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Class I
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NINE MILE POINT NUCLEAR POWER STATION UNIT 1
EXTENDED LOAD LINE LIMIT ANALYSIS
LICENSE AMENDMENT SUBMITTAL (CYCLE 6)

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1. INTRODUCTION

Previous analyses (References 1 and 2) provided the analytical bases for operation under a modified power/flow line designed to enable the direct ascension to full power within the design bases previously applied.

This submittal provides results of analyses which justify operation up to 100% of rated power at 91% of rated core flow. The analysis results are provided in the same sequence as the standard reload format to assure that all aspects of reactor operation which are affected are covered. Future reload submittals will incorporate the use of the extended load line in the analysis.

2. ANALYSIS RESULTS

2.1 Plant-Unique Items - Not Affected

2.2 Reload Fuel Bundles - Not Affected

2.3 Reference Core Loading Pattern - Not Affected

2.4 Calculated Core Effective Multiplication and Control System Worth - No Voids, 20°C - Not Affected

2.5 Standby Liquid Control System Shutdown Capability - Not Affected

2.6 Reload-Unique Transient Analysis Inputs - Affected by Additional Data as Shown

Transient Analysis Inputs

	EOC	EOC-1000 MWd/t	EOC-2000 MWd/t
Void Coefficient N/A,* (c/% Rg)	-6.85/-8.56	-7.58/-9.48	-8.67/-10.84
Void Fraction (%)	37.42	37.42	37.42
Doppler Coefficient N/A (c/% °F)	-0.233/-0.222	-0.228/-0.216	-0.222/-0.210
Avg Fuel Temperature (°F)	1204	1204	1204
Scram Worth N/A ($)	-36.83/-29.47	-35.61/-28.49	-33.73/-26.99
Scram Reactivity	Figure 1a	Figure 1b	Figure 1c

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

2.7 Reload-Unique GETAB Transient Analysis Initial Condition Parameters - Affected by Additions as Shown

Unique GETAB Transient Analysis
Initial Condition Parameters

100% Power/91% Flow

	8x8			8x8R		
	EOC	EOC-1000 MWd/t	EOC-2000 MWd/t	EOC	EOC-1000 MWd/t	EOC-2000 MWd/t
Peaking Factors						
Local	1.22	1.22	1.22	1.20	1.20	1.20
Radial	1.676	1.704	1.704	1.822	1.850	1.850
Axial	1.4	1.4	1.4	1.4	1.4	1.4
R-Factor	1.102	1.102	1.102	1.051	1.051	1.051
Bundle Power (MWt)	5.707	5.802	5.802	6.201	6.294	6.294
Bundle Flow (10^3 lb/hr)	93.34	92.67	92.67	89.53	88.96	88.96
Initial MCPR	1.22	1.20	1.20	1.22	1.20	1.20

2.8 Selected Margin Improvement Options - Not Affected

2.9 Core-Wide Transient Analysis Results - Affected by Additions as Shown

Core-Wide Transient Analysis Results

Transient	Exposure	Power (%)	Core Flow (%)	$\hat{\phi}$ (% Ref)	$\hat{Q}/A$ (% Ref)	P_{Dome} (psig)	P_V (psig)	ΔCPR 8x8/8x8R	Plant Response
Turbine Trip w/o Bypass	EOC	94.3	91	208.5	99.9	1193	1227	0.15	Figure 2a
Turbine Trip w/o Bypass	EOC-1000 MWd/t	98.0	91	168.4	98.7	1190	1224	0.06	Figure 2b
Turbine Trip w/o Bypass	EOC-2000 MWd/t	100	91	139.5	100.0	1179	1213	<0.01	Figure 2c

