PSEG Nuclear LLC
P.O. Box 236,, Hancocks Bridge, NJ 08038-0236

PSEG
Nuclear L.L.C.

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May 02, 2008

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Hope Creek Generating Station
Facility Operating License No. NPF-57
NRC Docket No. 50-354

Subject: Supplemental Reload Licensing Report

This letter provides the Supplemental Reload Licensing Report (SRLR) for Hope Creek Generating Station (HCGS) Cycle 15 extended power uprate (EPU) operation. The SRLR includes the results of the HCGS cycle-specific core analyses, and of the transient and accident analyses performed for the actual core design and for the current operating cycle at EPU conditions. HCGS will begin EPU operation after approval of the license amendment request currently under NRC review.

Results of other confirmatory analyses for HCGS cycle 15 EPU operation not contained in the SRLR are available for review in PSEG Nuclear's offices.

Should you have any questions regarding this transmittal, please contact Mr. Paul Duke at 856-339-1466.

Sincerely,

Jeffrie Keenan
Manager - Licensing

Attachment
0000-0078-1947-SRLR, Revision 2, Supplemental Reload Licensing Report for Hope Creek Unit 1, Reload 14 Cycle 15 EPU

A001
LRR

cc: S. Collins, Regional Administrator – NRC Region I
J. Lamb, Project Manager - USNRC
NRC Senior Resident Inspector - Hope Creek
P. Mulligan, Manager IV, NJBNE

Global Nuclear Fuel
A Joint Venture of GE, Toshiba, & Hitachi

0000-0078-1947-SRLR
Revision 2
Class I
April 2008

Supplemental Reload Licensing Report
for
Hope Creek Unit 1
Reload 14 Cycle 15 EPU

Important Notice Regarding Contents of This Report

Please Read Carefully

This report was prepared by Global Nuclear Fuel - Americas, LLC (GNF-A) solely for use by PSEG ("Recipient") in support of the operating license for HOPE CREEK (the "Nuclear Plant"). The information contained in this report (the "Information") is believed by GNF-A to be an accurate and true representation of the facts known by, obtained by or provided to GNF-A at the time this report was prepared.

The only undertakings of GNF-A respecting the Information are contained in the contract between Recipient and GNF-A for nuclear fuel and related services for the Nuclear Plant (the "Fuel Contract") and nothing contained in this document shall be construed as amending or modifying the Fuel Contract. The use of the Information for any purpose other than that for which it was intended under the Fuel Contract, is not authorized by GNF-A. In the event of any such unauthorized use, GNF-A neither (a) makes any representation or warranty (either expressed or implied) as to the completeness, accuracy or usefulness of the Information or that such unauthorized use may not infringe privately owned rights, nor (b) assumes any responsibility for liability or damage of any kind which may result from such use of such information.

The results provided in this report incorporate the additional information and restrictions imposed by the final Safety Evaluation report for NEDC-33173P, *Applicability of GE Methods to Expanded Operating Domains*.

Acknowledgement

The engineering and reload licensing analyses, which form the technical basis of this Supplemental Reload Licensing Report, were performed by GNF-A/GEH Nuclear Analysis personnel. The Supplemental Reload Licensing Report was prepared by Bill Cline. This document has been verified by Lynn Leatherwood.

The basis for this report is *General Electric Standard Application for Reactor Fuel*, NEDE-24011-P-A-15, September 2005; and the U.S. Supplement, NEDE-24011-P-A-15-US, September 2005.

1. Plant-unique Items

Appendix A: Analysis Conditions
Appendix B: Decrease In Core Coolant Temperature Events
Appendix C: ARTS Power and Flow Dependent Limits
Appendix D: Option B Licensing Basis
Appendix E: Reactor Recirculation Pump Seizure Event
Appendix F: Feedwater Temperature Reduction
Appendix G: NEDC-33173P Safety Evaluation – Supplementary Information Requirements
Appendix H: List of Acronyms

2. Reload Fuel Bundles [1]

Fuel Type	Cycle Loaded	Number
Irradiated:		
SVEA96-P10CASB360-12GZ-568U-4WR-150-T6-2656 (SV96P)	11	1
SVEA96-P10CASB360-12G5.0-568U-4WR-150-T6-2657 (SV96P)	11	3
SVEA96-P10CASB361-14GZ-568U-4WR-150-T6-2658 (SV96P)	12	148
SVEA96-P10CASB360-12G5.5/2G2.5-568U-4WR-150-T6-2659 (SV96P)	12	64
GE14-P10CNAB402-4G6.0/16G4.0-100T-150-T6-2757 (GE14C)	13	56
GE14-P10CNAB402-5G6.0/14G4.0-100T-150-T6-2758 (GE14C)	13	108
GE14-P10CNAB393-18G4.0-100T-150-T6-2885 (GE14C)	14	136
GE14-P10CNAB393-18GZ-100T-150-T6-2884 (GE14C)	14	20
New:		
GE14-P10CNAB400-14GZ-100T-150-T6-3006 (GE14C)	15	28
GE14-P10CNAB398-17GZ-100T-150-T6-3008 (GE14C)	15	96
GE14-P10CNAB405-15GZ-100T-150-T6-3009 (GE14C)	15	56
GE14-P10CNAB396-17GZ-100T-150-T6-3007 (GE14C)	15	48
Total:		**764**

[1] The SV96P or SVEA96 designator is used to identify the SVEA-96+ fuel design throughout this report.

3. Reference Core Loading Pattern

	Core Average Exposure	Cycle Exposure
Nominal previous end-of-cycle exposure:	31942 MWd/MT (28977 MWd/ST)	12549 MWd/MT (11384 MWd/ST)
Minimum previous end-of-cycle exposure (for cold shutdown considerations):	31611 MWd/MT (28677 MWd/ST)	12218 MWd/MT (11084 MWd/ST)
Assumed reload beginning-of-cycle exposure:	18915 MWd/MT (17159 MWd/ST)	0 MWd/MT (0 MWd/ST)
Assumed reload end-of-cycle exposure (rated conditions):	31922 MWd/MT (28959 MWd/ST)	13007 MWd/MT (11800 MWd/ST)
Reference core loading pattern:	Figure 1	

4. Calculated Core Effective Multiplication and Control System Worth - No Voids, 20°C

Beginning of Cycle, $k_{effective}$	
Uncontrolled	1.113
Fully controlled	0.952
Strongest control rod out	0.988
R, Maximum increase in strongest rod out reactivity during the cycle (Δk)	0.001
Cycle exposure at which R occurs	12125 MWd/MT (11000 MWd/ST)

5. Standby Liquid Control System Shutdown Capability

Boron (ppm) (at 20°C)	Shutdown Margin (Δk) (at 160°C, Xenon Free)	
	Analytical Requirement	Achieved
660	≥0.010	0.021

6. Reload Unique GETAB Anticipated Operational Occurrences (AOO) Analysis Initial Condition Parameters [2]

Operating domain: ICF (HBB)
Exposure range : BOC to MOC (Application Condition: 1, 2)

	Peaking Factors						
Fuel Design	**Local**	**Radial**	**Axial**	**R-Factor**	**Bundle Power (MWt)**	**Bundle Flow (1000 lb/hr)**	**Initial MCPR**
GE14C	1.45	1.39	1.31	1.040	6.827	106.8	1.35
SV96P	1.45	1.45	1.31	0.990	7.083	104.2	1.36

Operating domain: ICF (HBB)
Exposure range : MOC to EOC (Application Condition: 1, 2)

	Peaking Factors						
Fuel Design	**Local**	**Radial**	**Axial**	**R-Factor**	**Bundle Power (MWt)**	**Bundle Flow (1000 lb/hr)**	**Initial MCPR**
GE14C	1.45	1.34	1.40	1.040	6.598	109.8	1.35
SV96P	1.45	1.40	1.40	0.990	6.867	106.6	1.36

Operating domain: MELLLA (HBB)
Exposure range : BOC to MOC (Application Condition: 1, 2)

	Peaking Factors						
Fuel Design	**Local**	**Radial**	**Axial**	**R-Factor**	**Bundle Power (MWt)**	**Bundle Flow (1000 lb/hr)**	**Initial MCPR**
GE14C	1.45	1.36	1.29	1.040	6.648	96.6	1.35
SV96P	1.45	1.41	1.29	0.990	6.898	93.6	1.35

[2] Exposure range designation is defined in Table 7-1. Application condition number is defined in Section 11.

Operating domain: MELLLA (HBB)
Exposure range : MOC to EOC (Application Condition: 1, 2)

	Peaking Factors						
Fuel Design	**Local**	**Radial**	**Axial**	**R-Factor**	**Bundle Power (MWt)**	**Bundle Flow (1000 lb/hr)**	**Initial MCPR**
GE14C	1.45	1.32	1.36	1.040	6.450	99.0	1.35
SV96P	1.45	1.36	1.36	0.990	6.644	95.9	1.37

Operating domain: ICF (UB)
Exposure range : MOC to EOC (Application Condition: 1, 2)

	Peaking Factors						
Fuel Design	**Local**	**Radial**	**Axial**	**R-Factor**	**Bundle Power (MWt)**	**Bundle Flow (1000 lb/hr)**	**Initial MCPR**
GE14C	1.45	1.42	1.27	1.040	6.962	105.3	1.35
SV96P	1.45	1.47	1.27	0.990	7.204	103.1	1.35

Operating domain: MELLLA (UB)
Exposure range : MOC to EOC (Application Condition: 1, 2)

	Peaking Factors						
Fuel Design	**Local**	**Radial**	**Axial**	**R-Factor**	**Bundle Power (MWt)**	**Bundle Flow (1000 lb/hr)**	**Initial MCPR**
GE14C	1.45	1.39	1.26	1.040	6.814	94.8	1.34
SV96P	1.45	1.44	1.26	0.990	7.055	92.2	1.34

Operating domain: ICF & FWTR (HBB)
Exposure range : BOC to MOC (Application Condition: 1, 2)

	Peaking Factors						
Fuel Design	**Local**	**Radial**	**Axial**	**R-Factor**	**Bundle Power (MWt)**	**Bundle Flow (1000 lb/hr)**	**Initial MCPR**
GE14C	1.45	1.45	1.30	1.040	7.110	104.8	1.31
SV96P	1.45	1.51	1.30	0.990	7.374	101.8	1.31

Operating domain: ICF & FWTR (HBB) Exposure range : MOC to EOC (Application Condition: 1, 2)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.45	1.40	1.40	1.040	6.849	108.4	1.31
SV96P	1.45	1.45	1.40	0.990	7.085	104.9	1.32

Operating domain: MELLLA & FWTR (HBB) Exposure range : BOC to MOC (Application Condition: 1, 2)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.45	1.42	1.29	1.040	6.947	94.6	1.29
SV96P	1.45	1.46	1.29	0.990	7.145	91.6	1.31

Operating domain: MELLLA & FWTR (HBB) Exposure range : MOC to EOC (Application Condition: 1, 2)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.45	1.37	1.37	1.040	6.688	97.7	1.31
SV96P	1.45	1.41	1.37	0.990	6.884	94.1	1.32

Operating domain: ICF & FWTR (UB) Exposure range : MOC to EOC (Application Condition: 1, 2)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.45	1.48	1.27	1.040	7.245	103.4	1.30
SV96P	1.45	1.53	1.27	0.990	7.465	100.9	1.31

Operating domain: MELLLA & FWTR (UB) Exposure range : MOC to EOC (Application Condition: 1, 2)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.45	1.45	1.26	1.040	7.088	93.1	1.29
SV96P	1.45	1.50	1.26	0.990	7.314	90.3	1.29

Operating domain: ICF with RPTOOS (HBB) Exposure range : BOC to MOC (Application Condition: 2)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.45	1.37	1.31	1.040	6.727	107.4	1.38
SV96P	1.45	1.43	1.31	0.990	7.007	104.7	1.37

