUT PRESSURIZER SPRAY AND POWER OPERATED RELIEF VALVES, STEAM PRESSURE, vs TIME

UFSAR FIGURE 14.1-39	REV. No. 19

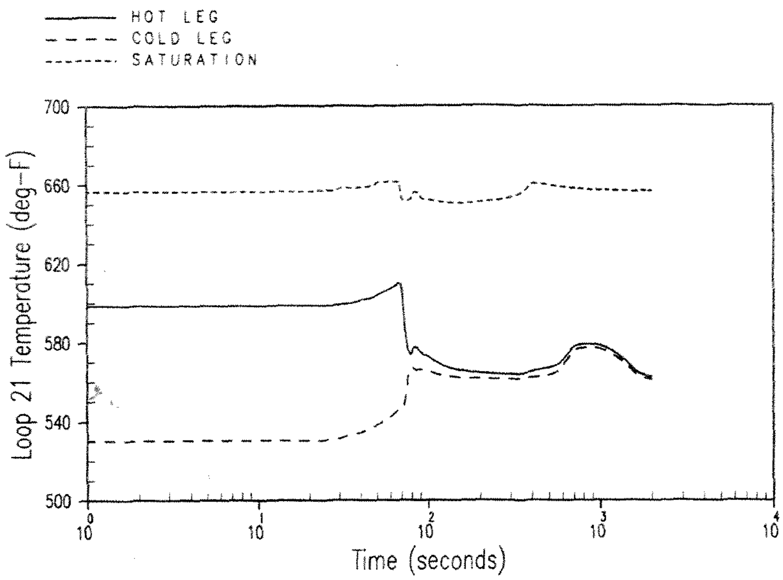


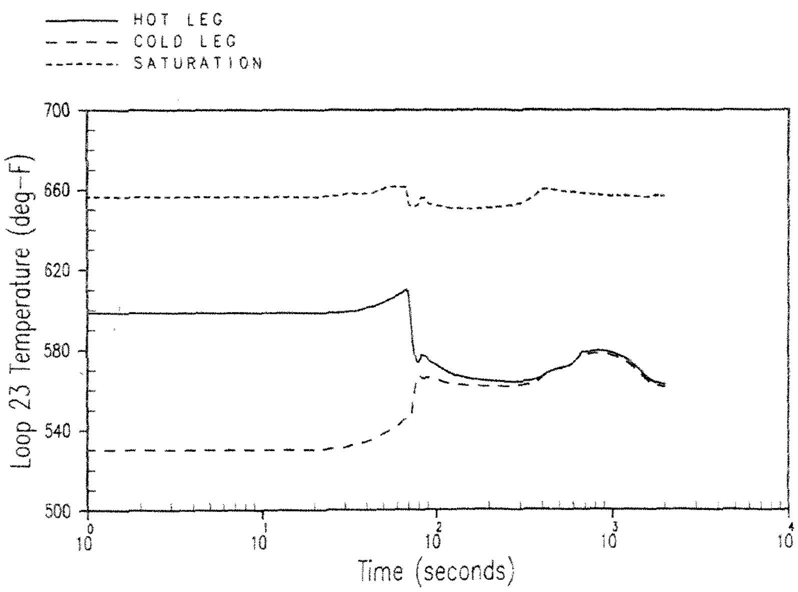


INDIAN POINT UNIT No. 2	
LOSS OF NORMAL FEEDWATER, OFFSITE POWER AVAILABLE, HIGH Tavg PROGRAM, PRESSURIZER PRESSURE AND PRESSURIZER WATER VOLUME vs TIME	
UFSAR FIGURE 14.1-43, sht.1	REV. No. 19

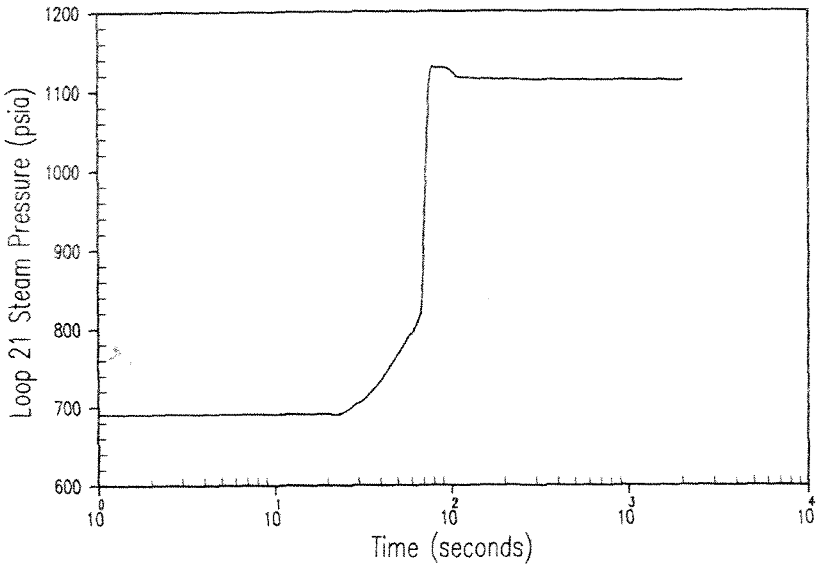


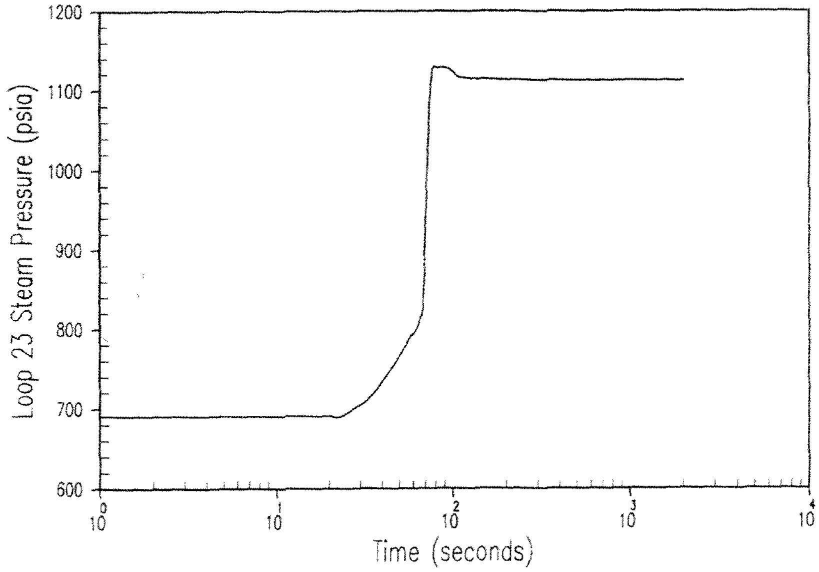
INDIAN POINT UNIT No. 2	
LOSS OF NORMAL FEEDWATER, OFFSITE POWER AVAILABLE, HIGH Tavg PROGRAM, NUCLEAR POWER AND CORE HEAT FLUX vs TIME	
UFSAR FIGURE 14.1-43, sht.2	REV. No. 19





INDIAN POINT UNIT No. 2	
LOSS OF NORMAL FEEDWATER, OFFSITE POWER AVAILABLE, HIGH Tavg PROGRAM, LOOP 21 AND LOOP 23 TEMPERATURE vs TIME	
UFSAR FIGURE 14.1-43, sht.3	REV. No. 19

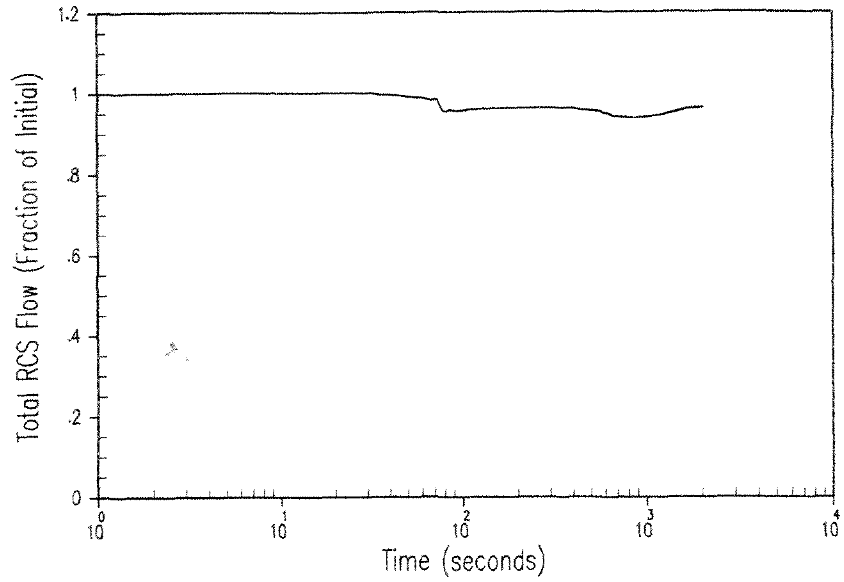


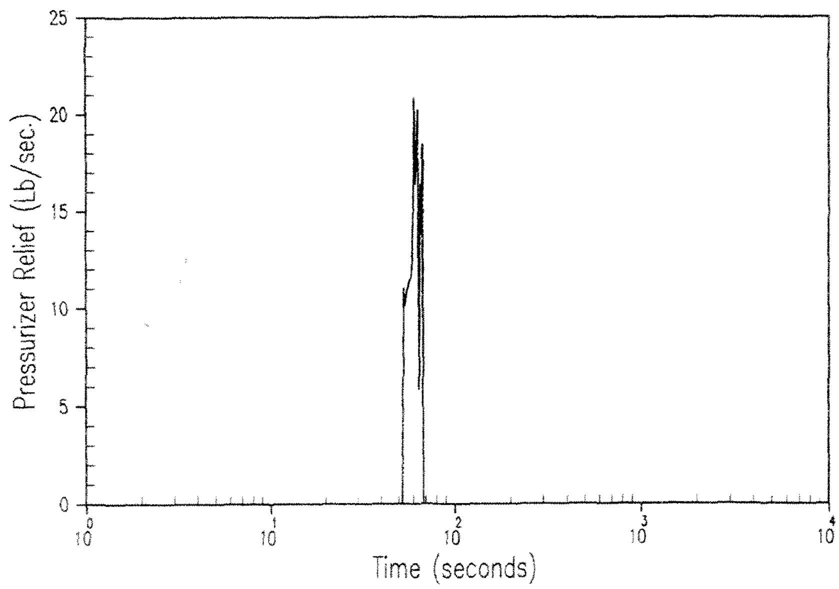


INDIAN POINT UNIT No. 2

LOSS OF NORMAL FEEDWATER, OFFSITE POWER AVAILABLE, HIGH Tavg PROGRAM, STEAM GENERATOR 21 AND STEAM GENERATOR 23 PRESSURE vs TIME

UFSAR FIGURE 14.1–43, sht.4	REV. No. 19

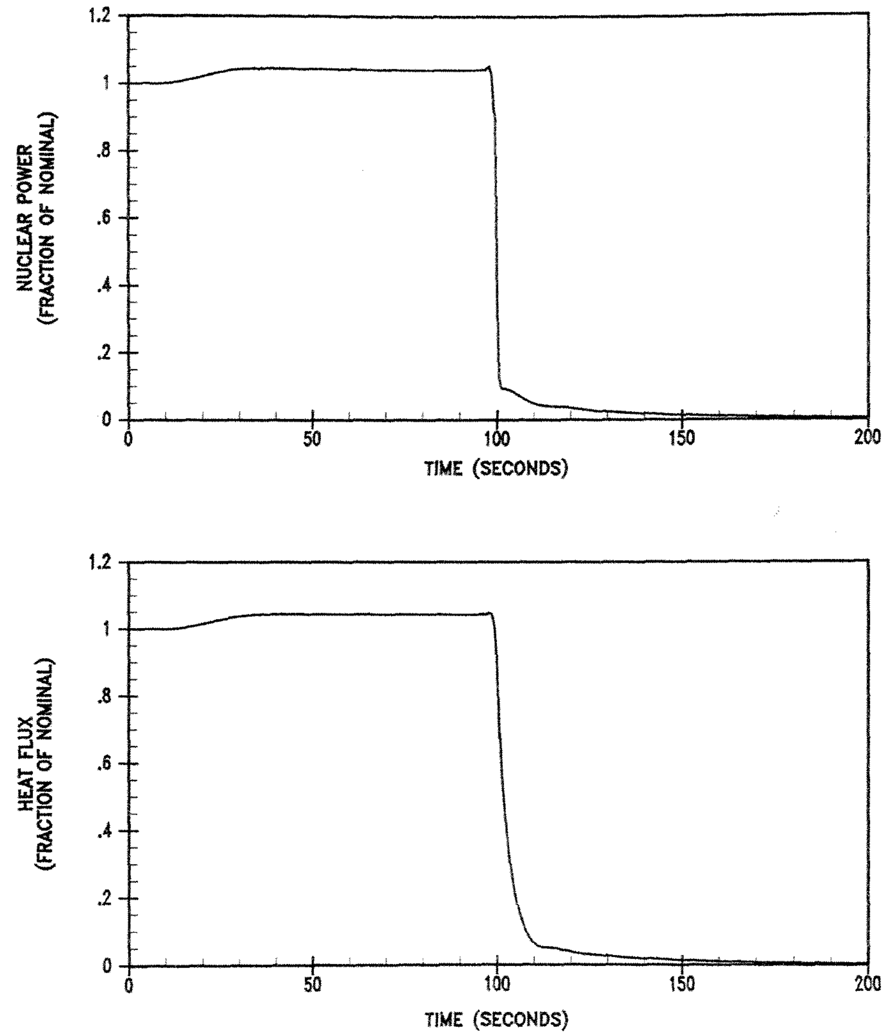




INDIAN POINT UNIT No. 2

LOSS OF NORMAL FEEDWATER, OFFSITE POWER AVAILABLE, HIGH Tavg PROGRAM ,TOTAL RCS FLOW AND PRESSURIZER RELIEF vs TIME

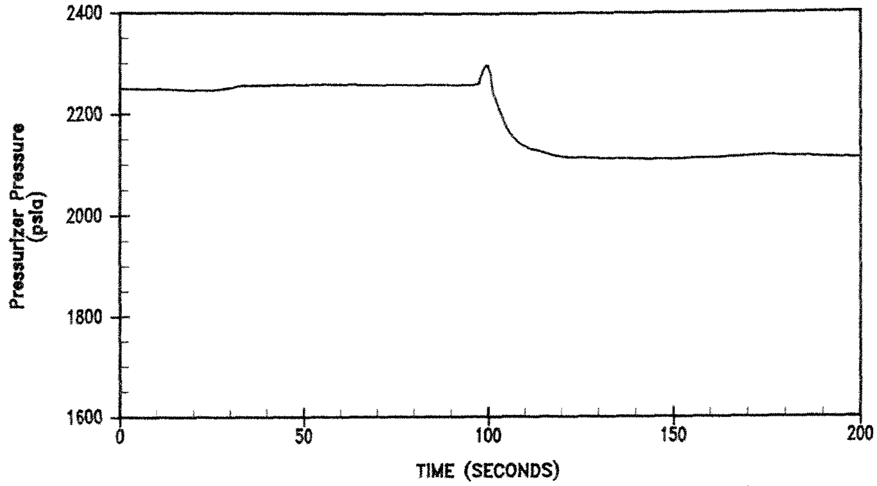
UFSAR FIGURE 14.1-43, sht.5	REV. No. 19

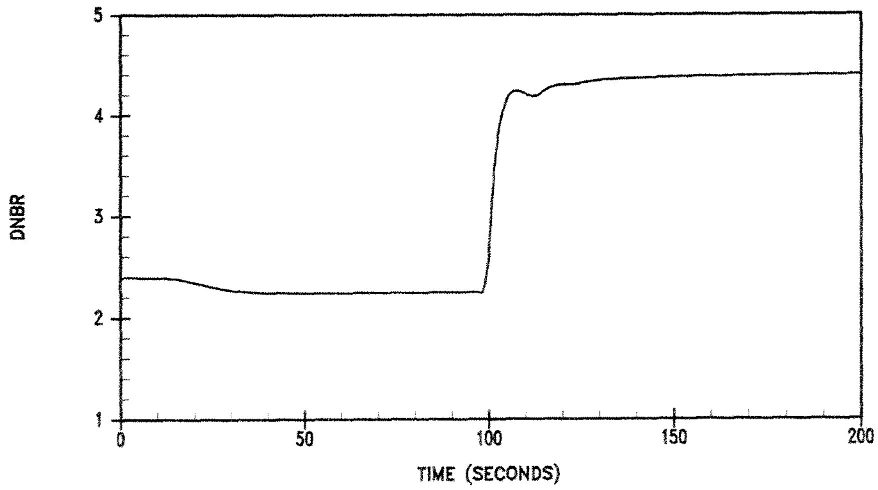


INDIAN POINT UNIT No. 2

FEEDWATER SYSTEM MALFUNCTION EXCESSIVE FEEDWATER FLOW – HFP CONDITIONS MANUAL ROD CONTROL NUCLEAR POWER AND CORE HEAT FLUX vs TIME

UFSAR FIGURE 14.1–45, sht.1 | REV. No. 19

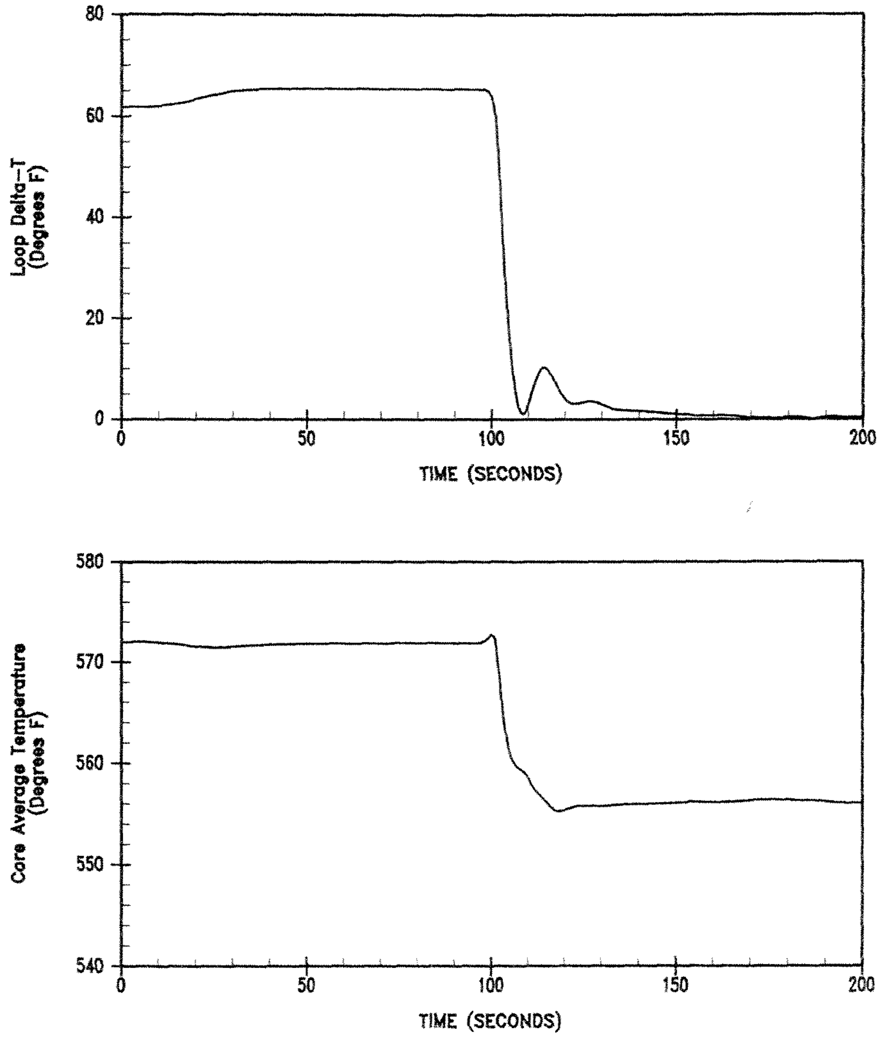




INDIAN POINT UNIT No. 2

FEEDWATER SYSTEM MALFUNCTION EXCESSIVE FEEDWATER FLOW – HFP CONDITIONS MANUAL ROD CONTROL PRESSURIZER PRESSURE AND DNBR vs TIME

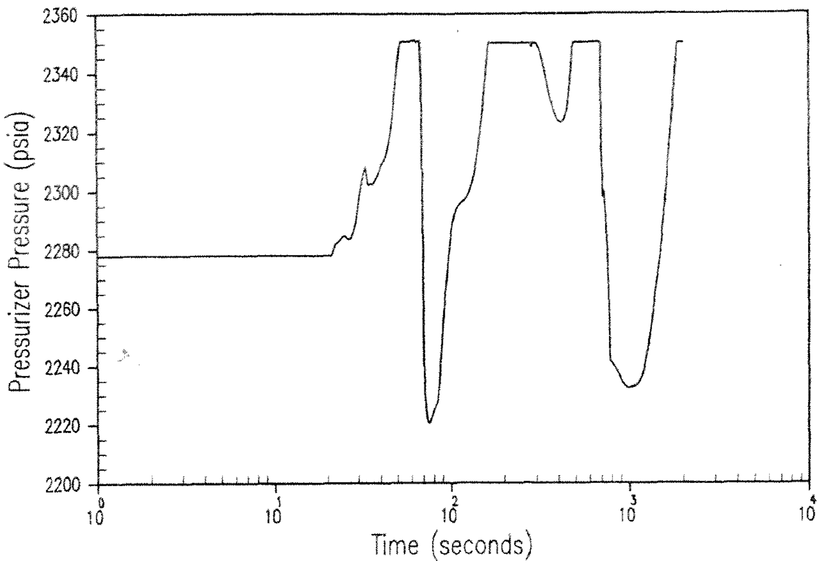
UFSAR FIGURE 14.1-45, sht.2	REV. No. 19

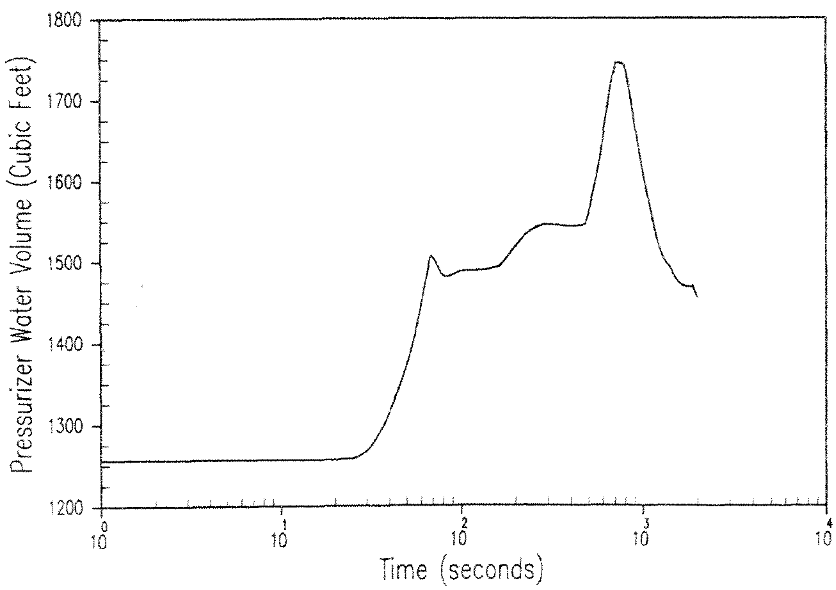


INDIAN POINT UNIT No. 2

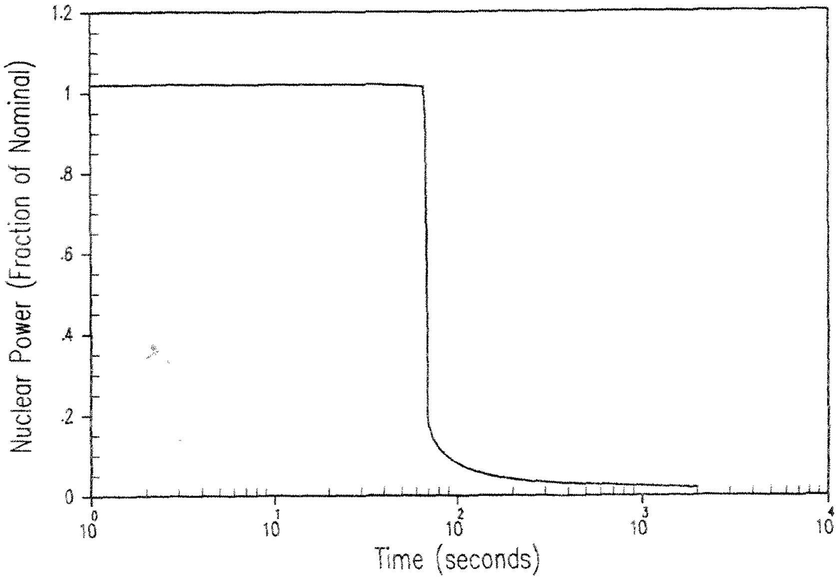
FEEDWATER SYSTEM MALFUNCTION EXCESSIVE FEEDWATER FLOW – HFP CONDITIONS MANUAL ROD CONTROL LOOP DELTA –T, AND CORE Tavg vs TIME

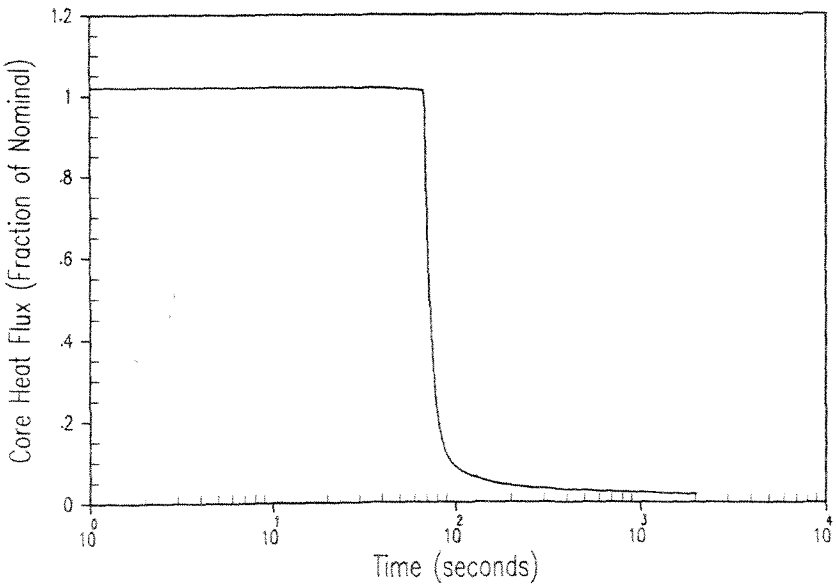
UFSAR FIGURE 14.1-45, sht.3	REV. No. 19



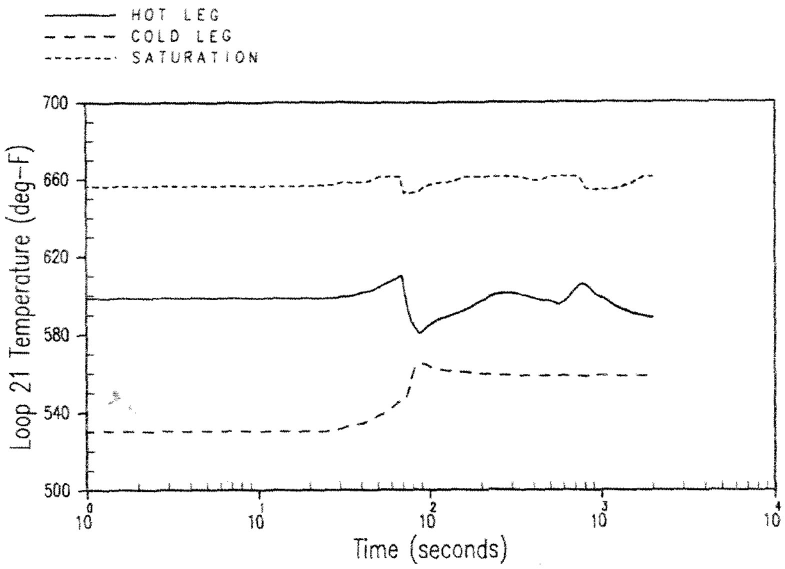


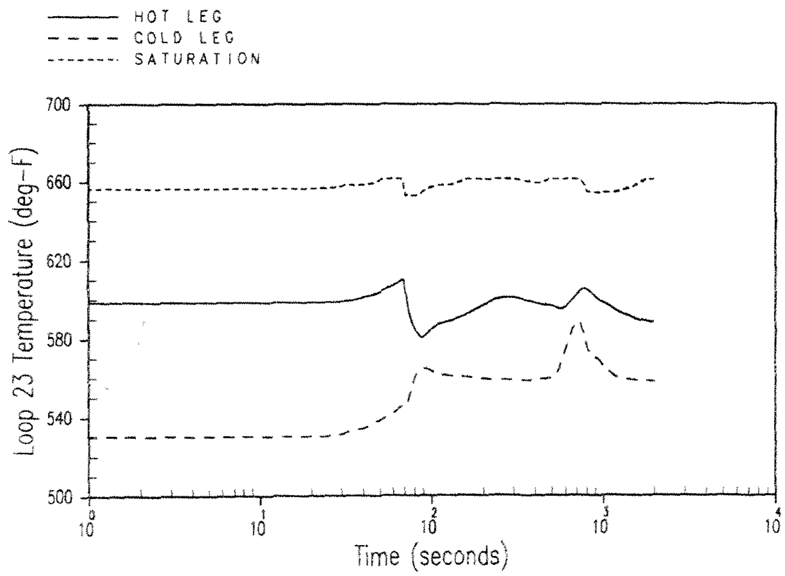
INDIAN POINT UNIT No. 2	
LOSS OF ALL AC POWER, HIGH Tavg PROGRAM, PRESSURIZER PRESSURE AND PRESSURIZER WATER VOLUME vs TIME	
UFSAR FIGURE 14.1-50, sht.1	REV. No. 19





INDIAN POINT UNIT No. 2	
LOSS OF ALL AC POWER, HIGH Tavg PROGRAM, NUCLEAR POWER AND CORE HEAT FLUX vs TIME	
UFSAR FIGURE 14.1-50, sht.2	REV. No. 19