2.10 Local Rod Withdrawal Error (With Limiting Instrument Failure) Transient Summary - Affected by Additions as Shown

Local Rod Withdrawal Error (With Limiting Instrument Failure) Transient Summary

Rod Block Reading	Rod Position (Feet Withdrawn)	ΔCPR 8x8	ΔCPR 8x8R	LHGR 8x8	LHGR 8x8R	Limiting Rod Pattern
104	8.0	0.30	0.25	13.77	15.69	Figure 3
105*	8.5	0.32	0.27	13.90	15.90	Figure 3
106	9.0	0.33	0.30	14.00	16.06	Figure 3
107	9.0	0.33	0.30	14.00	16.06	Figure 3
108	9.5	0.34	0.32	13.93	16.03	Figure 3
109	9.5	0.34	0.32	13.80	16.03	Figure 3

*Rod Block Setpoint

2.11 Operating MCPR Limit - Not Affected

2.12 Overpressurization Analysis Summary

Conservative analysis (EOC case) shows that operation of the plant in accordance with the extended load line limit does not violate the vessel overpressure protection criteria. Calculated peak pressures are at least 25 psi below the criteria of 1375 psig.

2.13 Stability Analysis Results - Not Affected

2.14 Loss-of-Coolant Accident Results - Potential Effects Explained

A discussion of low flow effects on LOCA analyses for all operating plants (Reference 3) has been presented to and was approved by the NRC (Reference 4). With the flow-dependent restrictions imposed by Reference 4, the LOCA analysis referenced in the plant/cycle specific reload submittal is applicable in the power flow domain discussed in this submittal.

2.15 Loading Error Results - Not Affected

2.16 Control Rod Drop Analysis Results - Not Affected

REFERENCES

1. "Nine Mile Point Nuclear Power Station Unit 1 Load Line Limit Analysis License Amendment Submittal", NEDO-24012, May 1977.

2. "Supplemental Reload Licensing Submittal for Nine Mile Point Nuclear Power Station Unit 1 Reload No. 7 Reanalysis Supplement", NEDO-24155-1, Supplement 1, December 1978.

3. Letter, R.L. Gridley to D.G. Eisenhut (NRC), "Review of Low Core Flow Effects on LOCA Analysis for Operating BWR's", May 8, 1978.

4. Letter, D.G. Eisenhut (NRC) to R.L. Gridley, enclosing "Safety Evaluation Report Revision of Previously Imposed MAPLHGR (ECCS-LOCA) Restrictions for BWR's at Less Than Rated Flow", May 19, 1978.