Operating domain: ICF with RPTOOS (HBB) Exposure range : MOC to EOC (Application Condition: 2)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.45	1.33	1.40	1.040	6.519	110.4	1.37
SV96P	1.45	1.38	1.40	0.990	6.766	107.4	1.38

Operating domain: MELLLA with RPTOOS (HBB) Exposure range : BOC to MOC (Application Condition: 2)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.45	1.34	1.29	1.040	6.579	97.0	1.36
SV96P	1.45	1.39	1.29	0.990	6.815	94.1	1.37

Operating domain: MELLLA with RPTOOS (HBB) Exposure range : MOC to EOC (Application Condition: 2)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.45	1.31	1.36	1.040	6.404	99.3	1.36
SV96P	1.45	1.35	1.36	0.990	6.600	96.2	1.38

Operating domain: ICF with RPTOOS (UB) Exposure range : MOC to EOC (Application Condition: 2)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.45	1.40	1.27	1.040	6.870	105.9	1.37
SV96P	1.45	1.45	1.27	0.990	7.103	103.8	1.37

Operating domain: MELLLA with RPTOOS (UB) Exposure range : MOC to EOC (Application Condition: 2)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.45	1.37	1.26	1.040	6.714	95.5	1.36
SV96P	1.45	1.42	1.26	0.990	6.957	92.9	1.36

Operating domain: ICF & FWTR with RPTOOS (HBB) Exposure range : BOC to MOC (Application Condition: 2)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.45	1.42	1.30	1.040	6.969	105.7	1.34
SV96P	1.45	1.49	1.30	0.990	7.274	102.5	1.33

Operating domain: ICF & FWTR with RPTOOS (HBB) Exposure range : MOC to EOC (Application Condition: 2)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.45	1.37	1.40	1.040	6.726	109.2	1.34
SV96P	1.45	1.43	1.40	0.990	6.990	105.5	1.34

Operating domain: MELLLA & FWTR with RPTOOS (HBB) Exposure range : BOC to MOC (Application Condition: 2)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.45	1.40	1.29	1.040	6.847	95.2	1.32
SV96P	1.45	1.45	1.29	0.990	7.078	92.0	1.32

Operating domain: MELLLA & FWTR with RPTOOS (HBB) Exposure range : MOC to EOC (Application Condition: 2)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.45	1.35	1.37	1.040	6.594	98.3	1.33
SV96P	1.45	1.39	1.37	0.990	6.801	94.6	1.34

Operating domain: ICF & FWTR with RPTOOS (UB) Exposure range : MOC to EOC (Application Condition: 2)							
	Peaking Factors						
Fuel Design	Local	Radial	Axial	R-Factor	Bundle Power (MWt)	Bundle Flow (1000 lb/hr)	Initial MCPR
GE14C	1.45	1.45	1.27	1.040	7.081	104.5	1.34
SV96P	1.45	1.50	1.27	0.990	7.340	101.8	1.33

Operating domain: MELLLA & FWTR with RPTOOS (UB) Exposure range : MOC to EOC (Application Condition: 2)							
	Peaking Factors						
Fuel Design	**Local**	**Radial**	**Axial**	**R-Factor**	**Bundle Power (MWt)**	**Bundle Flow (1000 lb/hr)**	**Initial MCPR**
GE14C	1.45	1.43	1.26	1.040	6.994	93.7	1.31
SV96P	1.45	1.48	1.26	0.990	7.213	90.9	1.31

7. Selected Margin Improvement Options [3]

Recirculation pump trip:	Yes
Rod withdrawal limiter:	No
Thermal power monitor:	Yes
Improved scram time:	Yes (ODYN Option B)
Measured scram time:	No
Exposure dependent limits:	Yes
Exposure points analyzed:	2

Table 7-1 Cycle Exposure Range Designation

Name	Exposure Range [4]
BOC to MOC	BOC15 to EOR15-2315 MWd/MT (2100 MWd/ST)
MOC to EOC	EOR15-2315 MWd/MT (2100 MWd/ST) to EOC15
BOC to EOC	BOC15 to EOC15

[3] Refer to the GESTAR basis document identified at the beginning of this report for the margin improvement options currently supported therein.
[4] End of Rated (EOR) is defined as the cycle exposure corresponding to all rods out, 100% power/100% flow, and normal feedwater temperature. For plants without mid-cycle OLMCPR points, EOR is not applicable.

8. Operating Flexibility Options [5]

The following information presents the operational domains and flexibility options which are supported by the reload licensing analysis.

Extended Operating Domain (EOD):	Yes
EOD type: Maximum Extended Load Line Limit (MELLLA)	
Minimum core flow at rated power:	94.8 %
Increased Core Flow:	Yes
Flow point analyzed throughout cycle:	105.0 %
Feedwater Temperature Reduction:	No
ARTS Program:	Yes
Single Loop Operation:	Yes
Equipment Out of Service:	
Safety/relief valves Out of Service: (credit taken for 13 valves)	Yes
RPTOOS	Yes

9. Core-wide AOO Analysis Results [6]

Methods used: GEMINI, GEXL-PLUS

Operating domain: ICF (HBB)
Exposure range : BOC to MOC (Application Condition: 1, 2)

Event	Flux (%rated)	Q/A (%rated)	Uncorrected ΔCPR GE14C	Uncorrected ΔCPR SV96P	Fig.
FW Controller Failure	248	114	0.22	0.22	2
Load Rejection w/o Bypass	369	117	0.27	0.27	3
Turbine Trip w/o Bypass	319	115	0.26	0.26	4

[5] Refer to the GESTAR basis document identified at the beginning of this report for the operating flexibility options currently supported therein.
[6] Exposure range designation is defined in Table 7-1. Application condition number is defined in Section 11.

Operating domain: ICF (HBB)
Exposure range : MOC to EOC (Application Condition: 1, 2)

			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	306	119	0.23	0.24	5
Load Rejection w/o Bypass	427	122	0.27	0.28	6
Turbine Trip w/o Bypass	385	120	0.26	0.27	7

Operating domain: MELLLA (HBB)
Exposure range : BOC to MOC (Application Condition: 1, 2)

			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	223	112	0.21	0.22	8
Load Rejection w/o Bypass	333	116	0.26	0.27	9
Turbine Trip w/o Bypass	287	113	0.25	0.26	10

Operating domain: MELLLA (HBB)
Exposure range : MOC to EOC (Application Condition: 1, 2)

			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	274	117	0.22	0.24	11
Load Rejection w/o Bypass	386	120	0.27	0.29	12
Turbine Trip w/o Bypass	340	118	0.26	0.28	13

Operating domain: ICF (UB)
Exposure range : MOC to EOC (Application Condition: 1, 2)

			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	220	111	0.21	0.21	14
Load Rejection w/o Bypass	337	115	0.27	0.27	15
Turbine Trip w/o Bypass	296	113	0.26	0.26	16

Operating domain: MELLLA (UB)
Exposure range : MOC to EOC (Application Condition: 1, 2)

			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	193	108	0.20	0.20	17
Load Rejection w/o Bypass	282	112	0.26	0.26	18
Turbine Trip w/o Bypass	261	109	0.24	0.24	19

Operating domain: ICF & FWTR (HBB)
Exposure range : BOC to MOC (Application Condition: 1, 2)

			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	249	115	0.22	0.23	20

Operating domain: ICF & FWTR (HBB)
Exposure range : MOC to EOC (Application Condition: 1, 2)

			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	313	120	0.23	0.24	21

Operating domain: MELLLA & FWTR (HBB)
Exposure range : BOC to MOC (Application Condition: 1, 2)

			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	227	113	0.22	0.23	22

Operating domain: MELLLA & FWTR (HBB)
Exposure range : MOC to EOC (Application Condition: 1, 2)

			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	292	119	0.23	0.25	23

Operating domain: ICF & FWTR (UB)
Exposure range : MOC to EOC (Application Condition: 1, 2)

Event	Flux (%rated)	Q/A (%rated)	Uncorrected ΔCPR GE14C	Uncorrected ΔCPR SV96P	Fig.
FW Controller Failure	229	113	0.22	0.22	24

Operating domain: MELLLA & FWTR (UB)
Exposure range : MOC to EOC (Application Condition: 1, 2)

Event	Flux (%rated)	Q/A (%rated)	Uncorrected ΔCPR GE14C	Uncorrected ΔCPR SV96P	Fig.
FW Controller Failure	199	110	0.20	0.21	25

Operating domain: ICF with RPTOOS (HBB)
Exposure range : BOC to MOC (Application Condition: 2)

Event	Flux (%rated)	Q/A (%rated)	Uncorrected ΔCPR GE14C	Uncorrected ΔCPR SV96P	Fig.
FW Controller Failure	275	117	0.25	0.24	26
Load Rejection w/o Bypass	406	120	0.29	0.29	27
Turbine Trip w/o Bypass	364	118	0.29	0.29	28

Operating domain: ICF with RPTOOS (HBB)
Exposure range : MOC to EOC (Application Condition: 2)

Event	Flux (%rated)	Q/A (%rated)	Uncorrected ΔCPR GE14C	Uncorrected ΔCPR SV96P	Fig.
FW Controller Failure	339	122	0.25	0.26	29
Load Rejection w/o Bypass	469	125	0.29	0.30	30
Turbine Trip w/o Bypass	434	124	0.29	0.29	31

Operating domain: MELLLA with RPTOOS (HBB) **Exposure range : BOC to MOC (Application Condition: 2)**					
			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	241	114	0.23	0.24	32
Load Rejection w/o Bypass	360	118	0.28	0.29	33
Turbine Trip w/o Bypass	319	116	0.28	0.28	34

Operating domain: MELLLA with RPTOOS (HBB) **Exposure range : MOC to EOC (Application Condition: 2)**					
			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	296	119	0.24	0.26	35
Load Rejection w/o Bypass	415	123	0.29	0.30	36
Turbine Trip w/o Bypass	373	121	0.28	0.29	37

Operating domain: ICF with RPTOOS (UB) **Exposure range : MOC to EOC (Application Condition: 2)**					
			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	249	114	0.25	0.24	38
Load Rejection w/o Bypass	374	118	0.30	0.29	39
Turbine Trip w/o Bypass	341	117	0.29	0.28	40

Operating domain: MELLLA with RPTOOS (UB) **Exposure range : MOC to EOC (Application Condition: 2)**					
			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	215	111	0.23	0.22	41
Load Rejection w/o Bypass	304	115	0.28	0.28	42
Turbine Trip w/o Bypass	295	113	0.27	0.27	43

Operating domain: ICF & FWTR with RPTOOS (HBB) **Exposure range : BOC to MOC (Application Condition: 2)**					
			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	277	118	0.25	0.25	44

Operating domain: ICF & FWTR with RPTOOS (HBB) **Exposure range : MOC to EOC (Application Condition: 2)**					
			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	346	123	0.25	0.26	45

Operating domain: MELLLA & FWTR with RPTOOS (HBB) **Exposure range : BOC to MOC (Application Condition: 2)**					
			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	246	115	0.24	0.24	46

Operating domain: MELLLA & FWTR with RPTOOS (HBB) **Exposure range : MOC to EOC (Application Condition: 2)**					
			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	314	121	0.25	0.26	47

Operating domain: ICF & FWTR with RPTOOS (UB) **Exposure range : MOC to EOC (Application Condition: 2)**					
			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	258	116	0.25	0.25	48

Operating domain: MELLLA & FWTR with RPTOOS (UB) Exposure range : MOC to EOC (Application Condition: 2)					
			Uncorrected ΔCPR		
Event	**Flux (%rated)**	**Q/A (%rated)**	**GE14C**	**SV96P**	**Fig.**
FW Controller Failure	220	112	0.23	0.23	49

10. Local Rod Withdrawal Error (With Limiting Instrument Failure) AOO Summary

The ARTS based rod withdrawal error is an unblocked basis. The unblocked rod withdrawal error results in a ΔCPR of 0.26.