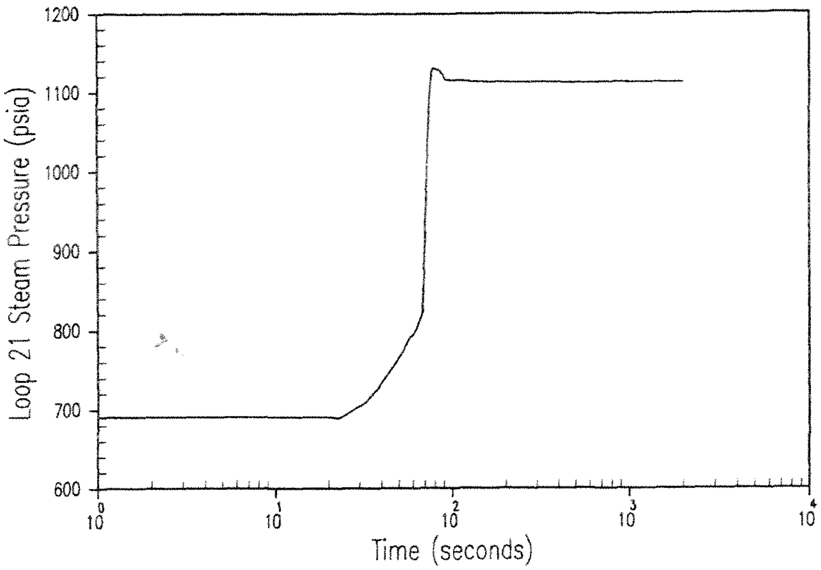


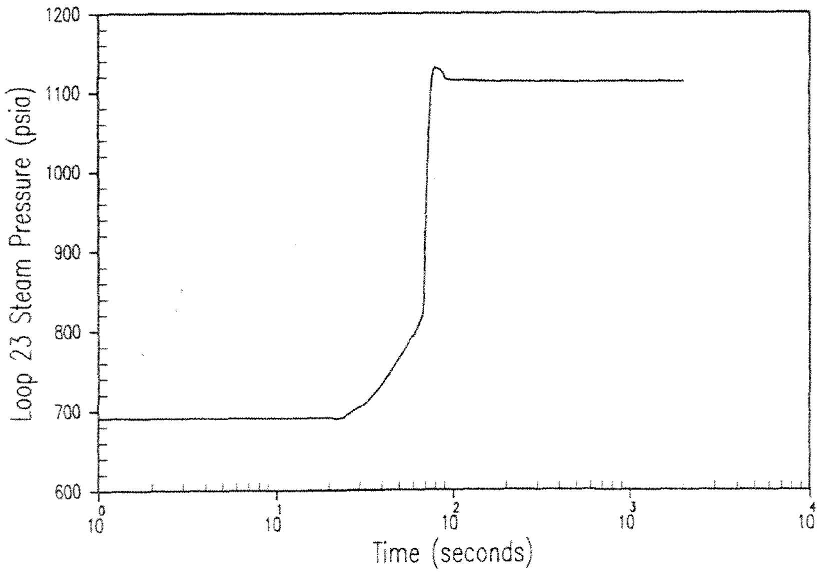


INDIAN POINT UNIT No. 2

LOSS OF ALL AC POWER TO THE STATION AUXILARIES, HIGH Tavg PROGRAM, LOOP 21 AND LOOP 23 TEMPERATURE vs TIME

UFSAR FIGURE 14.1-50, sht.3	REV. No. 19

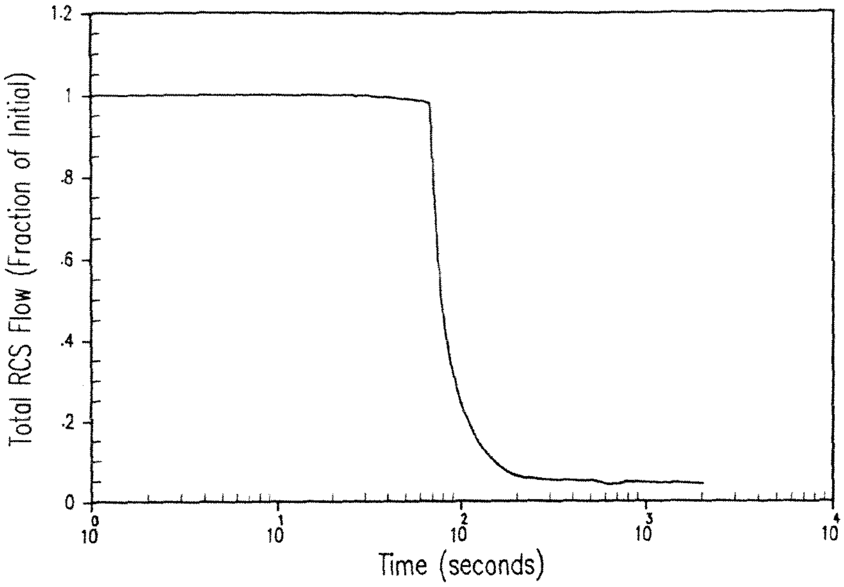


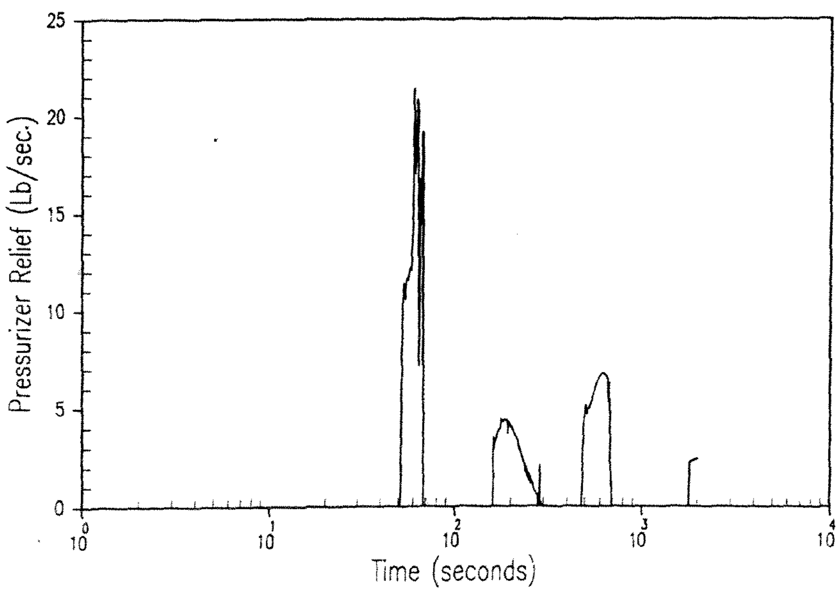


INDIAN POINT UNIT No. 2

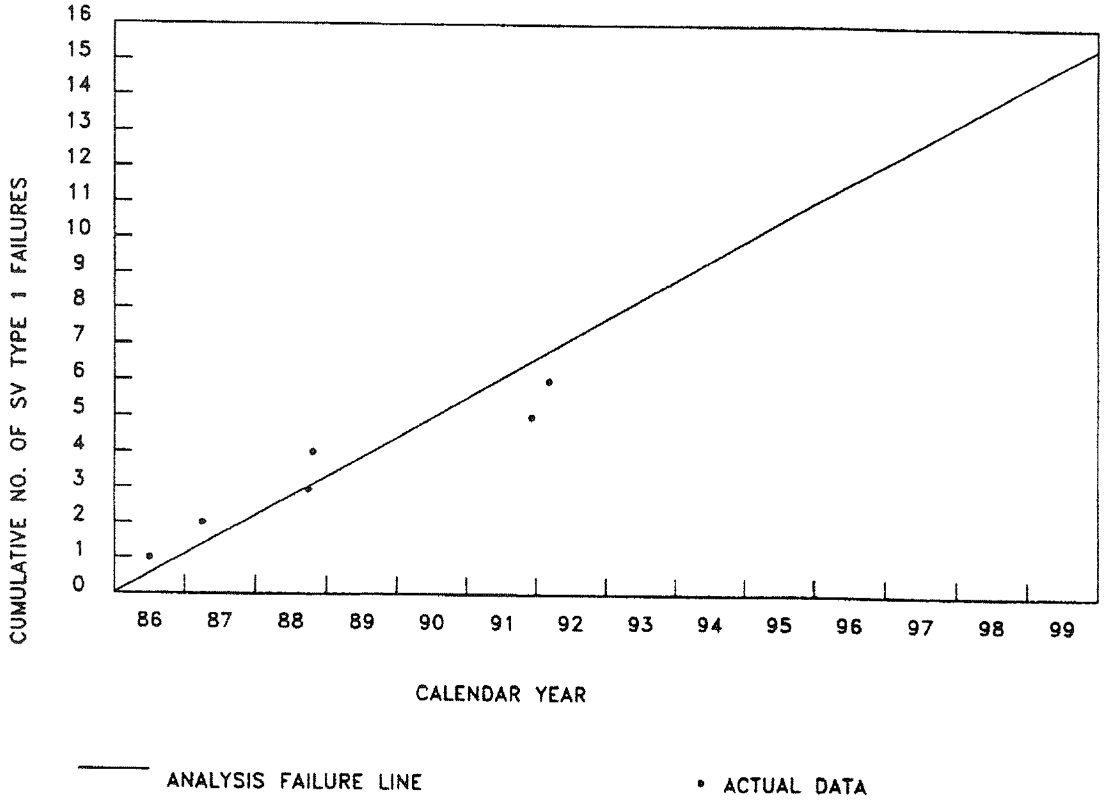
LOSS OF ALL AC POWER TO THE STATION AUXILARIES, HIGH Tavg PROGRAM, LOOP 21 AND LOOP 23 STEAM PRESSURE vs TIME

UFSAR FIGURE 14.1-50, sht.4	REV. No. 19





INDIAN POINT UNIT No. 2	
LOSS OF ALL AC POWER TO THE STATION AUXILARIES, INTERMEDIATE Tavg PROGRAM, TOTAL RCS FLOW AND PRESSURIZER RELIEF RATE vs TIME	
UFSAR FIGURE 14.1-50, sht.5	REV. No. 19

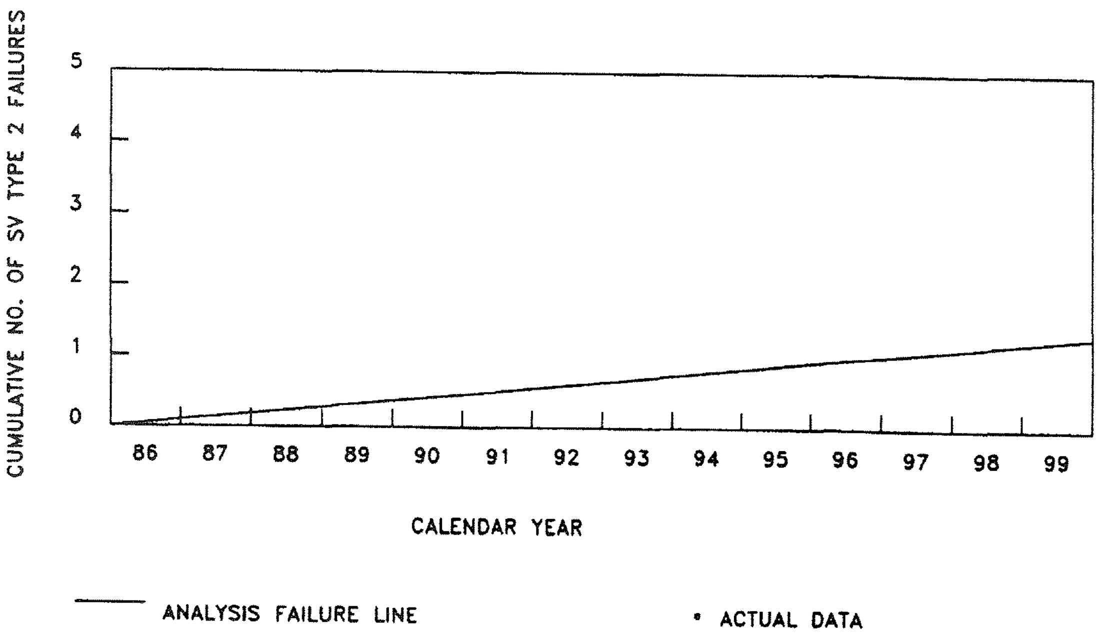


SV TYPE 1 FAILURE RATE = 2.47-06/HR

SLOPE OF ANALYSIS FAILURE LINE = [(SV TYPE 1 F.R.) * (OPERATING HOURS)] / (CALENDAR YEARS)

= [(2.47E-06/HR) * (2.917E+06 HRS)] / (6.42 CAL. YRS.) = 1.1 FAIL./CAL. YR.

INDIAN POINT UNIT No. 2	
UFSAR FIGURE 14.1-62 TRACKING B-95/96 STOP VALVE (SV) TYPE 1 FAILURES STOP VALVE DISC FAILS	
MIC. No. 2001MB1537	REV. No. 17A

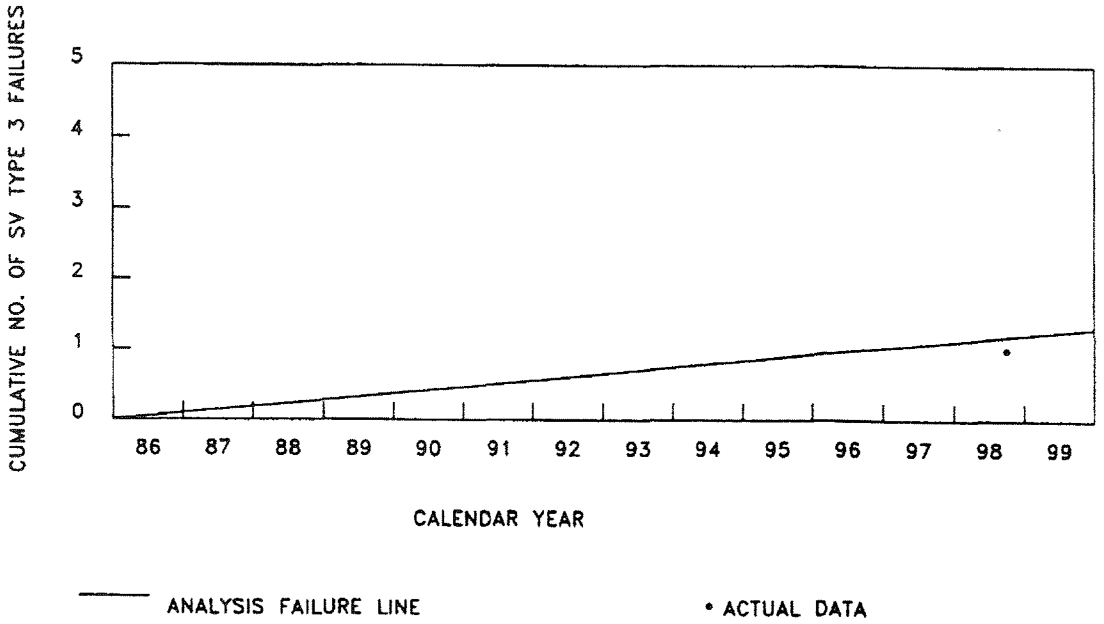


SV TYPE 2 FAILURE RATE = 2.05-07/HR

SLOPE OF ANALYSIS FAILURE LINE = [(SV TYPE 2 F.R.) * (OPERATING HOURS)] / (CALENDAR YEARS)

= [(2.05E-07/HR) * (2.917E+06 HRS)] / (6.42 CAL. YRS.) = 0.093 FAIL./CAL. YR.

INDIAN POINT UNIT No. 2	
UFSAR FIGURE 14.1-63 TRACKING B-95/96 STOP VALVE (SV) TYPE 2 FAILURES STOP VALVE SPRING FAILS	
MIC. No. 2001MB1538	REV. No. 17A

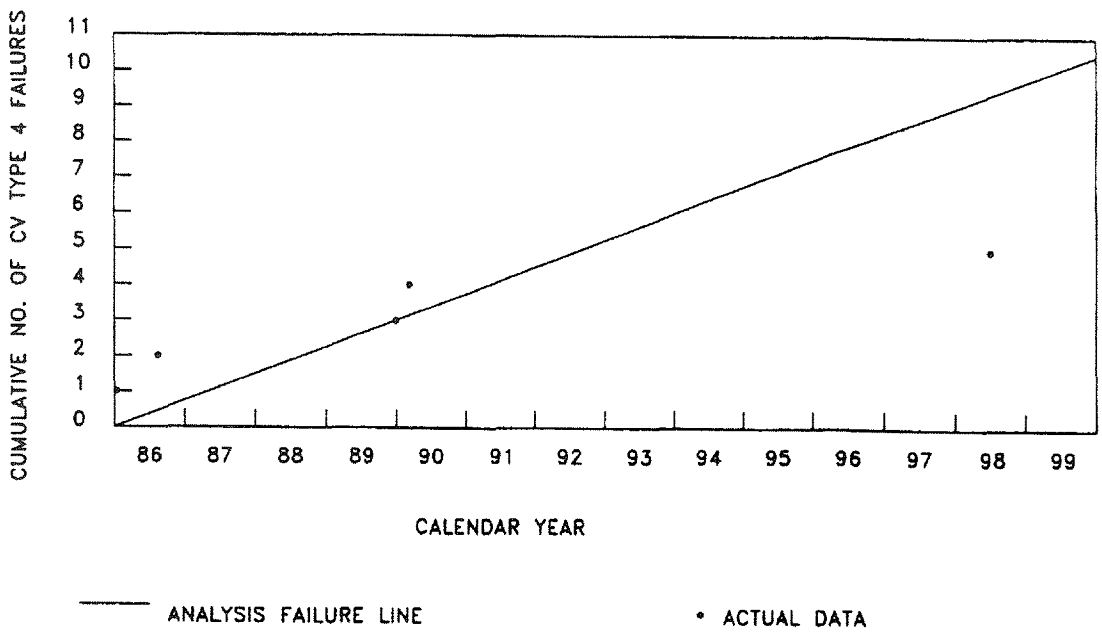


SV TYPE 3 FAILURE RATE = 2.05–07/HR

SLOPE OF ANALYSIS FAILURE LINE = [(SV TYPE 3 F.R.) * (OPERATING HOURS)] / (CALENDAR YEARS)

= [(2.05E–07/HR) * (2.917E+06 HRS)] / (6.42 CAL. YRS.) = 0.093 FAIL./CAL. YR.

INDIAN POINT UNIT No. 2	
UFSAR FIGURE 14.1–64 TRACKING B–95/96 STOP VALVE (SV) TYPE 3 FAILURES STOP VALVE STICKS OPEN	
MIC. No. 2001MB1539	REV. No. 17A

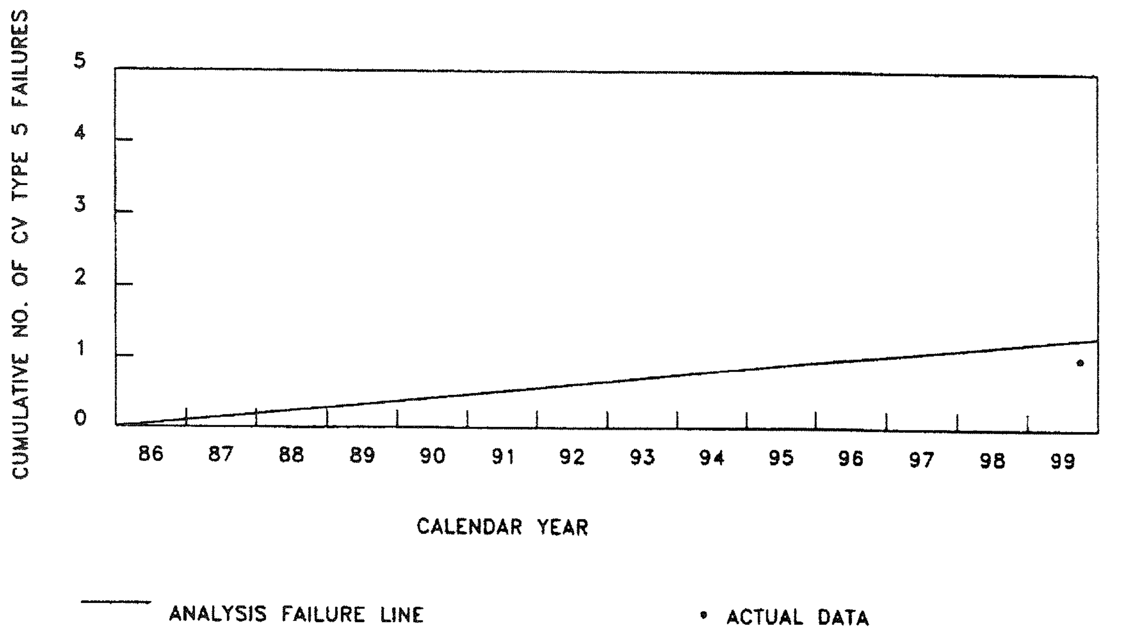


CV TYPE 4 FAILURE RATE = 1.22-06/HR

SLOPE OF ANALYSIS FAILURE LINE = [(CV TYPE 4 F.R.) * (OPERATING HOURS)] / (CALENDAR YEARS)

= [(1.22E-06/HR) * (3.925E+06 HRS)] / (6.42 CAL. YRS.) = 0.75 FAIL./CAL. YR.

INDIAN POINT UNIT No. 2	
UFSAR FIGURE 14.1-65 TRACKING B-95/96 CONTROL VALVE (CV) TYPE 4 FAILURES CONTROL VALVE SPRING BOLT FAILS	
MIC. No. 2001MB1540	REV. No. 17A



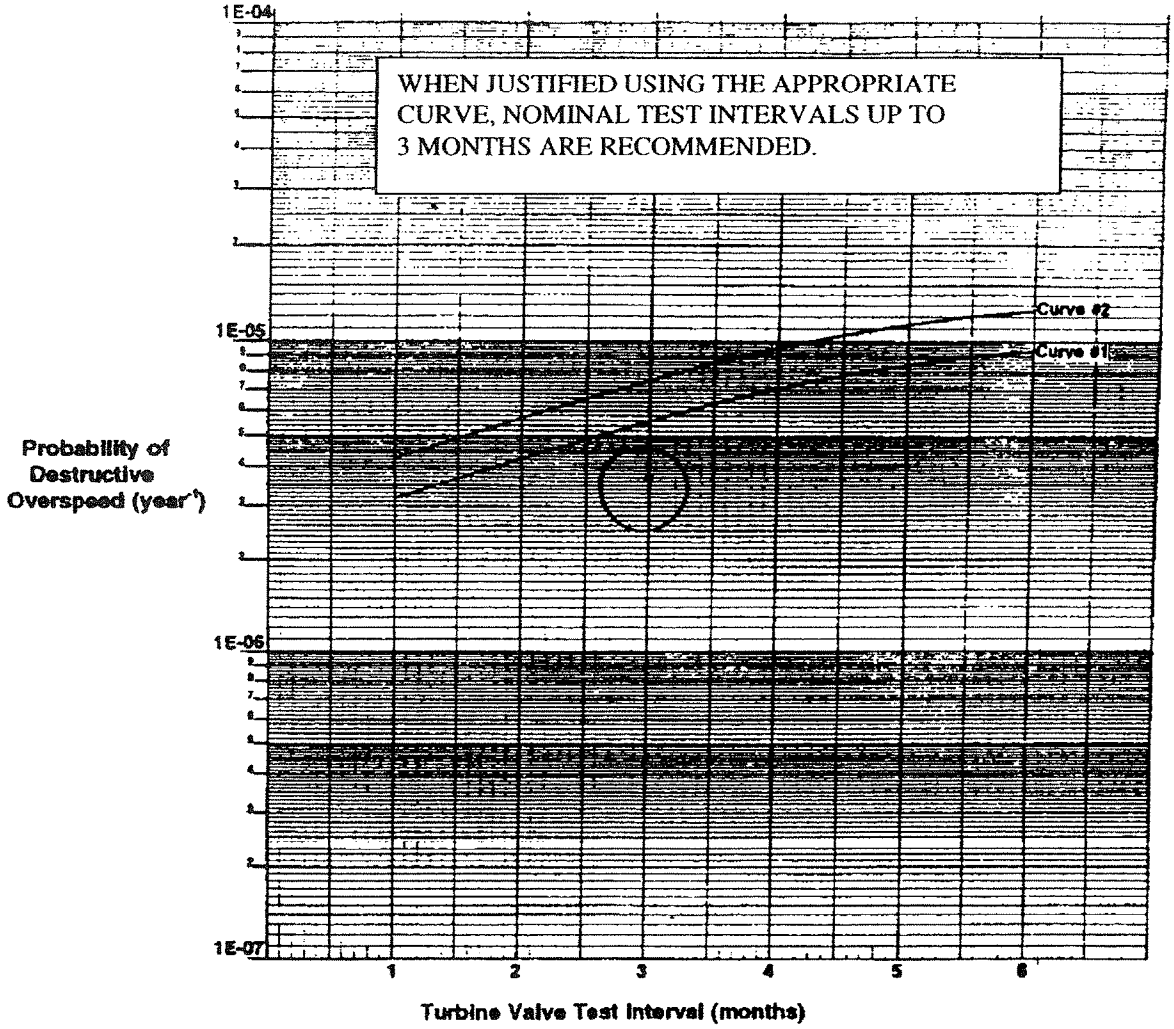
CV TYPE 5 FAILURE RATE = 1.53-07/HR

SLOPE OF ANALYSIS FAILURE LINE = [(CV TYPE 5 F.R.) * (OPERATING HOURS)] / (CALENDAR YEARS)

= [(1.53E-07/HR) * (3.925E+06 HRS)] / (6.42 CAL. YRS.) = 0.094 FAIL./CAL. YR.

INDIAN POINT UNIT No. 2	
UFSAR FIGURE 14.1-66 TRACKING B-95/96 CONTROL VALVE (CV) TYPE 5 FAILURES CONTROL VALVE STICKS OPEN	
MIC. No. 2001MB1541	REV. No. 17A

Initial Case

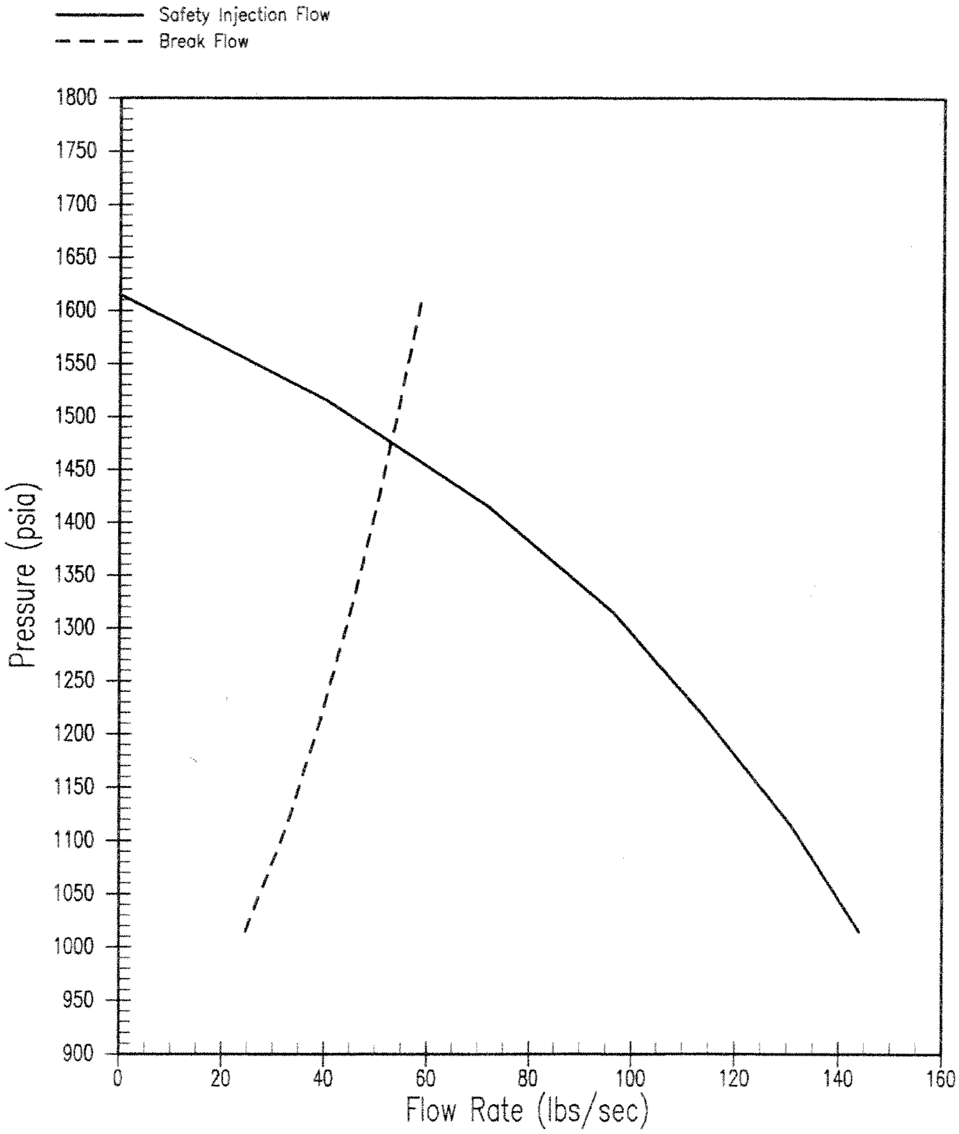


Curve #1: Surveillance of stop valve discs occurs every 18 months. Testing of valve freedom of movement occurs at intervals of 1 to 6 months (horizontal axis).

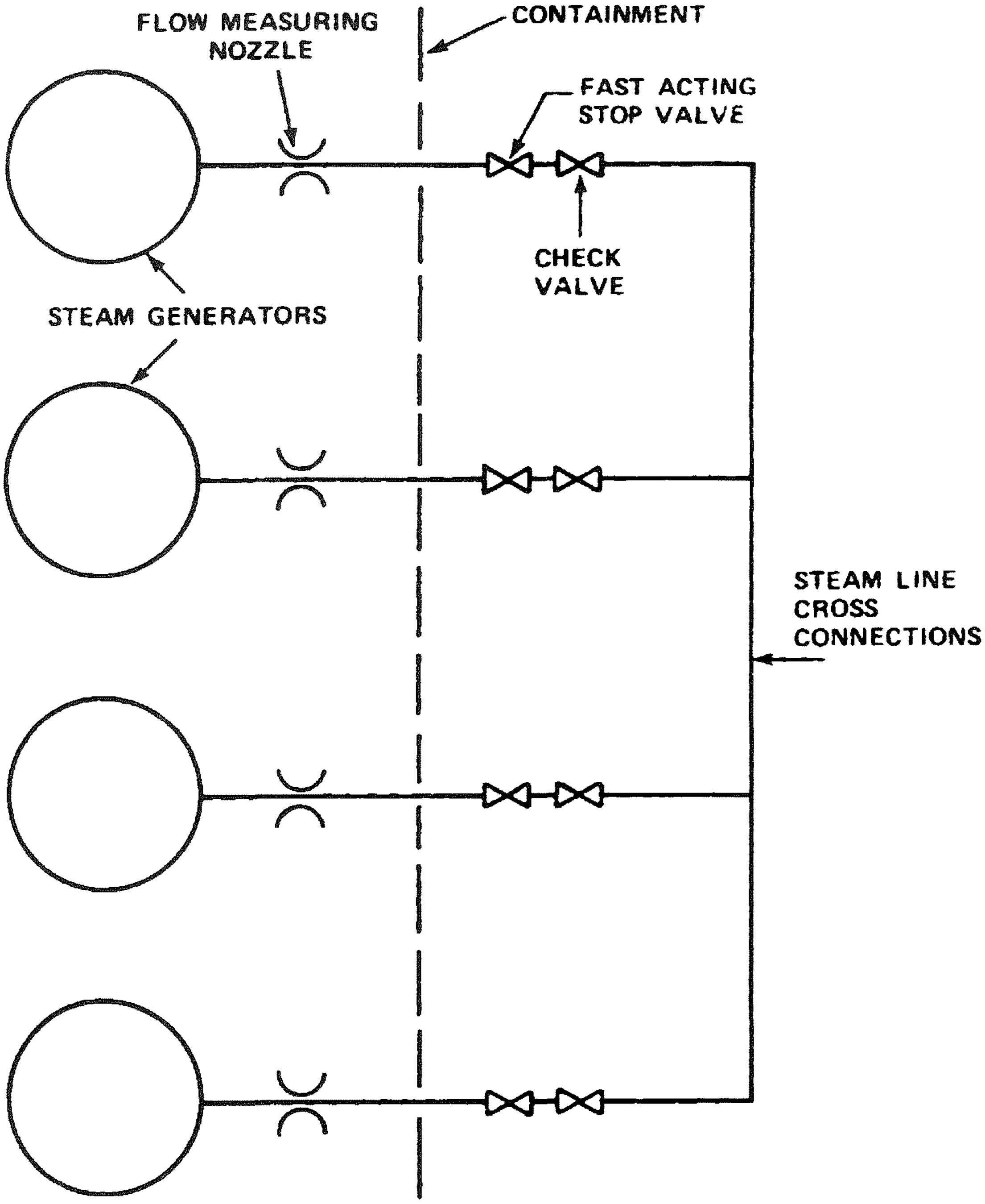
Curve #2: Surveillance of stop valve discs occurs every 24 months. Testing of valve freedom of movement occurs at intervals of 1 to 6 months (horizontal axis).

- Estimated 3.7E-06/r for 3 month test interval for Curve #2

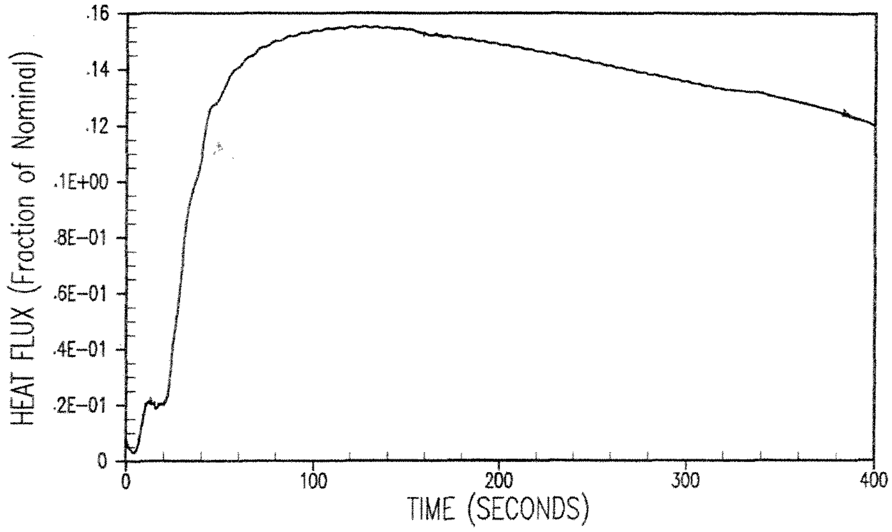
INDIAN POINT UNIT No. 2	
UFSAR FIGURE 14.1-67 ANNUAL FREQUENCY OF DESTRUCTIVE OVERSPEED FOR VARIOUS BB-95/96 TURBINE VALVE TEST INTERVAL (1-ON-1 SV-CV TURBINE / 1 OUT OF 4 STEAM PATHS)	
MIC. No. 2001MB1542	REV. No. 17A

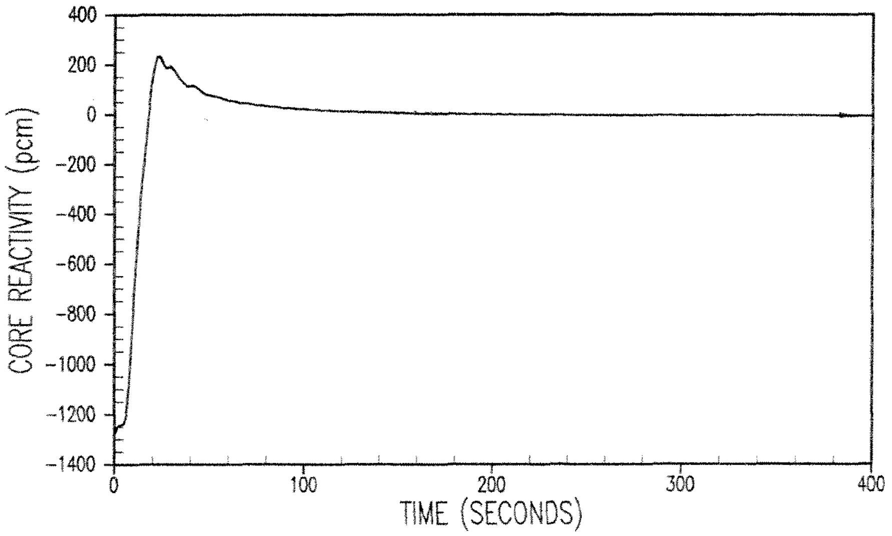


INDIAN POINT UNIT No. 2	
STEAM GENERATOR TUBE RUPTURE, BREAK FLOW AND SAFETY INJECTION FLOW VS. REACTOR COOLANT SYSTEM PRESSURE	
UFSAR FIGURE 14.2-0	REV. No. 19



