ENCLOSURE II

DRESDEN STATION UNIT 2

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SUPPLEMENTAL RELOAD LICENSING SUBMITTAL

FOR

DRESDEN NUCLEAR POWER STATION

UNIT 2 RELOAD 4

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CONTENTS OF THIS REPORT
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1. PLANT UNIQUE ITEMS (1.0)*

a.	Plant Parameter Changes	See Appendix A
b.	Loading Error	See Appendix A
c.	Loss-of-Coolant Accident Analysis	See Reference 1 (Pg. 5)
d.	R (Item 4)	Value shown includes effect of B_4C settling (0.0002Δk)

2. RELOAD FUEL BUNDLES (1.0, 3.3.1 and 4.0)

	Fuel Type	Number	Number Drilled
Irradiated	Initial (7DB212)	56	
	Reload-1 (7DB230)	32	
	(8DB250)	124	
	Reload-2 (8DB250)	80	
	(8DB262)	80	
	Reload-3 (8DB250)	192	
New	Reload-4 (8DRB265L)	160	160
Total		724	160

3. REFERENCE CORE LOADING PATTERN (3.3.1)

Nominal previous cycle exposure: 15,070 MWd/t

Assumed reload cycle exposure: 16,300 MWd/t

Core loading pattern: Figure 1

4. CALCULATED CORE EFFECTIVE MULTIPLCATION AND CONTROL SYSTEM WORTH - NO VOIDS, 20°C (3.3.2.1.1 AND 3.3.2.1.2)

BOC k_{eff}	
Uncontrolled	1.107
Fully Controlled	0.947
Strongest Control Rod Out	0.982
R, Maximum Increase in Cole Core Reactivity with Exposure Into Cycle, Δk	0.0032

*( ) refers to areas of discussion in "Generic Reload Fuel Application," NEDE-24011-P-A, August 1978.

5. STANDBY LIQUID CONTROL SYSTEM SHUTDOWN CAPABILITY (3.3.2.1.3)

ppm	Shutdown Margin (Δk) (20°C, Xenon Free)
600	0.043

6. RELOAD UNIQUE TRANSIENT ANALYSIS INPUTS (3.3.2.1.5 AND 5.2)

	EOC	EOC - 2 GWd/t
Void Coefficient N/A* (¢/% Rg)	-5.77/-7.22	-7.06/-8.82
Void Fraction (%)	30.71	34.10
Doppler Coefficient N/A (¢/°F)	-0.231/-0.219	-0.220/-0.209
Average Fuel Temperature (°F)	1203	1203
Scram Worth N/A ($)	-39.52/-31.61	-36.5/-29.2
Scram Reactivity vs Time	Figure 2a	Figure 2b

7. RELOAD UNIQUE GETAB TRANSIENT ANALYSIS INITIAL CONDITION PARAMETERS (5.2)

Exposure	7x7 EOC	8x8/8x8R EOC
Peaking factors (local, radial and axial)	1.30/1.53/1.40	1.18/1.82/1.40
R-Factor	1.100	1.051
Bundle Power (MWt)	5.240	6.201
Bundle Flow (10^3 lb/hr)	113.84	108.74
Initial MCPR	1.24	1.30

8. SELECTED MARGIN IMPROVEMENT OPTIONS (5.2.2)

None

*N = Nuclear Input Data
A = Used in Transient Analysis

9. CORE-WIDE TRANSIENT ANALYSIS RESULTS (5.2.1)

Transient	Exposure	Power (%)	Flow (%)	ϕ (%)	Q/A (%)	P_{s1} (psig)	P_v (psig)	ΔCPR 7x7	ΔCPR 8x8/8x8R	Plant Response
Load Rejection without Bypass	EOC-2GWd/t to EOC	98	100	265.2	110.8	1214	1248	0.17	0.24	Figure 3
Load Rejection without Bypass	EOC to EOC-2GWd/t	100	100	235.2	109.3	1206	1238	—	—	Figure 4
Loss of 145°F Feedwater Heating	BOC-EOC	100	100	118.9	118.3	992	1042	0.16	0.18	Figure 5
Feedwater Controller Failure	BOC-EOC	100	100	153.9	107.3	1114	1151	0.08	0.11	Figure 6

10. LOCAL ROD WITHDRAWAL ERROR (WITH LIMITING INSTRUMENT FAILURE) TRANSIENT SUMMARY (5.2.1)

Rod Block Reading	Rod Position (Feet Withdrawn)	ΔCPR 7x7	ΔCPR 8x8/8x8R	MLHGR (Kw/ft) 7x7	MLHGR (Kw/ft) 8x8/8x8R	Limiting Rod Pattern
104	4.0	0.11	0.17	11.18	13.33	Figure 7
105	4.5	0.13	0.19	11.30	13.36	Figure 7
106	5.0	0.15	0.22	11.46	13.61	Figure 7
107*	5.5	0.16	0.24	11.63	13.95	Figure 7
108	6.0	0.18	0.25	11.74	14.28	Figure 7
109	6.5	0.19	0.27	11.77	14.55	Figure 7

11. OPERATING MCPR LIMIT (5.2)

BOC7-EOC7	
1.31	(8x8/8x8R fuel)
1.24	(7x7 fuel)

*Indicates setpoint selected

12. OVERPRESSURIZATION ANALYSIS SUMMARY (5.3)

Transient	Power (%)	Core Flow (%)	P_{sl} (psig)	P_v (psig)	Plant Response
MSIV Closure (Flux Scram)	100	100	1277	1311	Figure 8

13. STABILITY ANALYSIS RESULTS (5.4)

Decay Ratio: Figure 9

Reactor Core Stability:

Decay Ratio, x_2/x_0 (100% Rod Line - Natural Circulation Power) 0.59

Channel Hydrodynamic Performance

	Decay Ratio, x_2/x_0 (100% Rod Line - Natural Circulation Power)
8x8/8x8R channel	0.27
7x7 channel	0.12

14. LOSS-OF-COOLANT ACCIDENT RESULTS (5.5.2)

See Reference 1.