11. Cycle MCPR Values [7] [8] [9]

Two loop operation safety limit: 1.08

Single loop operation safety limit: 1.10

Stability MCPR Design Basis: See Section 15

ECCS MCPR Design Basis: See Section 16 (Initial MCPR)

SLO Pump Seizure OLMCPR: See Pump Seizure Appendix

Non-pressurization Events:

Exposure range: BOC to EOC		
	GE14C	**SV96P**
Loss of Feedwater Heating (110°F)	1.24	1.24
Control Rod Withdrawal Error (unblocked)	1.35	1.35
Fuel Loading Error (misoriented)	1.25	1.32
Fuel Loading Error (mislocated)	Not Limiting	

[7] The two loop and single loop Safety Limit values include a +0.02 ΔCPR adder in accordance with extended operating domain licensing commitments. The OLMCPR values presented in the Non-pressurization and Limiting Pressurization Events summary tables have been adjusted to include an additional +0.01 ΔCPR adder in accordance with extended operating domain licensing commitments. OLMCPR values presented in the detailed Pressurization Events tables do NOT include this adjustment.

[8] Exposure range designation is defined in Table 7-1.

[9] For single loop operation, the MCPR operating limit is 0.02 greater than the two loop value.

Limiting Pressurization Events OLMCPR Summary Table: [10]

Appl. Cond.	Exposure Range	Option A		Option B	
		GE14C	SV96P	GE14C	SV96P
1	**Equipment In Service**				
	BOC to MOC	1.49	1.49	1.38	1.38
	MOC to EOC	1.59	1.61	1.42	1.44
2	**RPTOOS**				
	BOC to MOC	1.51	1.51	1.40	1.40
	MOC to EOC	1.61	1.62	1.44	1.45

Pressurization Events: [11]

Operating domain: ICF (HBB)
Exposure range : BOC to MOC **(Application Condition: 1, 2)**

	Option A		Option B	
	GE14C	SV96P	GE14C	SV96P
FW Controller Failure	1.42	1.42	1.31	1.31
Load Rejection w/o Bypass	1.48	1.48	1.37	1.37
Turbine Trip w/o Bypass	1.47	1.47	1.36	1.36

Operating domain: ICF (HBB)
Exposure range : MOC to EOC **(Application Condition: 1, 2)**

	Option A		Option B	
	GE14C	SV96P	GE14C	SV96P
FW Controller Failure	1.53	1.55	1.36	1.38
Load Rejection w/o Bypass	1.57	1.59	1.40	1.42
Turbine Trip w/o Bypass	1.57	1.59	1.40	1.42

[10] Each application condition (Appl. Cond.) covers the entire range of licensed flow and feedwater temperature unless specified otherwise. The OLMCPR values presented apply to rated power operation based on the two loop operation safety limit MCPR.

[11] Application condition numbers shown for each of the following pressurization events represent the application conditions for which this event contributed in the determination of the limiting OLMCPR value.

Operating domain: MELLLA (HBB) Exposure range : BOC to MOC (Application Condition: 1, 2)				
	Option A		Option B	
	GE14C	SV96P	GE14C	SV96P
FW Controller Failure	1.42	1.42	1.31	1.31
Load Rejection w/o Bypass	1.47	1.48	1.36	1.37
Turbine Trip w/o Bypass	1.46	1.47	1.35	1.36

Operating domain: MELLLA (HBB) Exposure range : MOC to EOC (Application Condition: 1, 2)				
	Option A		Option B	
	GE14C	SV96P	GE14C	SV96P
FW Controller Failure	1.52	1.55	1.35	1.38
Load Rejection w/o Bypass	1.57	1.60	1.40	1.43
Turbine Trip w/o Bypass	1.57	1.59	1.40	1.42

Operating domain: ICF (UB) Exposure range : MOC to EOC (Application Condition: 1, 2)				
	Option A		Option B	
	GE14C	SV96P	GE14C	SV96P
FW Controller Failure	1.51	1.52	1.34	1.35
Load Rejection w/o Bypass	1.58	1.58	1.41	1.41
Turbine Trip w/o Bypass	1.56	1.57	1.39	1.40

Operating domain: MELLLA (UB) Exposure range : MOC to EOC (Application Condition: 1, 2)				
	Option A		Option B	
	GE14C	SV96P	GE14C	SV96P
FW Controller Failure	1.50	1.50	1.33	1.33
Load Rejection w/o Bypass	1.56	1.57	1.39	1.40
Turbine Trip w/o Bypass	1.55	1.55	1.38	1.38

Operating domain: ICF & FWTR (HBB) Exposure range : BOC to MOC (Application Condition: 1, 2)				
	Option A		Option B	
	GE14C	SV96P	GE14C	SV96P
FW Controller Failure	1.43	1.43	1.32	1.32

Operating domain: ICF & FWTR (HBB)
Exposure range : MOC to EOC (Application Condition: 1, 2)

	Option A		Option B	
	GE14C	**SV96P**	**GE14C**	**SV96P**
FW Controller Failure	1.53	1.55	1.36	1.38

Operating domain: MELLLA & FWTR (HBB)
Exposure range : BOC to MOC (Application Condition: 1, 2)

	Option A		Option B	
	GE14C	**SV96P**	**GE14C**	**SV96P**
FW Controller Failure	1.42	1.43	1.31	1.32

Operating domain: MELLLA & FWTR (HBB)
Exposure range : MOC to EOC (Application Condition: 1, 2)

	Option A		Option B	
	GE14C	**SV96P**	**GE14C**	**SV96P**
FW Controller Failure	1.53	1.56	1.36	1.39

Operating domain: ICF & FWTR (UB)
Exposure range : MOC to EOC (Application Condition: 1, 2)

	Option A		Option B	
	GE14C	**SV96P**	**GE14C**	**SV96P**
FW Controller Failure	1.52	1.53	1.35	1.36

Operating domain: MELLLA & FWTR (UB)
Exposure range : MOC to EOC (Application Condition: 1, 2)

	Option A		Option B	
	GE14C	**SV96P**	**GE14C**	**SV96P**
FW Controller Failure	1.50	1.51	1.33	1.34

Operating domain: ICF with RPTOOS (HBB)
Exposure range : BOC to MOC (Application Condition: 2)

	Option A		Option B	
	GE14C	**SV96P**	**GE14C**	**SV96P**
FW Controller Failure	1.45	1.45	1.34	1.34
Load Rejection w/o Bypass	1.50	1.50	1.39	1.39
Turbine Trip w/o Bypass	1.50	1.50	1.39	1.39

Operating domain: ICF with RPTOOS (HBB)
Exposure range : MOC to EOC (Application Condition: 2)

	Option A		Option B	
	GE14C	SV96P	GE14C	SV96P
FW Controller Failure	1.55	1.57	1.38	1.40
Load Rejection w/o Bypass	1.60	1.61	1.43	1.44
Turbine Trip w/o Bypass	1.59	1.61	1.42	1.44

Operating domain: MELLLA with RPTOOS (HBB)
Exposure range : BOC to MOC (Application Condition: 2)

	Option A		Option B	
	GE14C	SV96P	GE14C	SV96P
FW Controller Failure	1.44	1.44	1.33	1.33
Load Rejection w/o Bypass	1.49	1.49	1.38	1.38
Turbine Trip w/o Bypass	1.48	1.49	1.37	1.38

Operating domain: MELLLA with RPTOOS (HBB)
Exposure range : MOC to EOC (Application Condition: 2)

	Option A		Option B	
	GE14C	SV96P	GE14C	SV96P
FW Controller Failure	1.55	1.57	1.38	1.40
Load Rejection w/o Bypass	1.59	1.61	1.42	1.44
Turbine Trip w/o Bypass	1.59	1.61	1.42	1.44

Operating domain: ICF with RPTOOS (UB)
Exposure range : MOC to EOC (Application Condition: 2)

	Option A		Option B	
	GE14C	SV96P	GE14C	SV96P
FW Controller Failure	1.55	1.55	1.38	1.38
Load Rejection w/o Bypass	1.60	1.61	1.43	1.44
Turbine Trip w/o Bypass	1.59	1.59	1.42	1.42

Operating domain: MELLLA with RPTOOS (UB) **Exposure range : MOC to EOC (Application Condition: 2)**				
	Option A		**Option B**	
	GE14C	**SV96P**	**GE14C**	**SV96P**
FW Controller Failure	1.53	1.53	1.36	1.36
Load Rejection w/o Bypass	1.59	1.59	1.42	1.42
Turbine Trip w/o Bypass	1.58	1.58	1.41	1.41

Operating domain: ICF & FWTR with RPTOOS (HBB) **Exposure range : BOC to MOC (Application Condition: 2)**				
	Option A		**Option B**	
	GE14C	**SV96P**	**GE14C**	**SV96P**
FW Controller Failure	1.46	1.46	1.35	1.35

Operating domain: ICF & FWTR with RPTOOS (HBB) **Exposure range : MOC to EOC (Application Condition: 2)**				
	Option A		**Option B**	
	GE14C	**SV96P**	**GE14C**	**SV96P**
FW Controller Failure	1.56	1.58	1.39	1.41

Operating domain: MELLLA & FWTR with RPTOOS (HBB) **Exposure range : BOC to MOC (Application Condition: 2)**				
	Option A		**Option B**	
	GE14C	**SV96P**	**GE14C**	**SV96P**
FW Controller Failure	1.44	1.45	1.33	1.34

Operating domain: MELLLA & FWTR with RPTOOS (HBB) **Exposure range : MOC to EOC (Application Condition: 2)**				
	Option A		**Option B**	
	GE14C	**SV96P**	**GE14C**	**SV96P**
FW Controller Failure	1.55	1.57	1.38	1.40

Operating domain: ICF & FWTR with RPTOOS (UB) **Exposure range : MOC to EOC (Application Condition: 2)**				
	Option A		**Option B**	
	GE14C	**SV96P**	**GE14C**	**SV96P**
FW Controller Failure	1.56	1.56	1.39	1.39

Operating domain: MELLLA & FWTR with RPTOOS (UB) Exposure range : MOC to EOC (Application Condition: 2)				
	Option A		Option B	
	GE14C	SV96P	GE14C	SV96P
FW Controller Failure	1.53	1.54	1.36	1.37

12. Overpressurization Analysis Summary

Event	Psl (psig)	Pdome (psig)	Pv (psig)	Plant Response
MSIV Closure (Flux Scram) - ICF (HBB)	1262	1267	1288	Figure 50
MSIV Closure (Flux Scram) - MELLLA (HBB)	1263	1268	1288	Figure 51

13. Loading Error Results

Variable water gap misoriented bundle analysis: Yes [12]

Misoriented Fuel Bundle	ΔCPR
GE14-P10CNAB396-17GZ-100T-150-T6-3007 (GE14C)	0.16
GE14-P10CNAB393-18G4.0-100T-150-T6-2885 (GE14C)	0.07
GE14-P10CNAB405-15GZ-100T-150-T6-3009 (GE14C)	0.10
GE14-P10CNAB393-18GZ-100T-150-T6-2884 (GE14C)	0.08
GE14-P10CNAB398-17GZ-100T-150-T6-3008 (GE14C)	0.16
GE14-P10CNAB400-14GZ-100T-150-T6-3006 (GE14C)	0.14
SVEA96-P10CASB361-14GZ-568U-4WR-150-T6-2658 (SV96P)	0.23

14. Control Rod Drop Analysis Results

This is a banked position withdrawal sequence plant, therefore, the control rod drop accident analysis is not required. NRC approval is documented in NEDE-24011-P-A-US.

[12] Includes a 0.02 penalty due to variable water gap R-factor uncertainty.