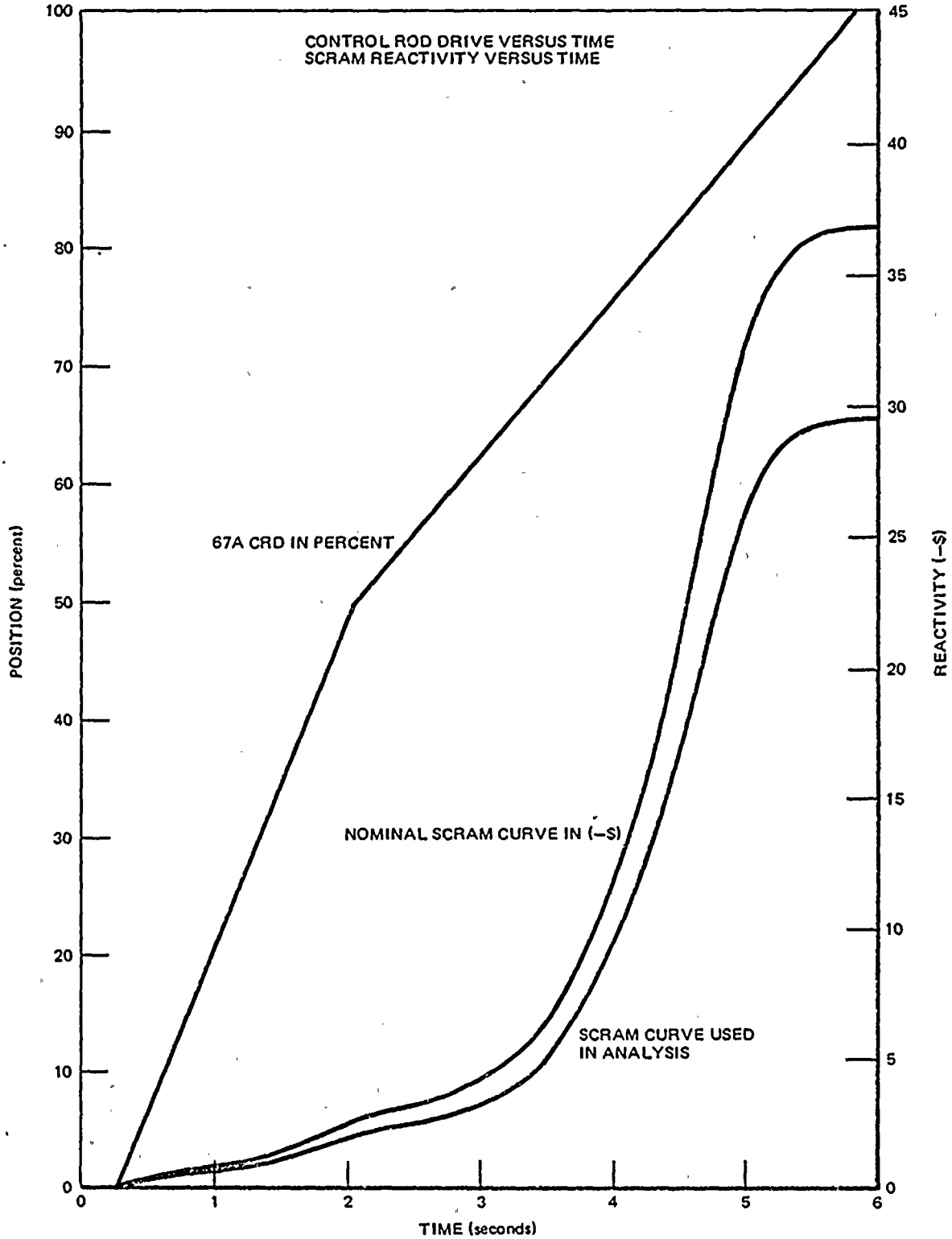

Figure 1a. EOC Scram Reactivity

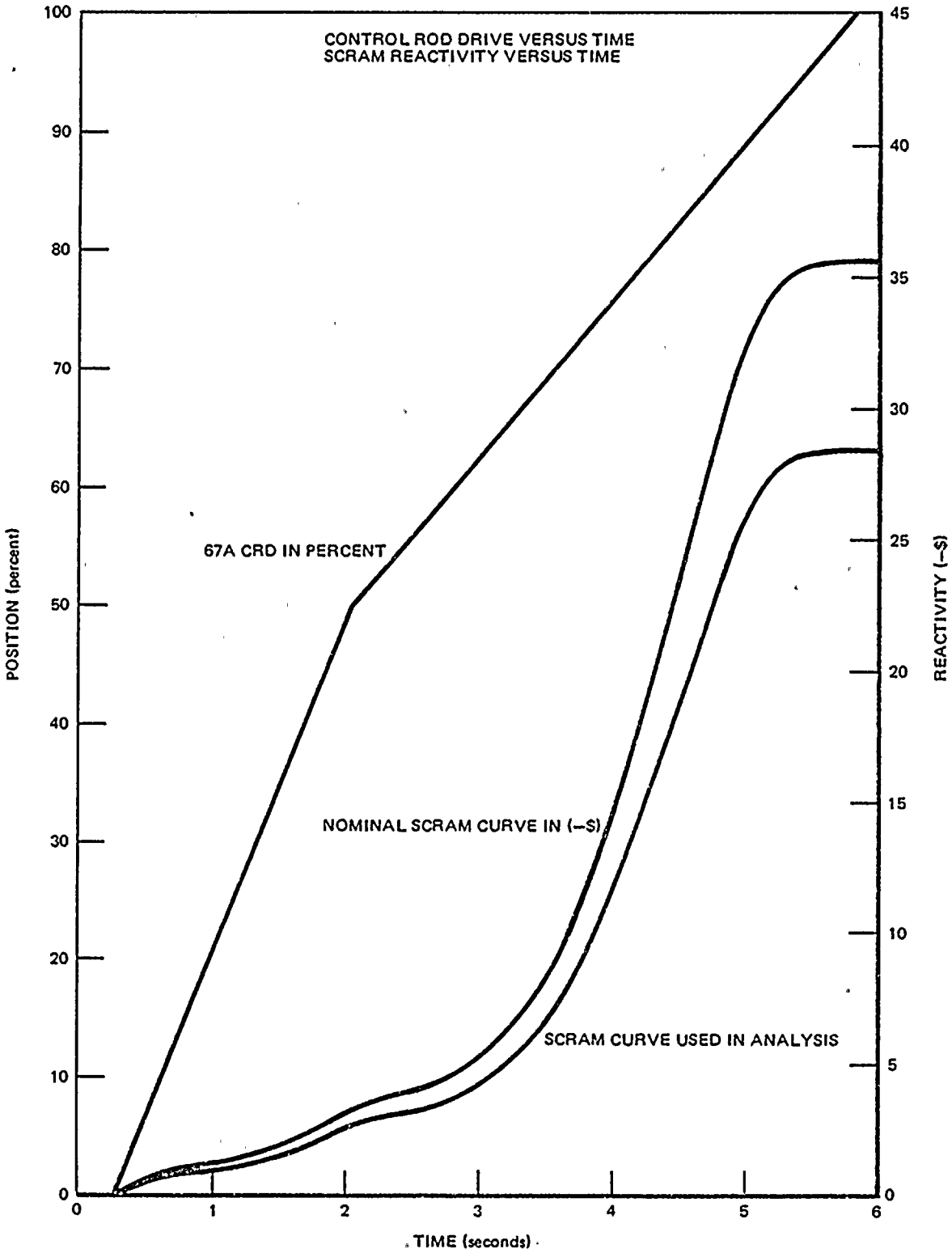