15. LOADING ERROR RESULTS (5.5.4)

Limiting Event: Rotated bundle

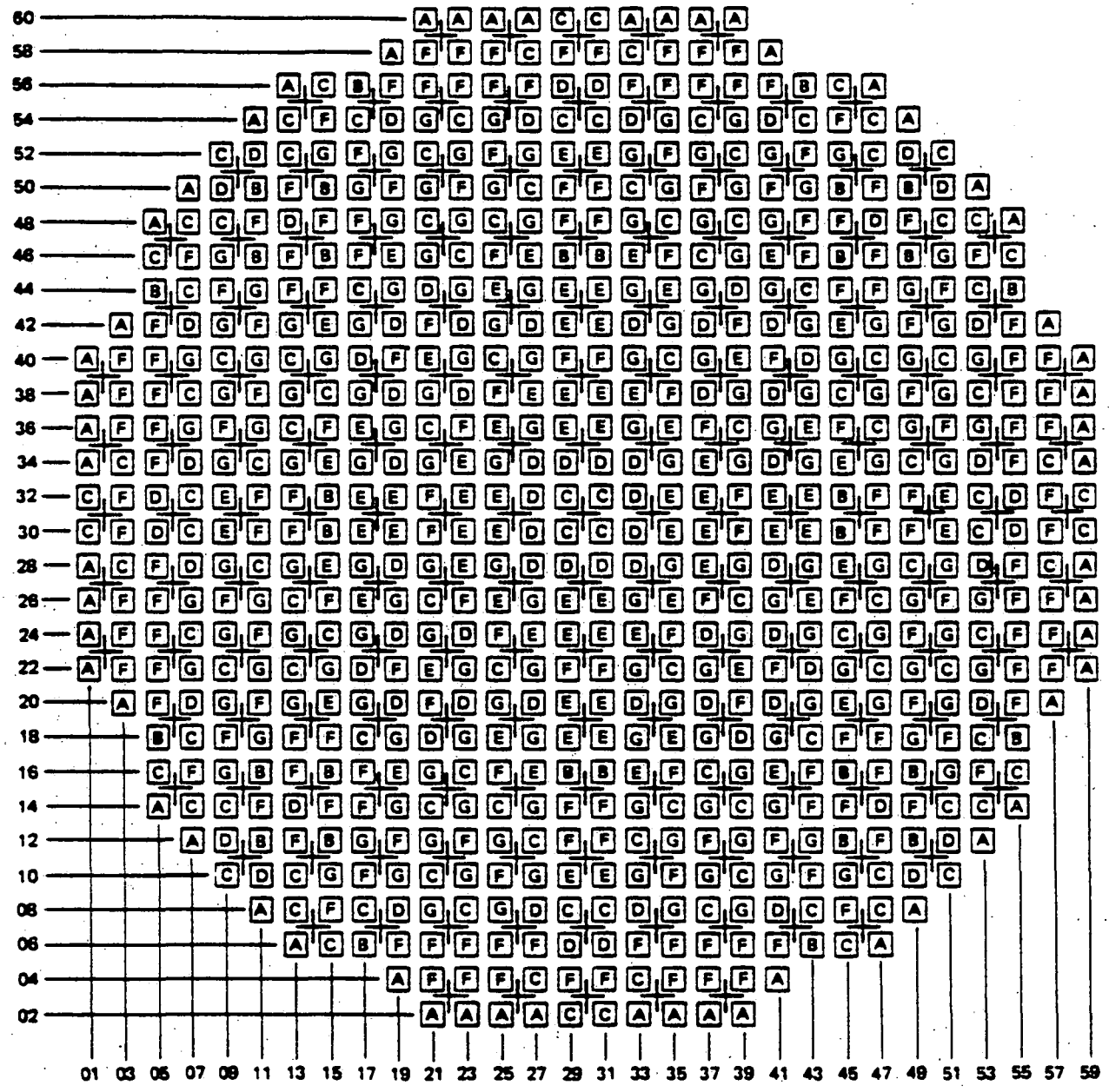
MCPR: 1.07

16. CONTROL ROD DROP ANALYSIS RESULTS (5.5.1)

Maximum incremental control rod worth: 0.56%Δk

REFERENCES:

(1) "Loss-of-Coolant Accident Analysis Report for Dresden Units 2, 3 and Quad Cities Units 1, 2 Nuclear Power Stations," NEDO-24146, September 1978.