15. Stability Analysis Results

15.1 Introduction

Hope Creek has implemented BWROG Long Term Stability Solution Option III using the Oscillation Power Range Monitor (OPRM) as described in Reference 1 in Section 15.4. The plant specific Hot Channel Oscillation Magnitude (HCOM) (Reference 2 in Section 15.4) and other cycle specific stability parameters are used in the Cycle 15 Option III stability evaluation. A Backup Stability Protection (BSP) evaluation is provided in the event that the Option III OPRM system is declared inoperable.

The following Option III OPRM stability setpoint determination described in Section 15.2 and the implementation of the associated BSP Regions described in Section 15.3 provides the stability licensing bases for Hope Creek Cycle 15.

15.2 Option III Stability Evaluation

A reload Option III evaluation has been performed in accordance with the licensing methodology described in Reference 3 in Section 15.4. The stability based Operating Limit Minimum Critical Power Ratio (OLMCPR) is determined for two conditions as a function of OPRM amplitude setpoint. The two conditions evaluated are: (1) a postulated oscillation at 45% rated core flow quasi steady-state operation (SS), and (2) a postulated oscillation following a two recirculation pump trip (2PT) from the limiting rated power operation state point.

The OPRM setpoint-dependent OLMCPR(SS) and OLMCPR(2PT) values are calculated for Cycle 15 using a DIVOM slope of 0.65 which was calculated in accordance with the BWROG regional mode DIVOM guidelines described in Reference 4 in Section 15.4. This DIVOM slope was calculated based on a radial peaking factor multiplier of 1.05 to add margin over the nominal rod patterns. Further evaluations may be necessary if the radial peaking during actual core operation is significantly different from that assumed. The Cycle 15 Option III evaluation provides adequate protection against violation of the Safety Limit MCPR (SLMCPR) for the two postulated reactor instability events as long as the plant OLMCPR is equal to or greater than the calculated OLMCPR(SS) and OLMCPR(2PT) for the selected OPRM setpoint in Table 15-1 and 15-2.

The relationship between the OPRM Successive Confirmation Count Setpoint and the OPRM Amplitude Setpoint is provided in Reference 3 in Section 15.4 and Table 15-3. For intermediate OPRM Amplitude Setpoints, the corresponding OPRM Successive Confirmation Count Setpoints may be obtained by using linear interpolation.

The OPRM setpoints for Two Loop Operation (TLO) are conservative relative to Single Loop Operation (SLO) and are therefore bounding.

Two sets of OPRM setpoints are provided. Table 15-1 assumes a 1.0 Hz corner frequency in the conditioning filter while Table 15-2 assumes a 1.5 Hz corner frequency for the conditioning filter.

Table 15-1: OPRM Setpoint Versus OLMCPR[13]
(1.0 Hz Corner Frequency)

OPRM Amplitude Setpoint	OLMCPR(SS)	OLMCPR(2PT)
1.04	1.2414	1.1097
1.05	1.2778	1.1423
1.06	1.3165	1.1769
1.07	1.3576	1.2136
1.08	1.4014	1.2527
1.09	1.4480	1.2944
1.10	1.4963	1.3375
1.11	1.5478	1.3836
1.12	1.6031	1.4330
1.13	1.6624	1.4861
1.14	1.7263	1.5432
OLMCPR Acceptance Criteria	**Off-rated OLMCPR @45% flow**	**Rated Power OLMCPR (see Section 11)**

[13] The setpoints in these tables include the 5% bypass voiding penalty imposed by the final Safety Evaluation report for NEDC-33173P, *Applicability of GE Methods to Expanded Operating Domains*.

Table 15-2: OPRM Setpoint Versus OLMCPR[14]
(1.5 Hz Corner Frequency)

OPRM Amplitude Setpoint	OLMCPR(SS)	OLMCPR(2PT)
1.04	1.2313	1.1006
1.05	1.2650	1.1308
1.06	1.3007	1.1627
1.07	1.3384	1.1964
1.08	1.3783	1.2321
1.09	1.4208	1.2700
1.10	1.4646	1.3092
1.11	1.5112	1.3509
1.12	1.5609	1.3953
1.13	1.6140	1.4428
1.14	1.6708	1.4935
OLMCPR Acceptance Criteria	**Off-rated OLMCPR @45% flow**	**Rated Power OLMCPR (see Section 11)**

[14] The setpoints in these tables include the 5% bypass voiding penalty imposed by the final Safety Evaluation report for NEDC-33173P, *Applicability of GE Methods to Expanded Operating Domains*.

Table 15-3: Relationship between OPRM Successive Confirmation Count Setpoint and OPRM Amplitude Setpoint

Successive Confirmation Count Setpoint	OPRM Amplitude Setpoint
6	≥ 1.04
8	≥ 1.05
9	≥ 1.06
10	≥ 1.07
11	≥ 1.08
12	≥ 1.09
13	≥ 1.10
14	≥ 1.11
15	≥ 1.13
16	≥ 1.14
17	≥ 1.16
18	≥ 1.18
19	≥ 1.21
20	≥ 1.24

15.3 Backup Stability Protection

The BSP region boundaries were calculated for Hope Creek Cycle 15 for normal feedwater temperature operation. The endpoints of the regions are defined in Table 15-4. The region boundaries, shown in Figure 15-1, are defined using the Generic Shape Function (GSF), in compliance with References 5 and 6 in Section 15.4.

Table 15-4: BSP Region Intercepts for Normal Feedwater Temperature

Region Boundary Intercept	%Power	% Flow	Core DR	Highest Channel DR
A1	62.4	45.1	<0.799	<0.450
B1	44.7	35.0	<0.799	<0.431
A2	67.2	51.1	<0.800	<0.404
B2	32.2	36.3	<0.799	<0.380

The Cycle 14 BSP regions described in Reference 7 in Section 15.4 are bounding for Cycle 15 up to an exposure of 11600 MWD/ST. [15]

The BSP results for the EPU analysis are bounded by the results for the CLTP analysis, and therefore, the intercepts in Table 15-4 are based on the CLTP analysis.

[15] The BSP intercepts shown in Reference 7 are based on the CLTP rated power, not the EPU rated power; therefore, they need to be scaled by multiplying the percent powers by the ratio CLTP/EPU rated power.

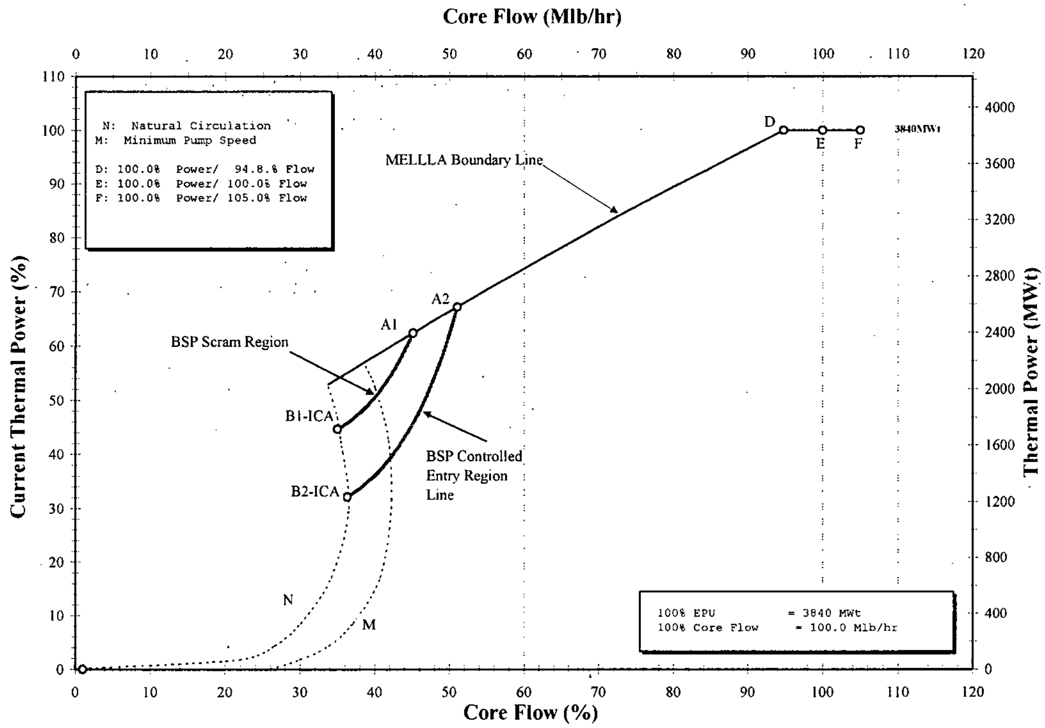


Figure 15-1: BSP Regions for Normal Feedwater Temperature Operation

15.4 References

1. *BWR Owners' Group Long-Term Stability Solutions Licensing Methodology*, NEDO-31960-A, November 1995.
2. *Reactor Long-Term Stability Solution Option III: Licensing Basis Hot Channel Oscillation Magnitude for Hope Creek*, GENE-A13-00381-04, Rev. 1, September 2004.
3. *Reactor Stability Detect and Suppress Solutions Licensing Basis Methodology for Reload Applications, Licensing Topical Report*, NEDO-32465-A, August 1996.
4. *Plant-Specific Regional Mode DIVOM Procedure Guideline*, GE-NE-0000-0028-9714-R1, June 2005.
5. *BWR Owners' Group Guidelines for Stability Interim Corrective Action*, BWROG-94079, June 1994.
6. *Backup Stability Protection (BSP) for Inoperable Option III Solution*, OG 02-0119-260, July 2002.
7. *MELLLA Backup Stability Protection Evaluation for Hope Creek Cycle 14*, GE-NE-0000-0044-3736-R0, January 2006.

16. Loss-of-Coolant Accident Results

16.1 10CFR50.46 Licensing Results

The ECCS-LOCA analysis is based on the SAFER/GESTR-LOCA methodology. The licensing results applicable to each fuel type in the new cycle are summarized in Table 16.1-1.

Table 16.1-1 Licensing Results

Fuel Type	Licensing Basis PCT (°F)	Local Oxidation (%)	Core-Wide Metal-Water Reaction (%)
SVEA96	1540	< 1.00	< 0.10
GE14C	1380	< 1.00	< 0.10

The SAFER/GESTR-LOCA analysis results for SVEA96 fuel are documented in Section 5 of Reference 1 for SVEA96 in Section 16.4.

The SAFER/GESTR-LOCA analysis results for GE14C fuel are documented in Section 5 of Reference 1 for GE14C in Section 16.4.

16.2 10CFR50.46 Error Evaluation

The 10CFR50.46 errors applicable to the Licensing Basis PCT are shown in the table below.

Table 16.2-1 Impact on Licensing Basis Peak Cladding Temperature for SVEA96

10CFR50.46 Error Notifications		
Number	**Subject**	**PCT Impact (°F)**
2006-01	Impact of Top Peaked Power Shape on Small Break LOCA Analysis	0
	Total PCT Adder (°F)	0

The SVEA96 Licensing Basis PCT remains below the 10CFR50.46 limit of 2200°F.

Table 16.2-2 Impact on Licensing Basis Peak Cladding Temperature for GE14C

10CFR50.46 Error Notifications		
Number	**Subject**	**PCT Impact (°F)**
2006-01	Impact of Top Peaked Power Shape on Small Break LOCA Analysis	0
	Total PCT Adder (°F)	0

The GE14C Licensing Basis PCT remains below the 10CFR50.46 limit of 2200°F.

16.3 ECCS-LOCA Operating Limits

The ECCS MAPLHGR operating limits for the new fuel bundles in this cycle are shown in the tables below. The MAPLHGR operating limits for the remaining fuel bundles are documented in Reference 2 for GE14C and Reference 2 for SVEA96 in Section 16.4.