Figure 1b. EOC-1000 MWd/t Scram Reactivity

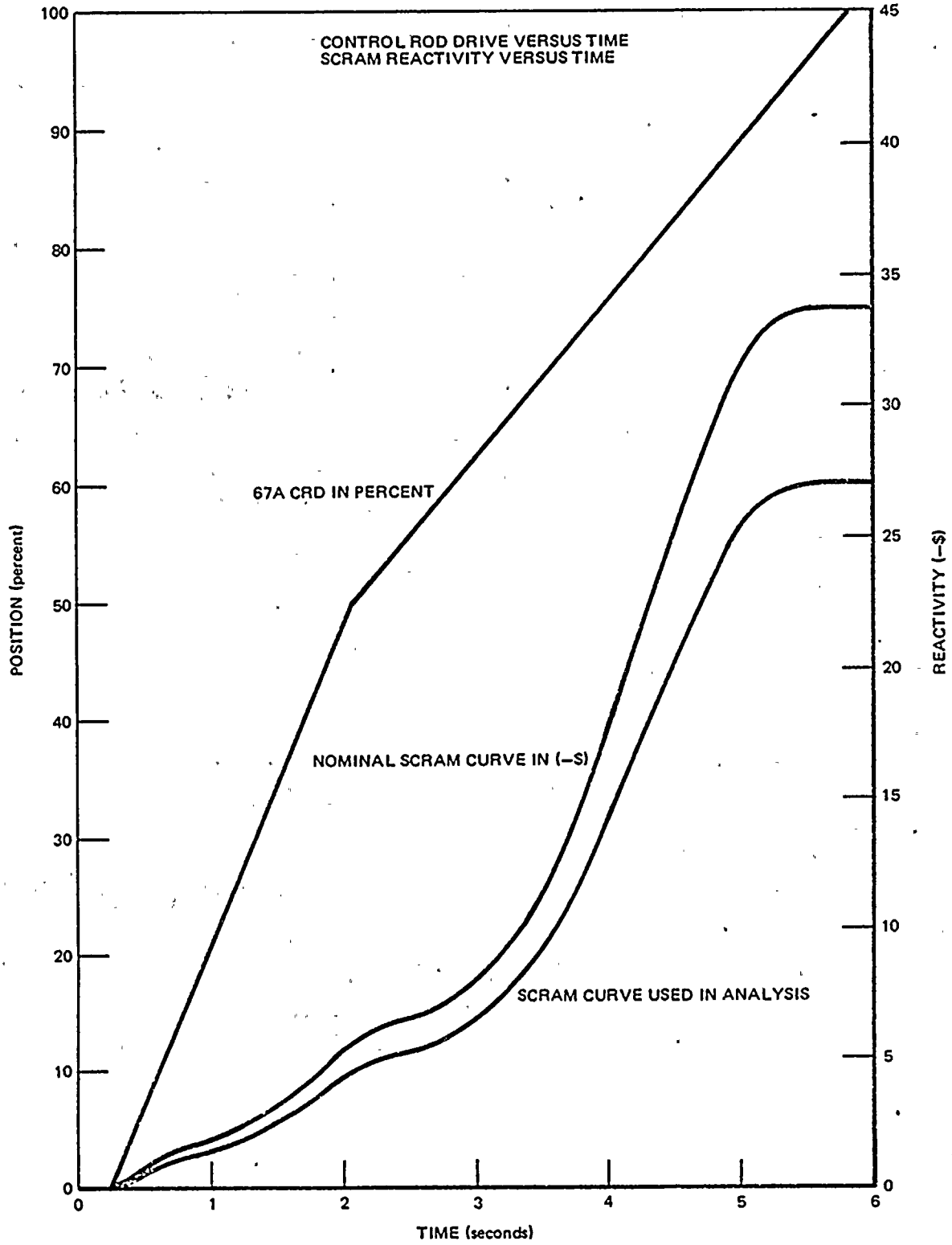