FUEL TYPE	
A = INITIAL FUEL	E = RELOAD 2 (8D8262)
B = RELOAD 1 (7D8230)	F = RELOAD 3 (8D8250)
C = RELOAD 1 (8D8250)	G = RELOAD 4 (8DR8265L)
D = RELOAD 2 (8D8250)	

Figure 1. Dresden Unit 2 Reload 4 Design Reference Core Loading

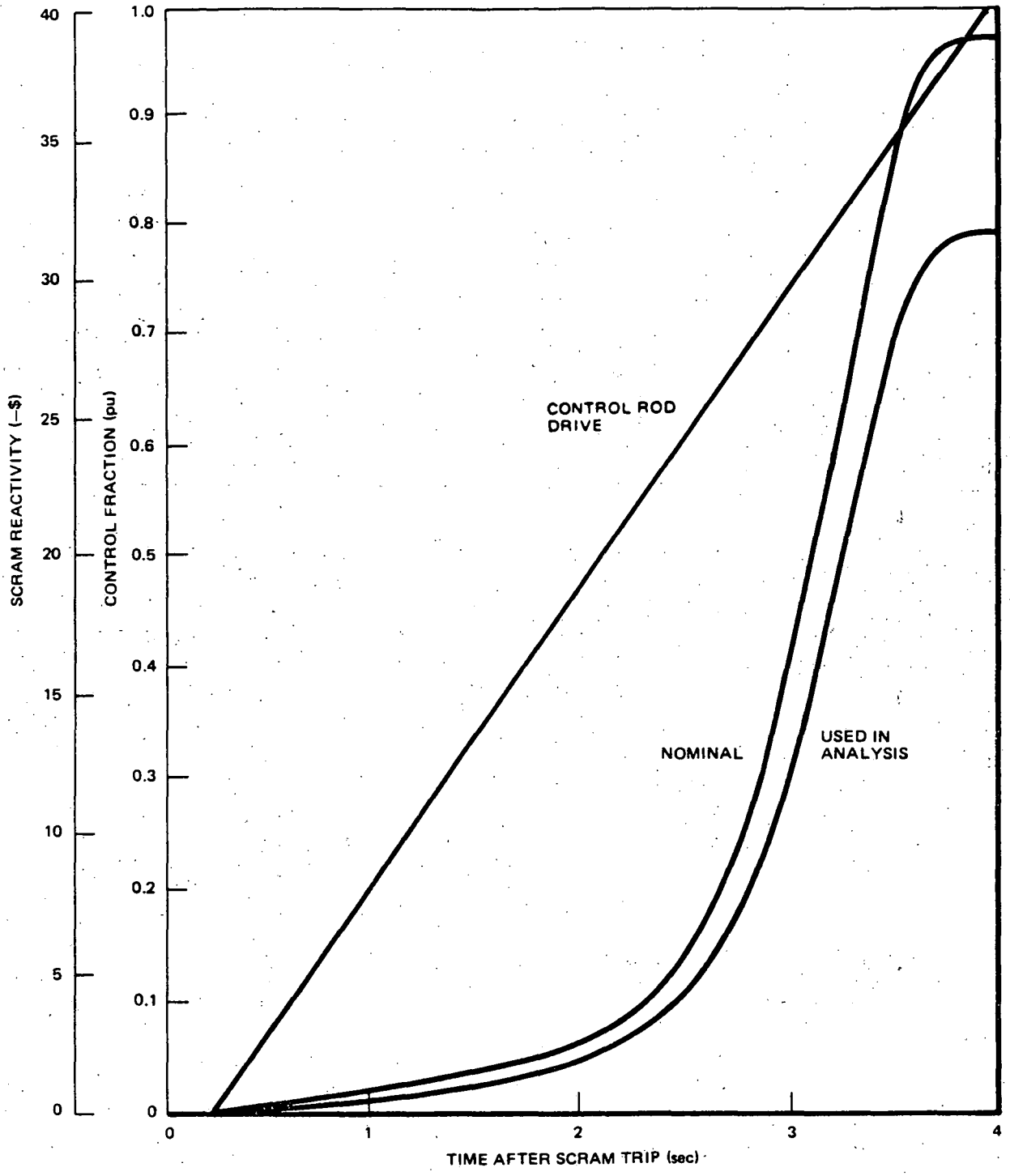


Figure 2a. Scram Reactivity vs Time (Dresden 2, Cycle 7, EOC7)