Table 16.3-1 MAPLHGR Limits

Bundle Type: GE14-P10CNAB396-17GZ-100T-150-T6-3007 (GE14C)

Average Planar Exposure		MAPLHGR Limit
GWd/MT	**GWd/ST**	**kW/ft**
0.00	0.00	12.82
16.00	14.51	12.82
21.09	19.13	12.82
63.50	57.61	8.00
70.00	63.50	5.00

Table 16.3-2 MAPLHGR Limits

Bundle Type: GE14-P10CNAB405-15GZ-100T-150-T6-3009 (GE14C)

Average Planar Exposure		MAPLHGR Limit
GWd/MT	**GWd/ST**	**kW/ft**
0.00	0.00	12.82
16.00	14.51	12.82
21.09	19.13	12.82
63.50	57.61	8.00
70.00	63.50	5.00

Table 16.3-3 MAPLHGR Limits

Bundle Type: GE14-P10CNAB398-17GZ-100T-150-T6-3008 (GE14C)

Average Planar Exposure		MAPLHGR Limit
GWd/MT	**GWd/ST**	**kW/ft**
0.00	0.00	12.82
16.00	14.51	12.82
21.09	19.13	12.82
63.50	57.61	8.00
70.00	63.50	5.00

Table 16.3-4 MAPLHGR Limits

Bundle Type: GE14-P10CNAB400-14GZ-100T-150-T6-3006 (GE14C)

Average Planar Exposure		MAPLHGR Limit
GWd/MT	**GWd/ST**	**kW/ft**
0.00	0.00	12.82
16.00	14.51	12.82
21.09	19.13	12.82
63.50	57.61	8.00
70.00	63.50	5.00

The single loop operation multiplier on LHGR and MAPLHGR, and the ECCS Initial MCPR values applicable to each fuel type in the new cycle core are shown in the table below.

Table 16.3-5 Initial MCPR and Single Loop Operation LHGR and MAPLHGR Multiplier

Fuel Type	Initial MCPR	Single Loop Operation LHGR and MAPLHGR Multiplier
SVEA96	1.250	0.80
GE14C	1.250	0.80

16.4 References

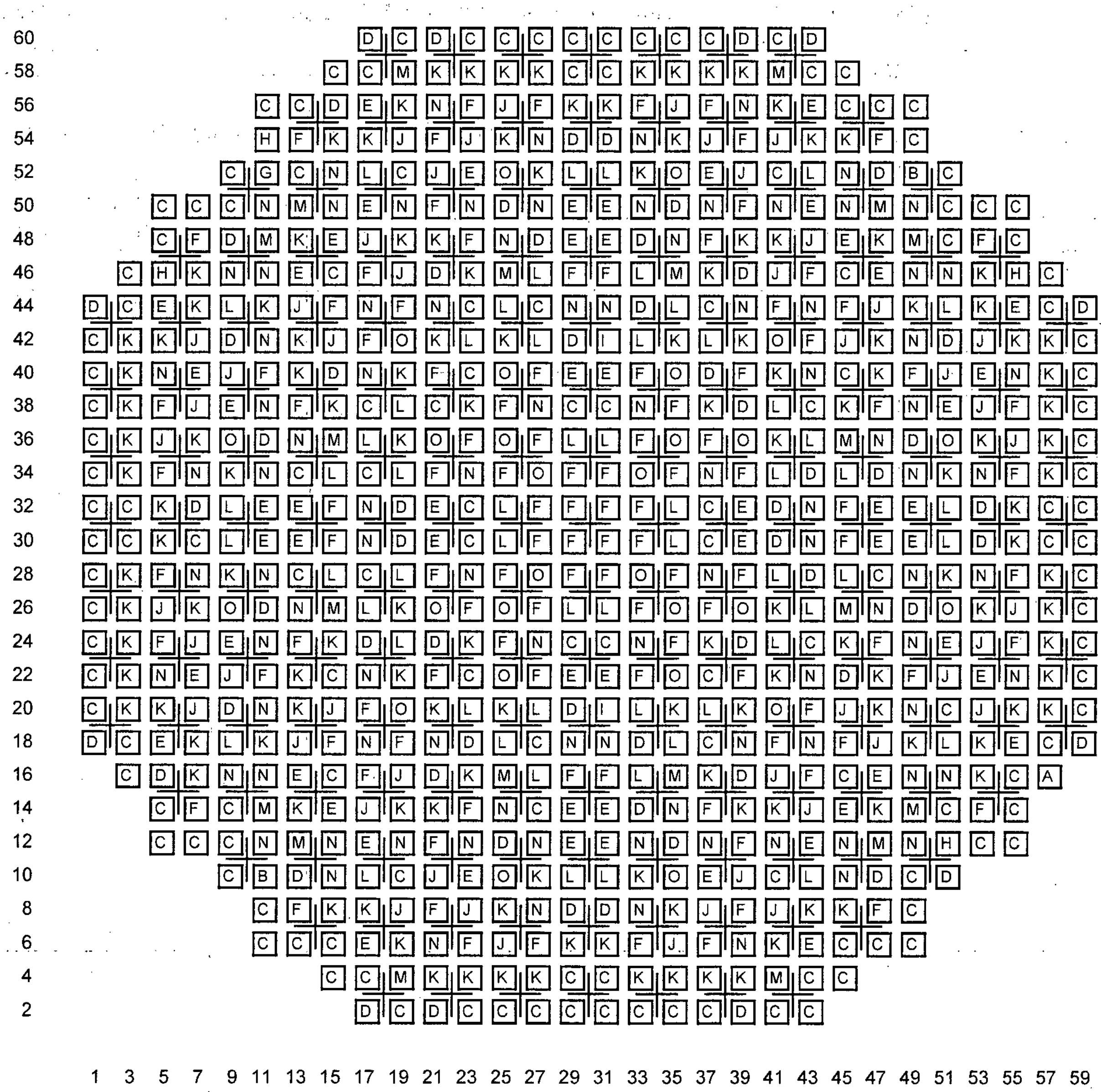
The SAFER/GESTR-LOCA analysis base reports applicable to the new cycle core are listed below.

References for SVEA96

1. *SAFER/GESTR-LOCA Loss of Coolant Accident Analysis for Hope Creek Generating Station at Power Uprate*, NEDC-33172P, March 2005
2. *Supplemental Reload Licensing Report for Hope Creek Unit 1 Reload 13 Cycle 14*, 0000-0041-6021-SRLR, Rev. 1, March 2006

References for GE14C

1. *SAFER/GESTR-LOCA Loss of Coolant Accident Analysis for Hope Creek Generating Station at Power Uprate*, NEDC-33172P, March 2005
2. *Supplemental Reload Licensing Report for Hope Creek Unit 1 Reload 13 Cycle 14*, 0000-0041-6021-SRLR, Rev. 1, March 2006



Fuel Type

A=SVEA96-P10CASB360-12GZ-568U-4WR-150-T6-2656 (Cycle 11)	I=SVEA96-P10CASB360-12G5.5/2G2.5-568U-4WR-150-T6-2659 (Cycle 12)
B=SVEA96-P10CASB360-12G5.0-568U-4WR-150-T6-2657 (Cycle 11)	J=GE14-P10CNAB396-17GZ-100T-150-T6-3007 (Cycle 15)
C=SVEA96-P10CASB361-14GZ-568U-4WR-150-T6-2658 (Cycle 12)	K=GE14-P10CNAB393-18G4.0-100T-150-T6-2885 (Cycle 14)
D=SVEA96-P10CASB360-12G5.5/2G2.5-568U-4WR-150-T6-2659 (Cycle 12)	L=GE14-P10CNAB405-15GZ-100T-150-T6-3009 (Cycle 15)
E=GE14-P10CNAB402-4G6.0/16G4.0-100T-150-T6-2757 (Cycle 13)	M=GE14-P10CNAB393-18GZ-100T-150-T6-2884 (Cycle 14)
F=GE14-P10CNAB402-5G6.0/14G4.0-100T-150-T6-2758 (Cycle 13)	N=GE14-P10CNAB398-17GZ-100T-150-T6-3008 (Cycle 15)
G=SVEA96-P10CASB360-12G5.0-568U-4WR-150-T6-2657 (Cycle 11)	O=GE14-P10CNAB400-14GZ-100T-150-T6-3006 (Cycle 15)
H=SVEA96-P10CASB361-14GZ-568U-4WR-150-T6-2658 (Cycle 12)	

Figure 1 Reference Core Loading Pattern

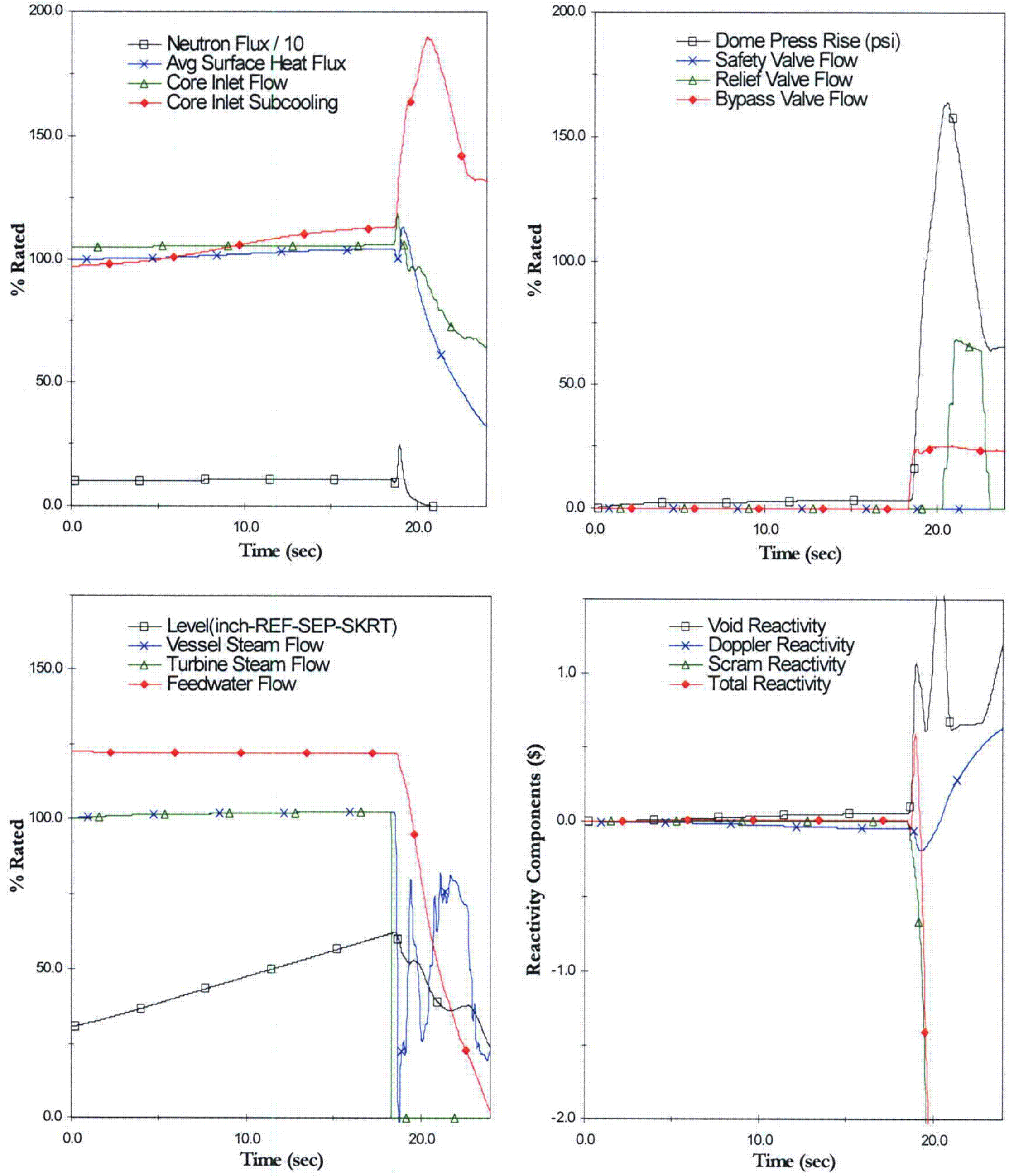


Figure 2 Plant Response to FW Controller Failure
(MOC ICF (HBB))