Figure 1c. EOC-2000 MWd/t Scram Reactivity

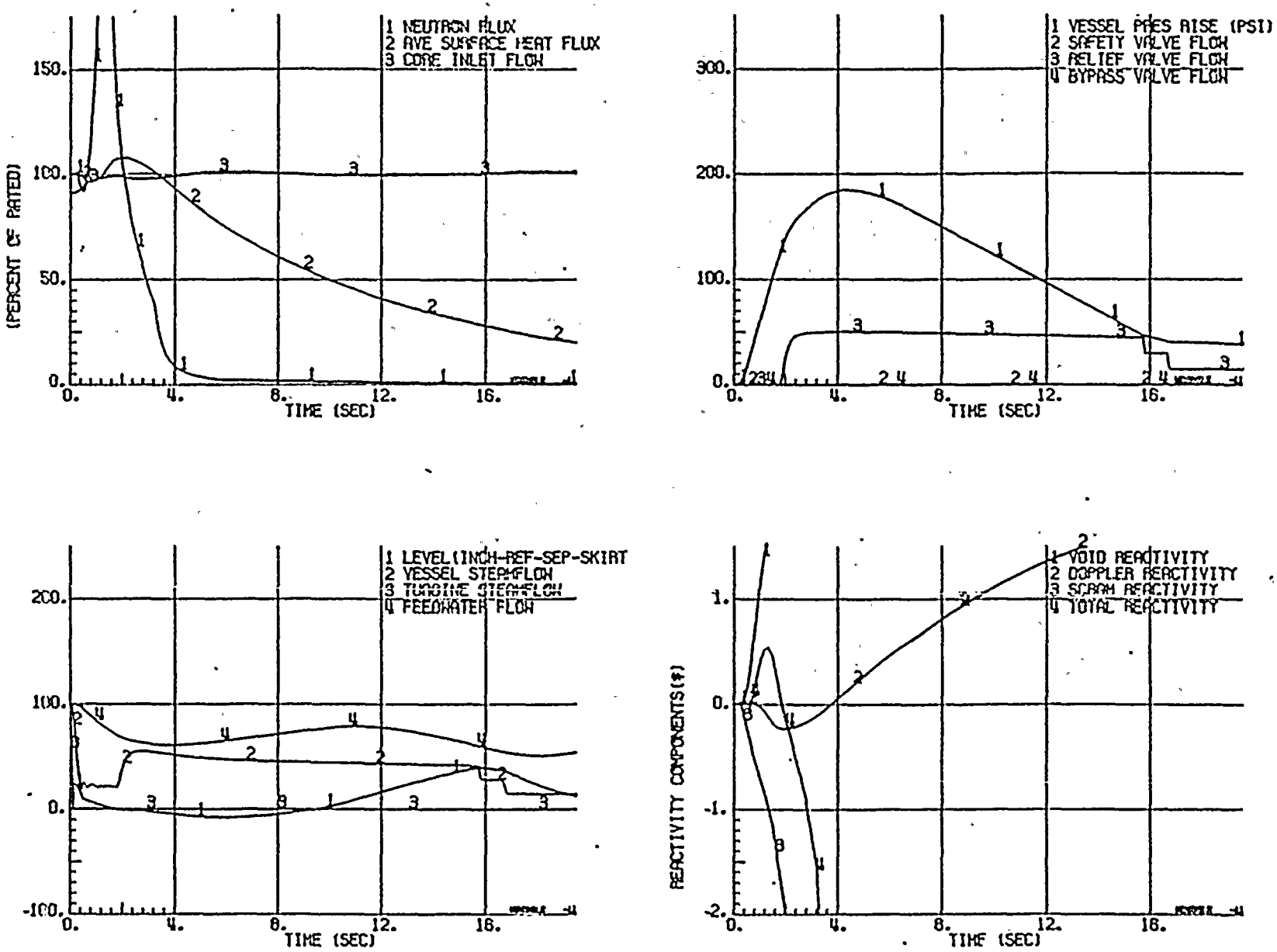