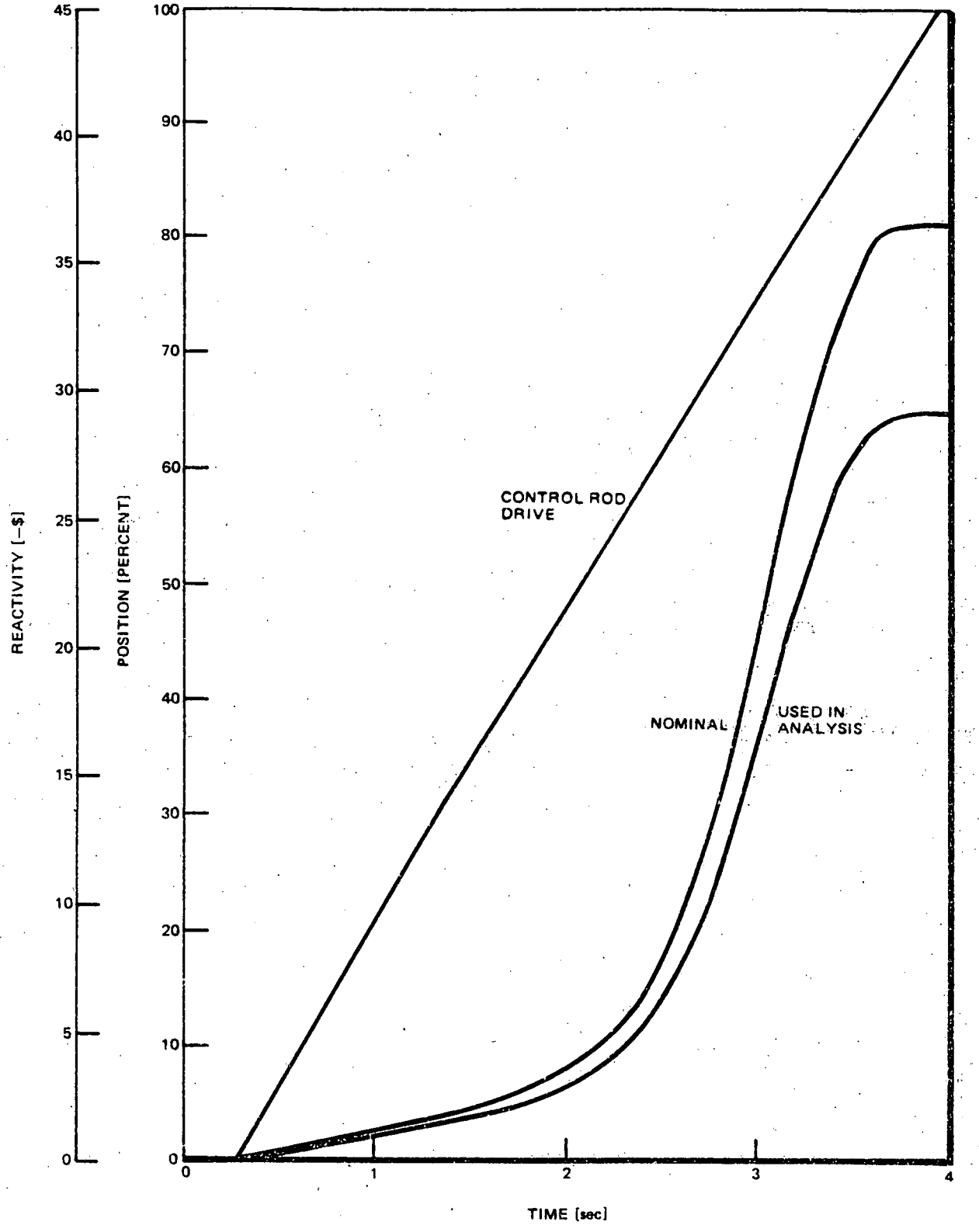


Figure 2b. Scram Reactivity vs Time (Dresden 2, Cycle 7, EOC7-2GWd/t)

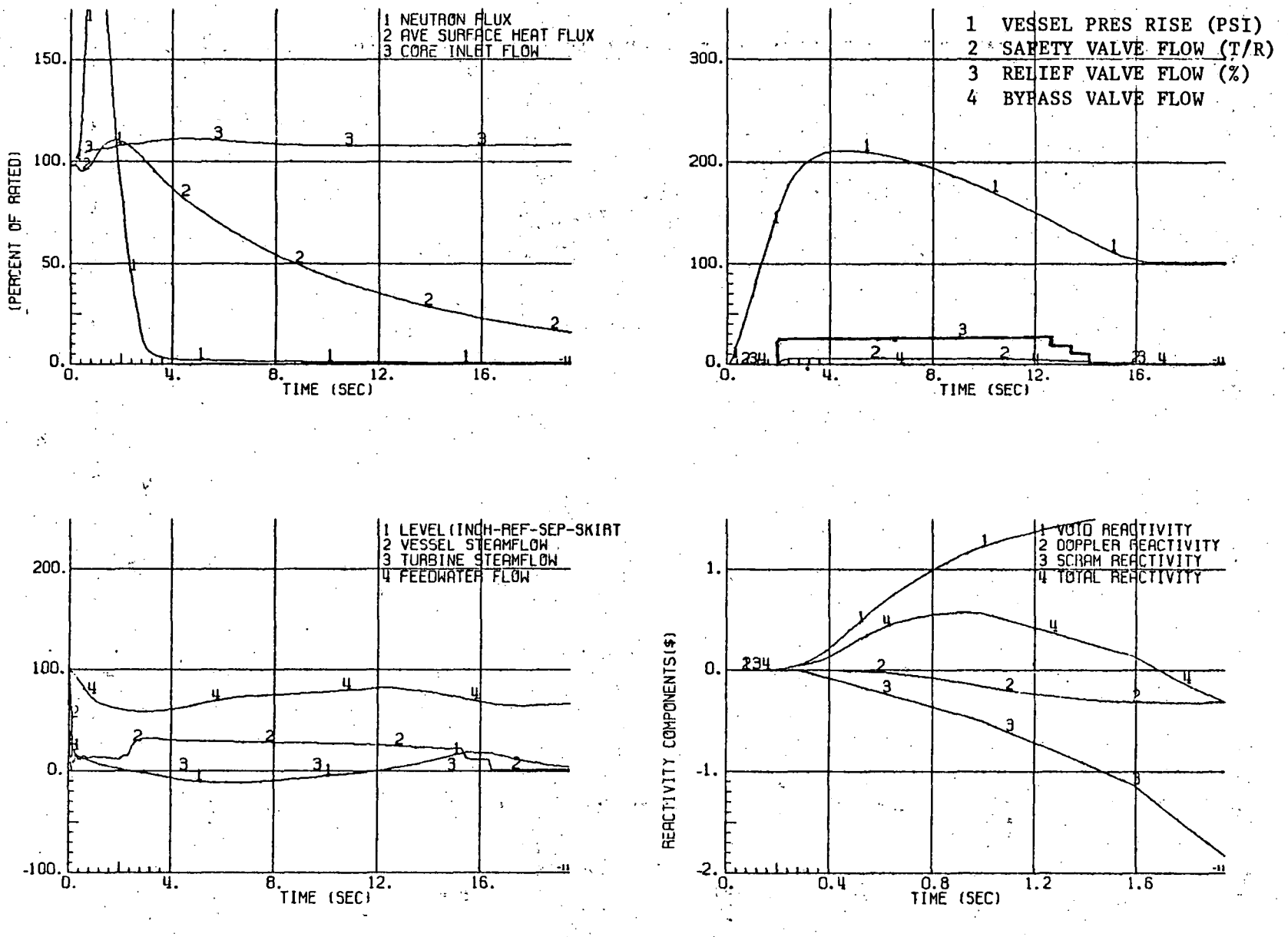


Figure 3. Load Rejection Without Bypass (EOC)