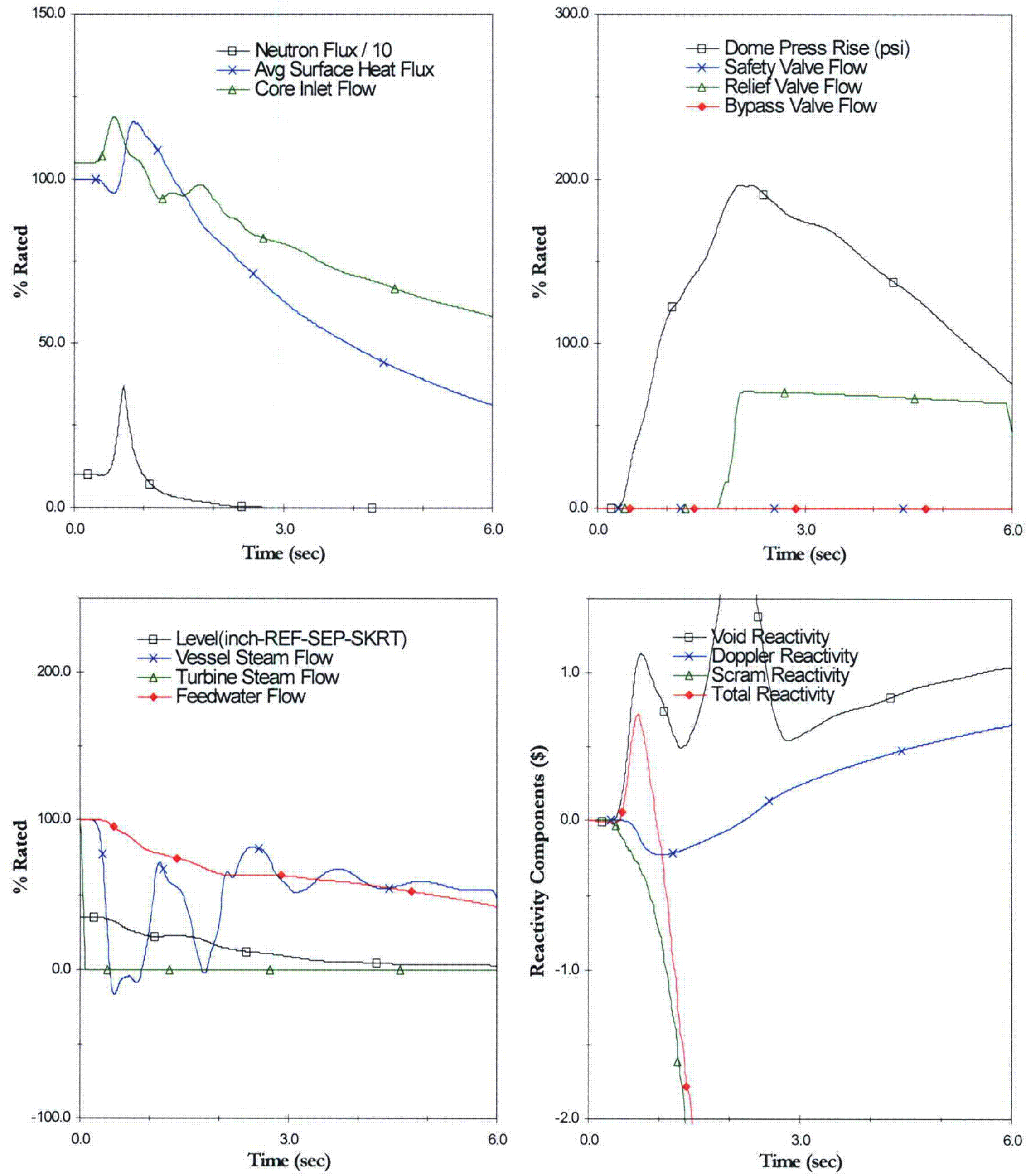


Figure 3 Plant Response to Load Rejection w/o Bypass (MOC ICF (HBB))

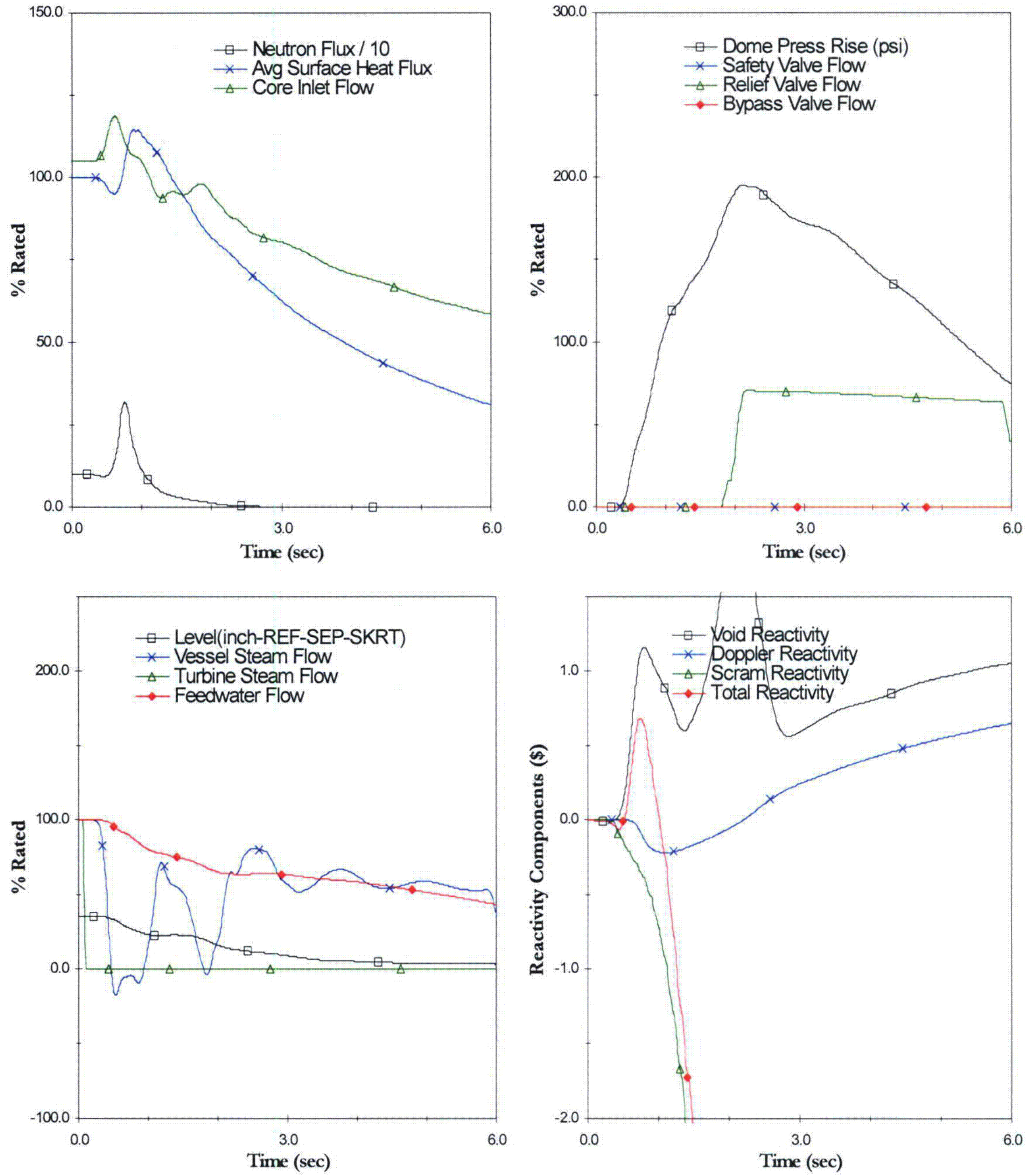


Figure 4 Plant Response to Turbine Trip w/o Bypass
(MOC ICF (HBB))