Figure 2a. Nine Mile Point-1 Turbine Trip Without Bypass, Trip Scram, EOC

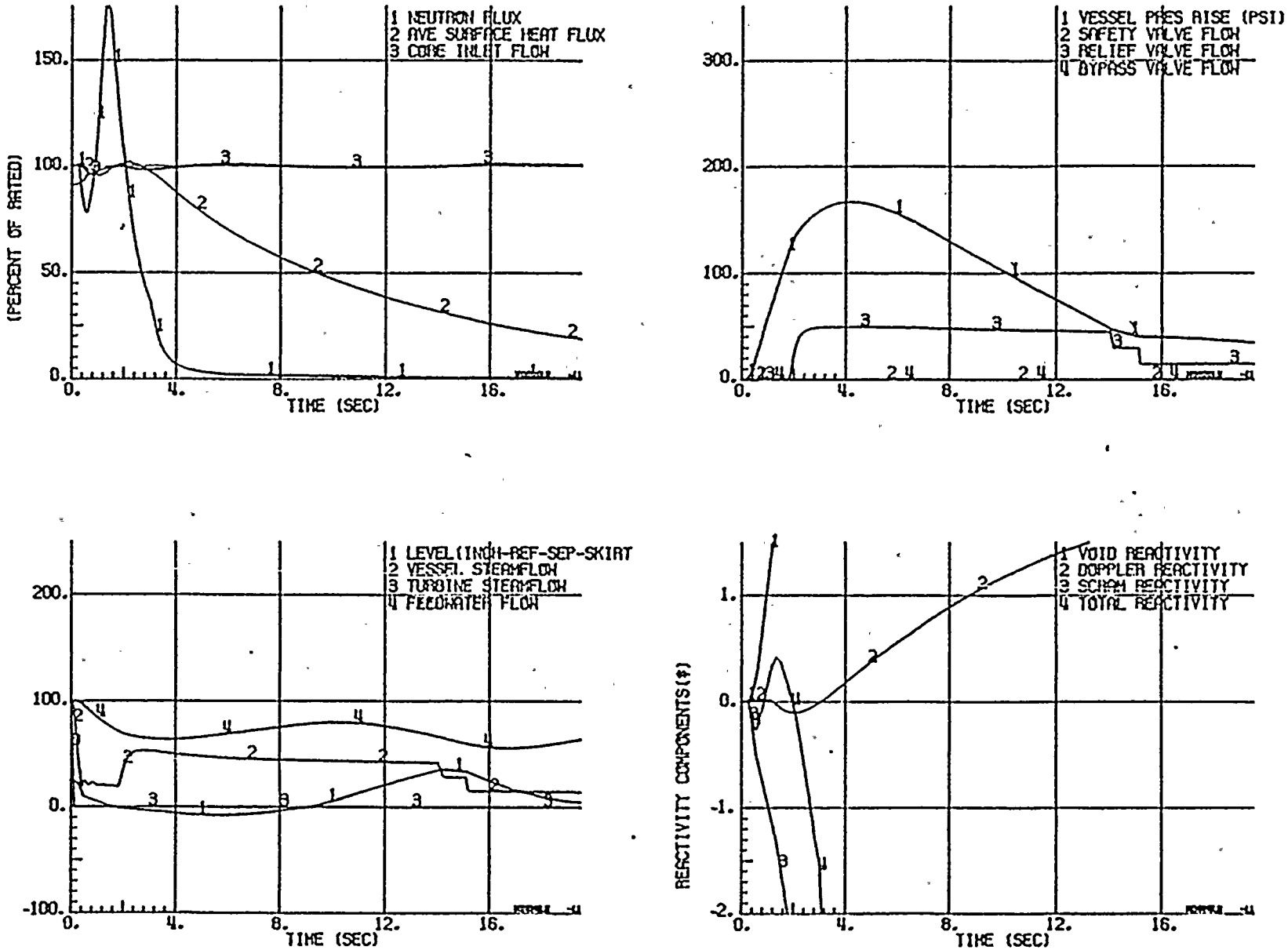

Figure 2b. Nine Mile Point-1 Turbine Trip Without Bypass, Trip Scram, EOC-1000 MWd/t