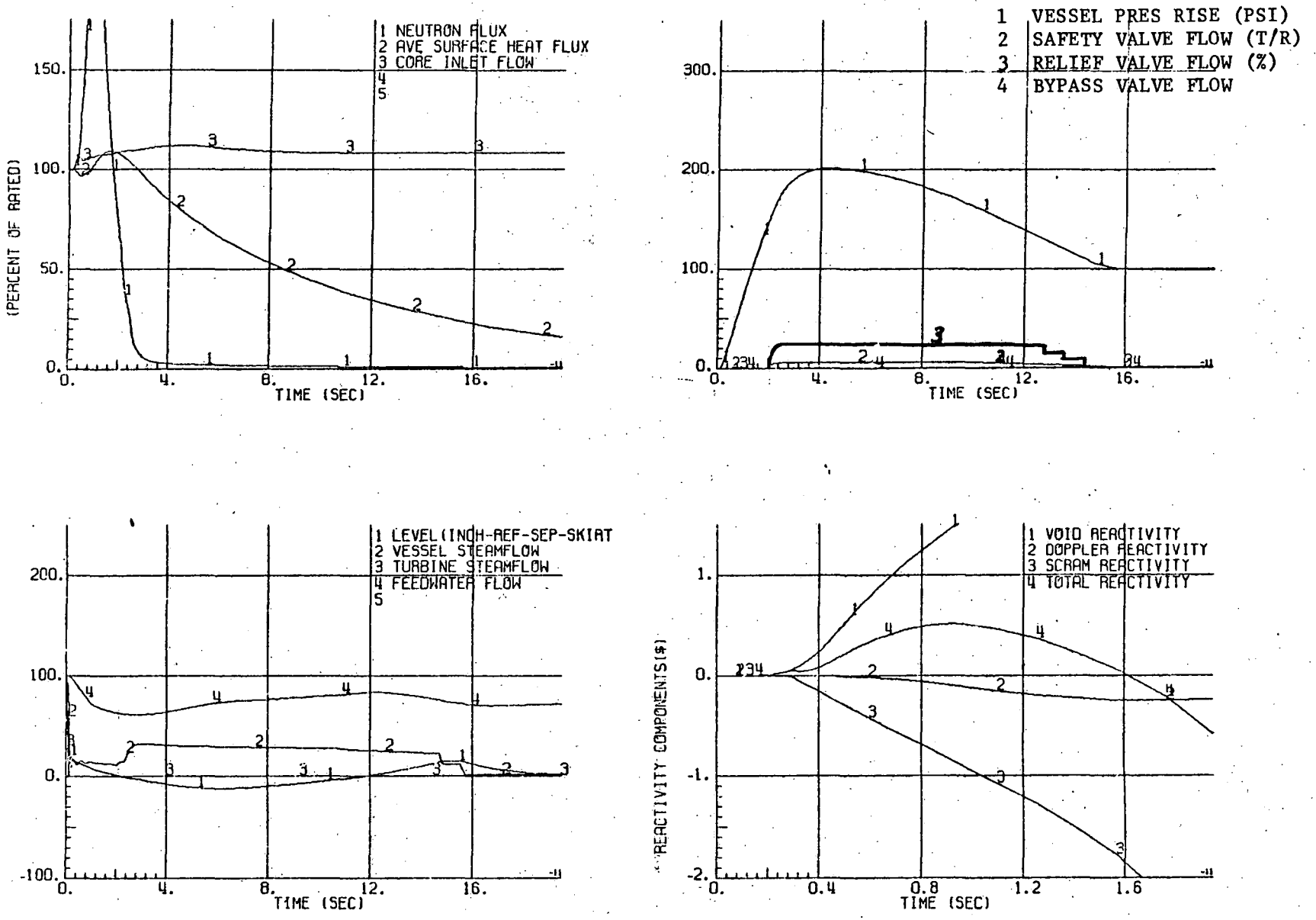


Figure 4. Load Rejection Without Bypass (EOC - 2 GWd/t)