INDIAN POINT UNIT No. 2	
UFSAR FIGURE 14.2-1 STEAM LINE VALVE ARRANGEMENT – SCHEMATIC	
MIC. No. 2001MB1570	REV. No. 17A

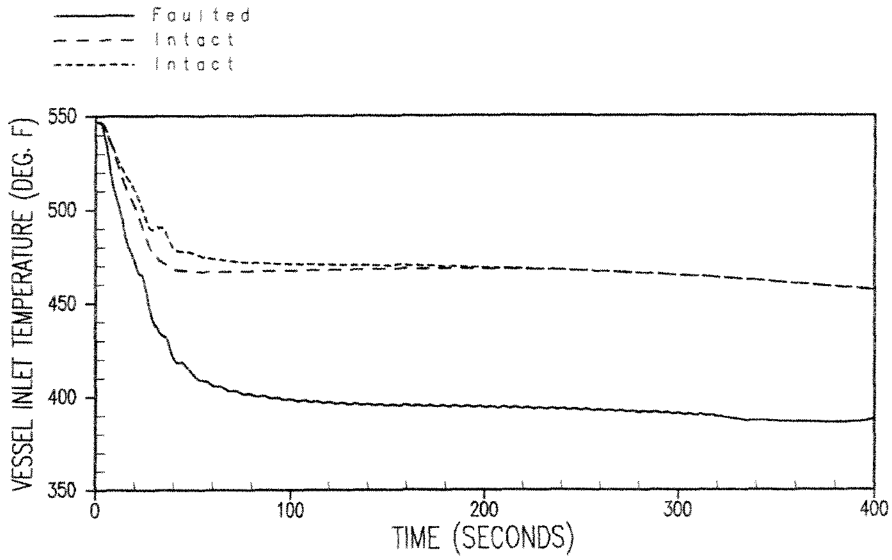


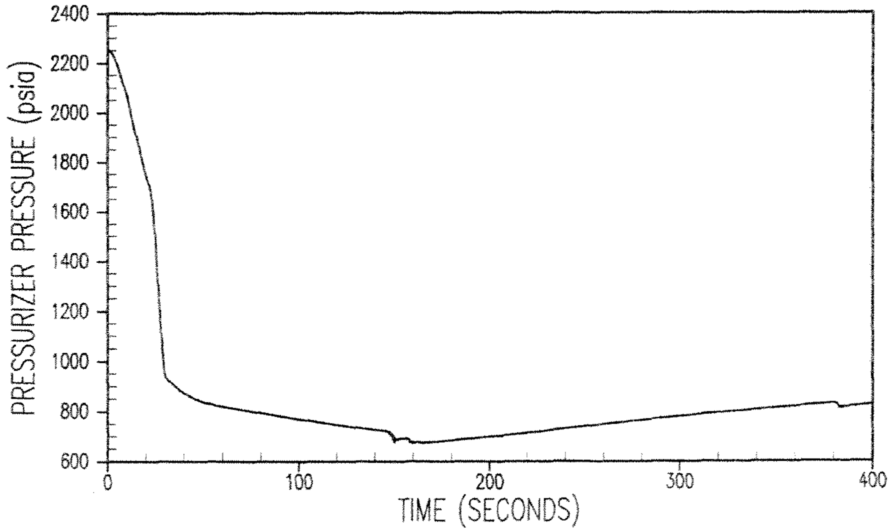


INDIAN POINT UNIT No. 2

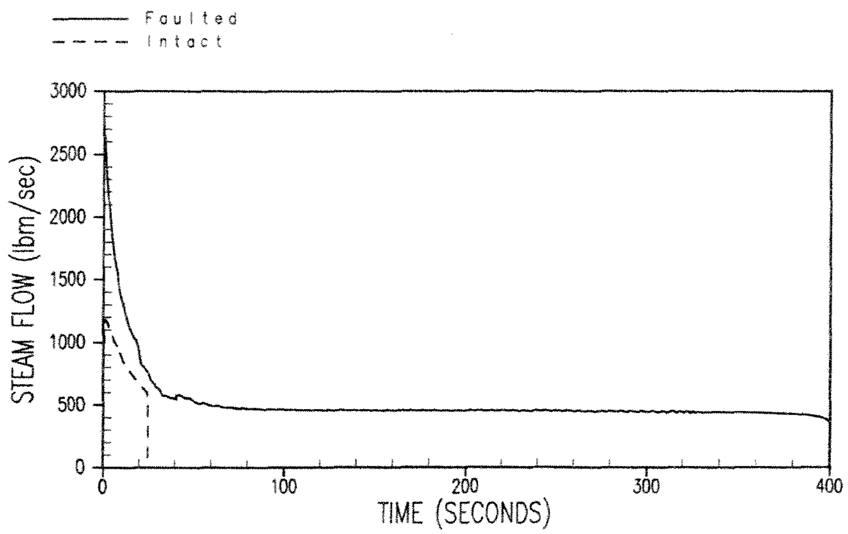
STEAM LINE RUPTURE OFFSITE POWER AVAILABLE, EOL CORE HEAT FLUX AND CORE REACTIVITY vs. TIME

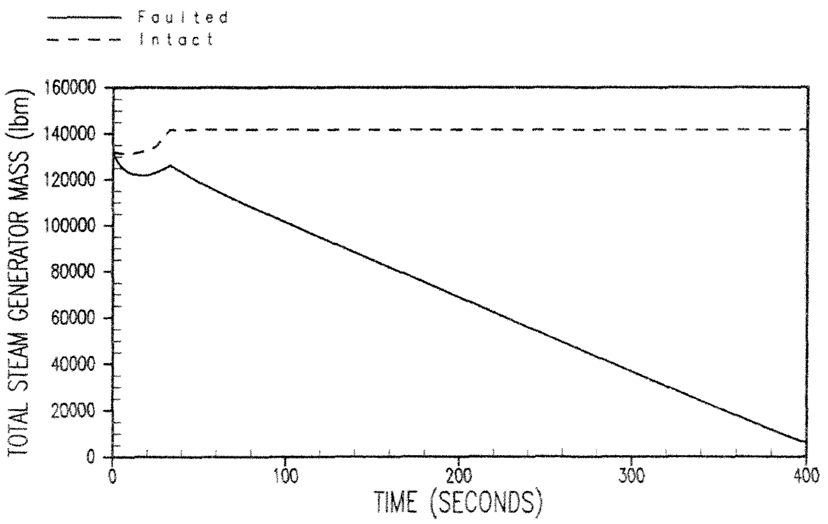
UFSAR FIGURE 14.2-2, sht.1	REV. No. 19



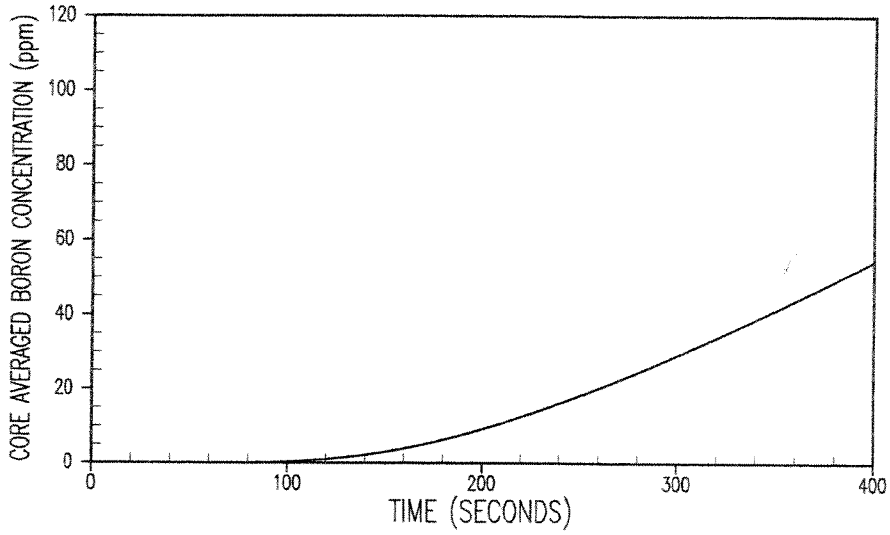


INDIAN POINT UNIT No. 2	
STEAM LINE RUPTURE OFFSITE POWER AVAILABLE, EOL, REACTOR COOLANT PRESSURE AND RV INLET TEMPERATURE vs. TIME	
UFSAR FIGURE 14.2-2, sht.2	REV. No. 19





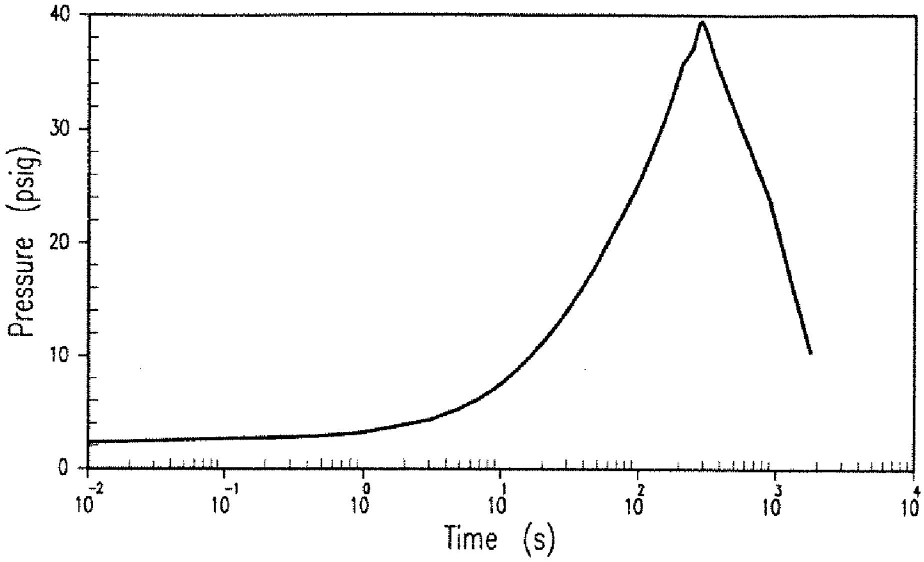
INDIAN POINT UNIT No. 2	
STEAM LINE RUPTURE OFFSITE POWER AVAILABLE, EOL, STEAM FLOW AND STEAM GENERATOR PRESSURE vs. TIME	
UFSAR FIGURE 14.2-2, sht.3	REV. No. 19



INDIAN POINT UNIT No. 2

STEAM LINE RUPTURE OFFSITE POWER AVAILABLE, EOL, CORE BORON CONCENTRATION vs TIME

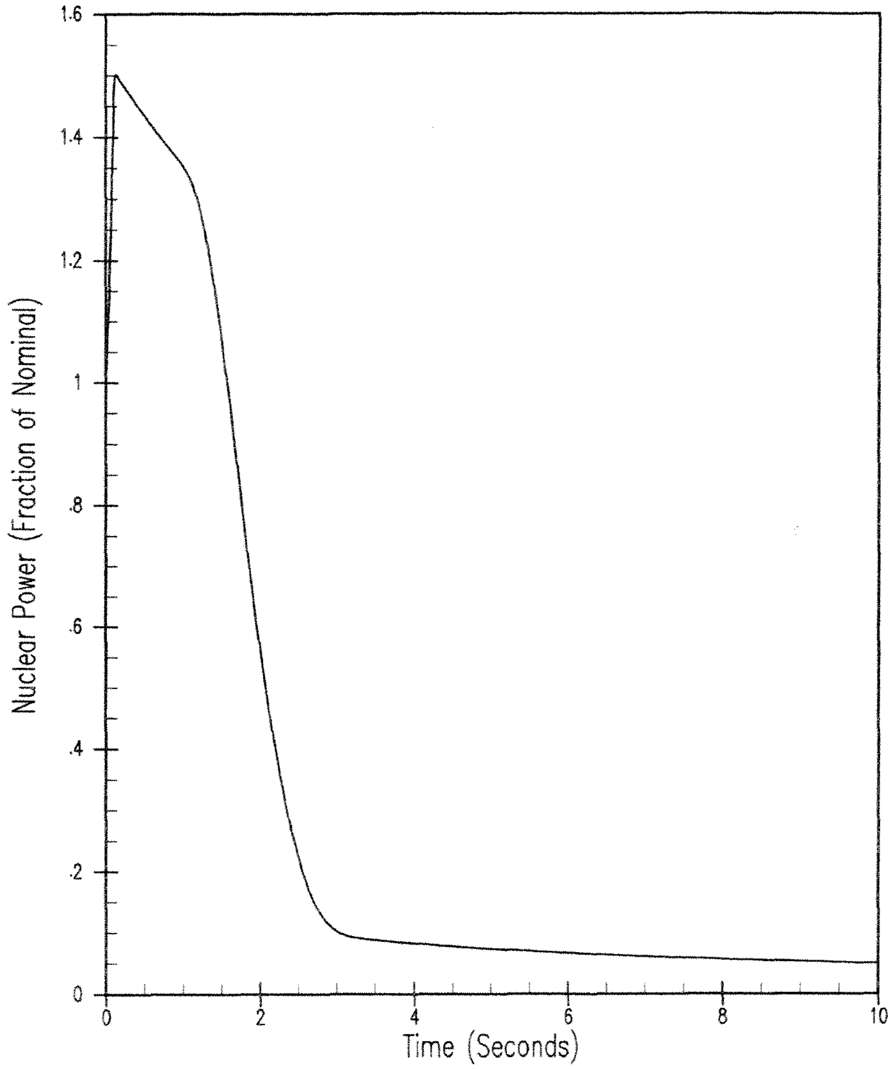
UFSAR FIGURE 14.2-2, sht.4	REV. No. 19



INDIAN POINT UNIT No. 2

CONTAINMENT PRESSURE TIME HISTORY
(DOUBLE – ENDED MAIN STEAM LINE BREAK
MAIN FCV FAILURE
MAXIMUM CONTAINMENT SAFEGUARDS)

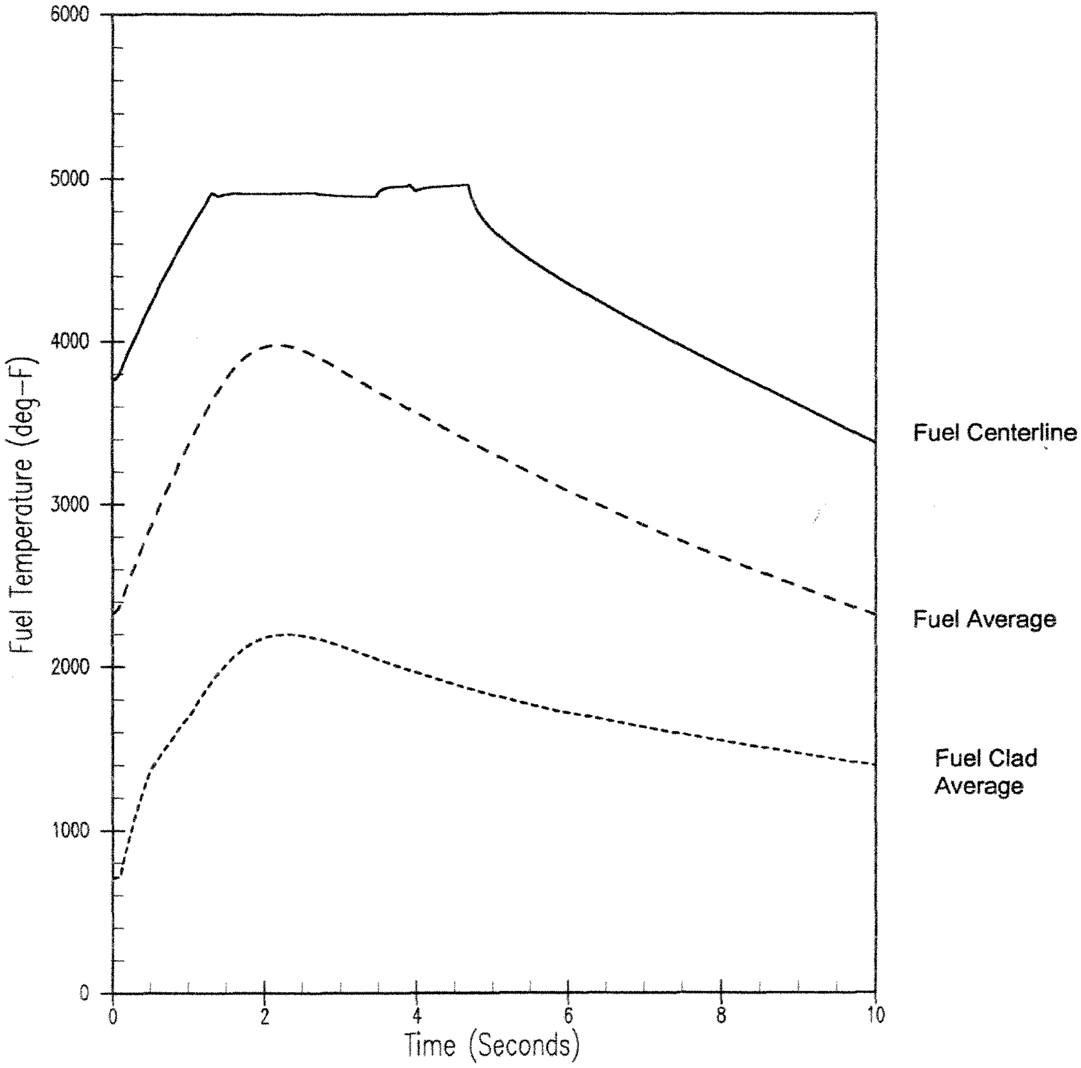
UFSAR FIGURE 14.2-7	REV. No. 20



INDIAN POINT UNIT No. 2

ROD EJECTION ACCIDENT, BOL-HFP,
NUCLEAR POWER vs. TIME

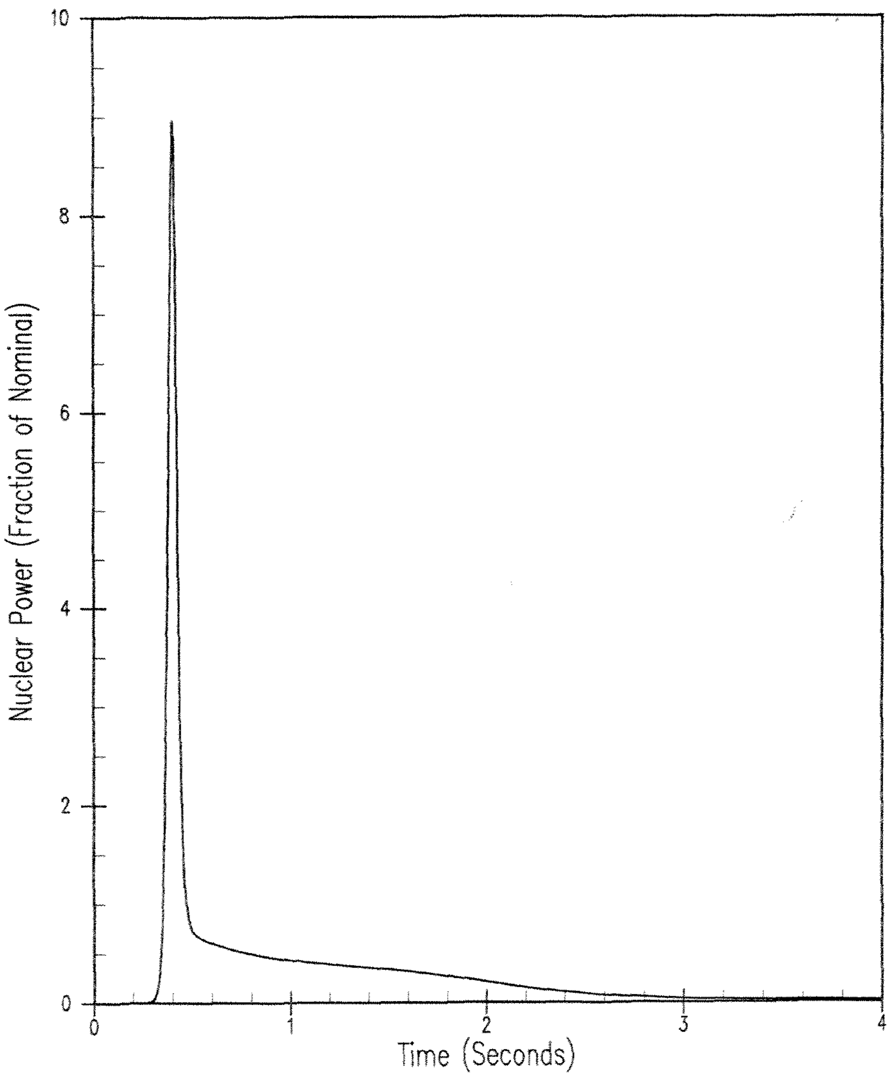
UFSAR FIGURE 14.2-11	REV. No. 19



INDIAN POINT UNIT No. 2

ROD EJECTION ACCIDENT, BOL-HFP, FUEL TEMPERATURES vs. TIME

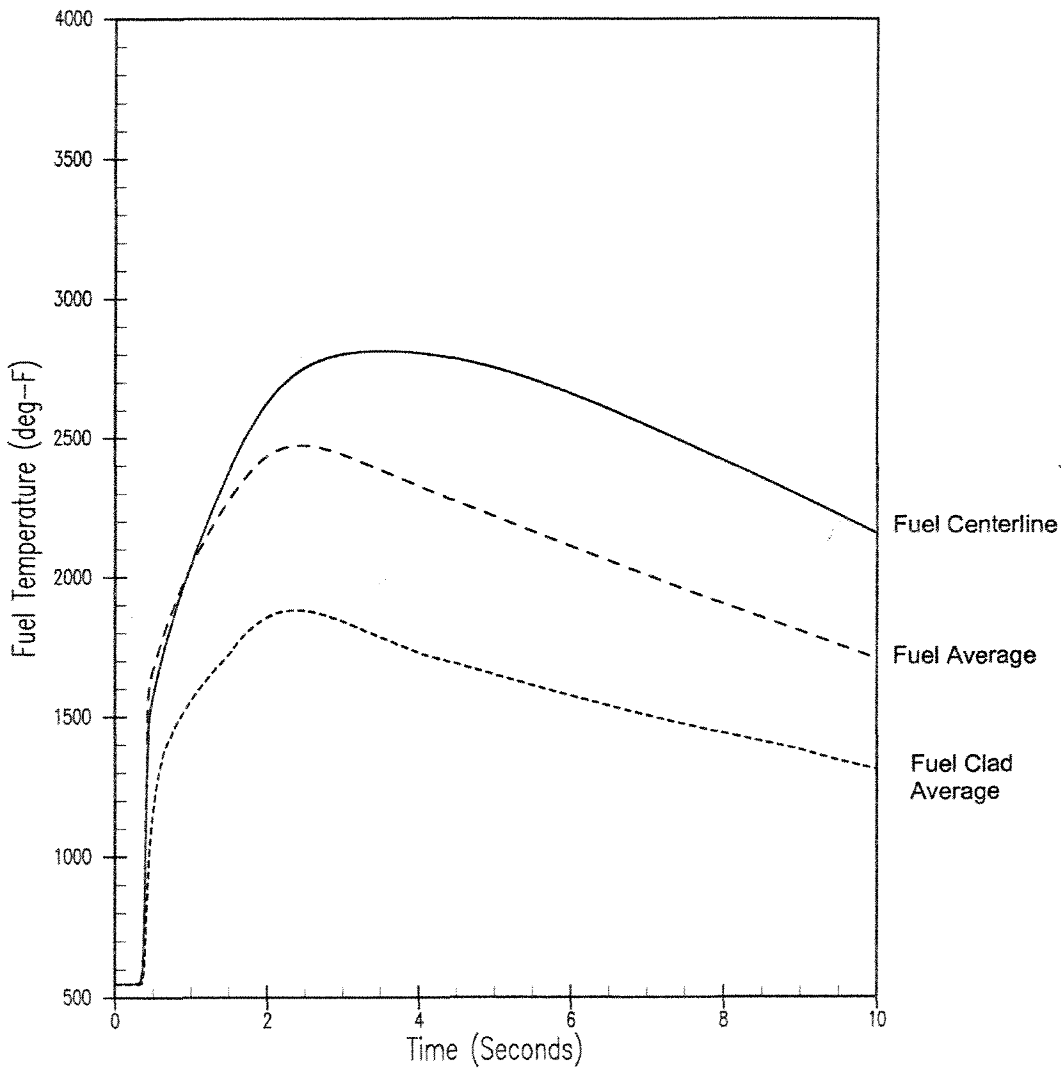
UFSAR FIGURE 14.2-12	REV. No. 19



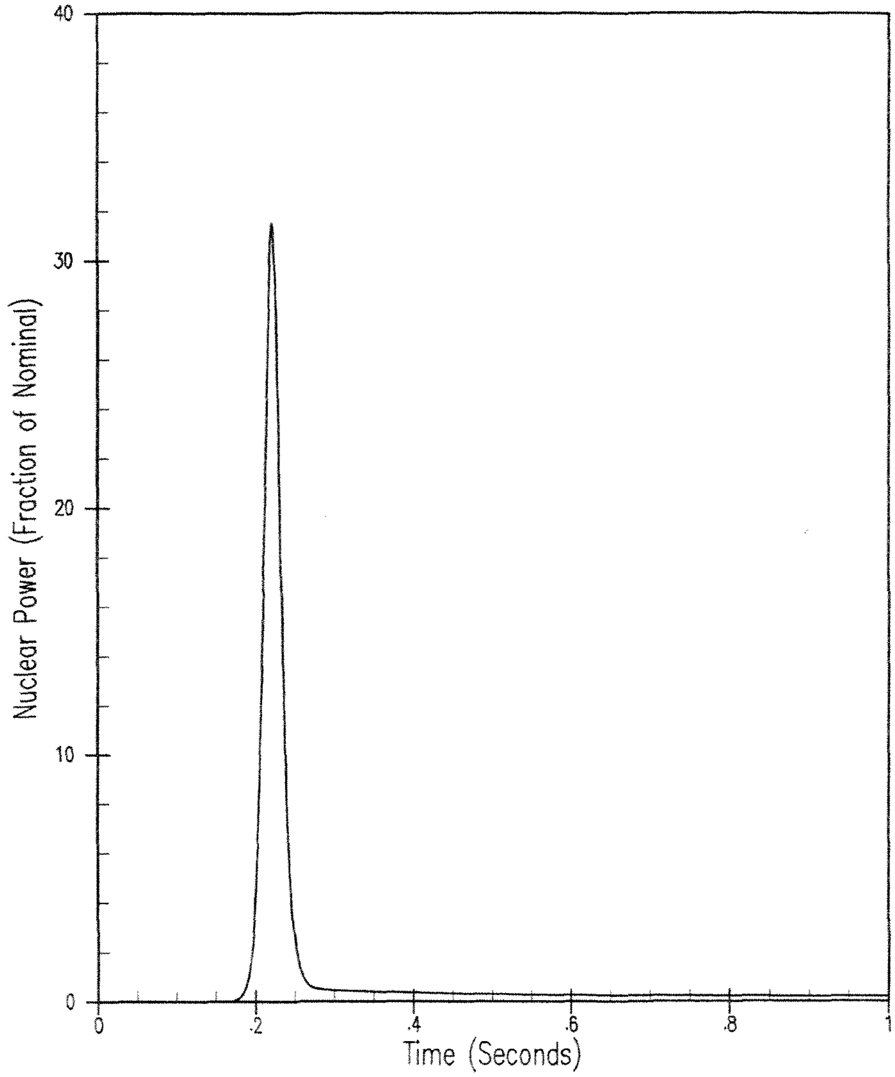
INDIAN POINT UNIT No. 2

ROD EJECTION ACCIDENT, BOL–HZP, NUCLEAR POWER vs. TIME

UFSAR FIGURE 14.2–13	REV. No. 19



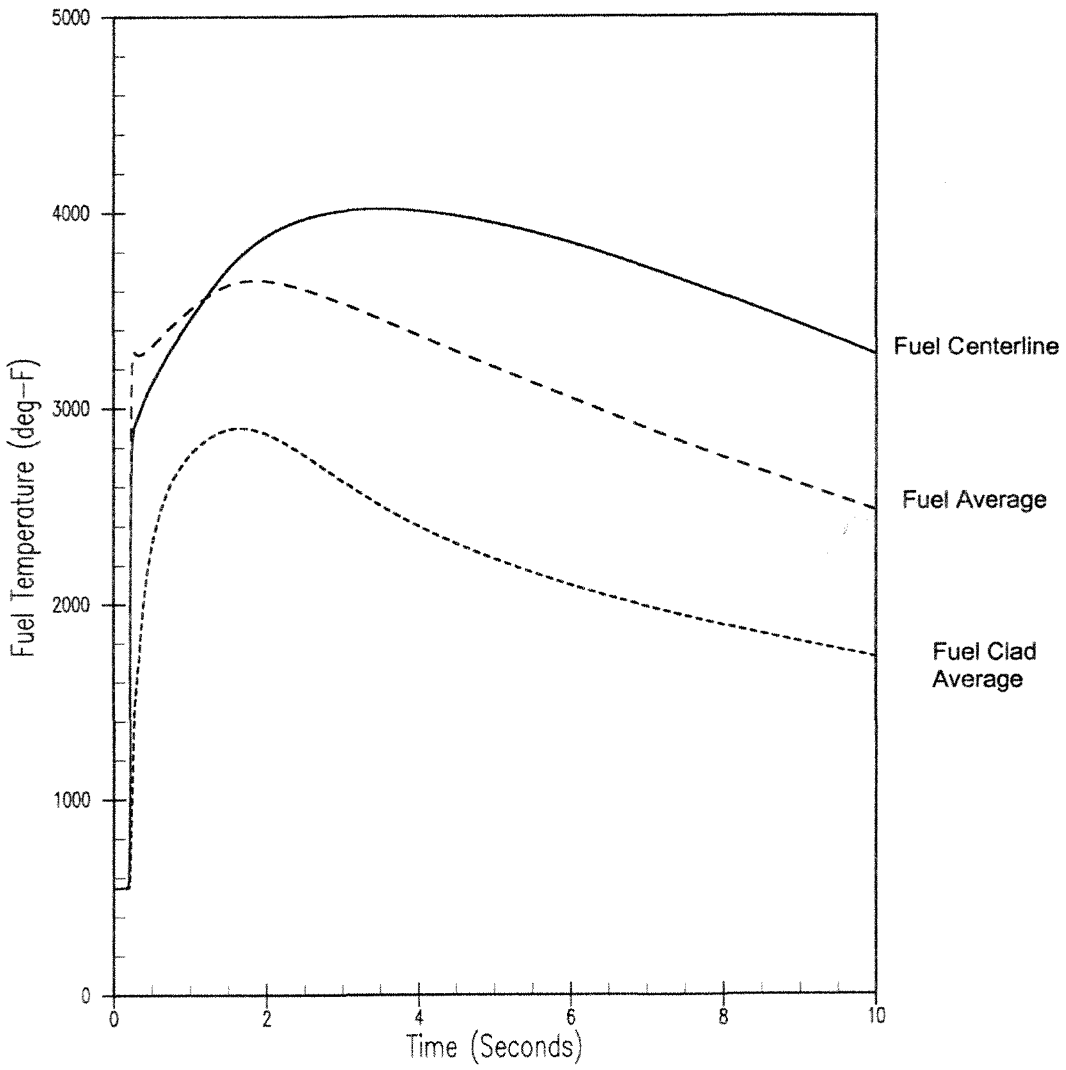
INDIAN POINT UNIT No. 2	
ROD EJECTION ACCIDENT, BOL-HZP, FUEL TEMPERATURES vs. TIME	
UFSAR FIGURE 14.2-14	REV. No. 19