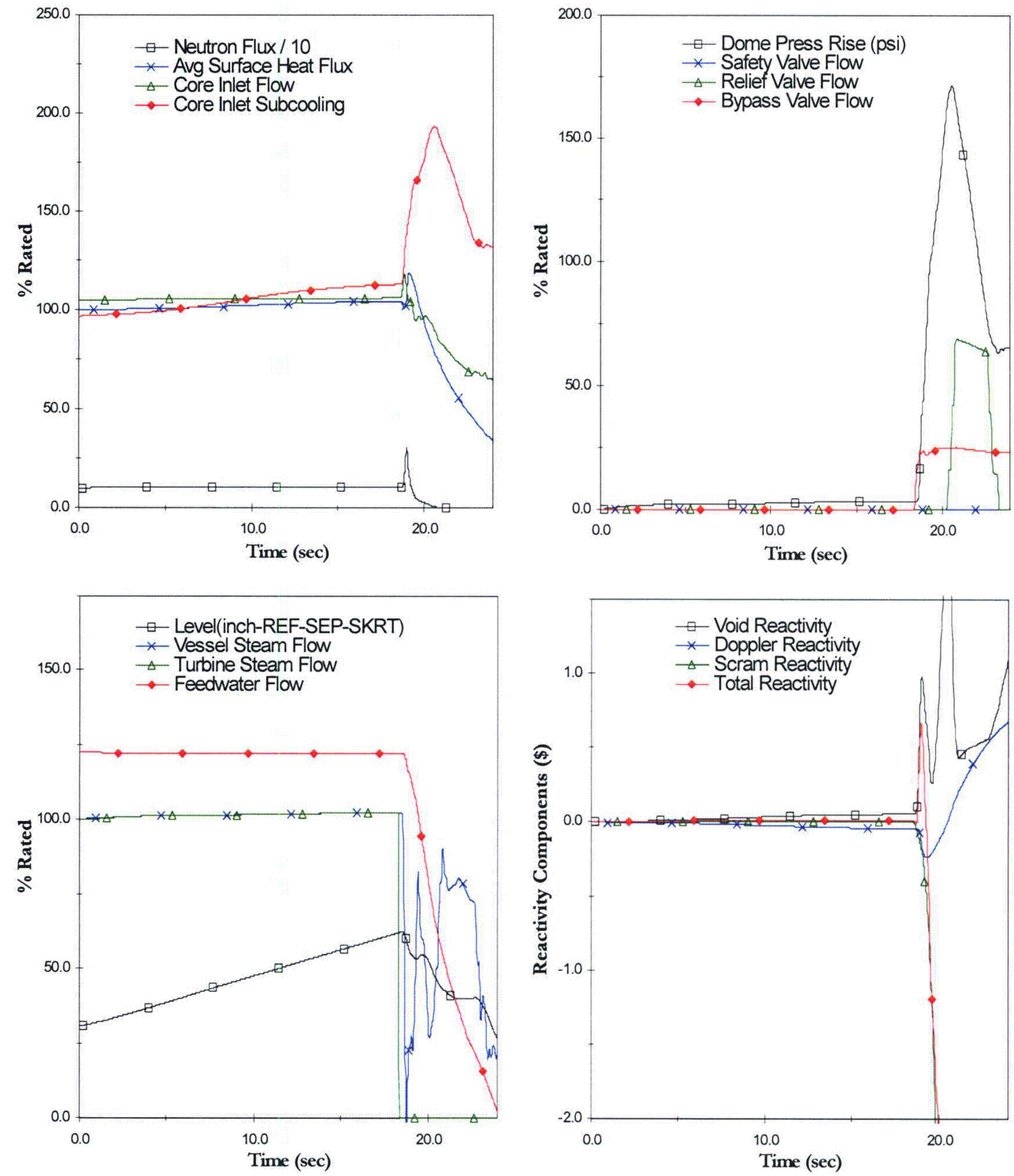


**Figure 5 Plant Response to FW Controller Failure
(EOC ICF (HBB))**

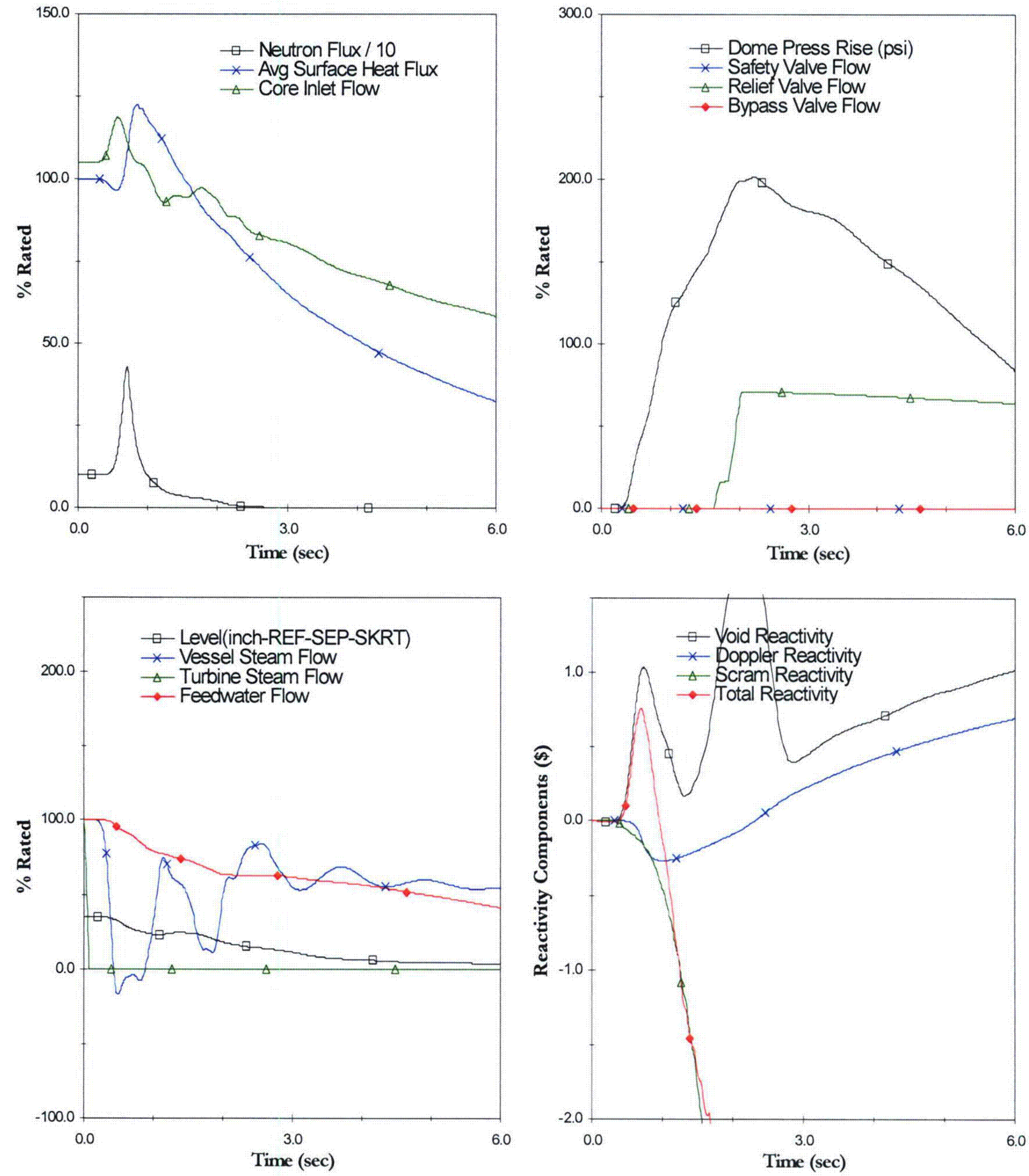


Figure 6 Plant Response to Load Rejection w/o Bypass
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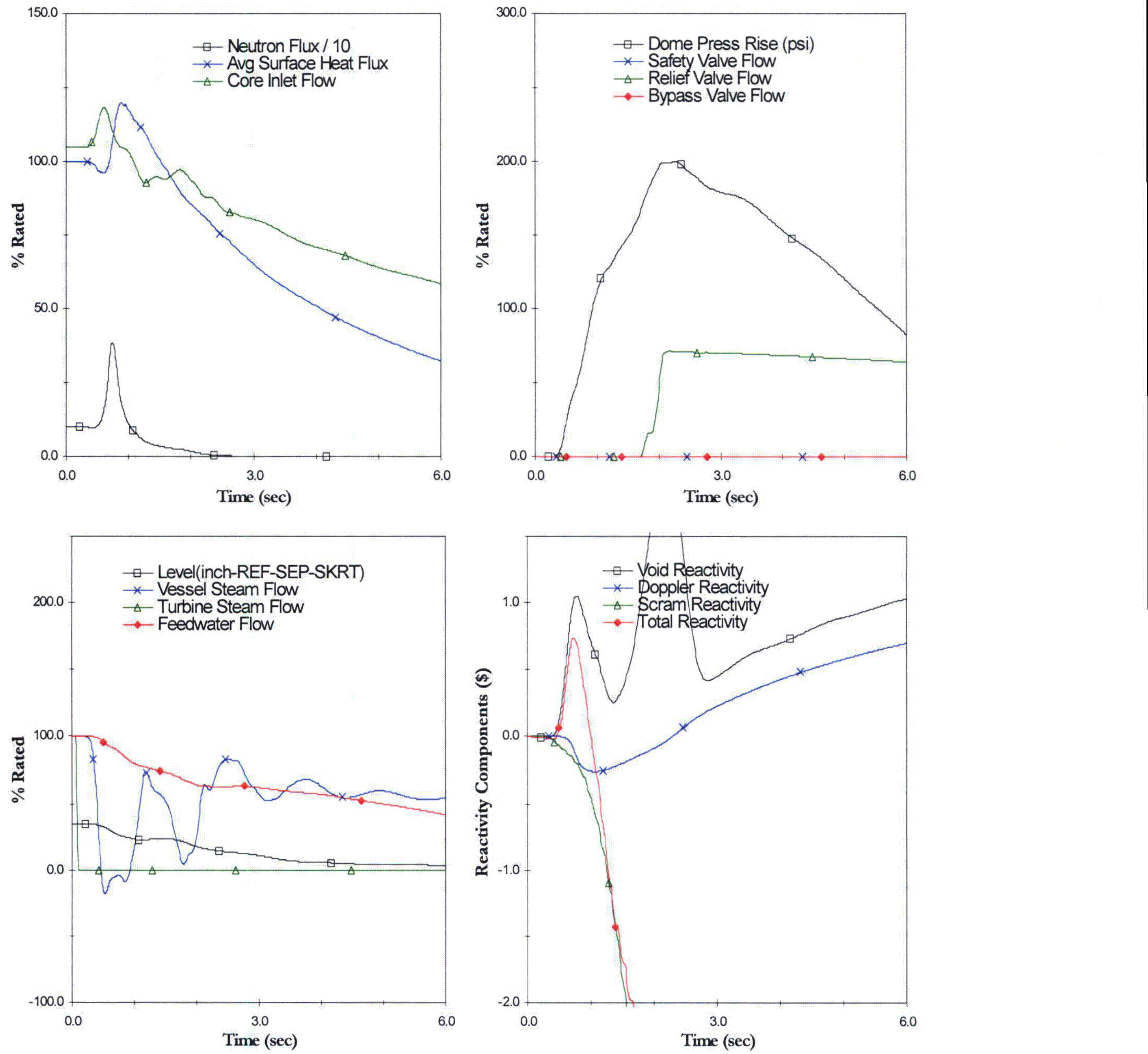

Figure 7 Plant Response to Turbine Trip w/o Bypass
(EOC ICF (HBB))

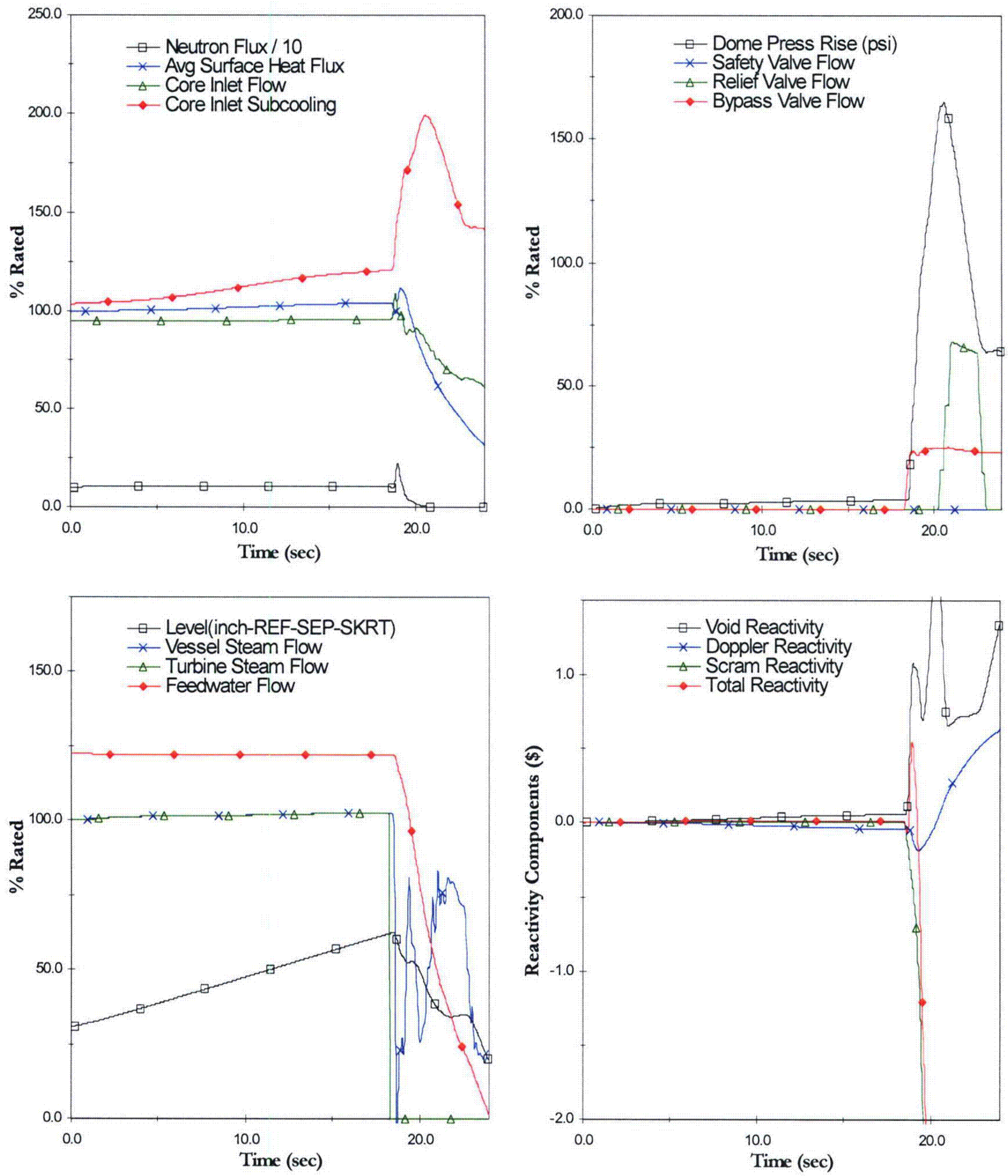

Figure 8 Plant Response to FW Controller Failure
(MOC MELLLA (HBB))