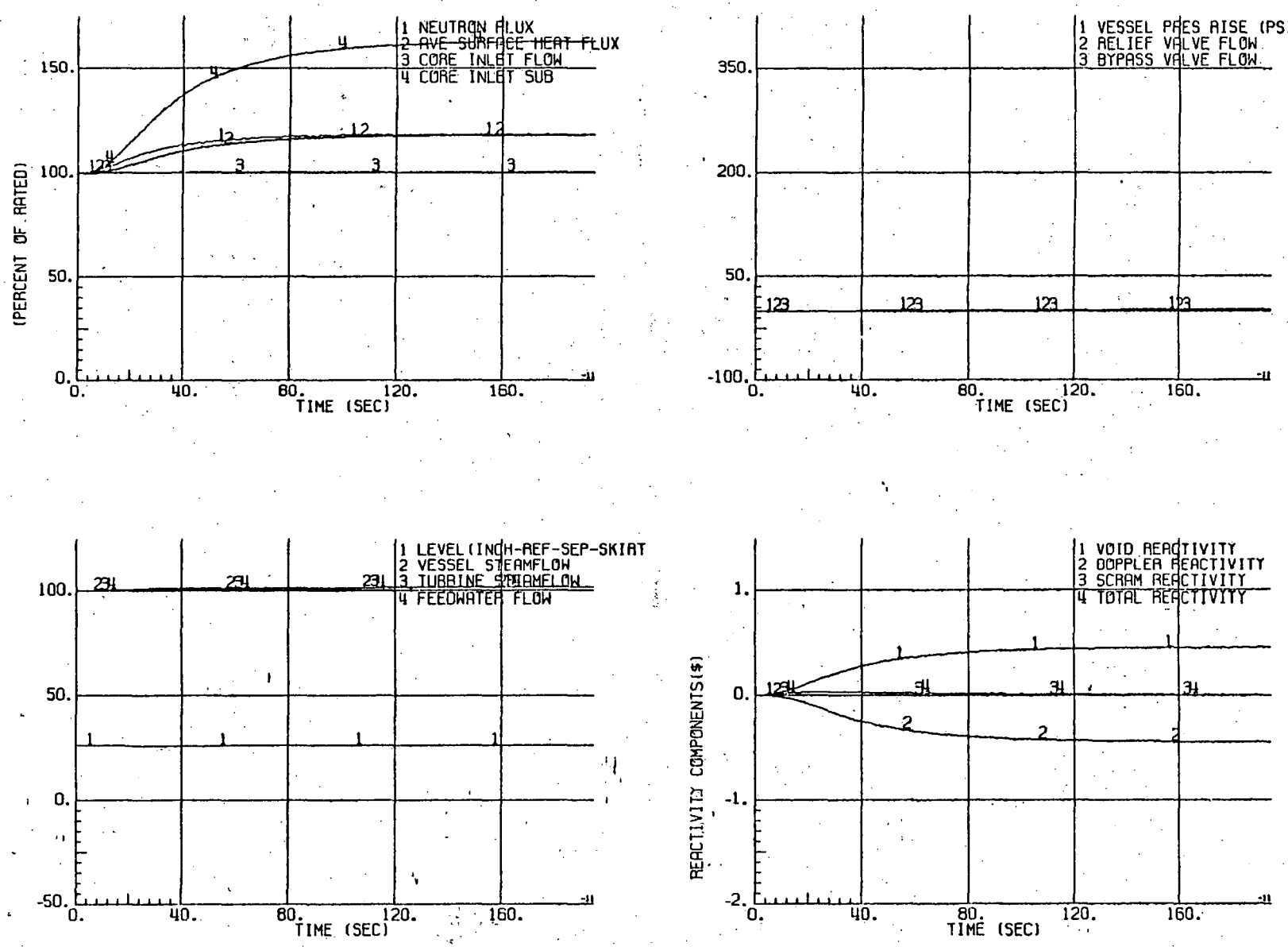


Figure 5. Loss of 145°F Feedwater Heating

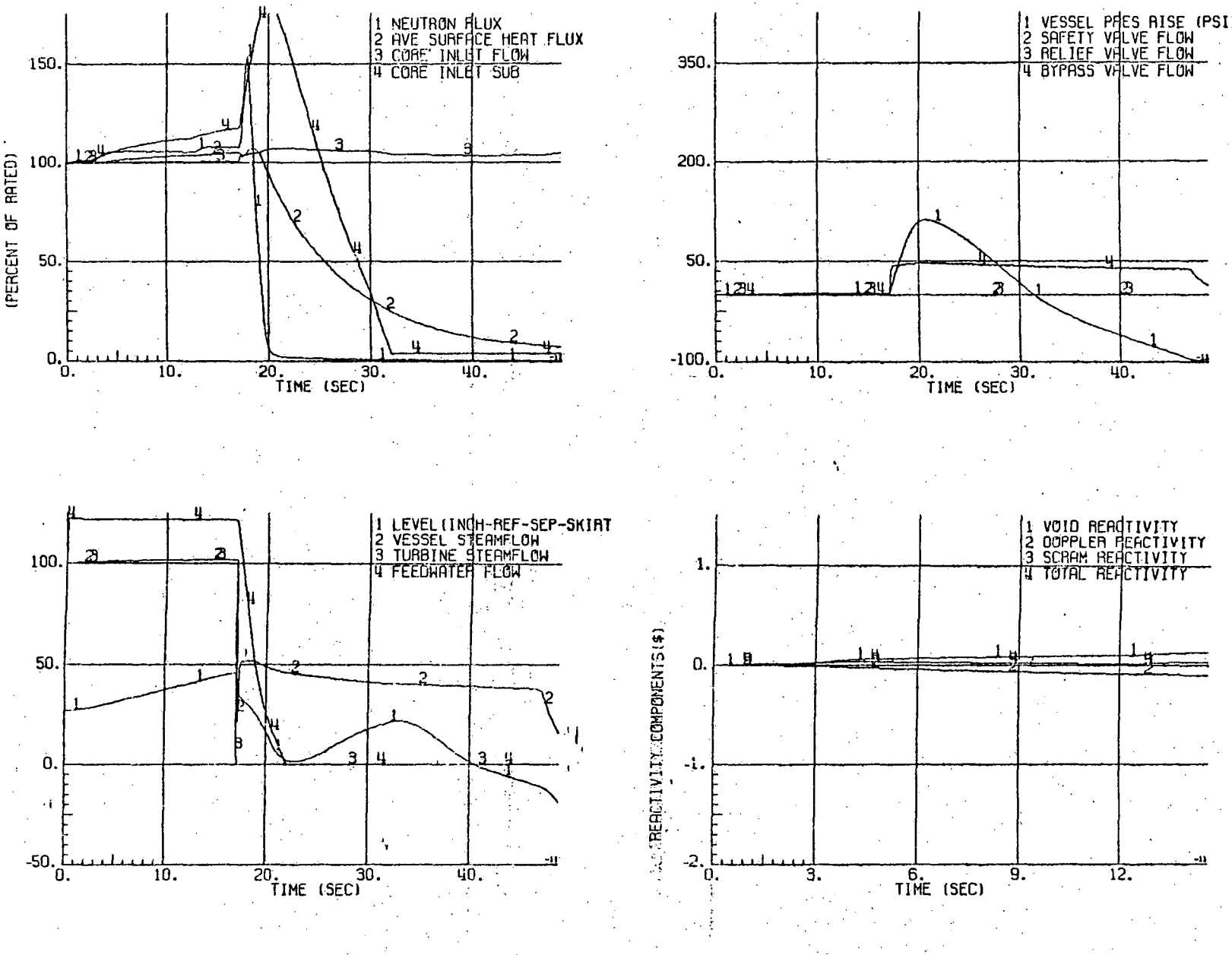


Figure 6. Feedwater Controller Failure

	02	06	10	14	18	22	26	30
59							00	
55				14		06		14
51			10		20		12	
47		14		00				00
41			20		38			
39		06				00		00
35	00		12				32	
31		18		00		00		00