INDIAN POINT UNIT No. 2

ROD EJECTION ACCIDENT, EOL-HZP,
NUCLEAR POWER vs. TIME

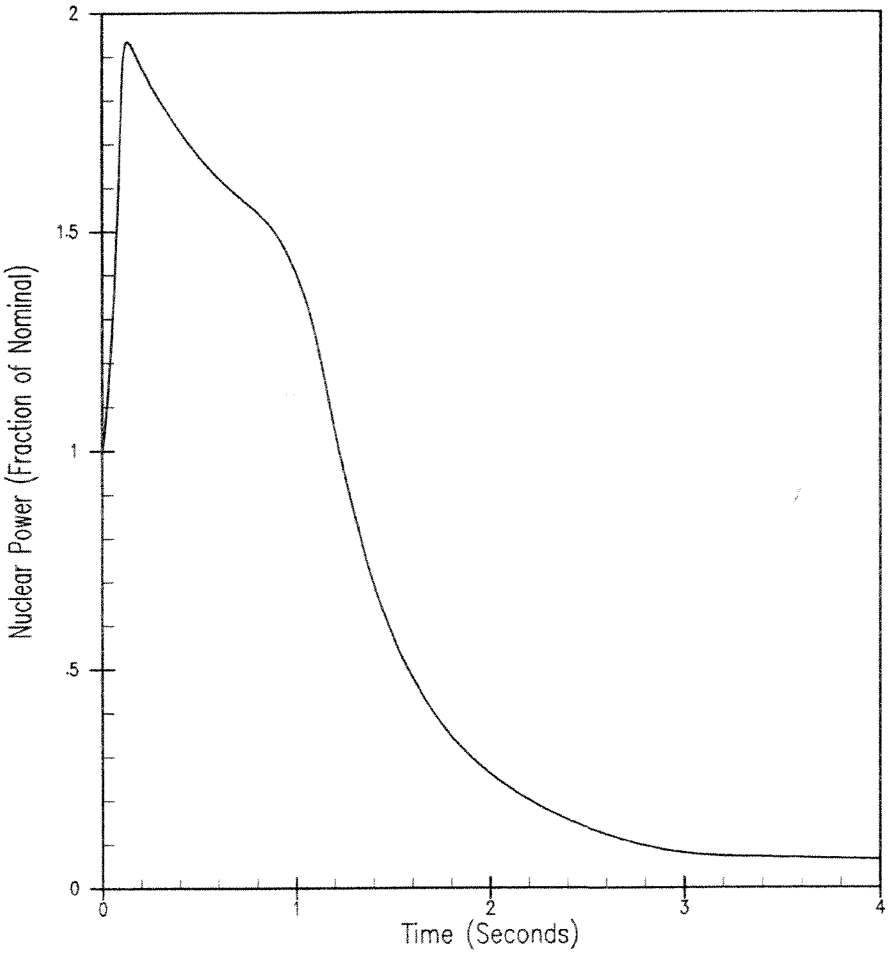
UFSAR FIGURE 14.2-15	REV. No. 19



INDIAN POINT UNIT No. 2

ROD EJECTION ACCIDENT, EOL-HZP,
FUEL TEMPERATURES vs. TIME

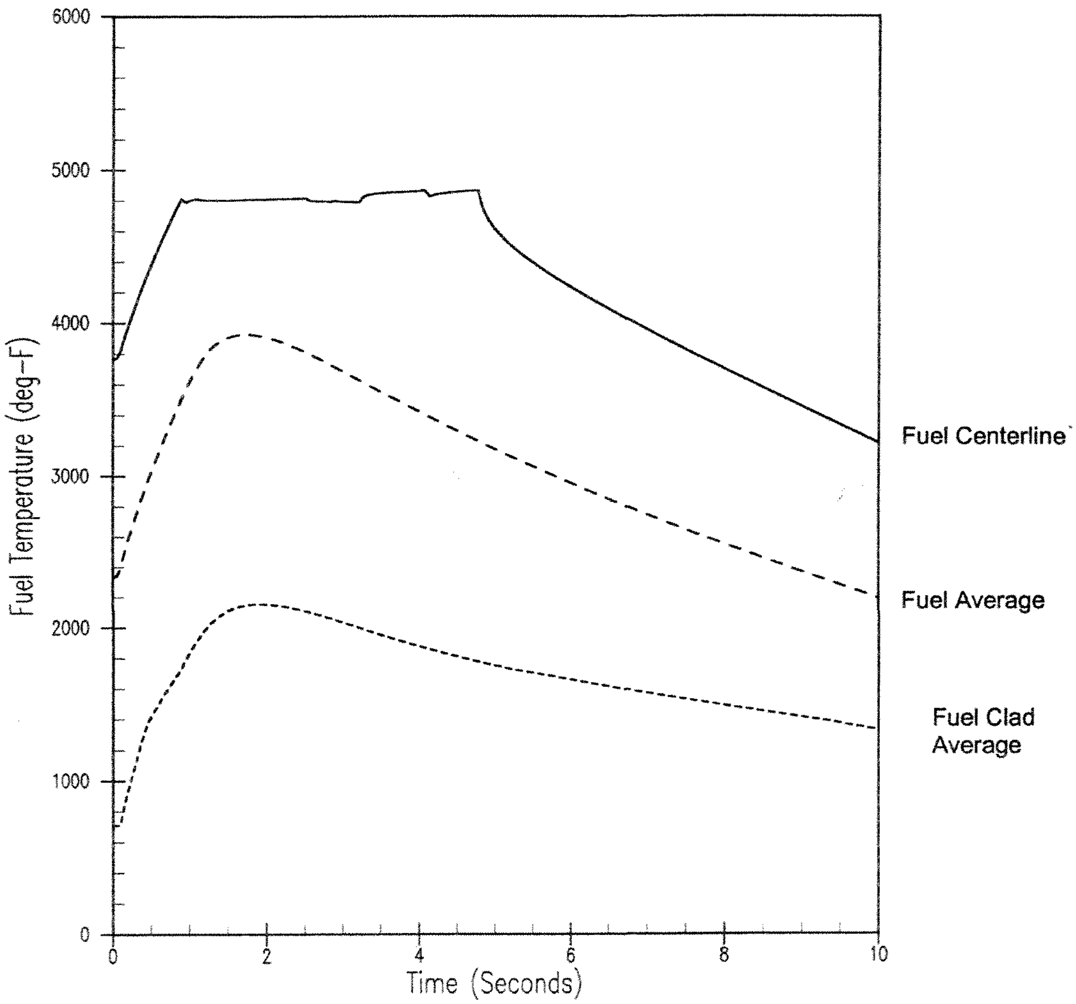
UFSAR FIGURE 14.2-16	REV. No. 19



INDIAN POINT UNIT No. 2

ROD EJECTION ACCIDENT, EOL–HFP,
NUCLEAR POWER vs TIME

UFSAR FIGURE 14.2–17	REV. No. 19



INDIAN POINT UNIT No. 2	
ROD EJECTION ACCIDENT, EOL-HFP, FUEL TEMPERATURES vs TIME	
UFSAR FIGURE 14.2-18	REV. No. 19

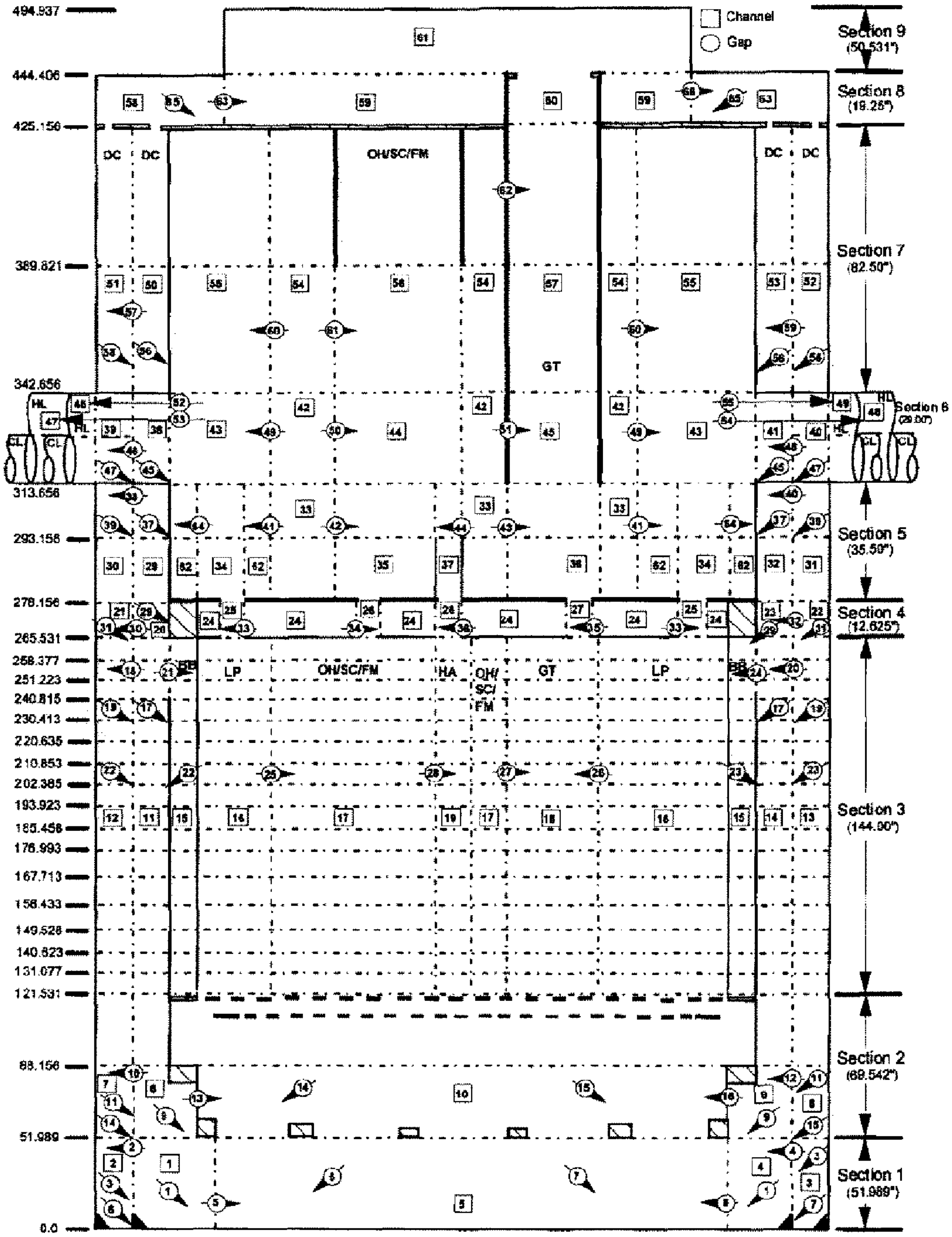


Figure 14.3-1: Indian Point Unit 2 WCOBRA/TRAC Vessel Model Noding Diagram

INDIAN POINT UNIT No. 2	
INDIAN POINT UNIT 2 WCOBRA/TRAC VESSEL MODEL NODING DIAGRAM	
UFSAR FIGURE 14.3-1	REV. No. 20

OAGI0000215_1646

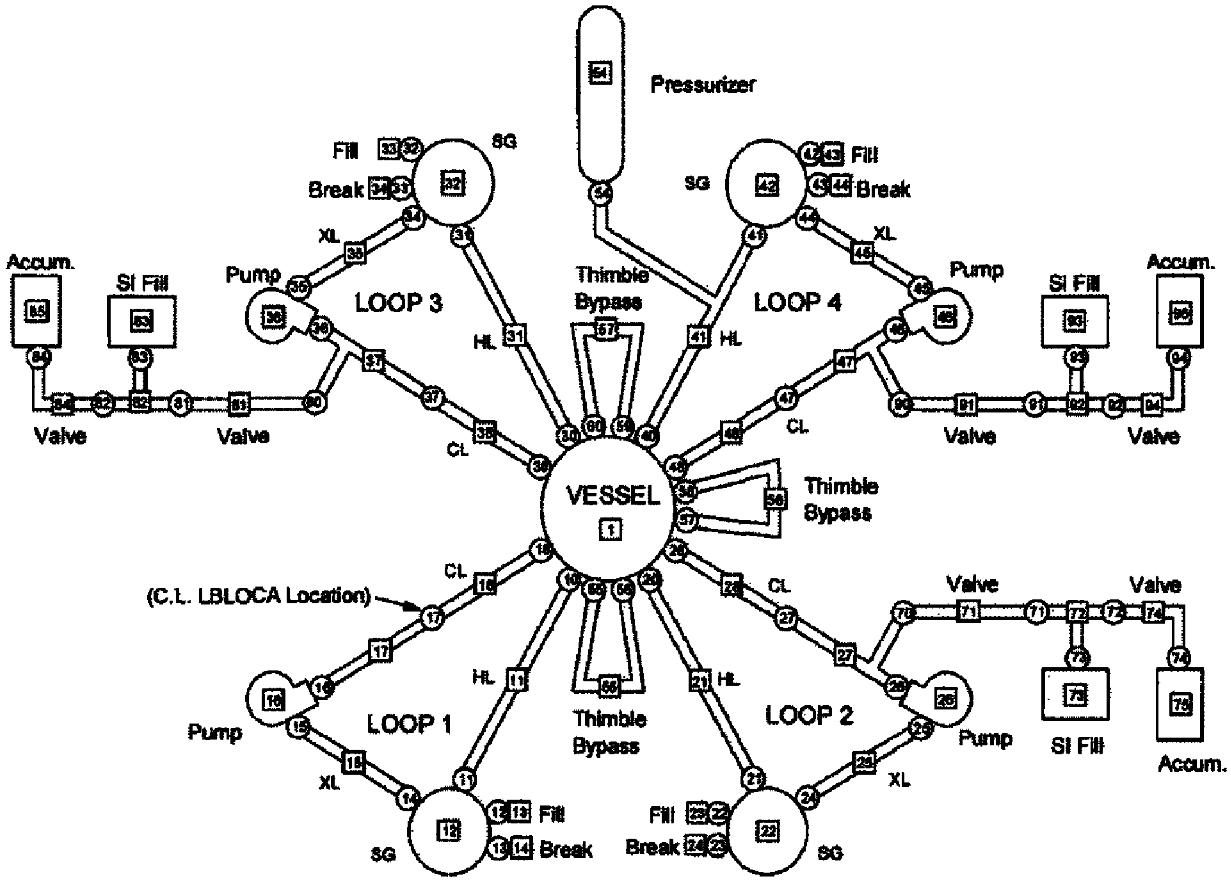
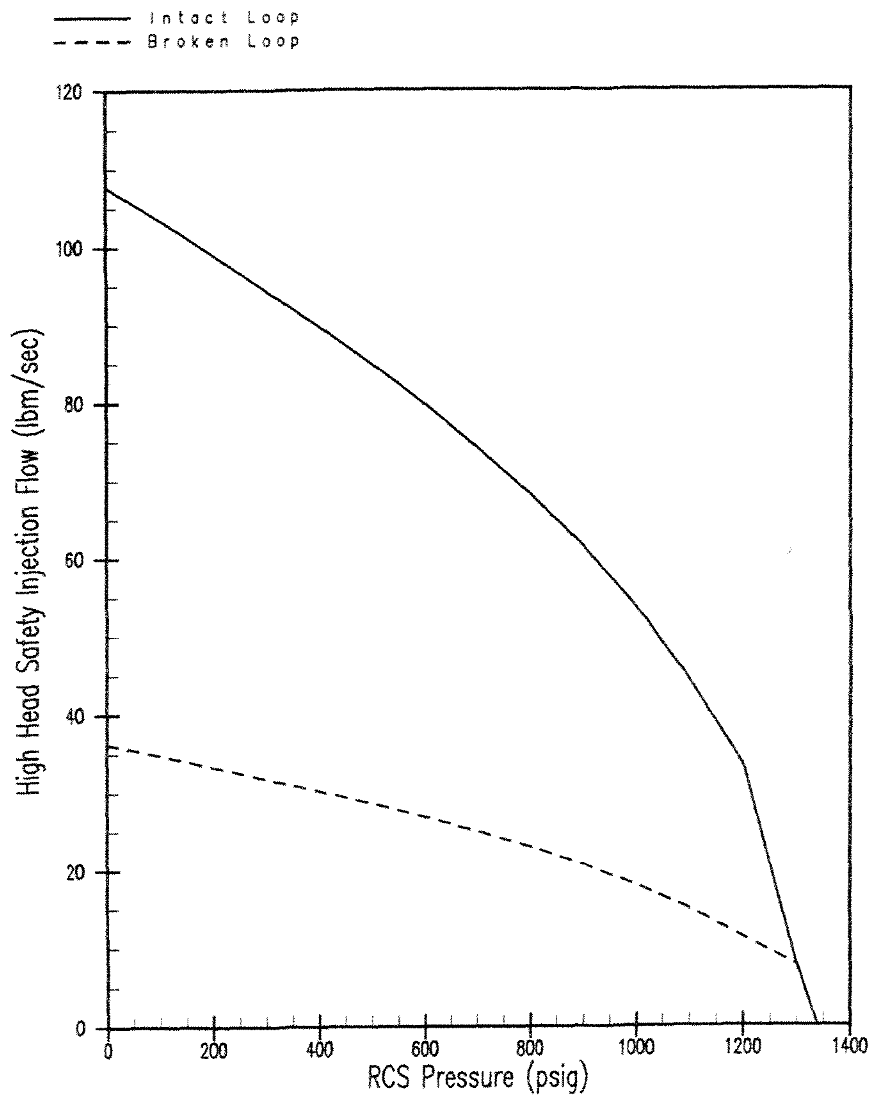


Figure 14.3-2: Indian Point Unit 2 WCOBRA/TRAC Model Loop Layout

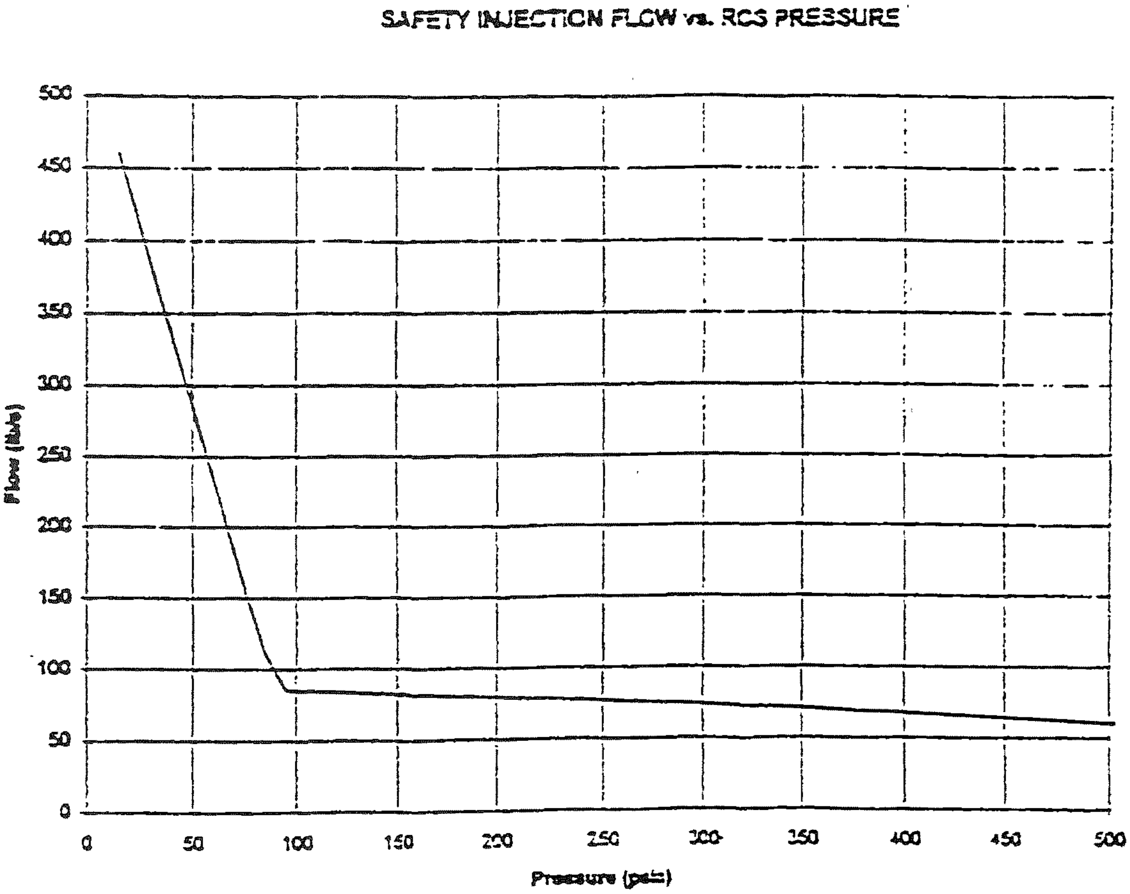
INDIAN POINT UNIT No. 2	
INDIAN POINT UNIT 2 WCOBRA/TRAC VESSEL MODEL LOOP LAYOUT	
UFSAR FIGURE 14.3-2	REV. No. 20



INDIAN POINT UNIT No. 2

HIGH HEAD SAFETY
INJECTION FLOW RATE

UFSAR FIGURE 14.3-3	REV. No. 19



INDIAN POINT UNIT No. 2

UFSAR FIGURE 14.3-3A

SAFETY INJECTION FLOW vs
RCS PRESSURE

MIC. No. 2000MC4204	REV. No. 17A

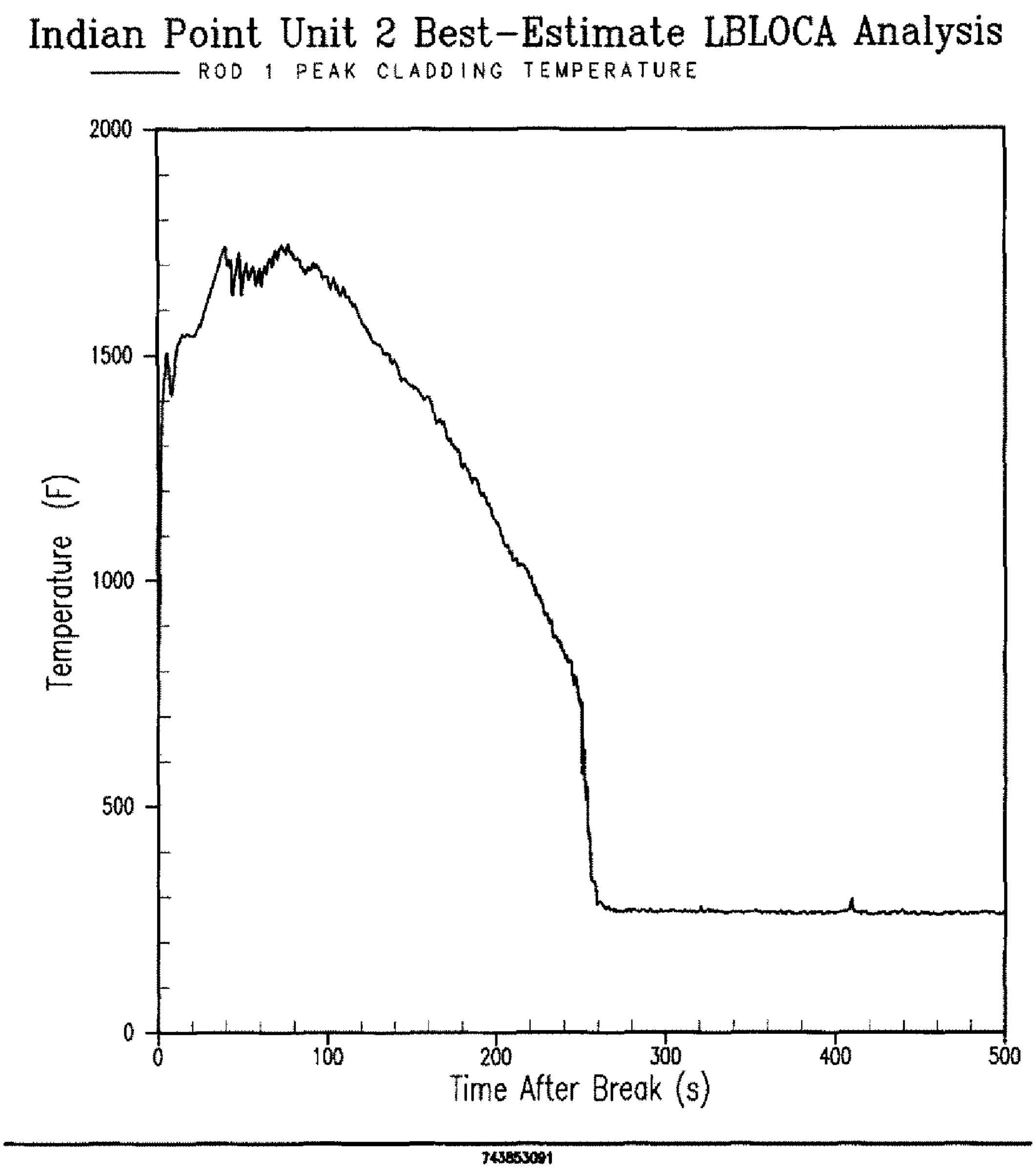


Figure 14.3-6: Peak Cladding Temperature for Reference Transient

INDIAN POINT UNIT No. 2	
PEAK CLADDING TEMPERATURE FOR REFERENCE TRANSIENT	
UFSAR FIGURE 14.3-6	REV. No. 20

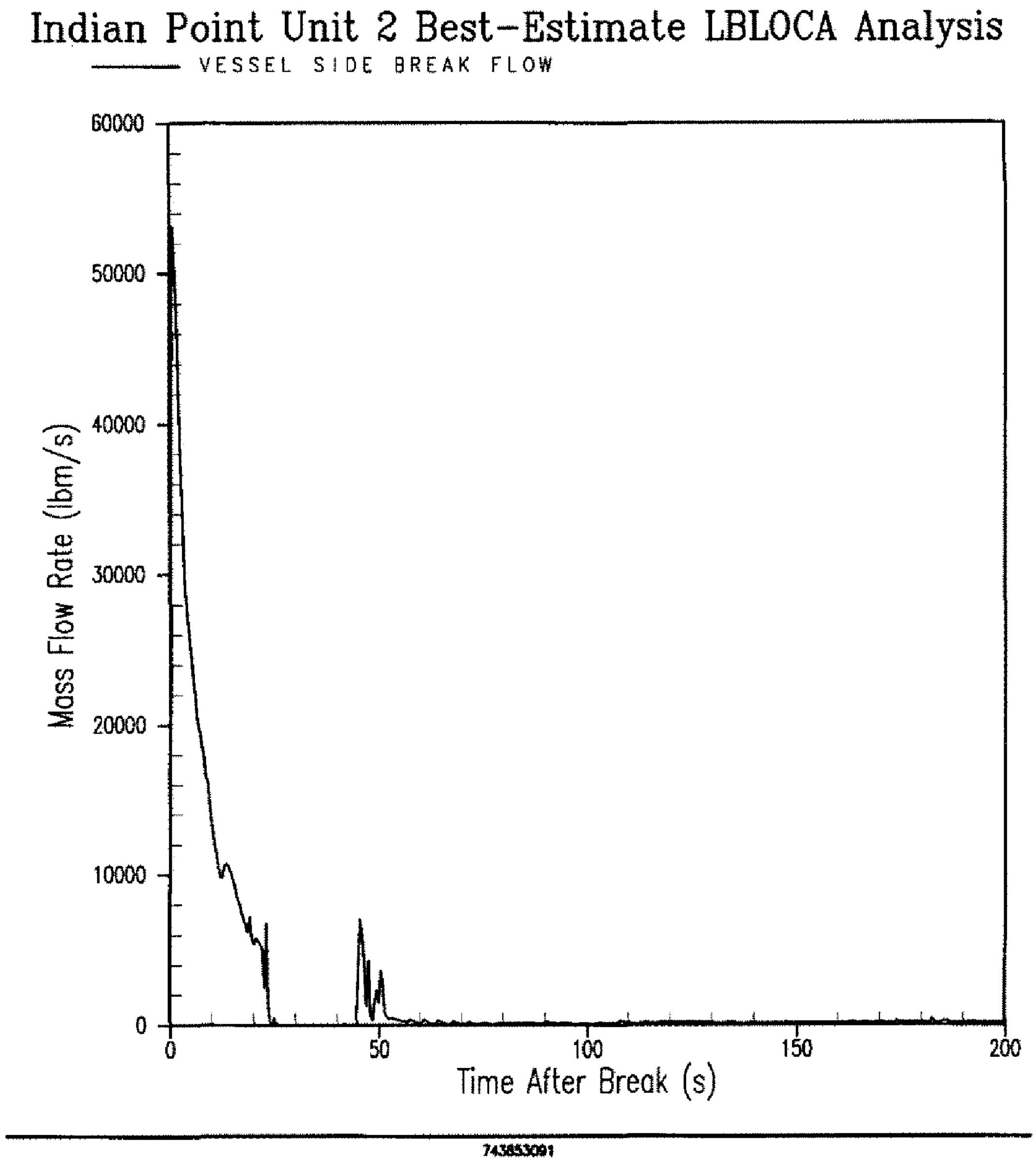


Figure 14.3-7: Vessel Side Break Flow for Reference Transient

INDIAN POINT UNIT No. 2	
VESSEL SIDE BREAK FLOW FOR REFERENCE TRANSIENT	
UFSAR FIGURE 14.3-7	REV. No. 20

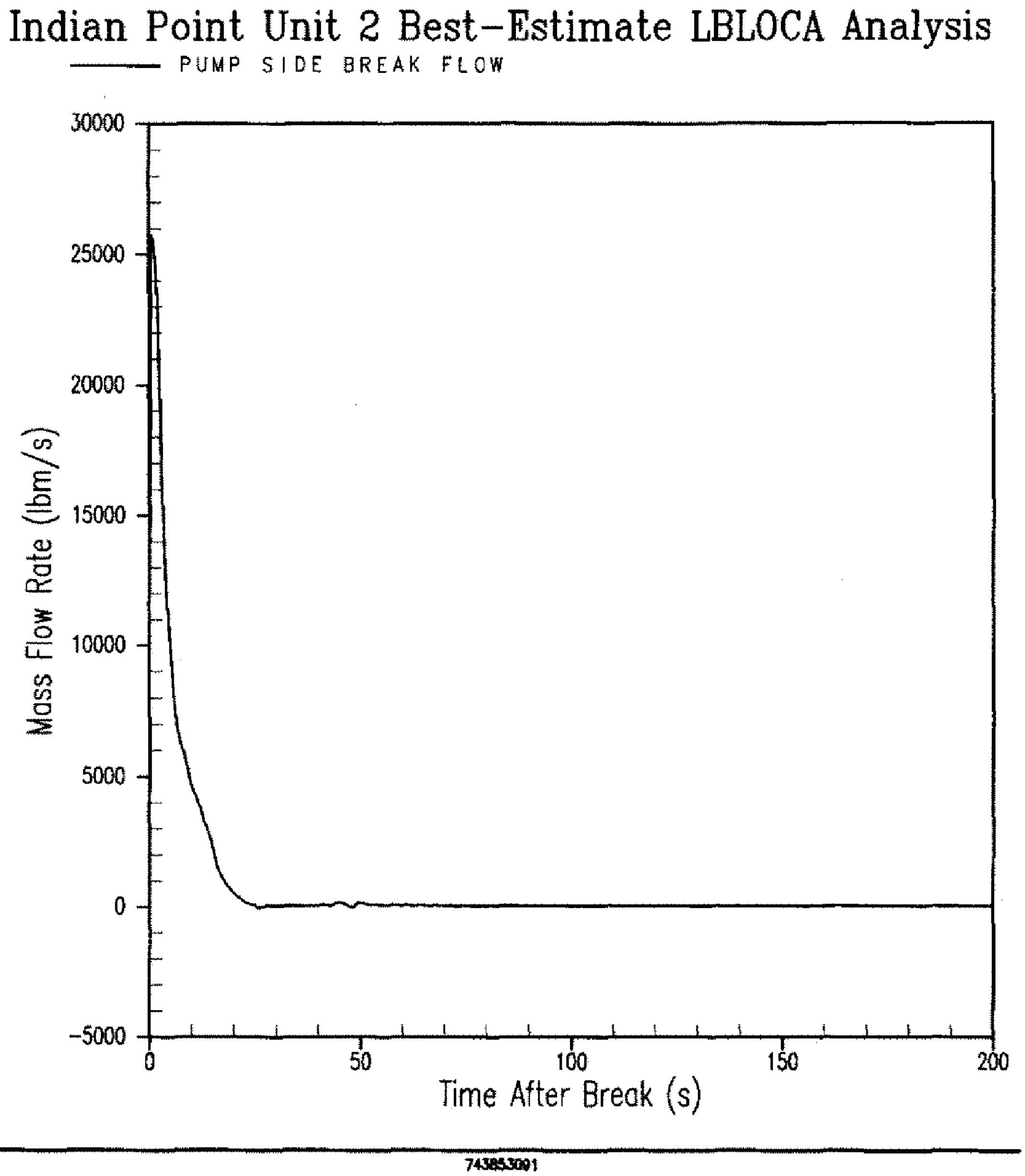


Figure 14.3-8: Loop Side Break Flow for Reference Transient

INDIAN POINT UNIT No. 2	
LOOP SIDE BREAK FLOW FOR REFERENCE TRANSIENT	
UFSAR FIGURE 14.3-8	REV. No. 20

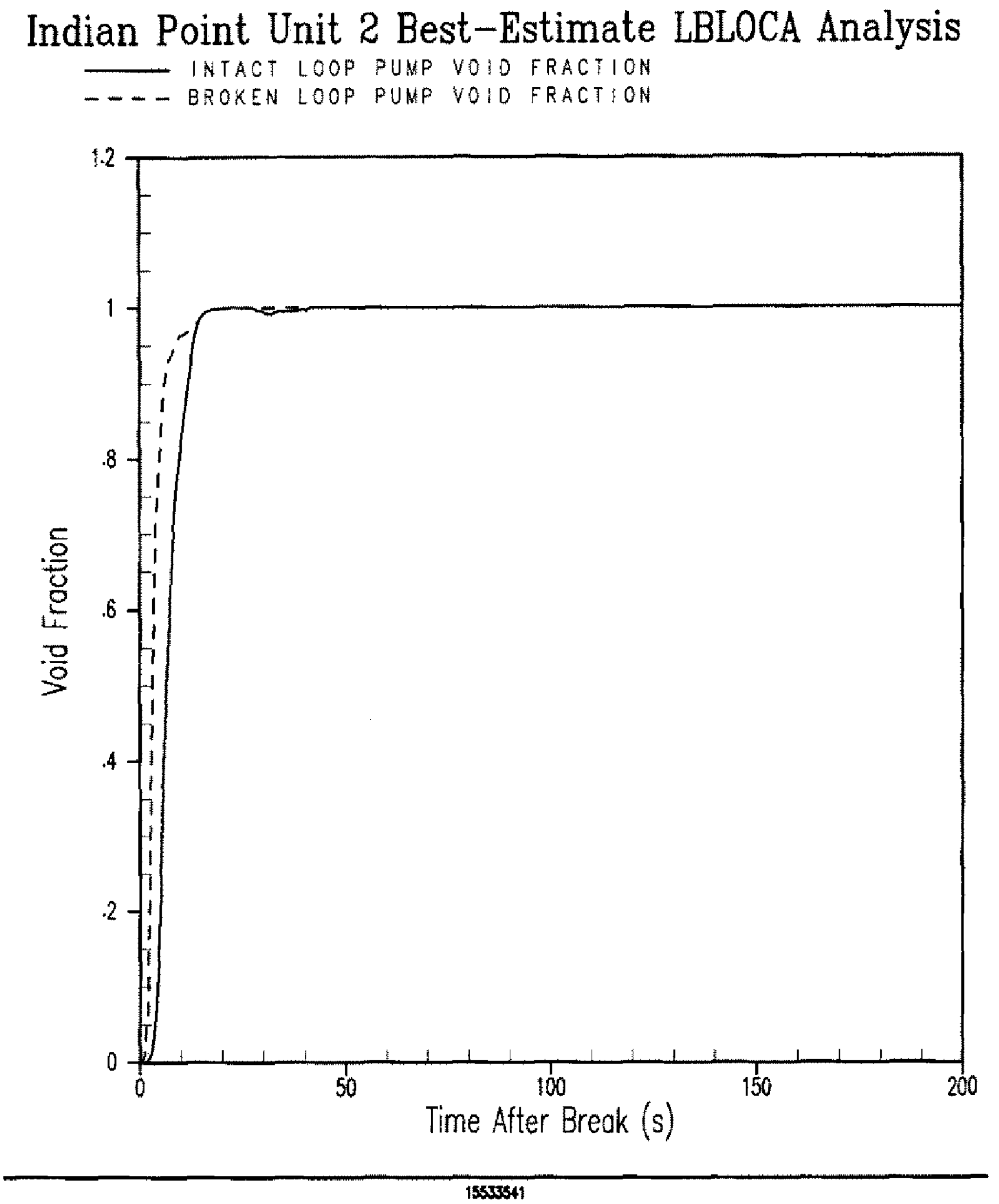


Figure 14.3-9: Void Fraction at the Intact and Broken Loop Pump Inlet for Reference Transient

INDIAN POINT UNIT No. 2	
VOID FRACTION AT THE INTACT AND BROKEN LOOP PUMP INLET FOR REFERENCE TRANSIENT	
UFSAR FIGURE 14.3-9	REV. No. 20