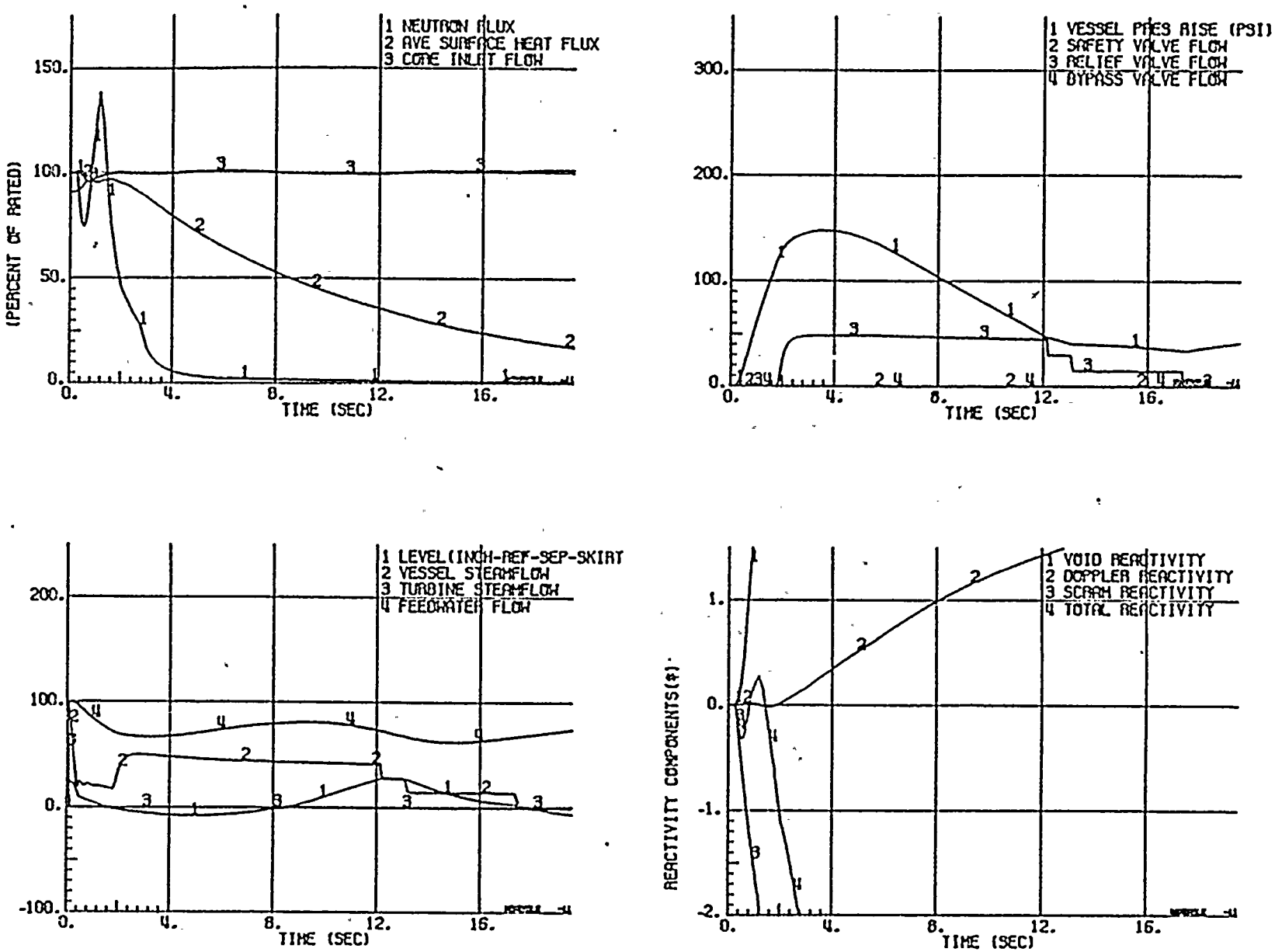

Figure 2c. Nine Mile Point-1 Turbine Trip Without Bypass, Trip Scram, EOC-2000 MWd/t

	02	06	10	14	18	22	26
51						00	
47					28		36
43				16		16	
39			00		00		00
35		16		36		38	
31			00		00		08
27		16		38		36	

NOTES: 1. ROD PATTERN IS 1/4 CORE MIRROR SYMMETRIC. UPPER LEFT QUADRANT IS SHOWN ON MAP

2. NUMBERS INDICATE NOTCHES WITHDRAWN OUT OF 48. BLANK IS A WITHDRAWN ROD

3. ERROR ROD IS 18,31

Figure 3. Limiting Rod Pattern

ATTACHMENT C

Niagara Mohawk Power Corporation

License No. DPR-63

Docket No. 50-220

Amendment Classification

The proposed amendment to the operating license has been evaluated and determined to fall within the definition of Class III of 10 C.F.R. 170.22 thereby requiring a fee of four thousand dollars ($4,000.00).

The proposed amendment for Nine Mile Point Unit 1 involves only a single safety issue. Therefore, it meets the requirements of Class III of 10 C.F.R. 170.22.