NOTE: 1. ROD PATTERN IS 1/4 CORE MIRROR SYMMETRIC UPPER LEFT QUADRANT SHOWN ON MAP
2. NUMBERS INDICATE NUMBER OF NOTCHES WITHDRAWN OUT OF 48. BLANK IS A WITHDRAWN ROD
3. ERROR ROD IS (22, 39)

Figure 7. Limiting Rod Pattern For Rod Withdrawal Error

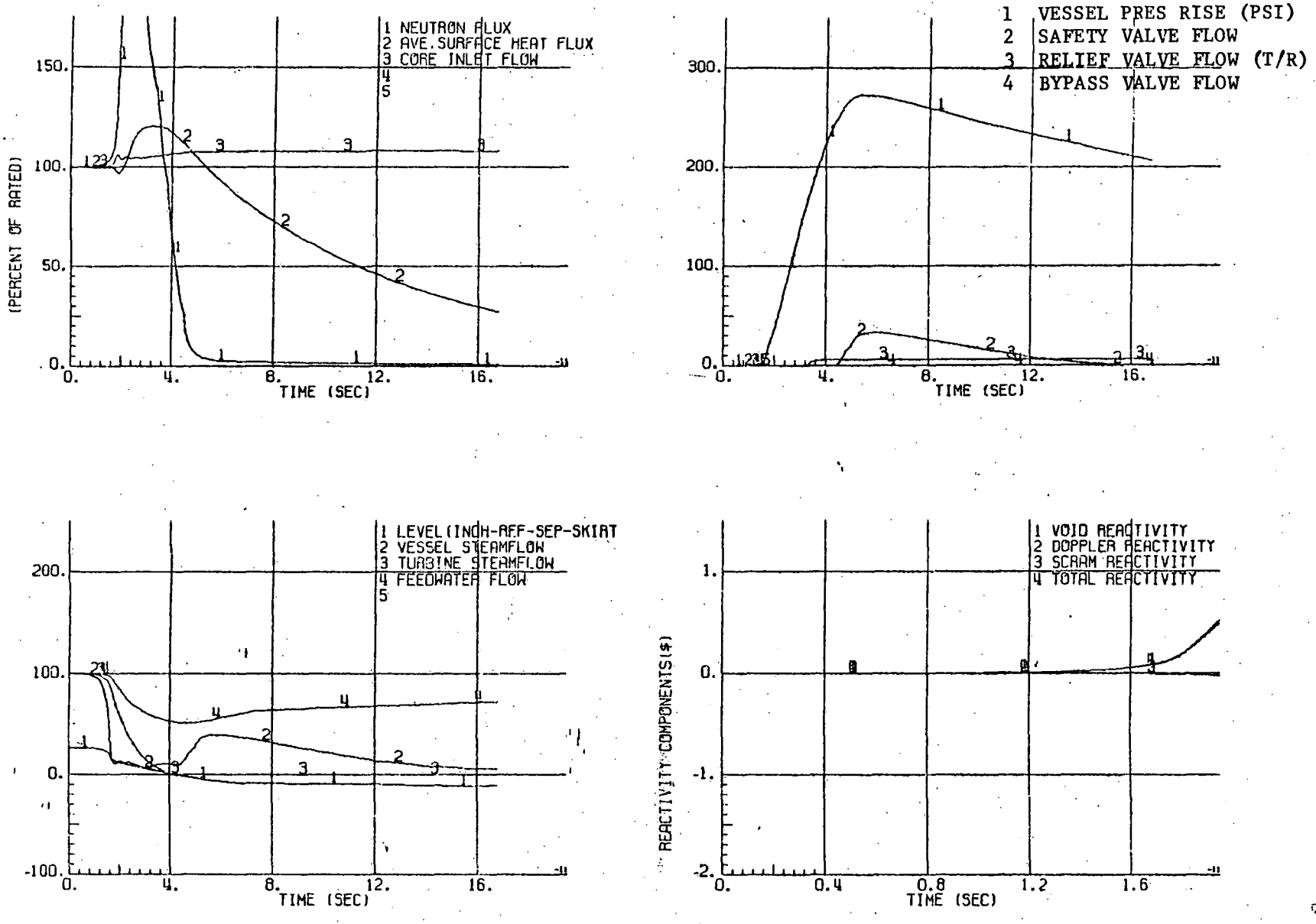


Figure 8. MSIV Closure, Flux Scram, EOC (Overpressure Protection Event)