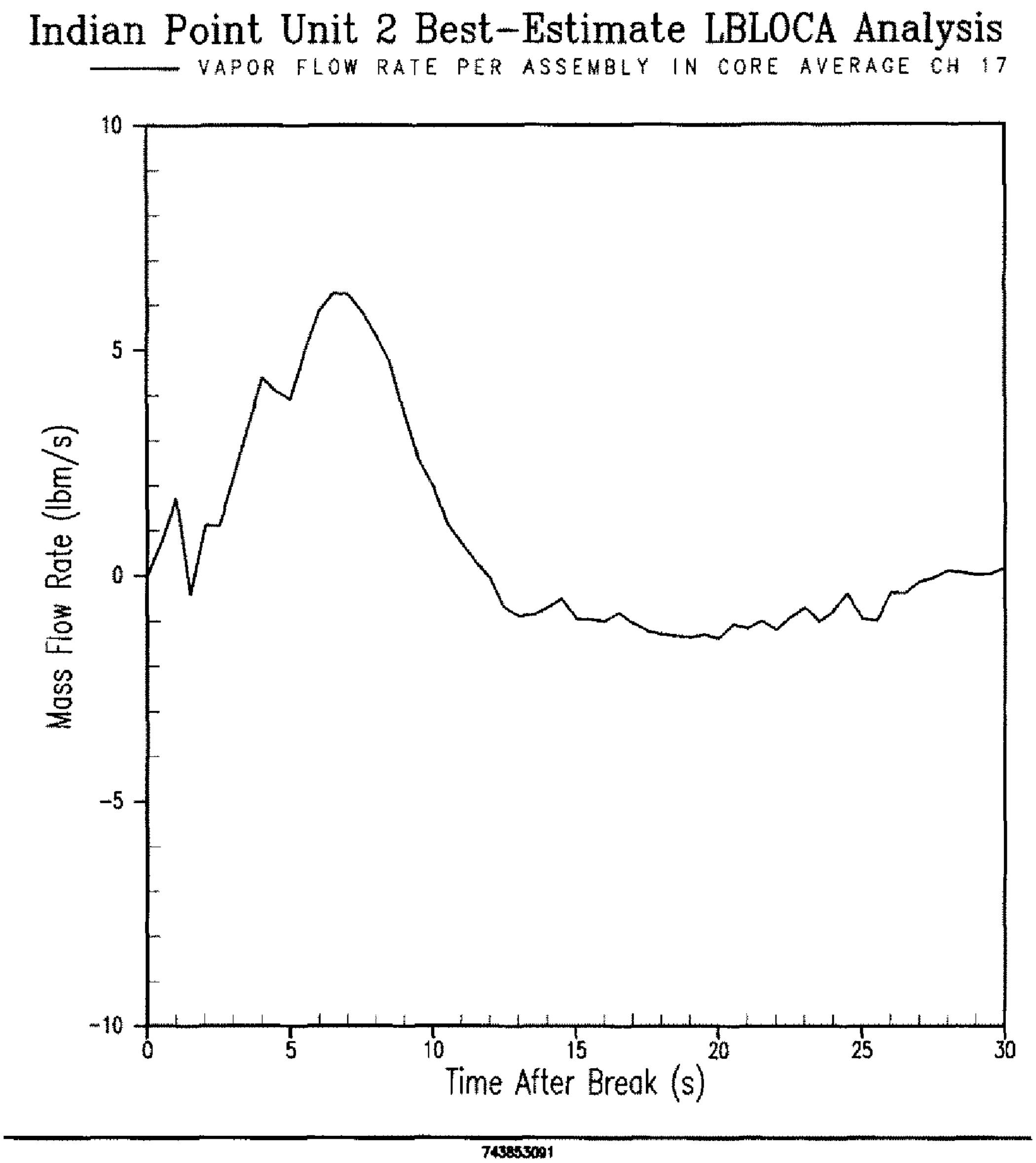


Figure 14.3-10: Vapor Flow Rate per Assembly at Mid-core in Core Average Channel 17 During Blowdown for Reference Transient

INDIAN POINT UNIT No. 2	
VAPOR FLOW RATE PER ASSEMBLY AT MID-CORE AVERAGE CHANNEL 17 DURING BLOWDOWN FOR REFERENCE TRANSIENT	
UFSAR FIGURE 14.3-10	REV. No. 20

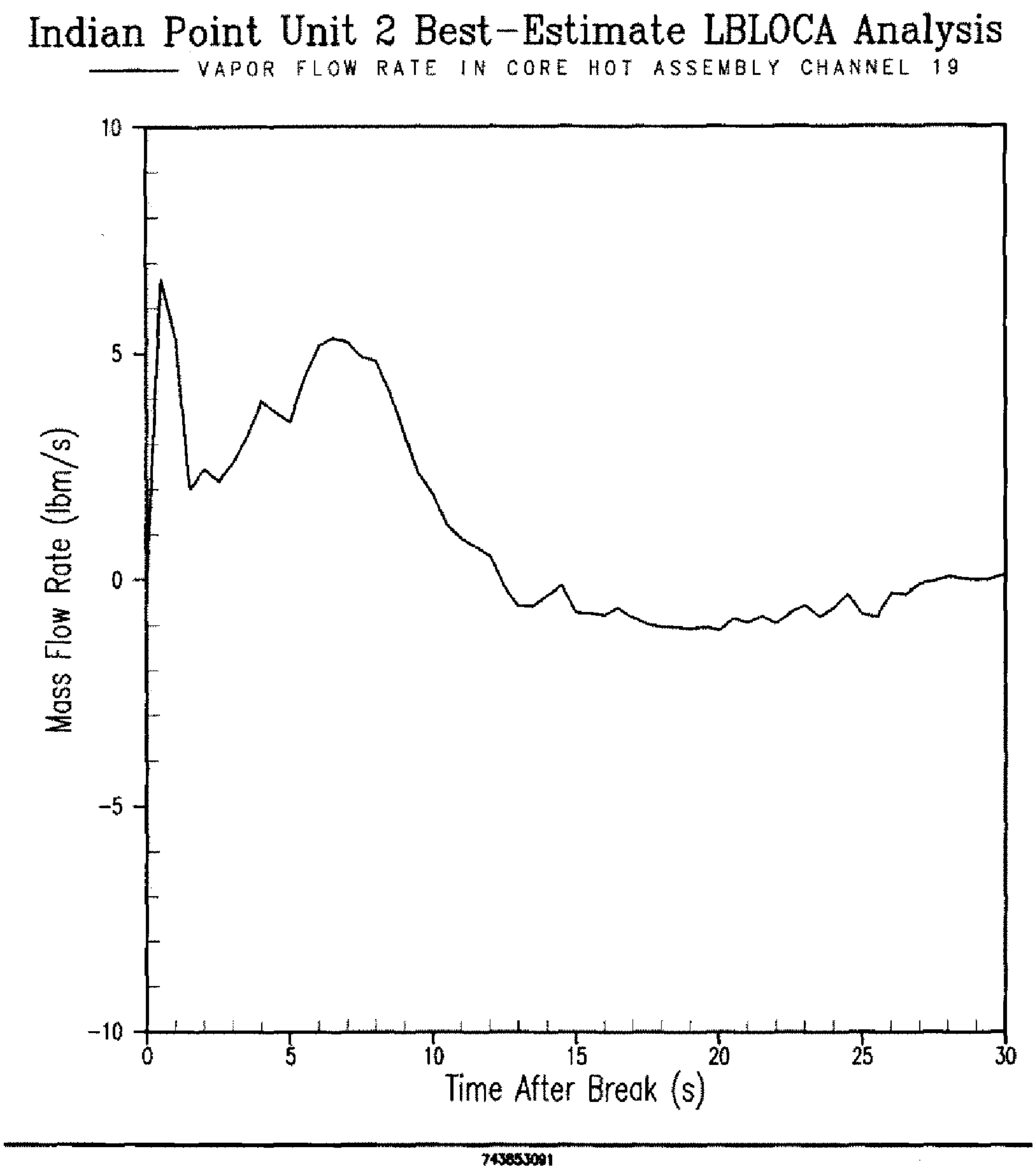


Figure 14.3-11: Vapor Flow Rate at Mid-core in Core Hot Assembly Channel 19 During Blowdown for Reference Transient

INDIAN POINT UNIT No. 2	
VAPOR FLOW RATE PER ASSEMBLY AT MID-CORE AVERAGE CHANNEL 19 DURING BLOWDOWN FOR REFERENCE TRANSIENT	
UFSAR FIGURE 14.3-11	REV. No. 20

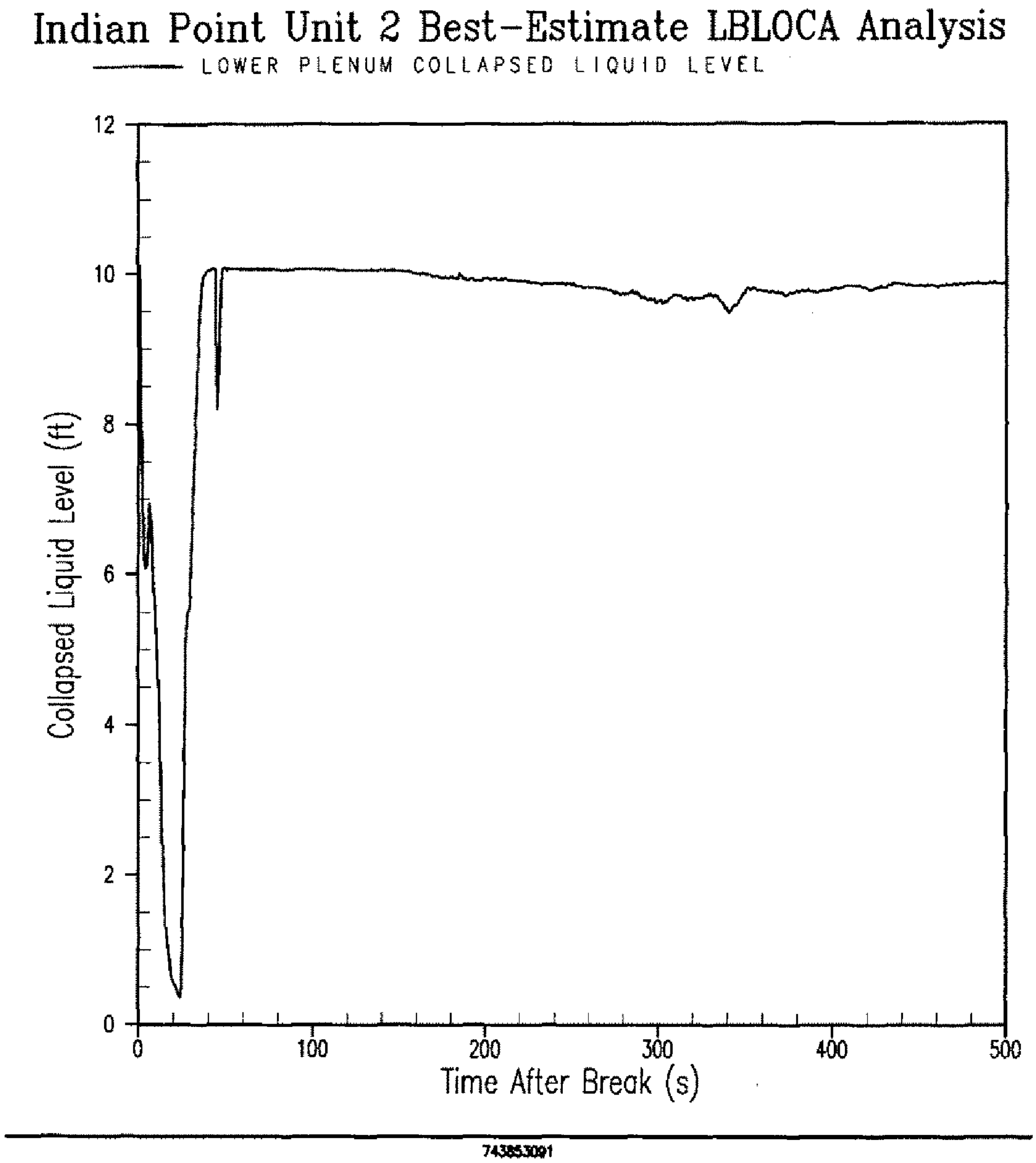


Figure 14.3-12: Collapsed Liquid Level in Lower Plenum for Reference Transient

INDIAN POINT UNIT No. 2	
COLLAPSED LIQUID LEVEL PLENUM FOR REFERENCE TRANSIENT	
UFSAR FIGURE 14.3-12	REV. No. 20

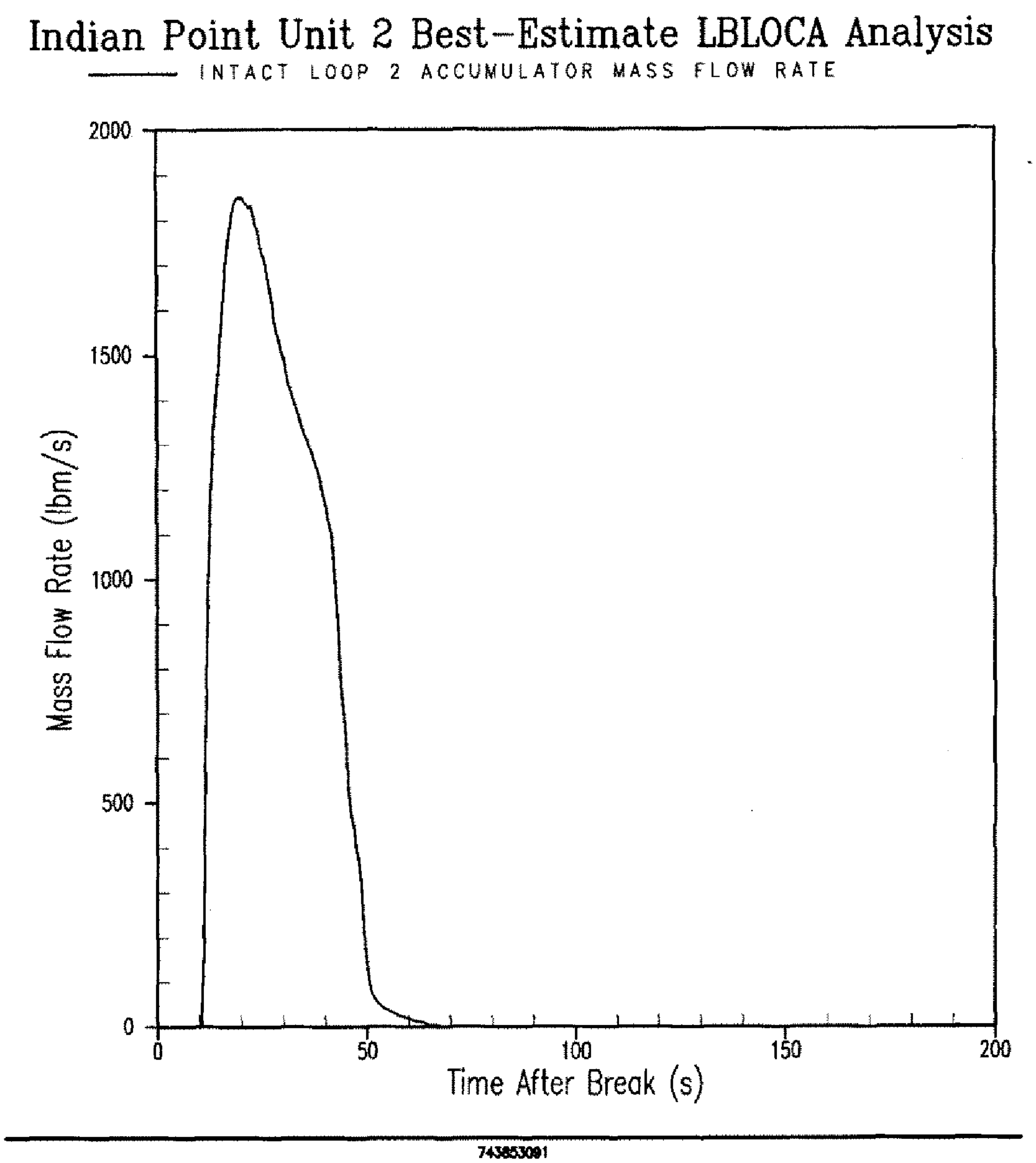


Figure 14.3-13: Intact Loop 2 Accumulator Flow for Reference Transient

INDIAN POINT UNIT No. 2	
INTACT LOOP 2 ACCUMULATOR FLOW FOR REFERENCE TRANSIENT	
UFSAR FIGURE 14.3-13	REV. No. 20

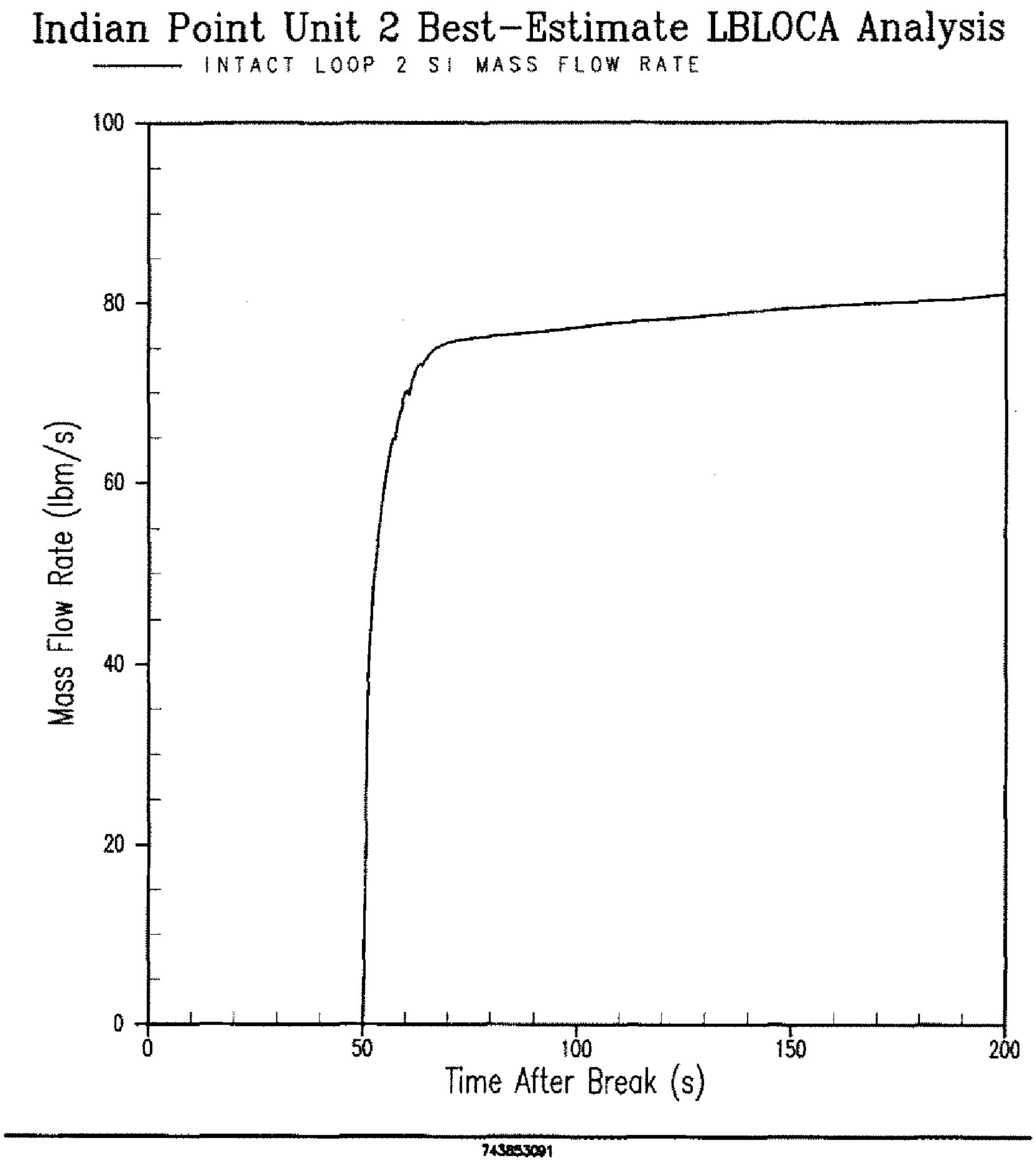


Figure 14.3-14: Intact Loop 2 Safety Injection Flow for Reference Transient

INDIAN POINT UNIT No. 2	
INTACT LOOP 2 SAFETY INJECTION FLOW FOR REFERENCE TRANSIENT	
UFSAR FIGURE 14.3-14	REV. No. 20

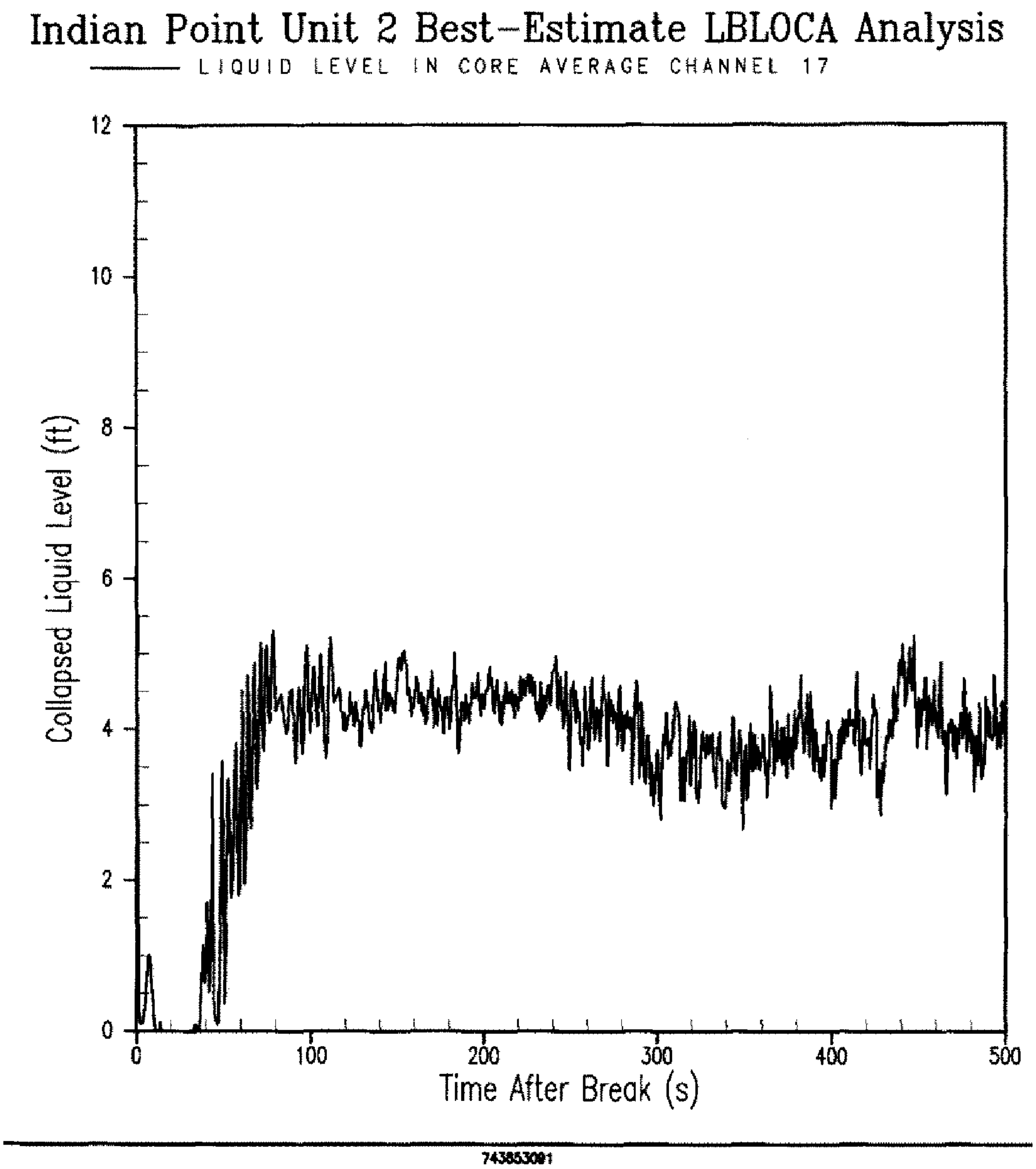


Figure 14.3-15: Collapsed Liquid Level in Core Average Channel 17 for Reference Transient

INDIAN POINT UNIT No. 2	
COLLAPSED LIQUID LEVEL IN CORE AVERAGE CHANNEL 17 FOR REFERENCE TRANSIENT	
UFSAR FIGURE 14.3-15	REV. No. 20

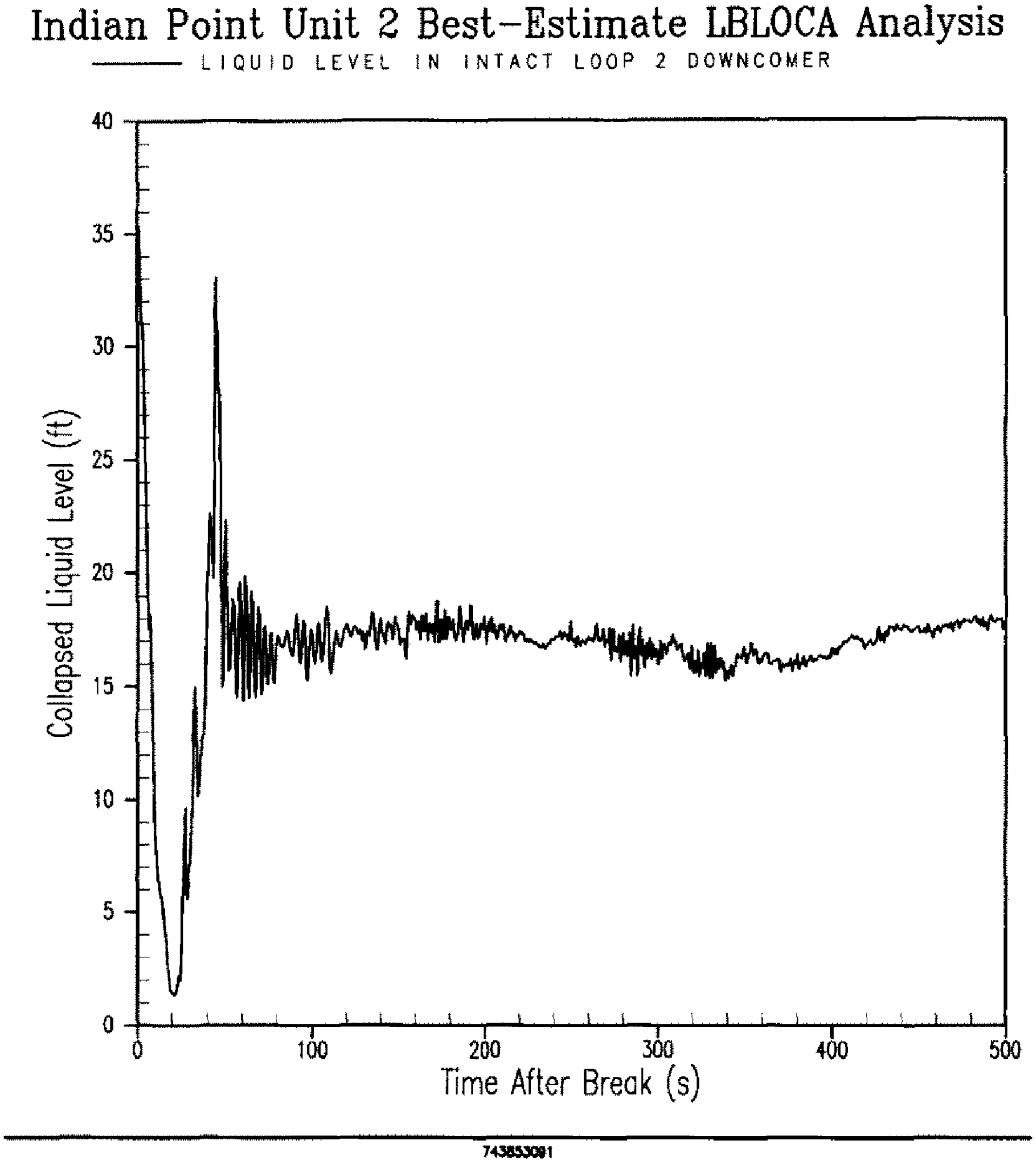


Figure 14.3-16: Collapsed Liquid Level in Intact Loop Downcomer for Reference Transient

INDIAN POINT UNIT No. 2	
COLLAPSED LIQUID LEVEL IN INTACT LOOP DOWNCOMER FOR REFERENCE TRANSIENT	
UFSAR FIGURE 14.3-16	REV. No. 20

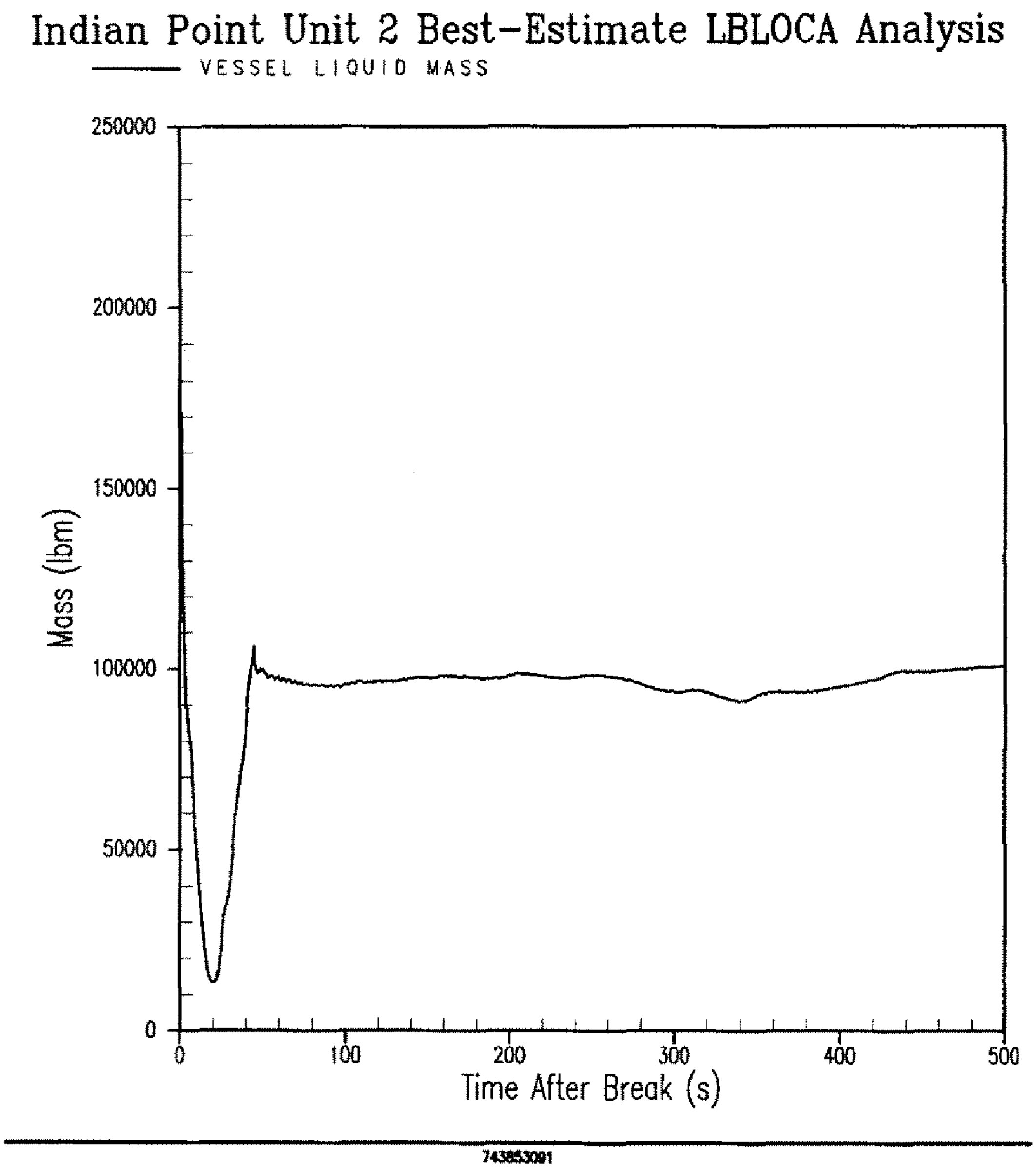


Figure 14.3-17: Vessel Fluid Mass for Reference Transient

INDIAN POINT UNIT No. 2	
VESSEL FLUID MASS FOR REFERENCE TRANSIENT	
UFSAR FIGURE 14.3-17	REV. No. 20

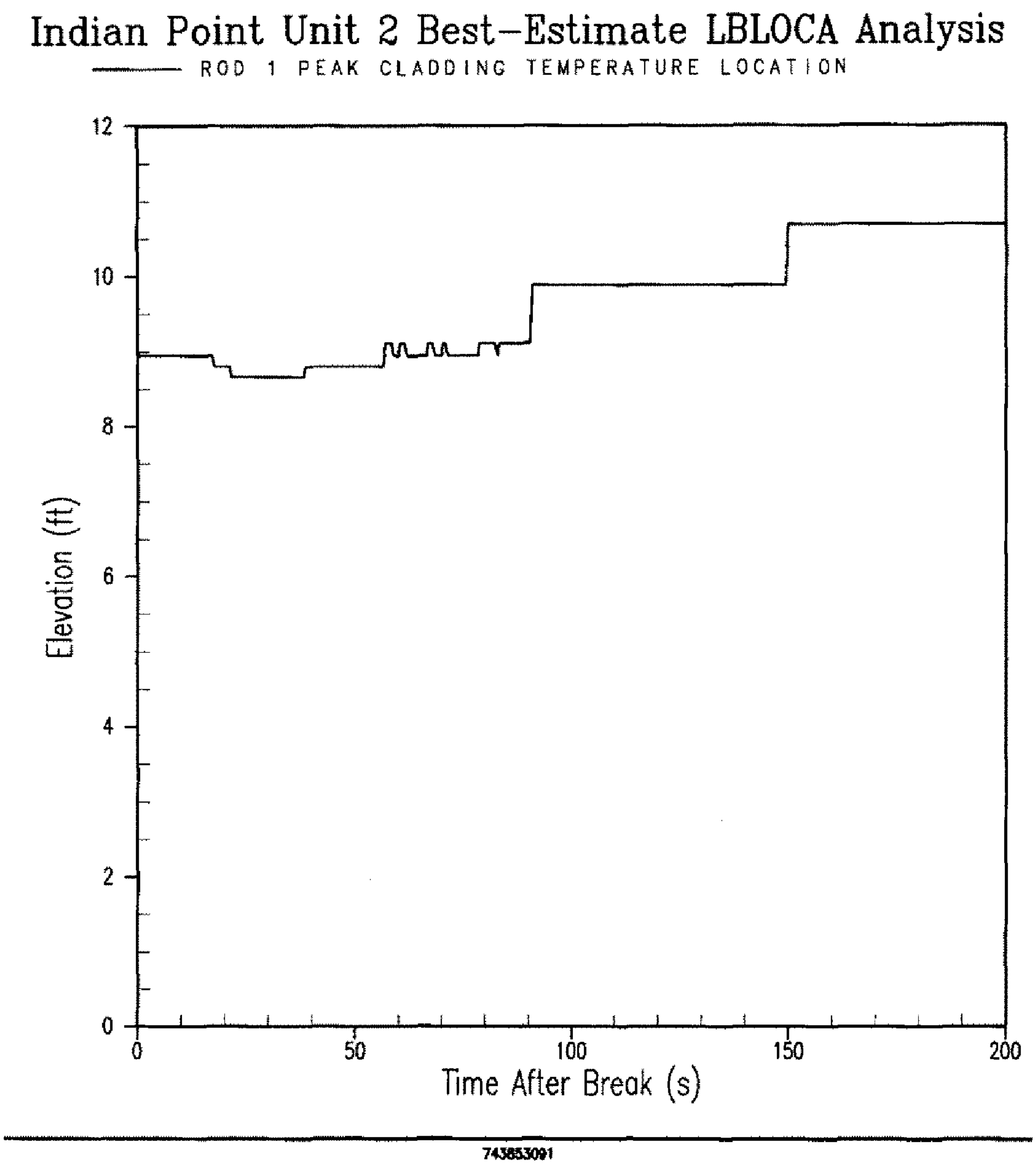


Figure 14.3-18: Peak Cladding Temperature Elevation for Reference Transient

INDIAN POINT UNIT No. 2	
PEAK CLADDING TEMPERATURE ELEVATION FOR REFERENCE TRANSIENT	
UFSAR FIGURE 14.3-18	REV. No. 20

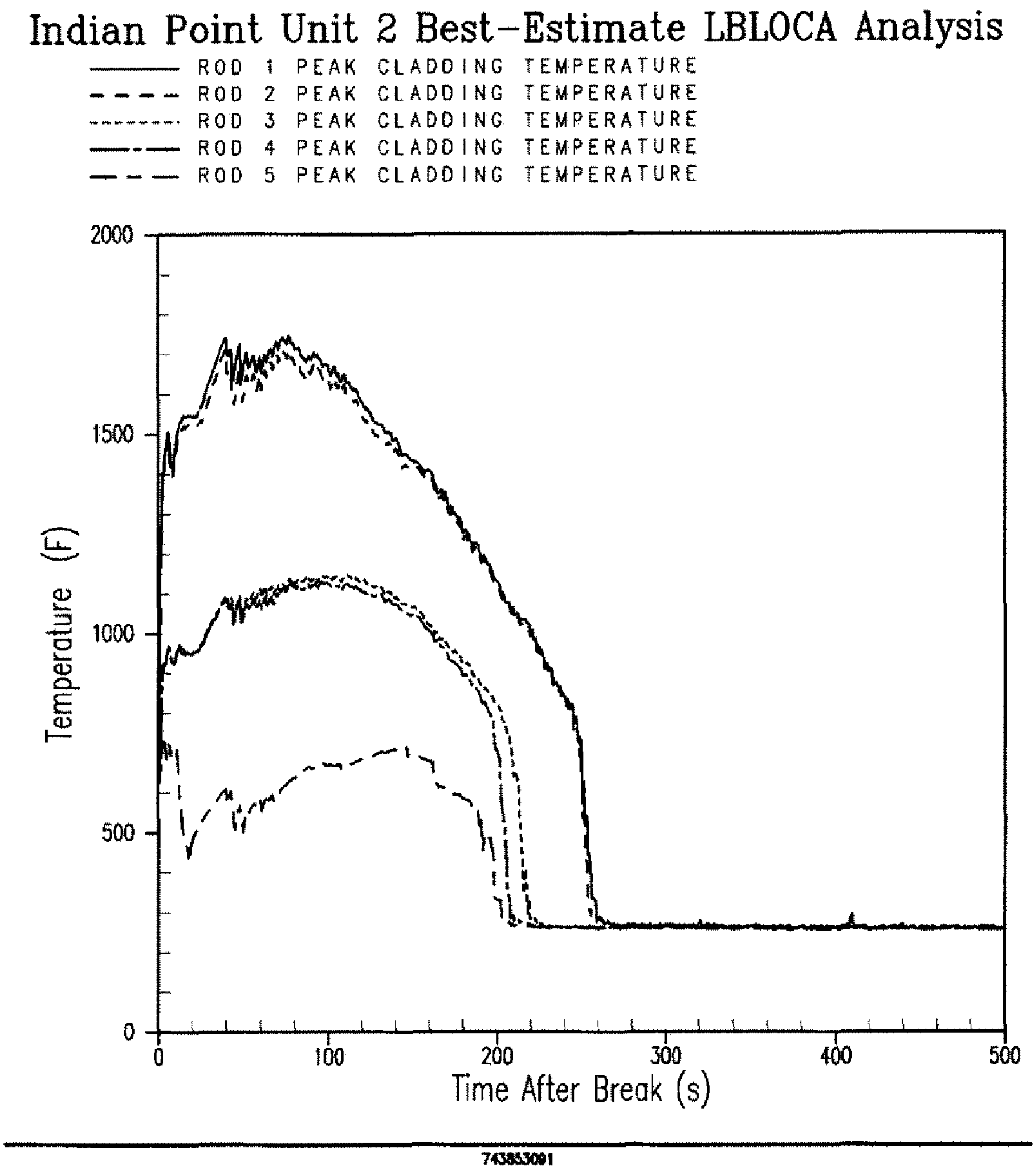


Figure 14.3-19: Peak Cladding Temperature Comparison for Five Rods for Reference Transient