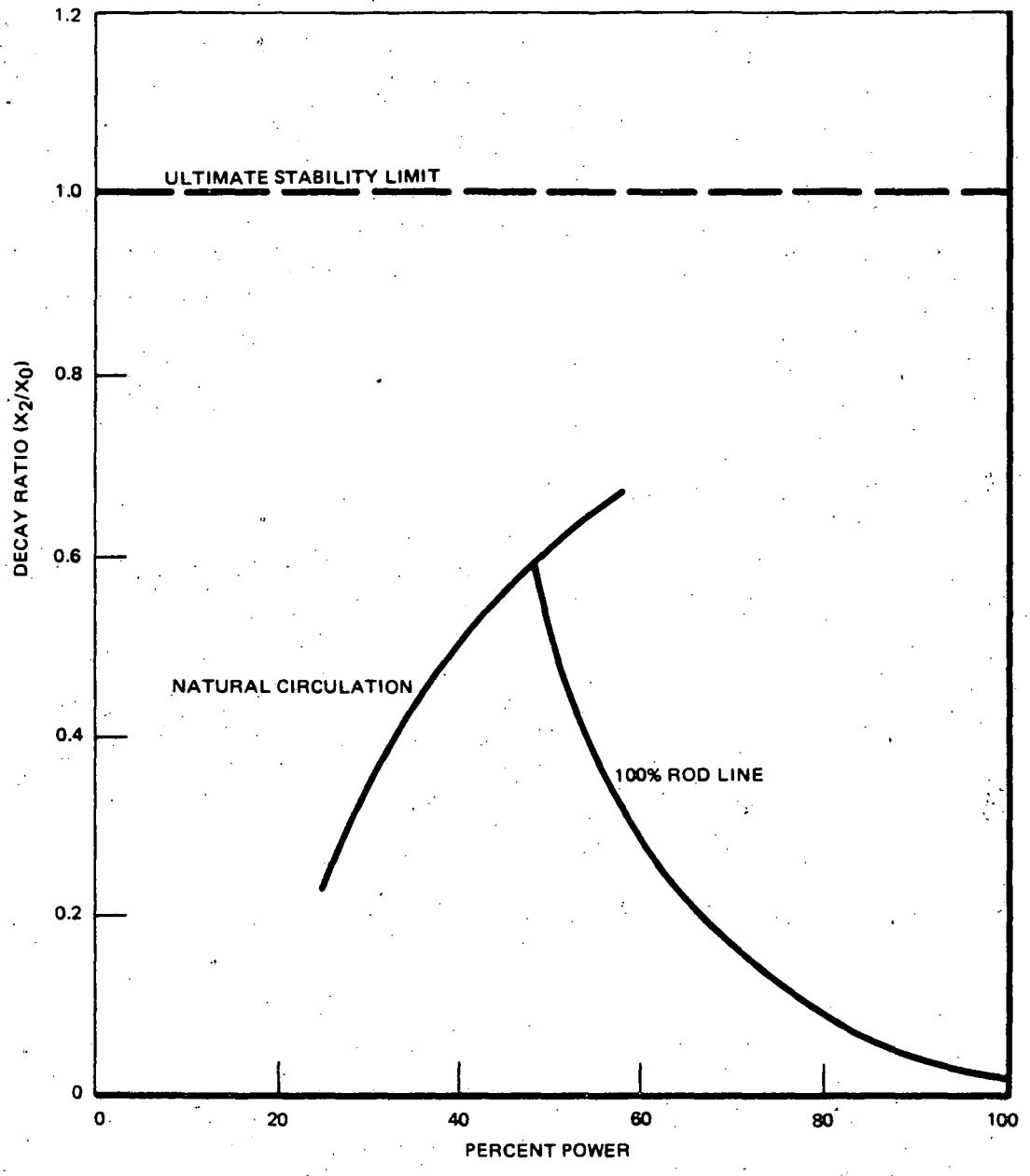


Figure 9. Decay Ratio

APPENDIX A

PLANT PARAMETER CHANGES

Pressure Relief Systems (Table 5-4, pg 5-62, NEDO-24011)	
Safety/Relief Valve setpoint (psig)	1115 + 1%
Safety/Relief Valve capacity (% NBR steam flow)	5/29.2
Safety Valve capacity (% NBR steam flow)	8/52.5
Transient Operating Parameters (Table 5-6, pg 5-64, NEDO-24011)	
Thermal Power (% of Rated)	
BOC to EOC-2 GWd/t	100
EOC-2 GWd/t to EOC	98
Turbine Pressure (psig)	950
GETAB Initial Conditions	
Reactor Core Pressure (psia)	1030
Inlet Enthalpy (Btu/lb)	522.5
Loading Error	
Linear Heat Generation Rate (kW/ft)	19.4