INDIAN POINT UNIT No. 2	
PEAK CLADDING TEMPERATURE COMPARISON FOR FIVE RODS FOR REFERENCE TRANSIENT	
UFSAR FIGURE 14.3-19	REV. No. 20

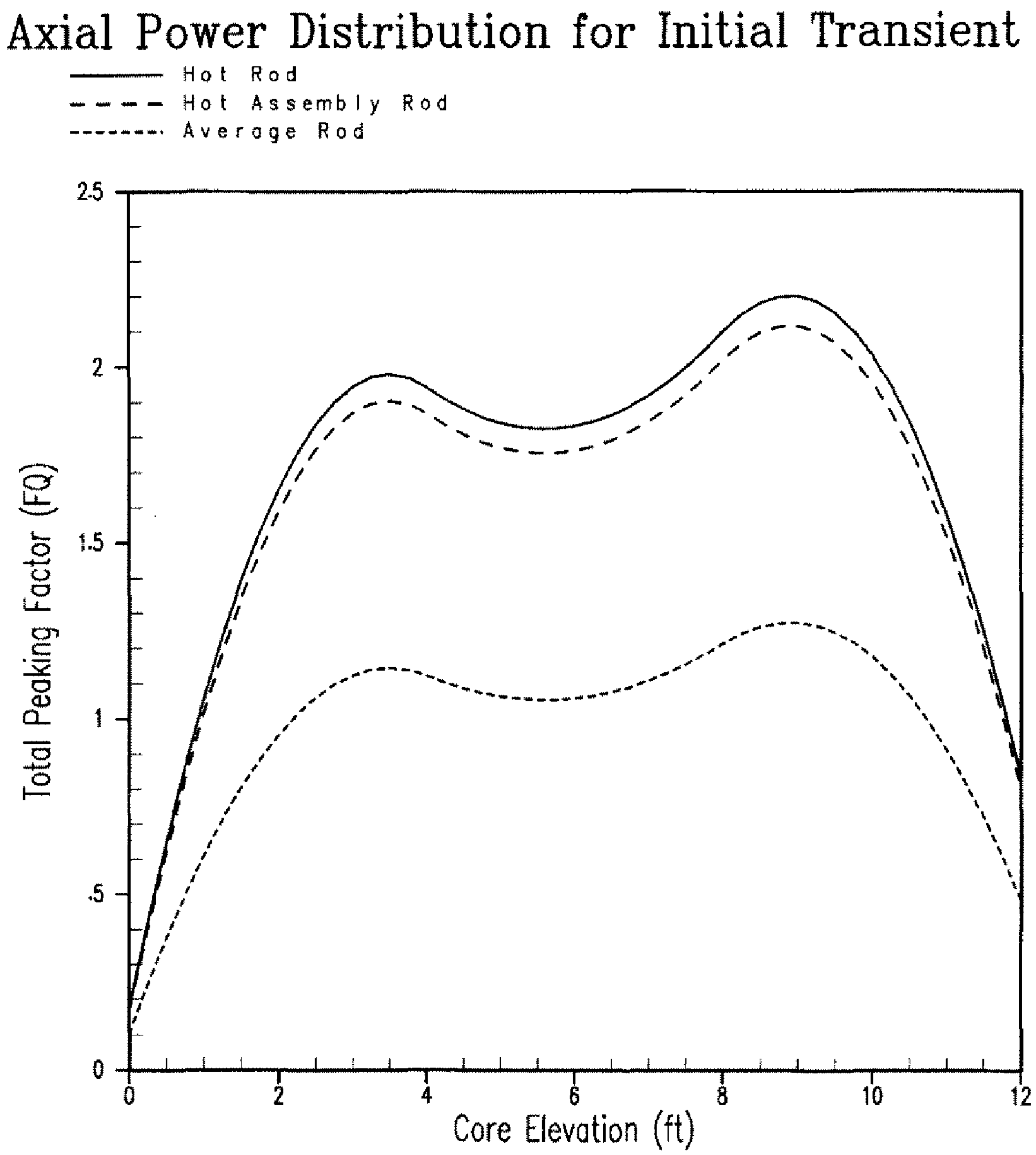


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Figure 14.3-20: Indian Point Unit 2 Axial Power Distribution for Initial and Reference Transient

INDIAN POINT UNIT No. 2	
INDIAN POINT UNIT 2 AXIAL POWER DISTRIBUTION FOR INITIAL AND REFERENCE TRANSIENT	
UFSAR FIGURE 14.3-20	REV. No. 20

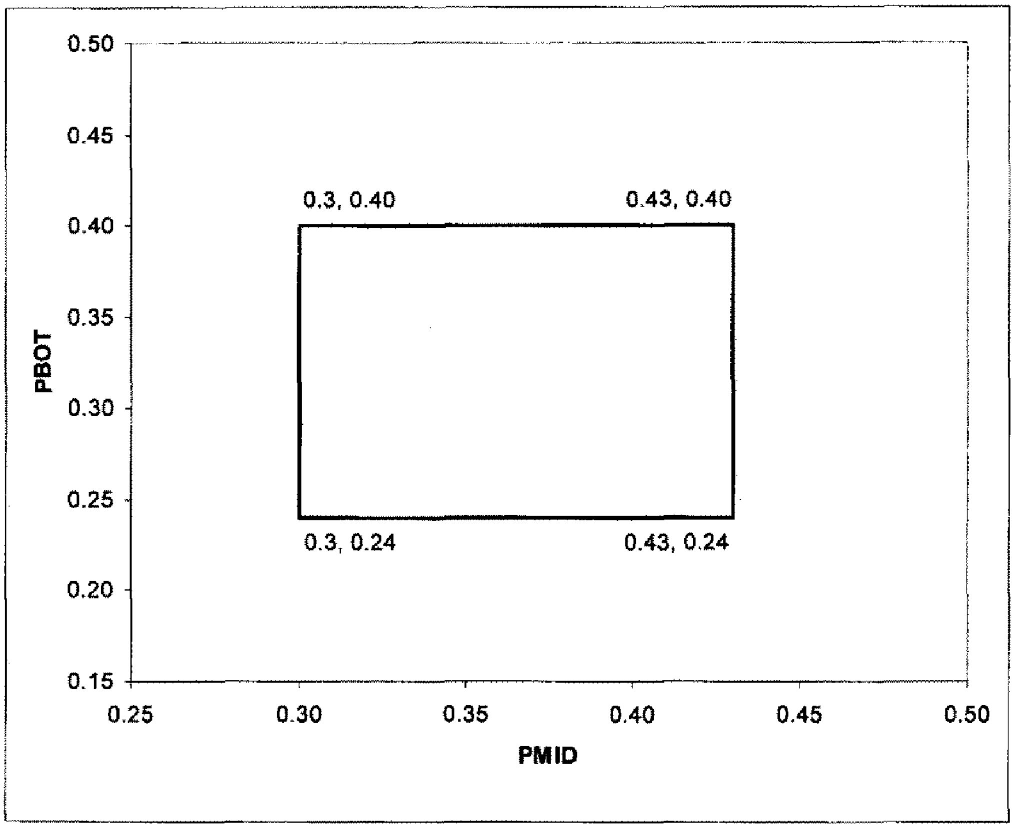

Figure 14.3-21: Indian Point Unit 2 PBOT/PMID Analysis and Operating Limits

INDIAN POINT UNIT No. 2	
INDIAN POINT UNIT 2 PBOT/PMID ANALYSIS AND OPERATING LIMITS	
UFSAR FIGURE 14.3-21	REV. No. 20

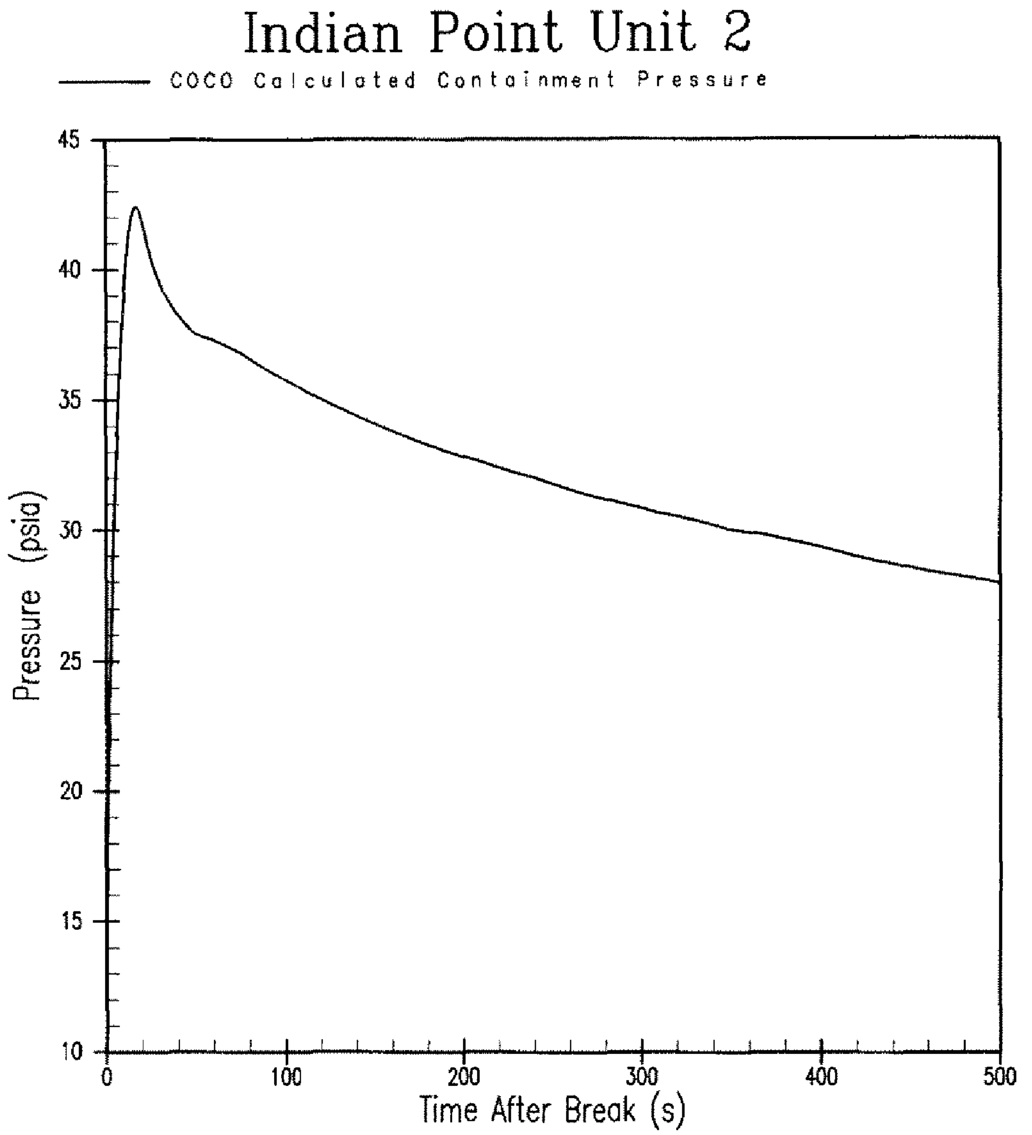

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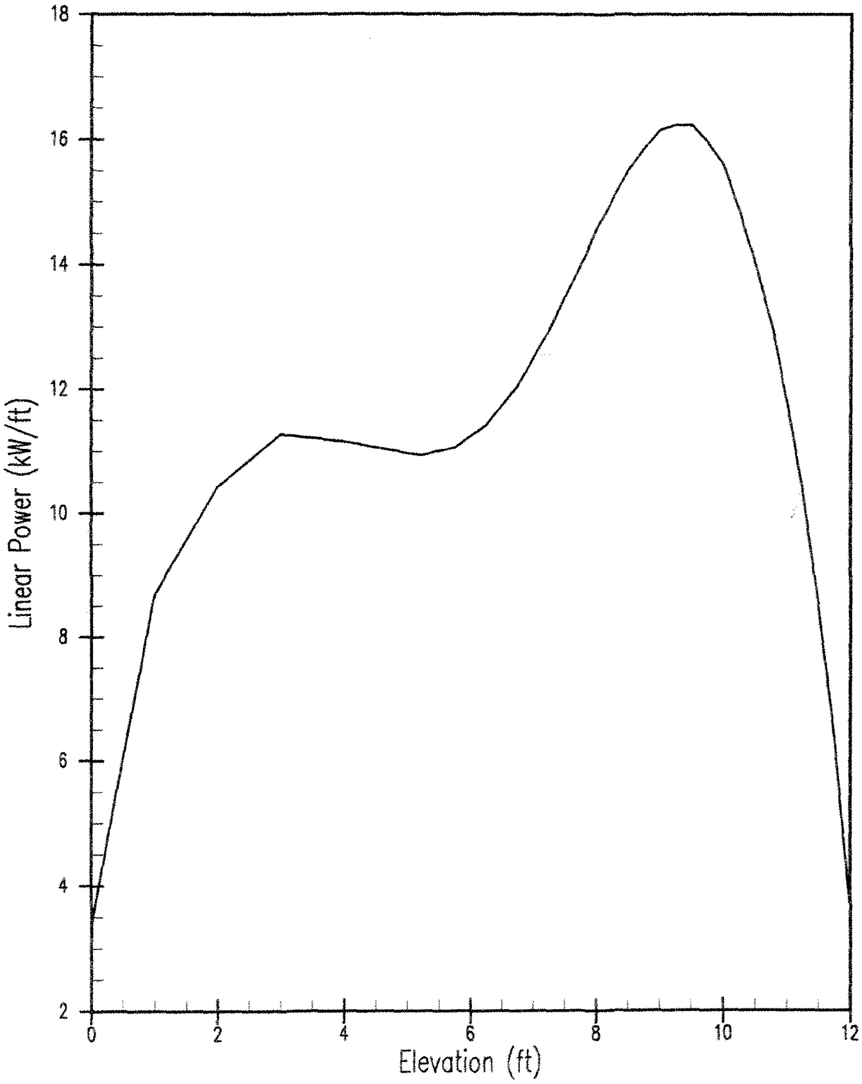
Figure 14.3-22: Indian Point Unit 2 Lower Bound COCO Calculated Containment Pressure

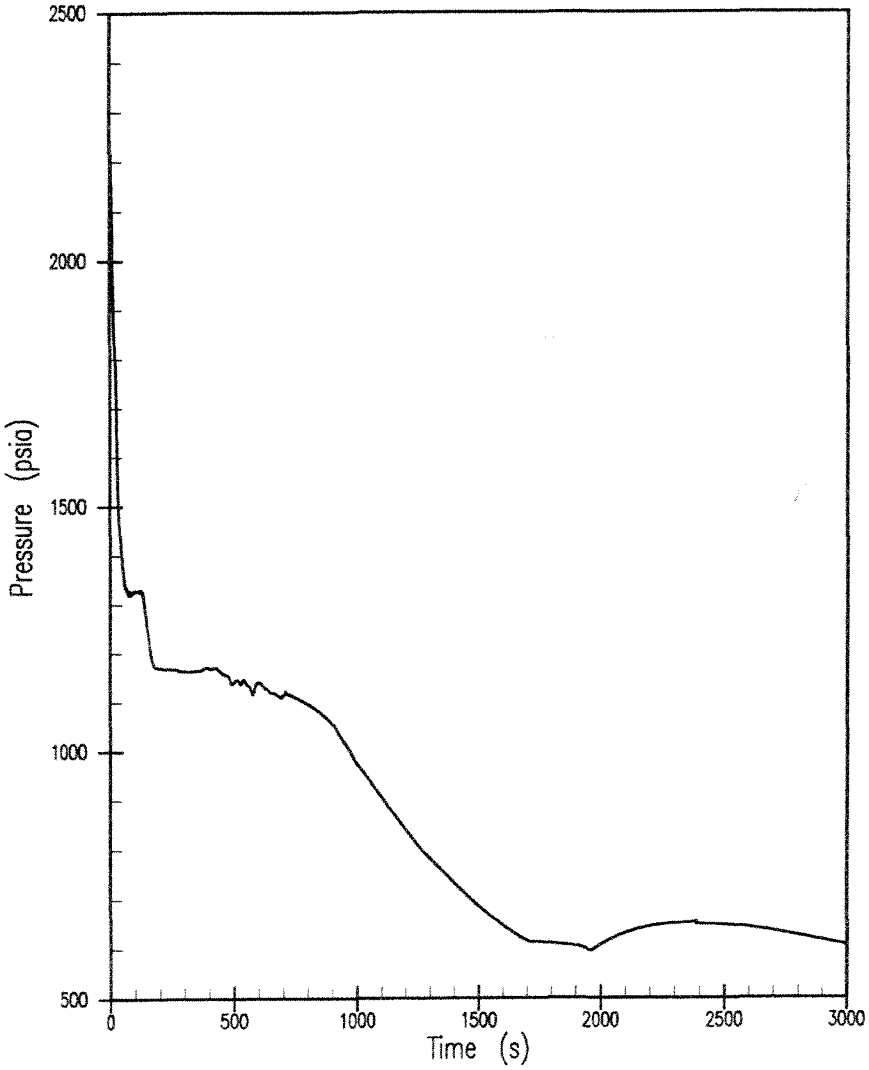
INDIAN POINT UNIT No. 2	
INDIAN POINT UNIT 2 LOWER BOUND COCO CALCULATED CONTAINMENT PRESSURE	
UFSAR FIGURE 14.3-22	REV. No. 20



INDIAN POINT UNIT No. 2

SMALL BREAK LOCA
AXIAL POWER SHAPE

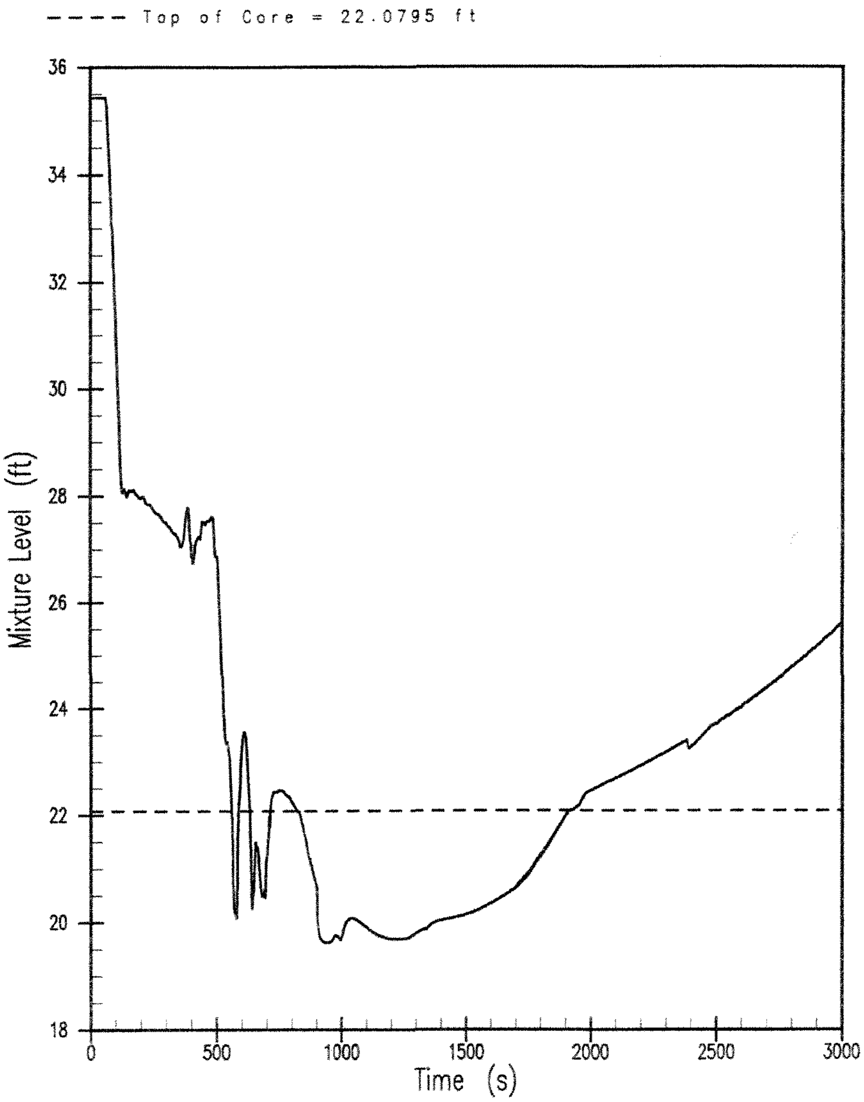
UFSAR FIGURE 14.3-53 | REV. No. 19



INDIAN POINT UNIT No. 2

3.0" SMALL BREAK LOCA
RCS PRESSURE

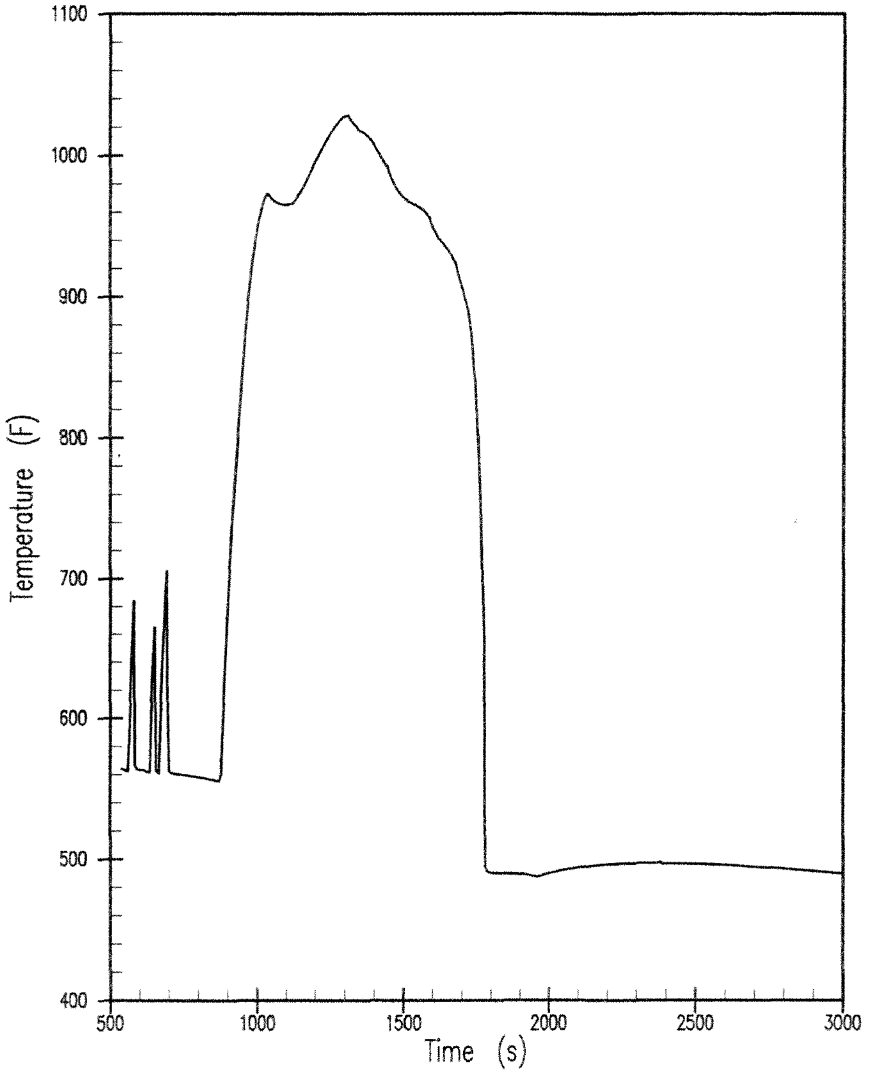
UFSAR FIGURE 14.3-54 | REV. No. 19



INDIAN POINT UNIT No. 2

3.0" SMALL BREAK LOCA
CORE MIXTURE LEVEL

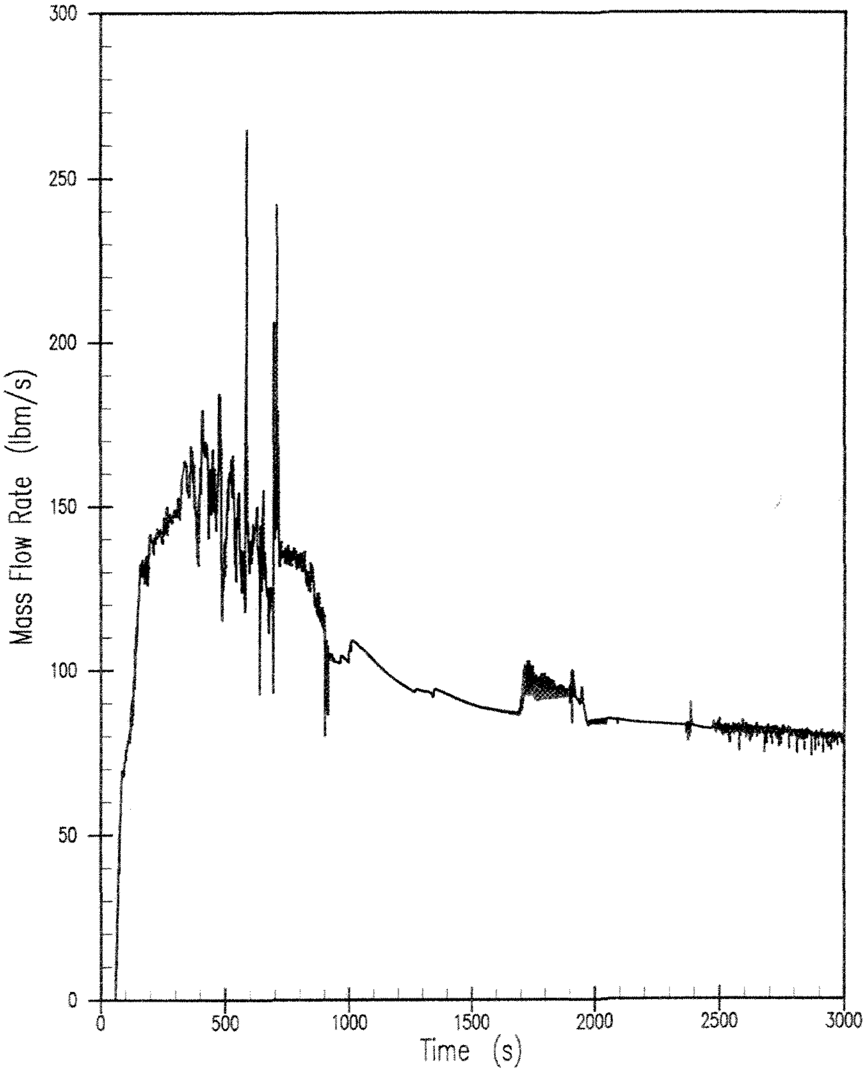
UFSAR FIGURE 14.3-55 | REV. No. 19



INDIAN POINT UNIT No. 2

3.0" SMALL BREAK LOCA HOT ROD CLAD AVERAGE TEMPERATURE

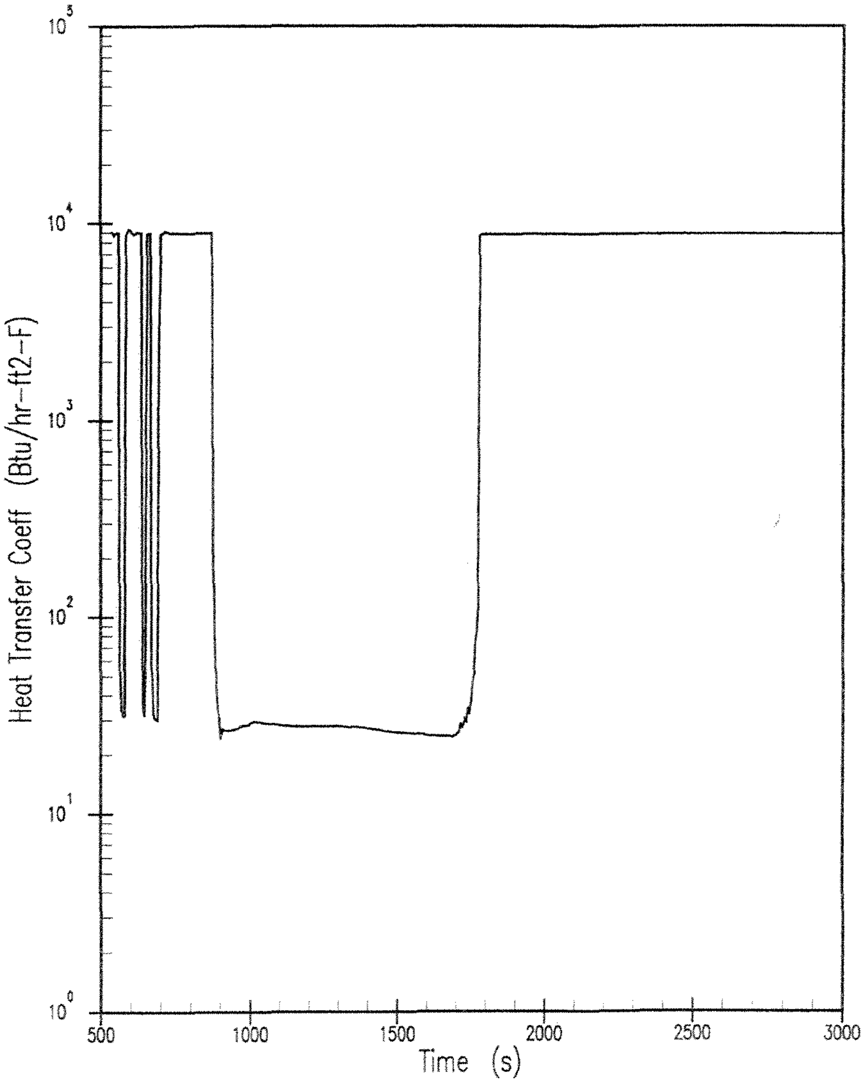
UFSAR FIGURE 14.3-56	REV. No. 19



INDIAN POINT UNIT No. 2

3.0" SMALL BREAK LOCA CORE OUTLET STEAM FLOW

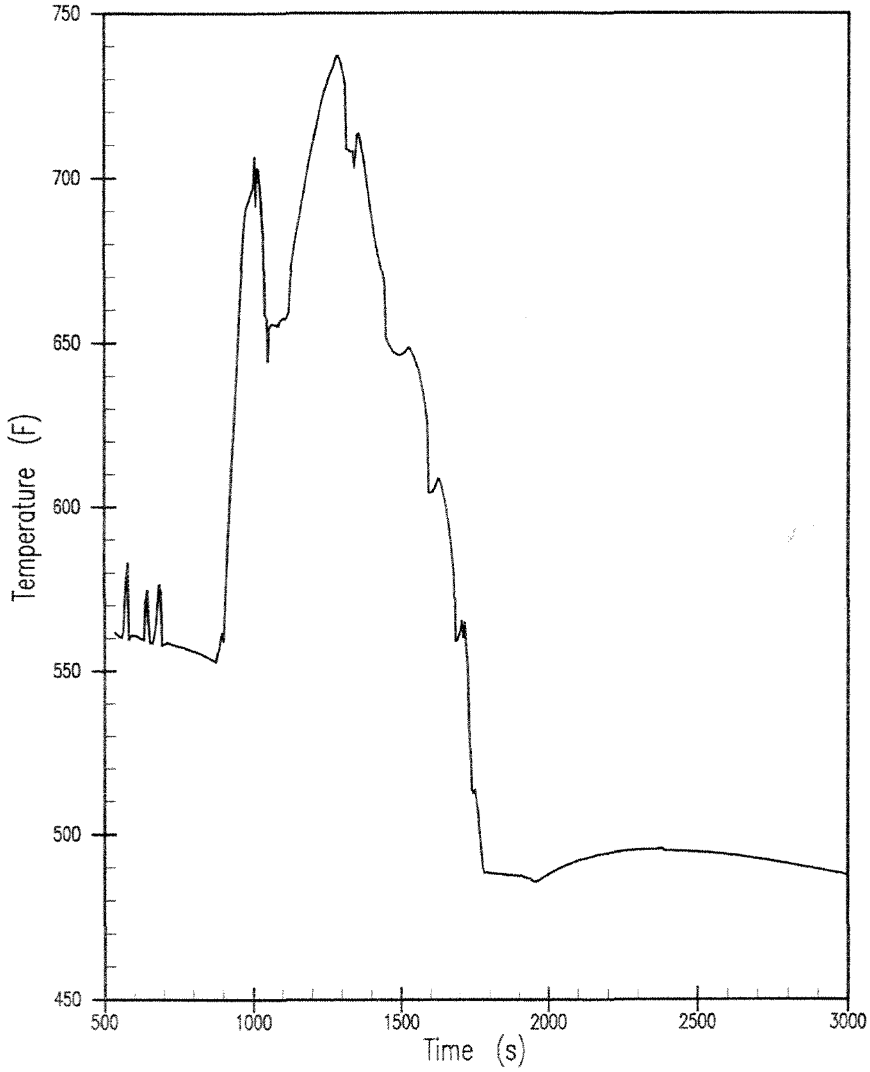
UFSAR FIGURE 14.3-57 | REV. No. 19



INDIAN POINT UNIT No. 2

3.0" SMALL BREAK LOCA
HEAT TRANSFER COEFFICIENT

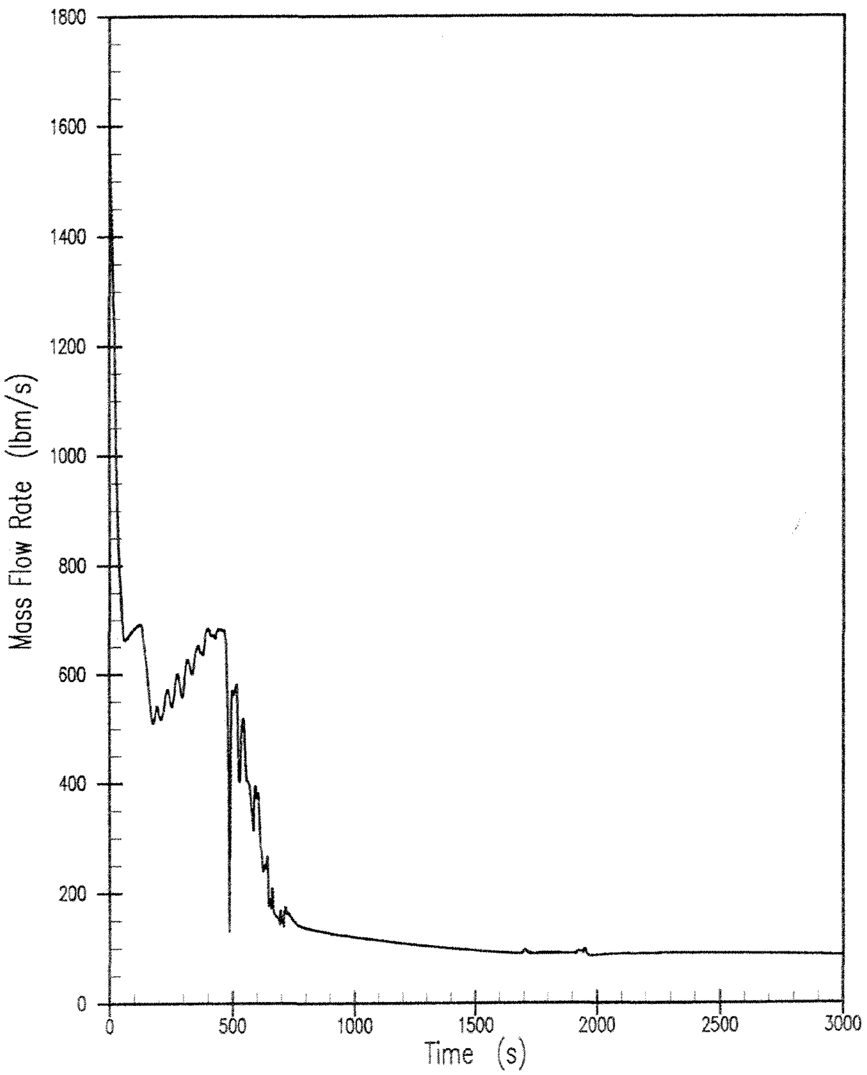
UFSAR FIGURE 14.3-58	REV. No. 19



INDIAN POINT UNIT No. 2

3.0" SMALL BREAK LOCA HOT SPOT FLUID TEMPERATURE

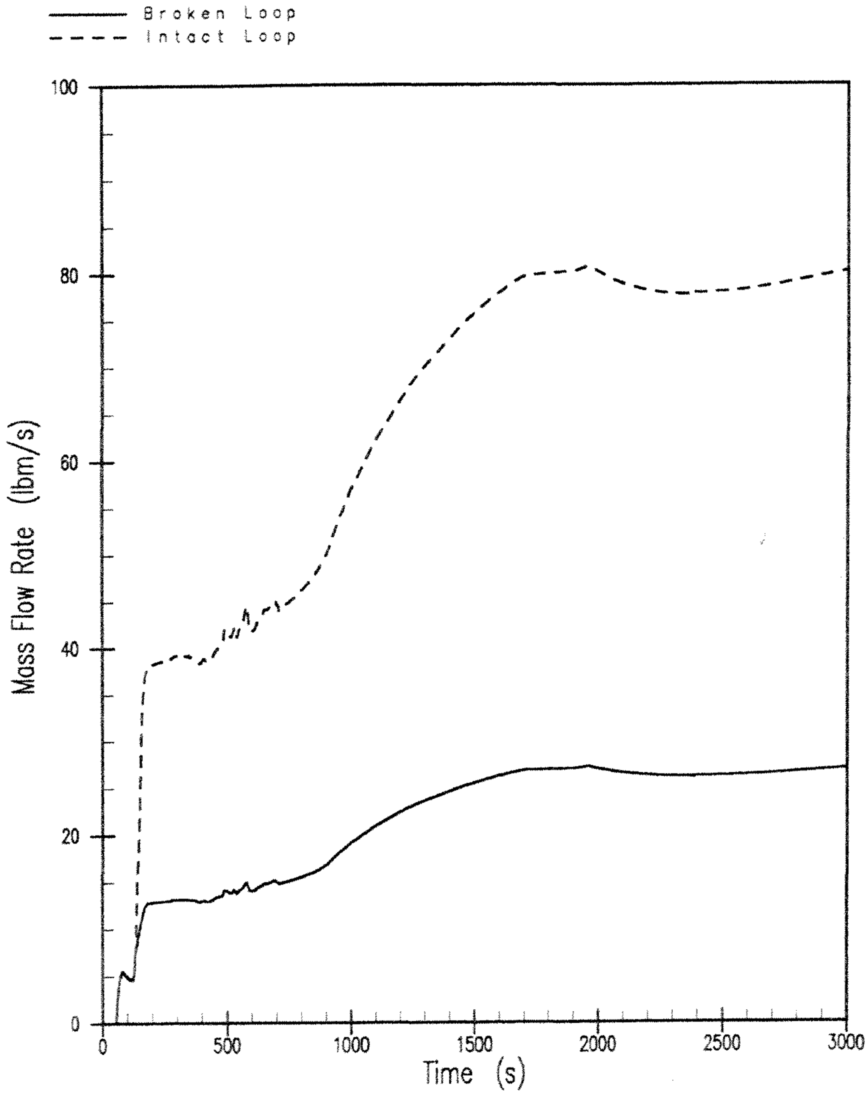
UFSAR FIGURE 14.3-59 | REV. No. 19



INDIAN POINT UNIT No. 2

3.0" SMALL BREAK LOCA
BREAK FLOW

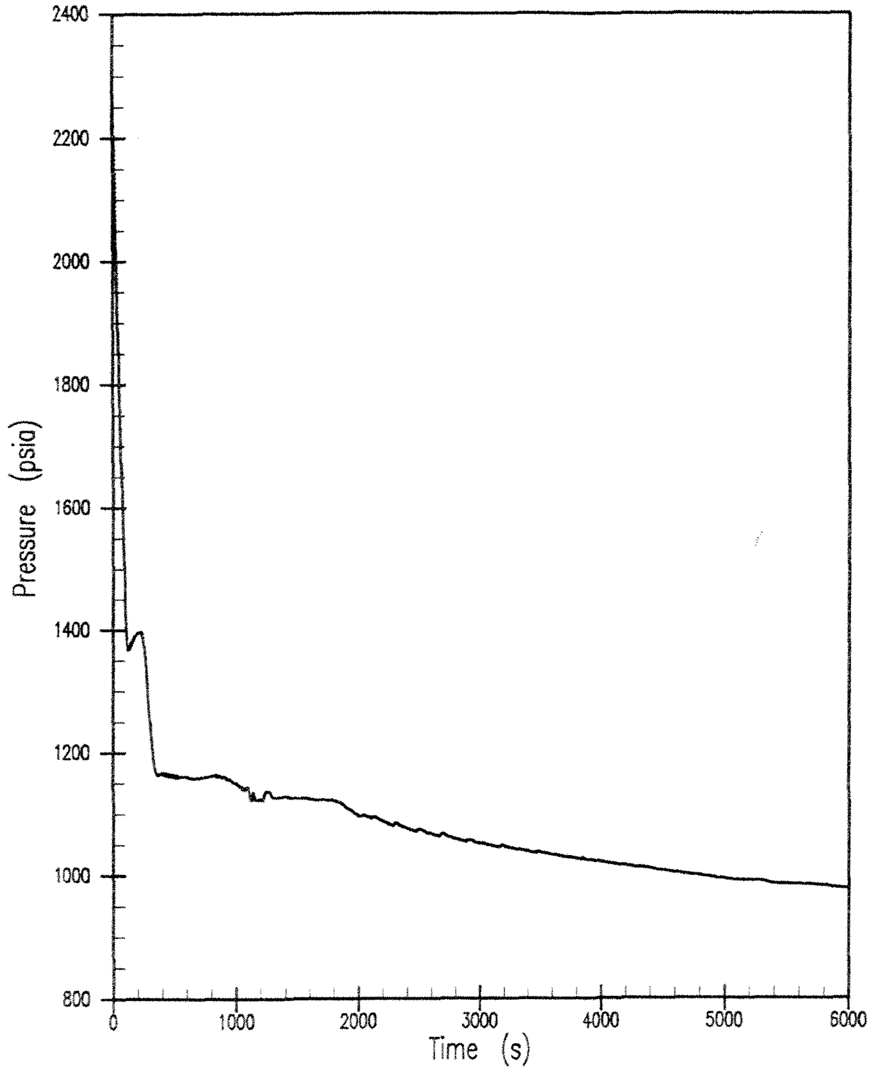
UFSAR FIGURE 14.3-60	REV. No. 19



INDIAN POINT UNIT No. 2

3.0" SMALL BREAK LOCA SAFETY INJECTION MASS FLOW RATE

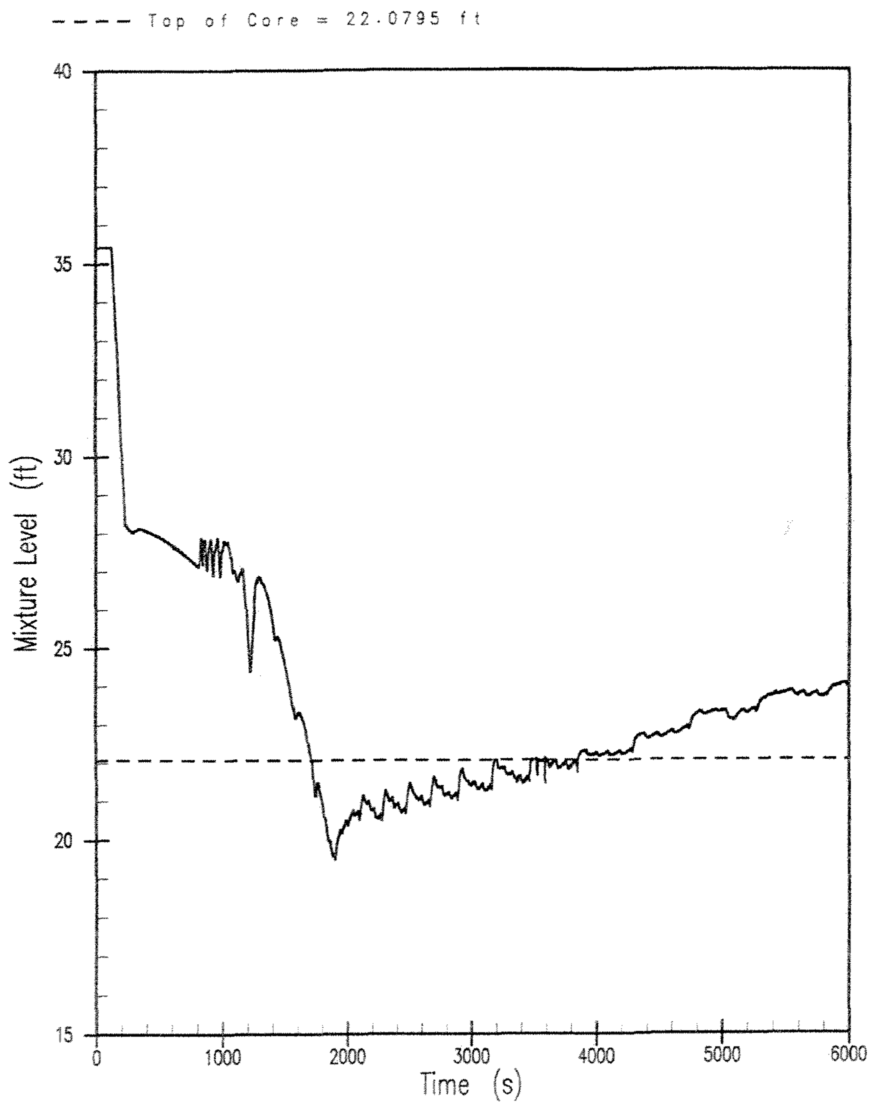
UFSAR FIGURE 14.3-61 | REV. No. 19



INDIAN POINT UNIT No. 2

2.0" SMALL BREAK LOCA
RCS PRESSURE

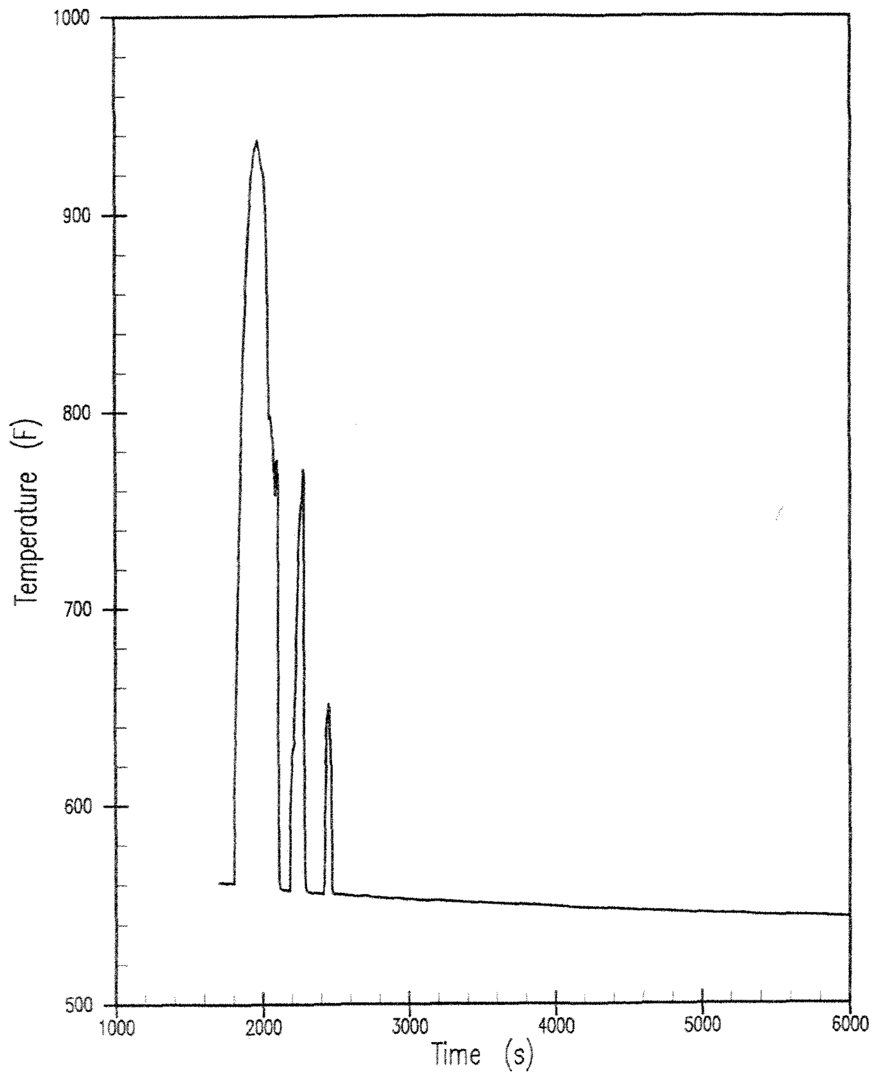
UFSAR FIGURE 14.3-62 | REV. No. 19



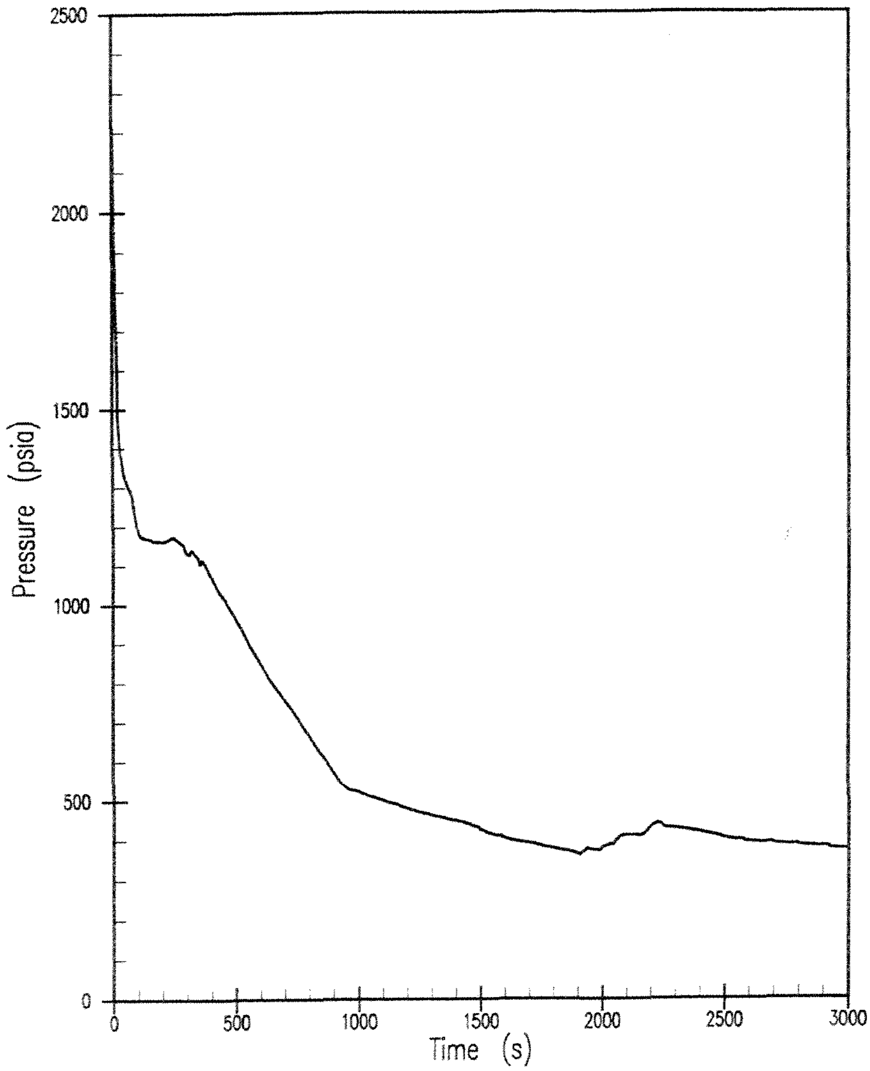
INDIAN POINT UNIT No. 2

2.0" SMALL BREAK LOCA
CORE MIXTURE LEVEL

UFSAR FIGURE 14.3-63	REV. No. 19



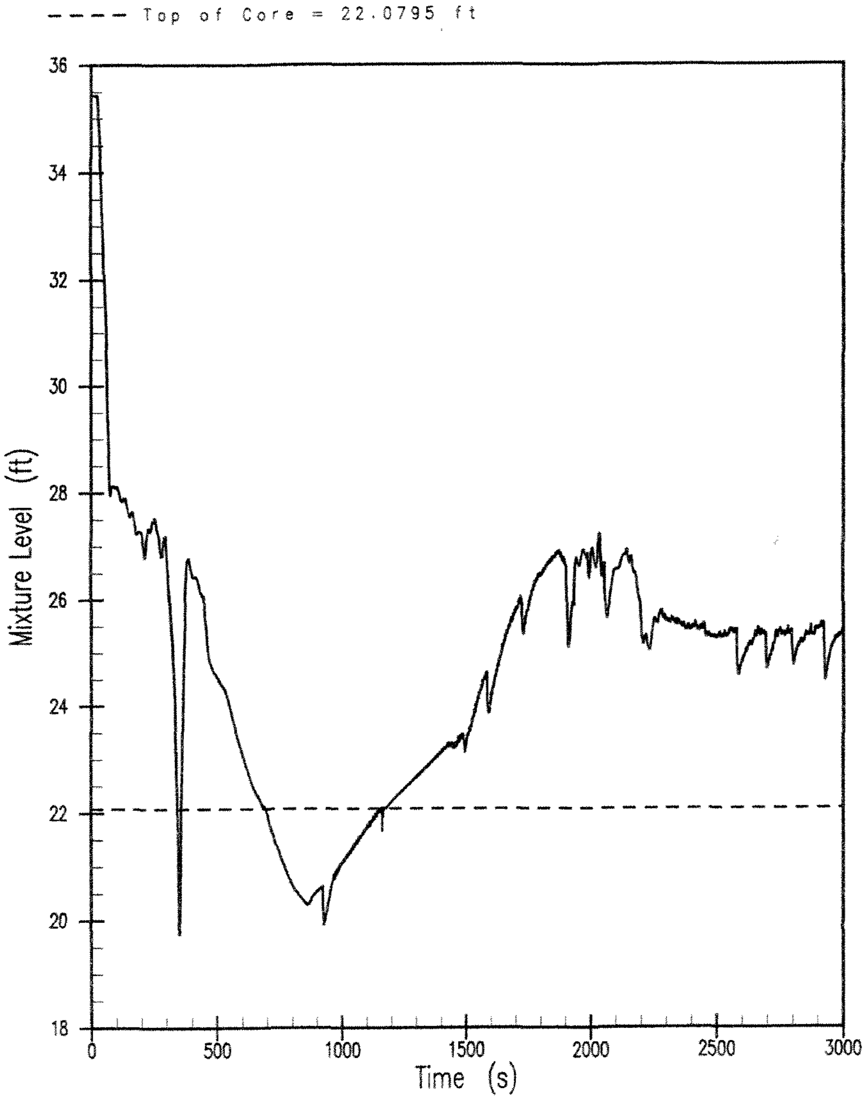
INDIAN POINT UNIT No. 2	
2.0" SMALL BREAK LOCA HOT ROD CLAD AVERAGE TEMPERATURE	
UFSAR FIGURE 14.3-64	REV. No. 19



INDIAN POINT UNIT No. 2

4.0" SMALL BREAK LOCA
RCS PRESSURE

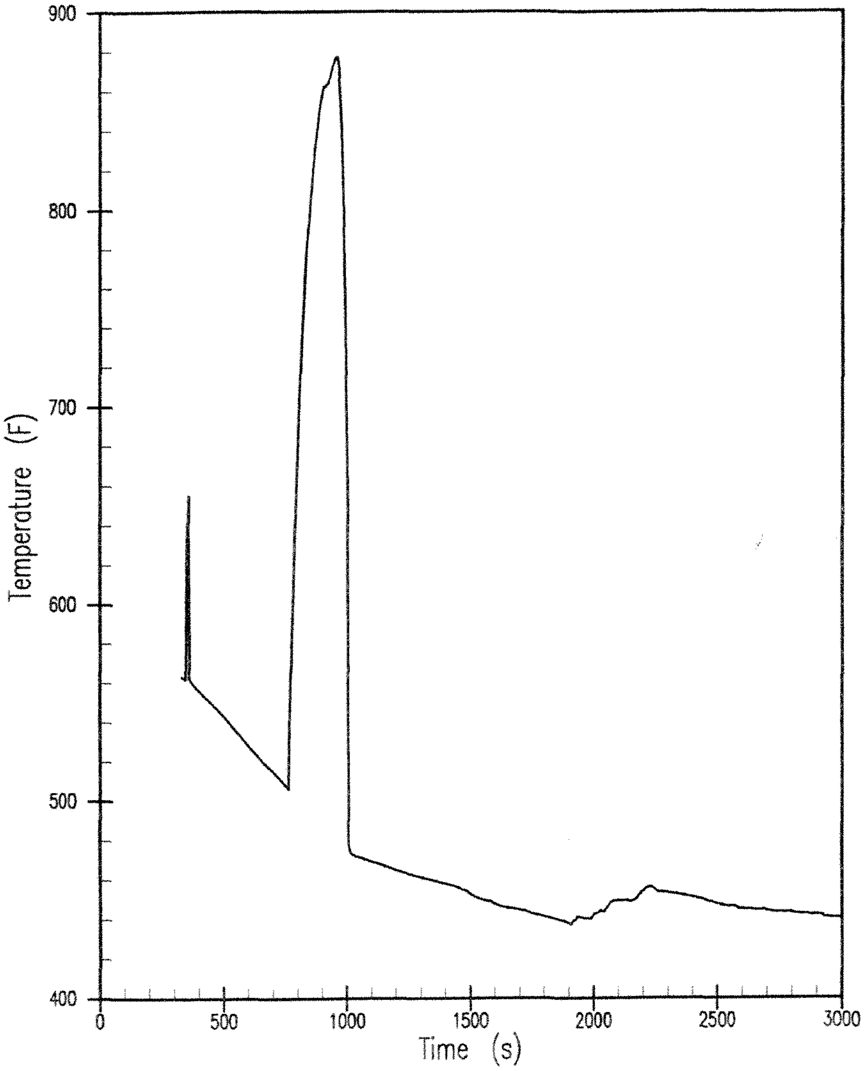
UFSAR FIGURE 14.3-65	REV. No. 19



INDIAN POINT UNIT No. 2

4.0" SMALL BREAK LOCA
CORE MIXTURE LEVEL

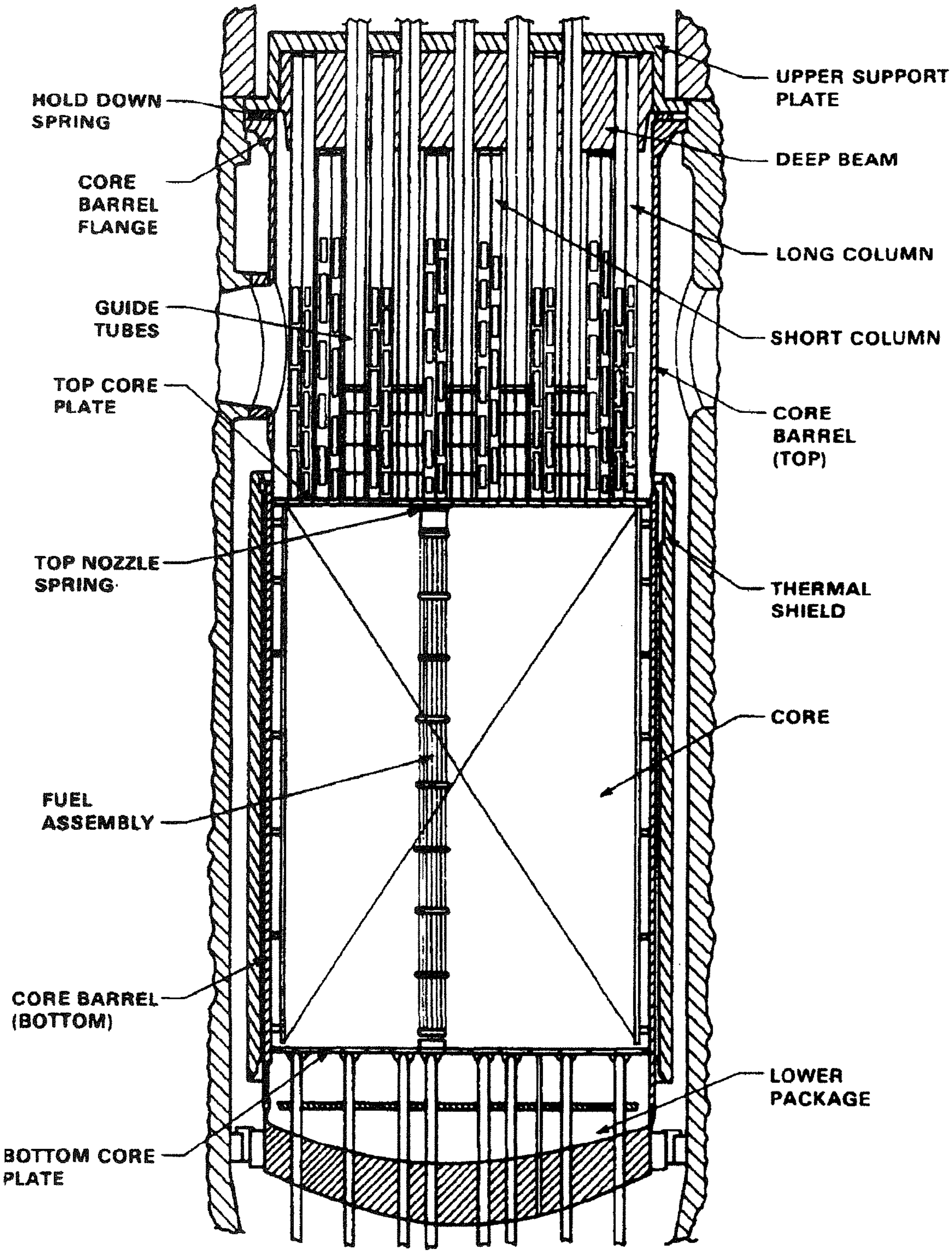
UFSAR FIGURE 14.3-66 | REV. No. 19



INDIAN POINT UNIT No. 2

4.0" SMALL BREAK LOCA HOT ROD CLAD AVERAGE TEMPERATURE

UFSAR FIGURE 14.3-67 | REV. No. 19

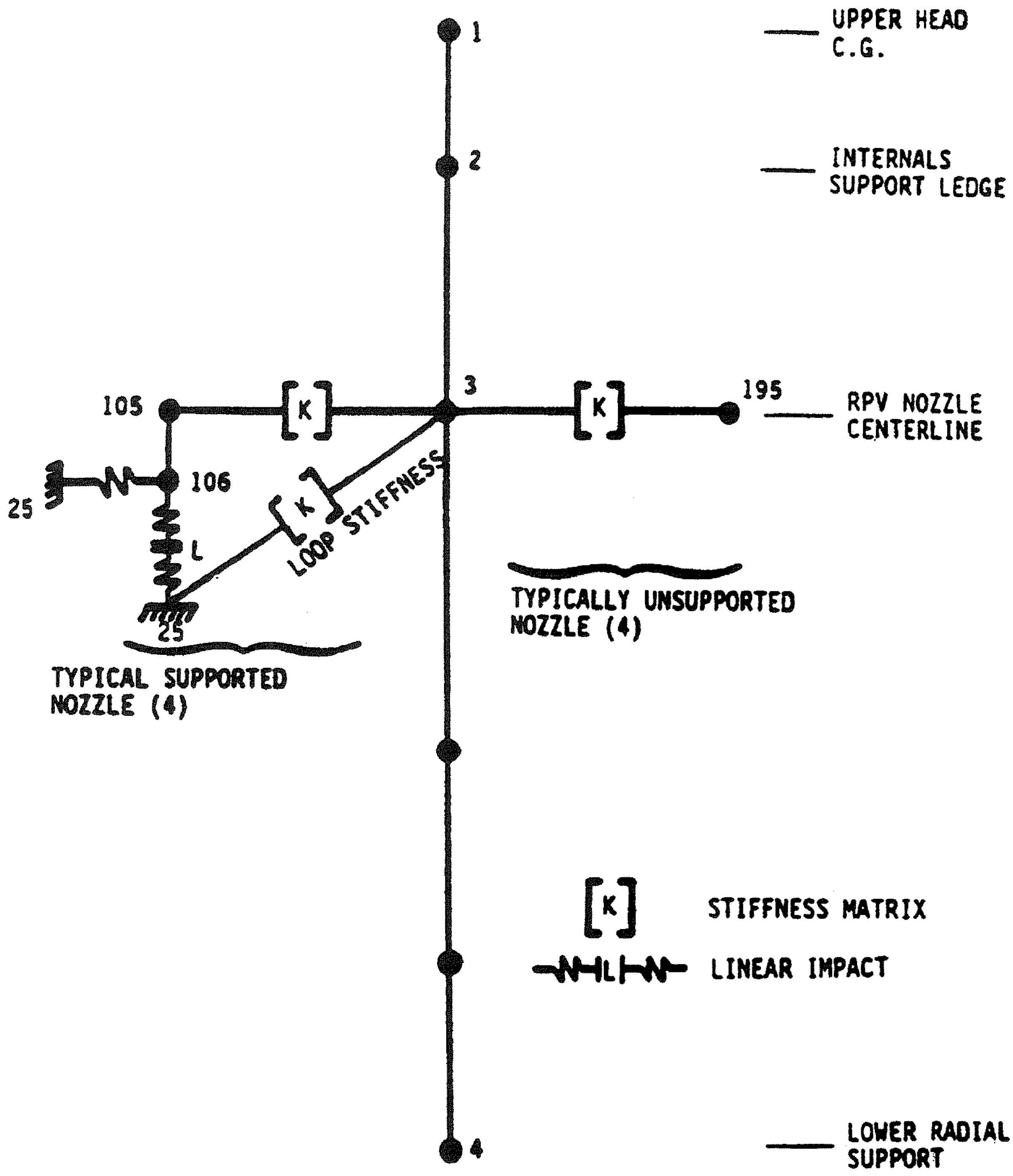


INDIAN POINT UNIT No. 2

UFSAR FIGURE 14.3-101

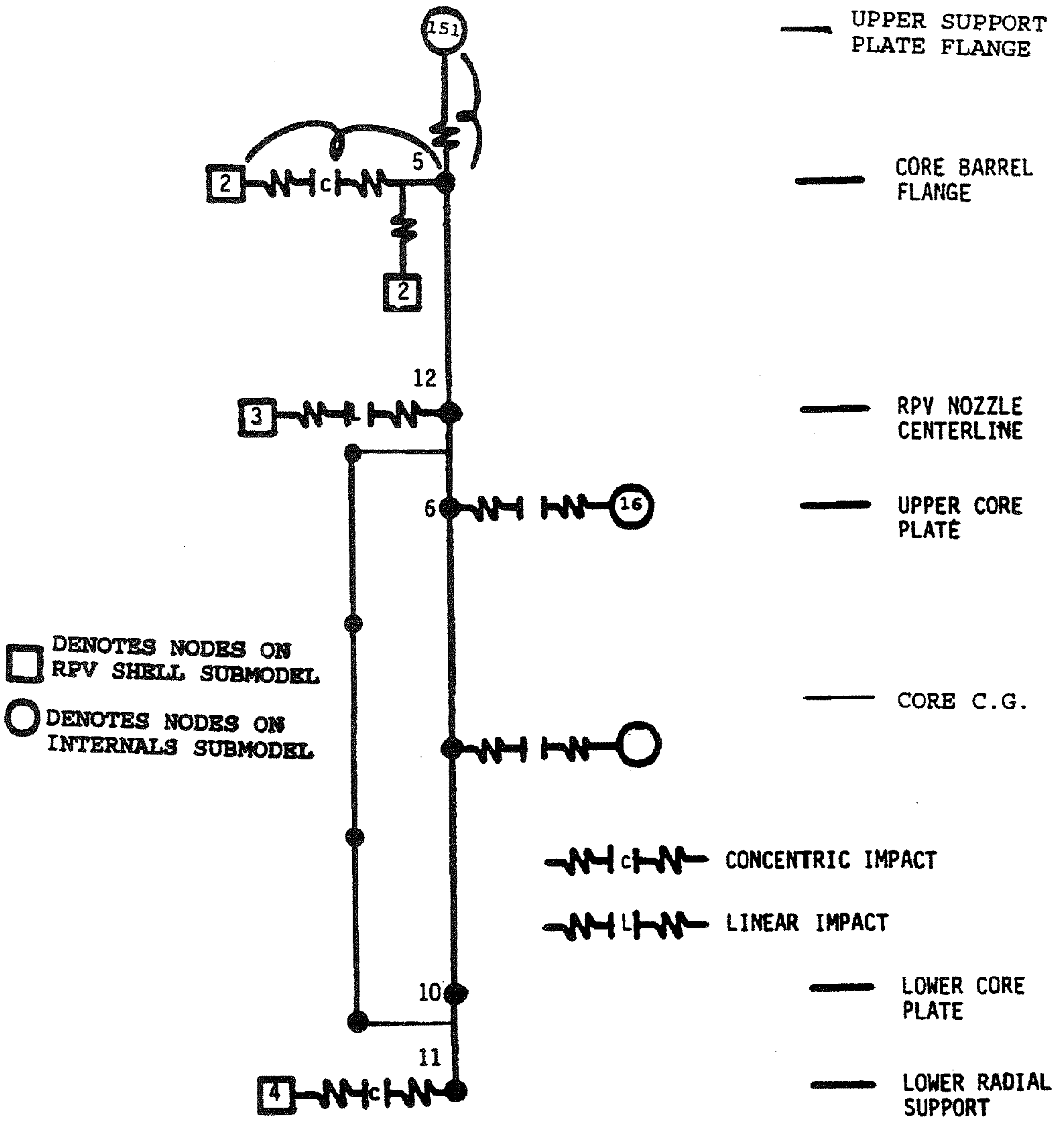
REACTOR VESSEL INTERNALS

MIC. No. 2000MC4300 | REV. No. 17A



INDIAN POINT UNIT No. 2	
UFSAR FIGURE 14.3-102 RPV SHELL AND SUPPORT SYSTEM	
MIC. No. 2000MC4301	REV. No. 17A

OAGI0000215_1683

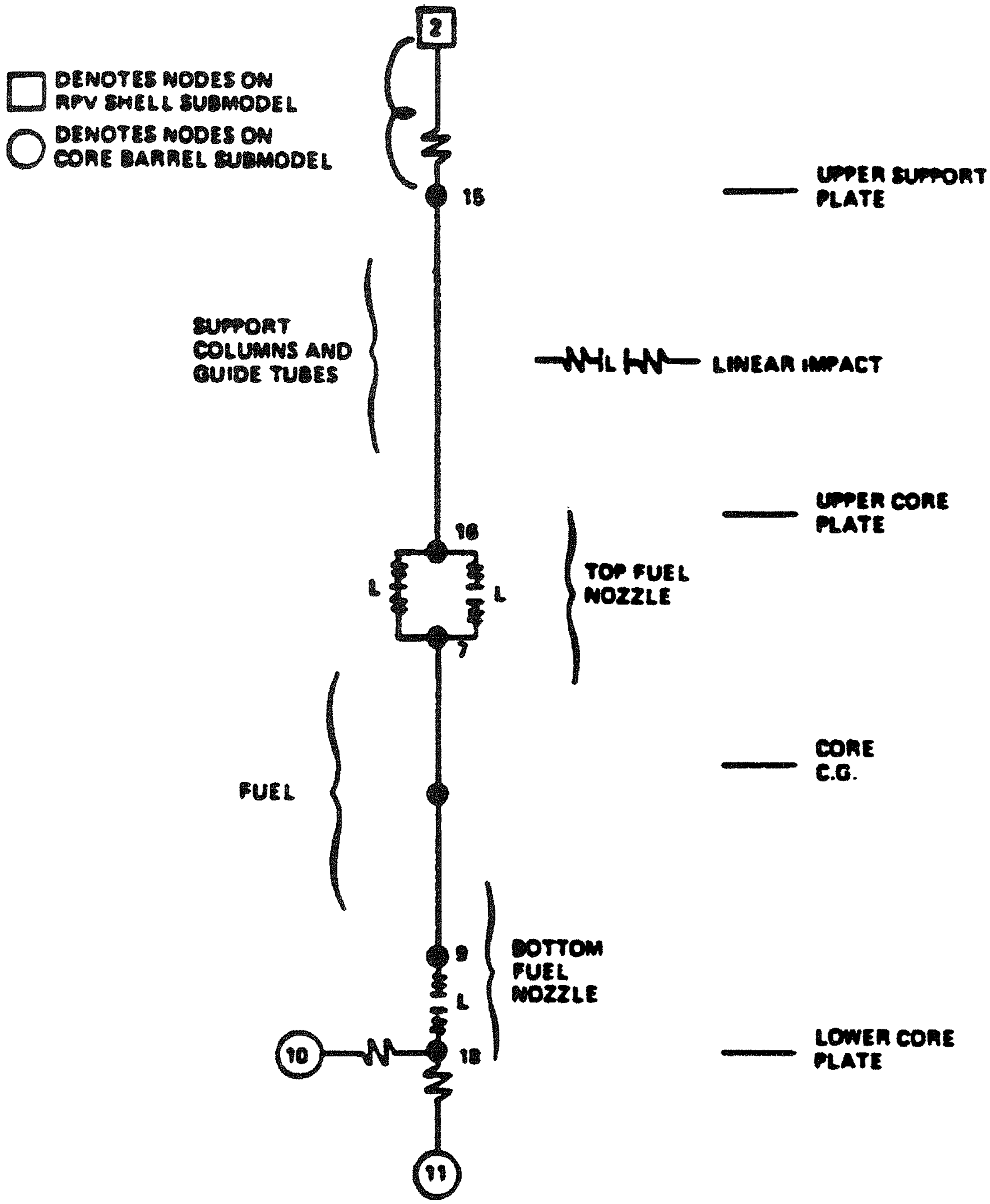


INDIAN POINT UNIT No. 2

UFSAR FIGURE 14.3–103A

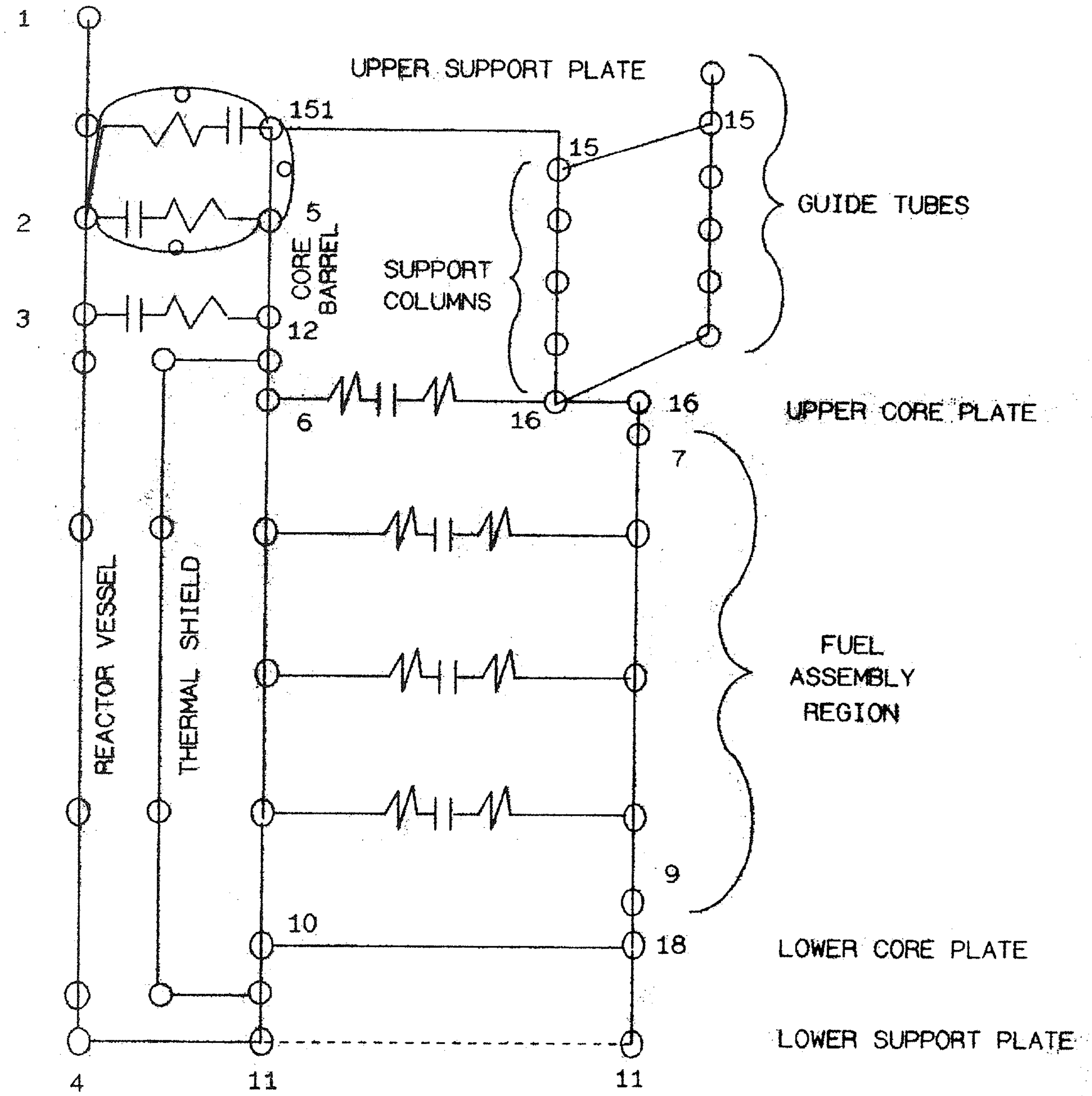
REACTOR VESSEL INTERNALS CORE BARREL ASSEMBLY

MIC. No. 2001MB1166 | REV. No. 17A

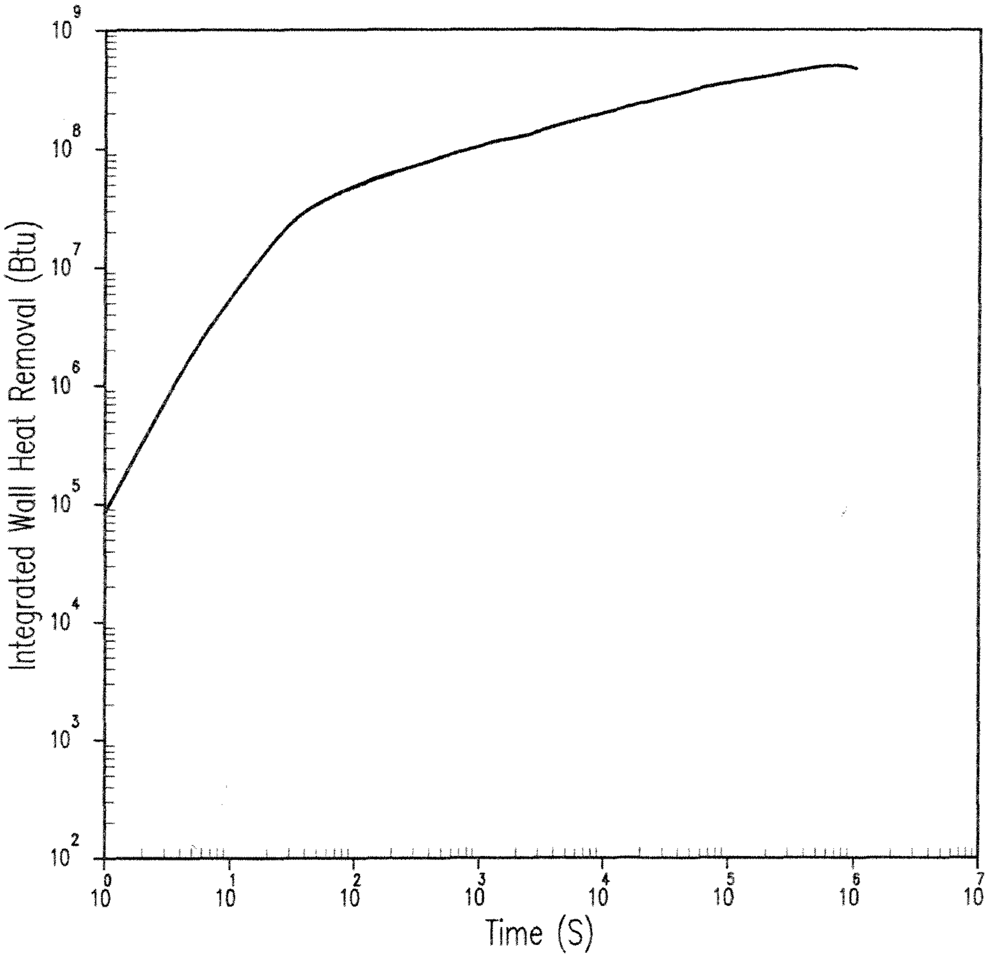


INDIAN POINT UNIT No. 2	
UFSAR FIGURE 14.3-103B REACTOR INTERNALS AND FUEL	
MIC. No. 2001MB1167	REV. No. 17A

OAGI0000215_1685



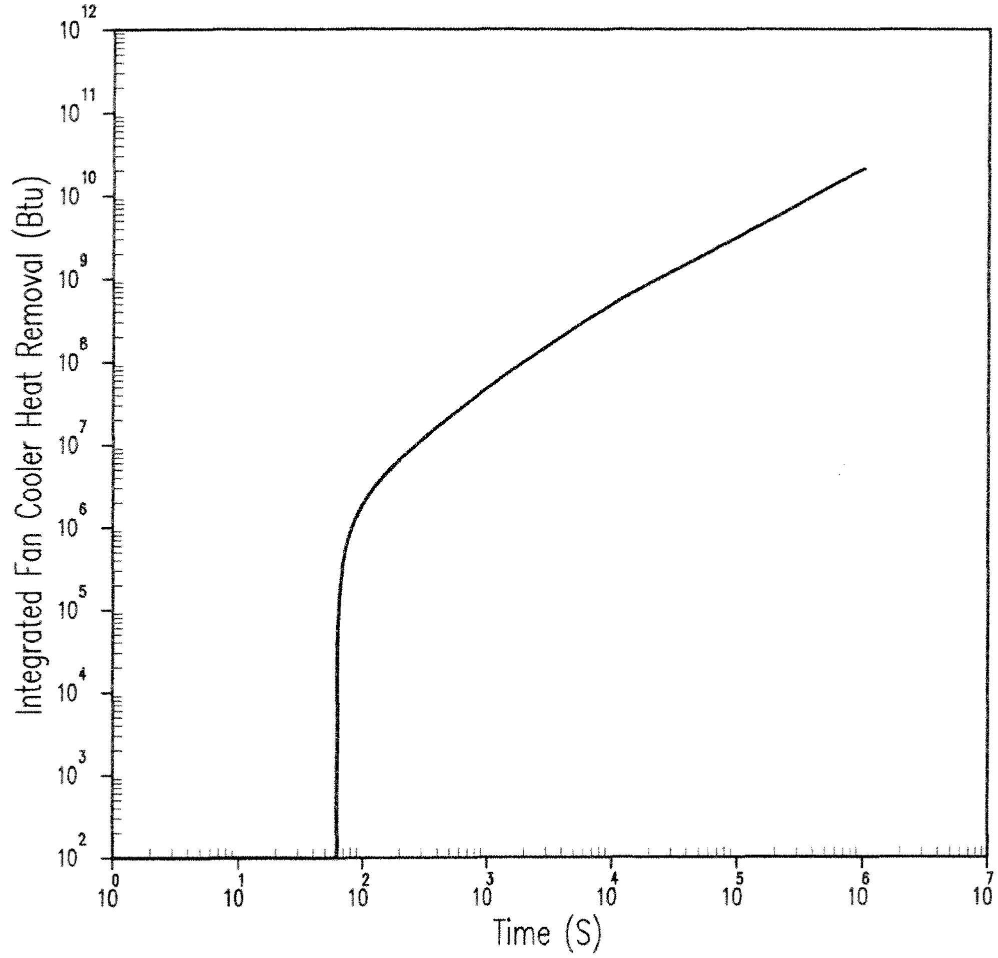
INDIAN POINT UNIT No. 2	
UFSAR FIGURE 14.3-104 RPV SYSTEM MODEL	
MIC. No. 2000MC4303	REV. No. 17A



INDIAN POINT UNIT No. 2

DOUBLE-ENDED PUMP SUCTION BREAK
FOR 3216 MWt MINIMUM SAFEGUARDS
INTEGRATED WALL HEAT REMOVAL

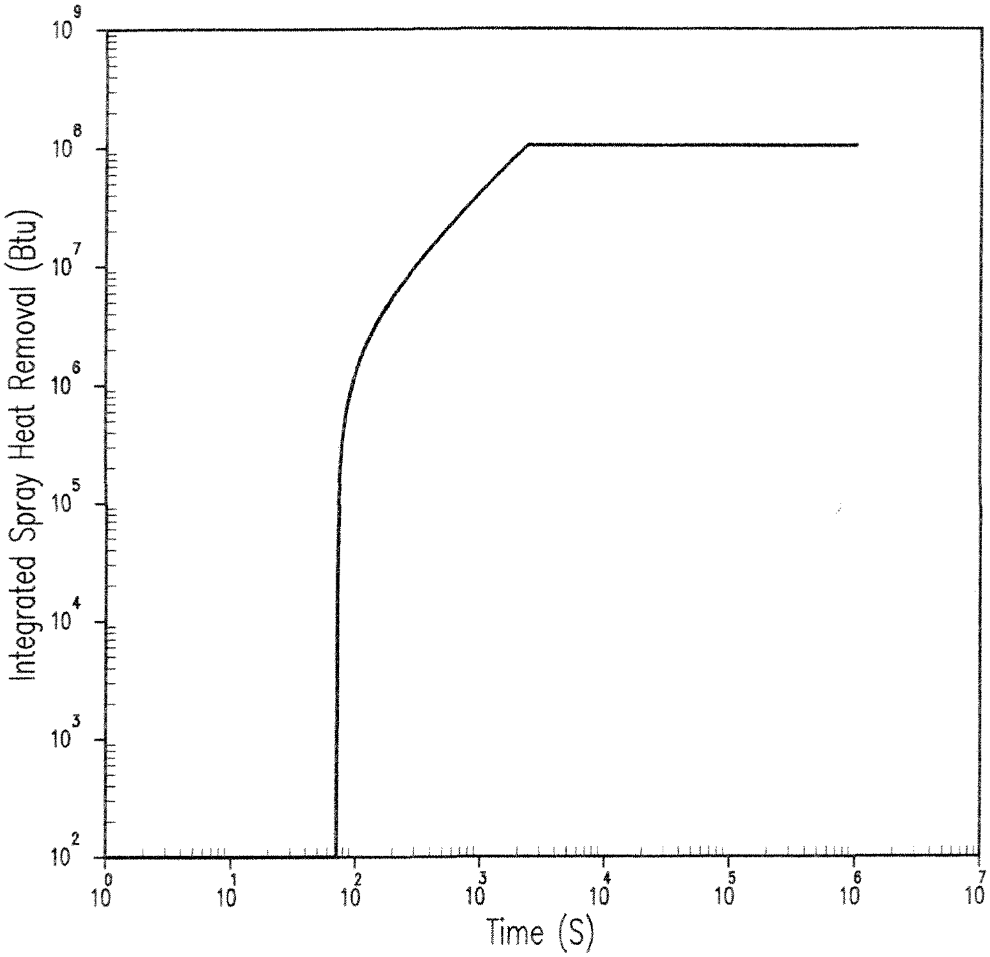
UFSAR FIGURE 14.3-105 | REV. No. 19



INDIAN POINT UNIT No. 2

DOUBLE-ENDED PUMP SUCTION BREAK
FOR 3216 MWt MINIMUM SAFEGUARDS
INTEGRATED FAN COOLER HEAT REMOVAL

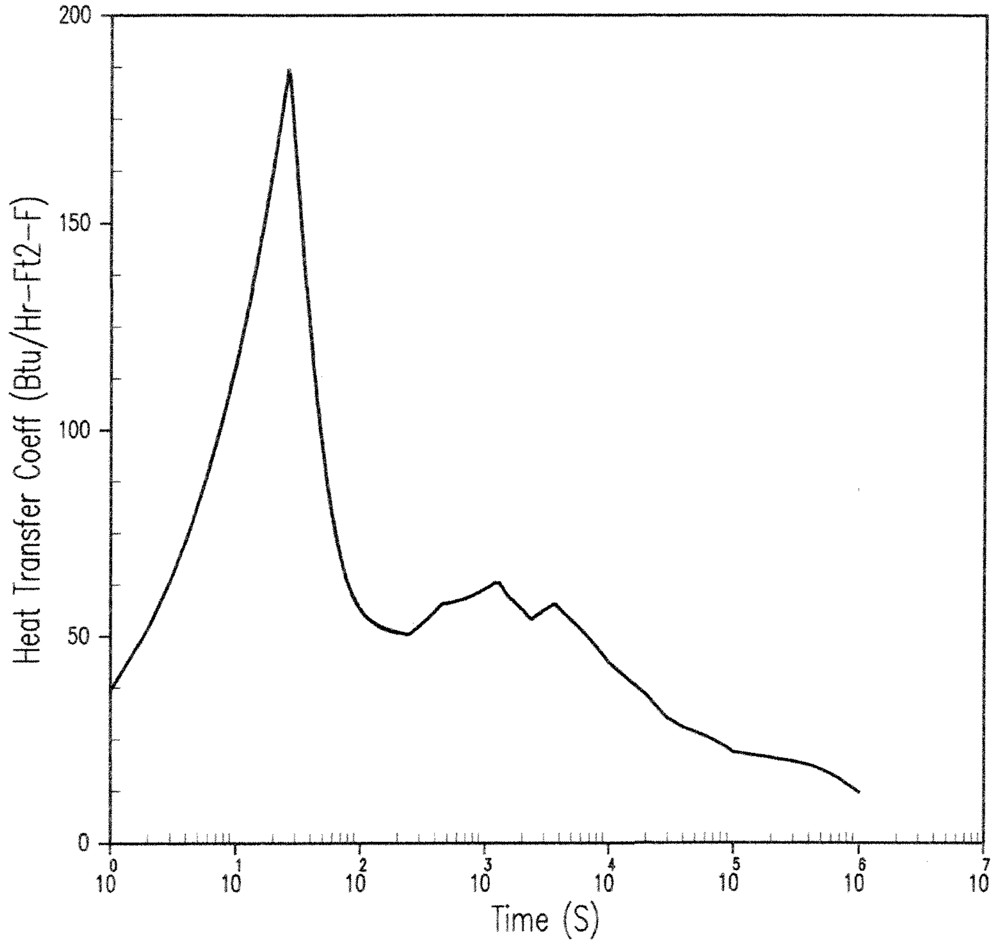
UFSAR FIGURE 14.3-106 | REV. No. 19



INDIAN POINT UNIT No. 2

DOUBLE-ENDED PUMP SUCTION BREAK FOR 3216 MWt MINIMUM SAFEGUARDS INTEGRATED SPRAY HEAT REMOVAL

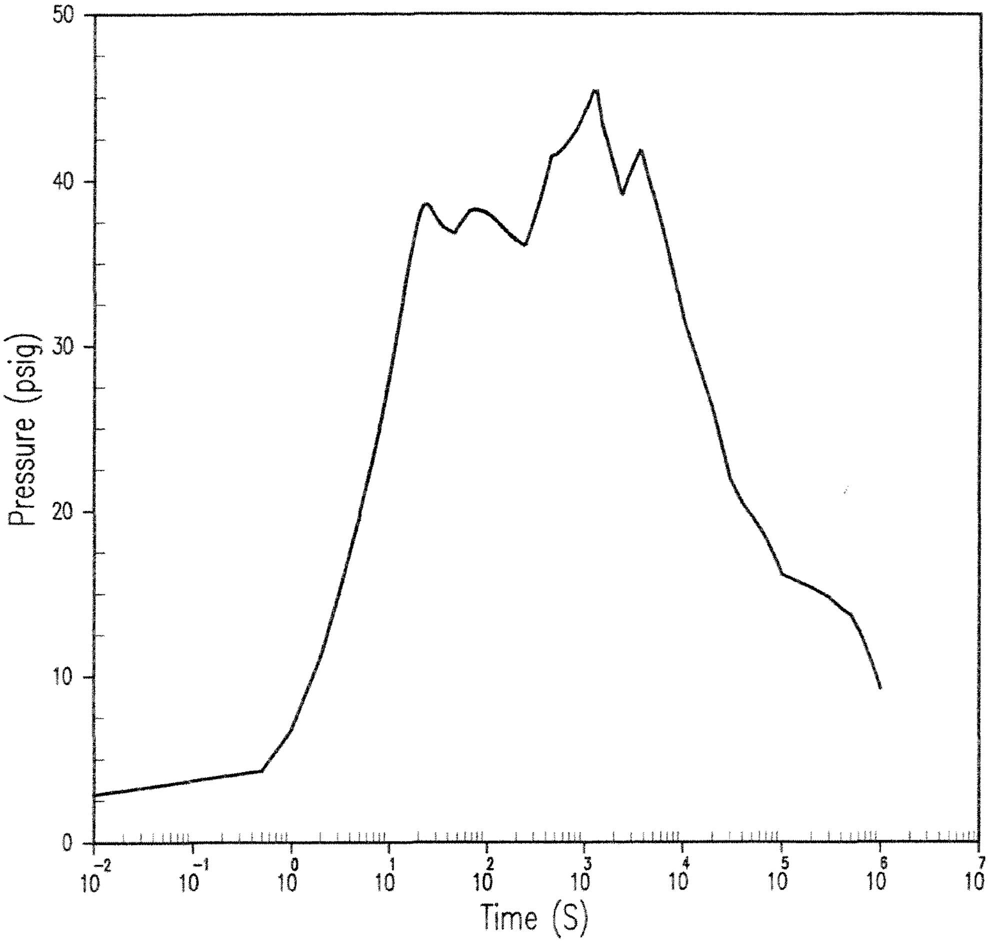
UFSAR FIGURE 14.3-107	REV. No. 19



INDIAN POINT UNIT No. 2

DOUBLE-ENDED PUMP SUCTION BREAK
FOR 3216 MWt MINIMUM SAFEGUARDS
STRUCTURAL HEAT TRANSFER COEFFICIENT

UFSAR FIGURE 14.3-108	REV. No. 19

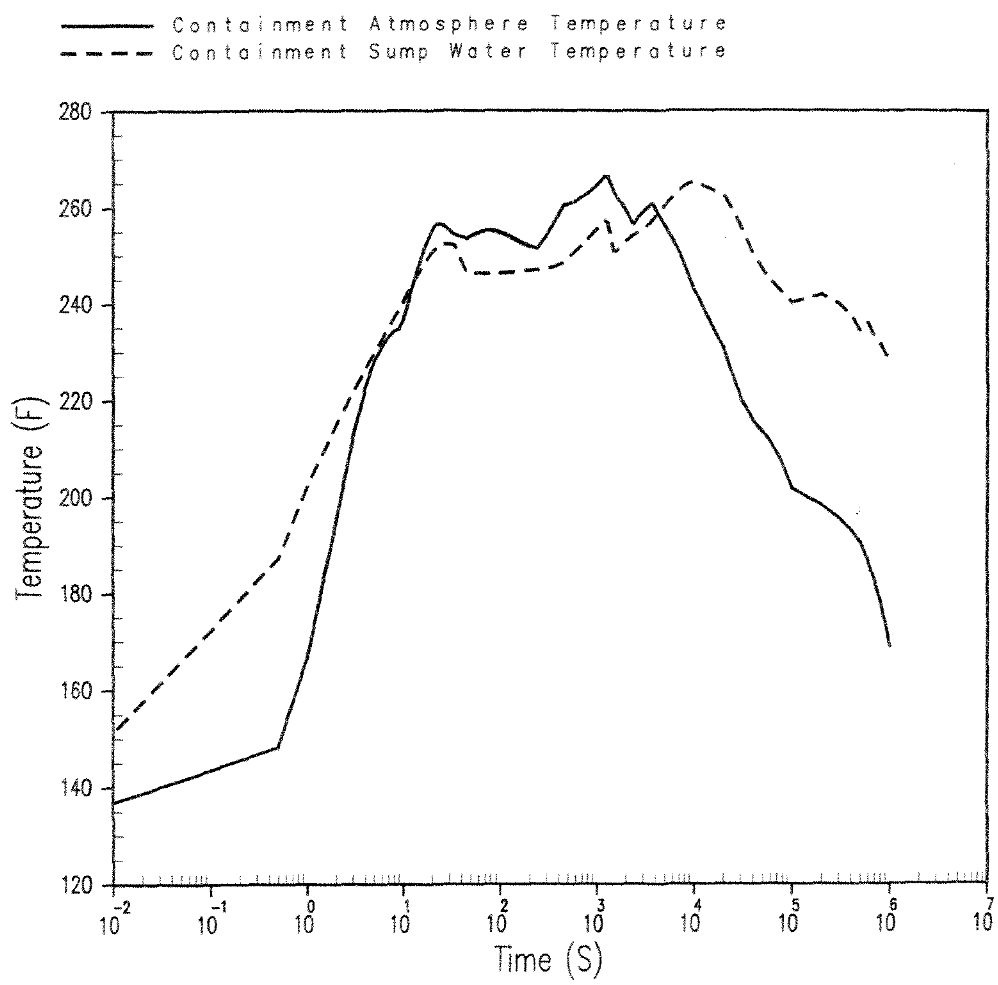


INDIAN POINT UNIT No. 2

DOUBLE-ENDED PUMP SUCTION BREAK FOR 3216 MWt MINIMUM SAFEGUARDS CONTAINMENT PRESSURE

UFSAR FIGURE 14.3-109	REV. No. 19

OAGI0000215_1691



INDIAN POINT UNIT No. 2	
DOUBLE-ENDED PUMP SUCTION BREAK FOR 3216 MWt MINIMUM SAFEGUARDS CONTAINMENT TEMPERATURE	
UFSAR FIGURE 14.3-110	REV. No. 19