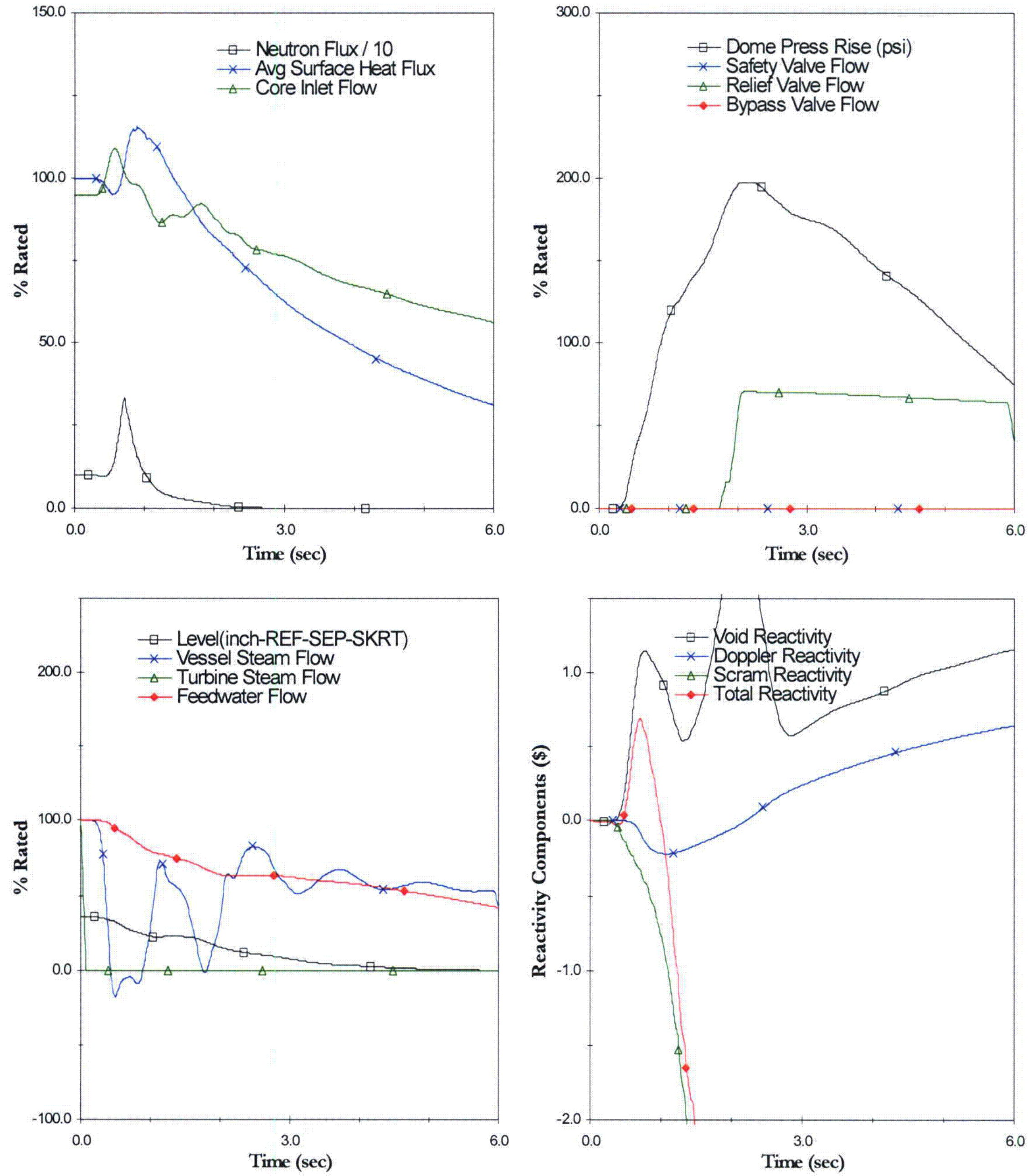

Figure 9 Plant Response to Load Rejection w/o Bypass
(MOC MELLLA (HBB))

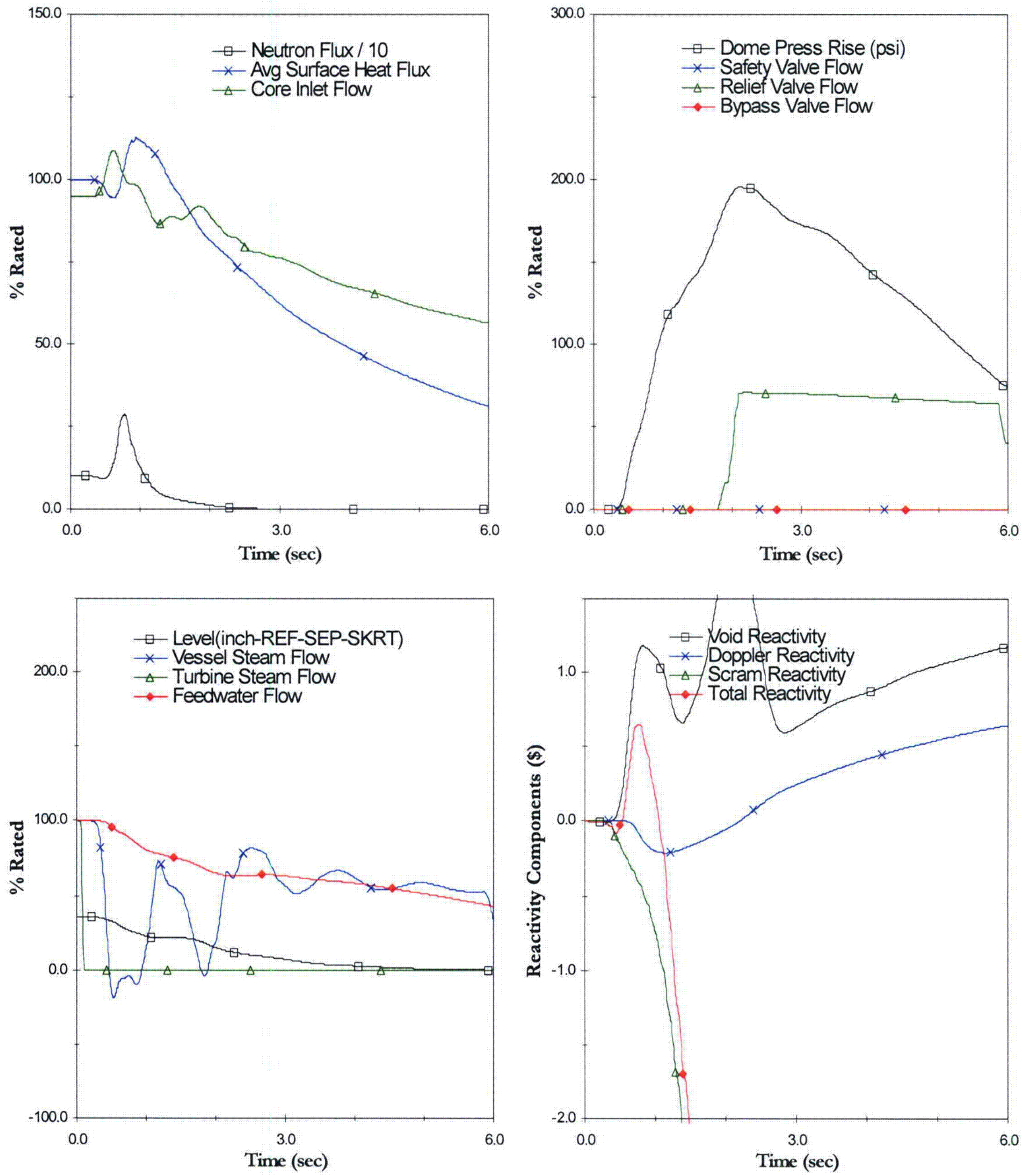

Figure 10 Plant Response to Turbine Trip w/o Bypass (MOC MELLLA (HBB))

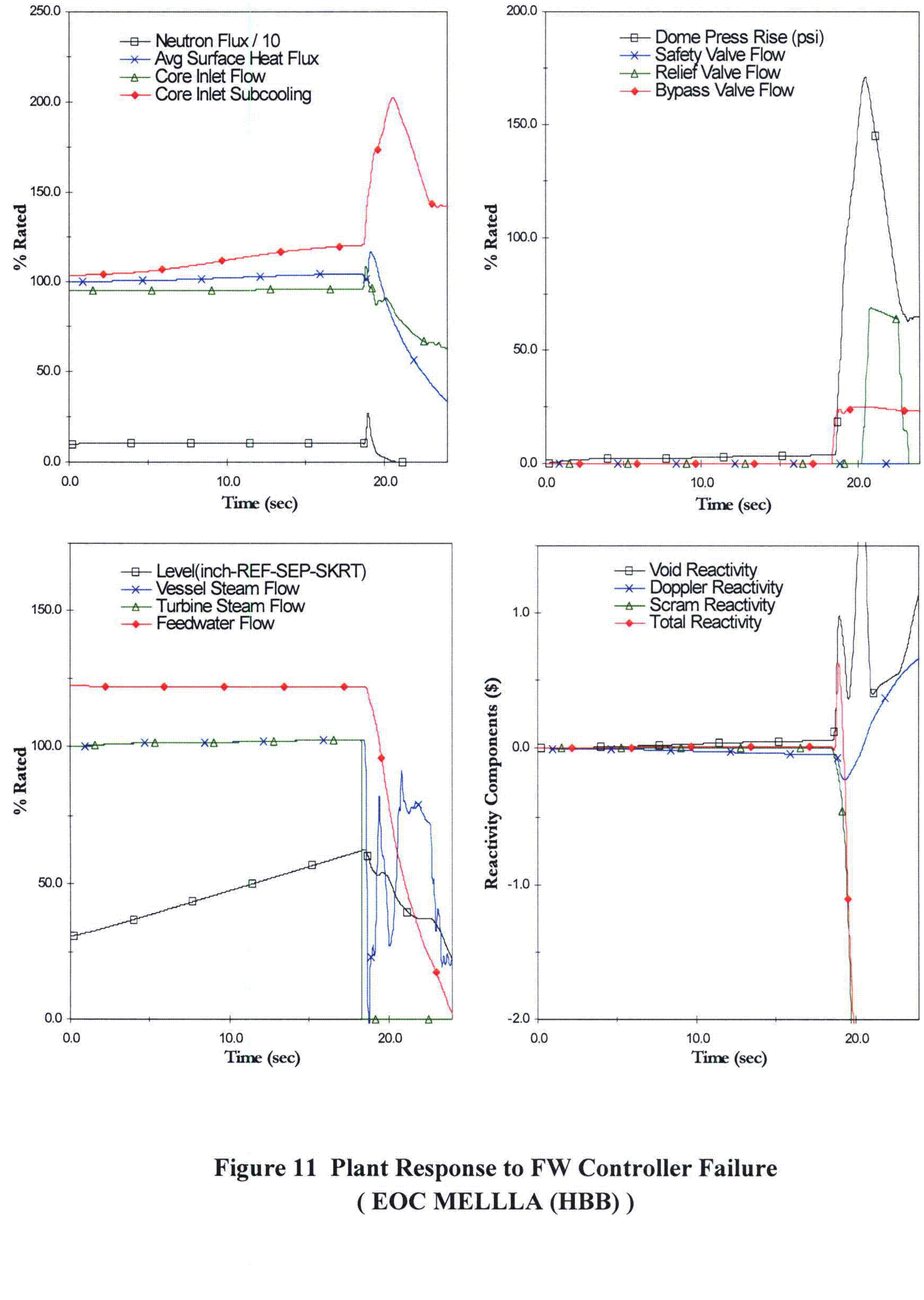

Figure 11 Plant Response to FW Controller Failure
(EOC MELLLA (HBB))

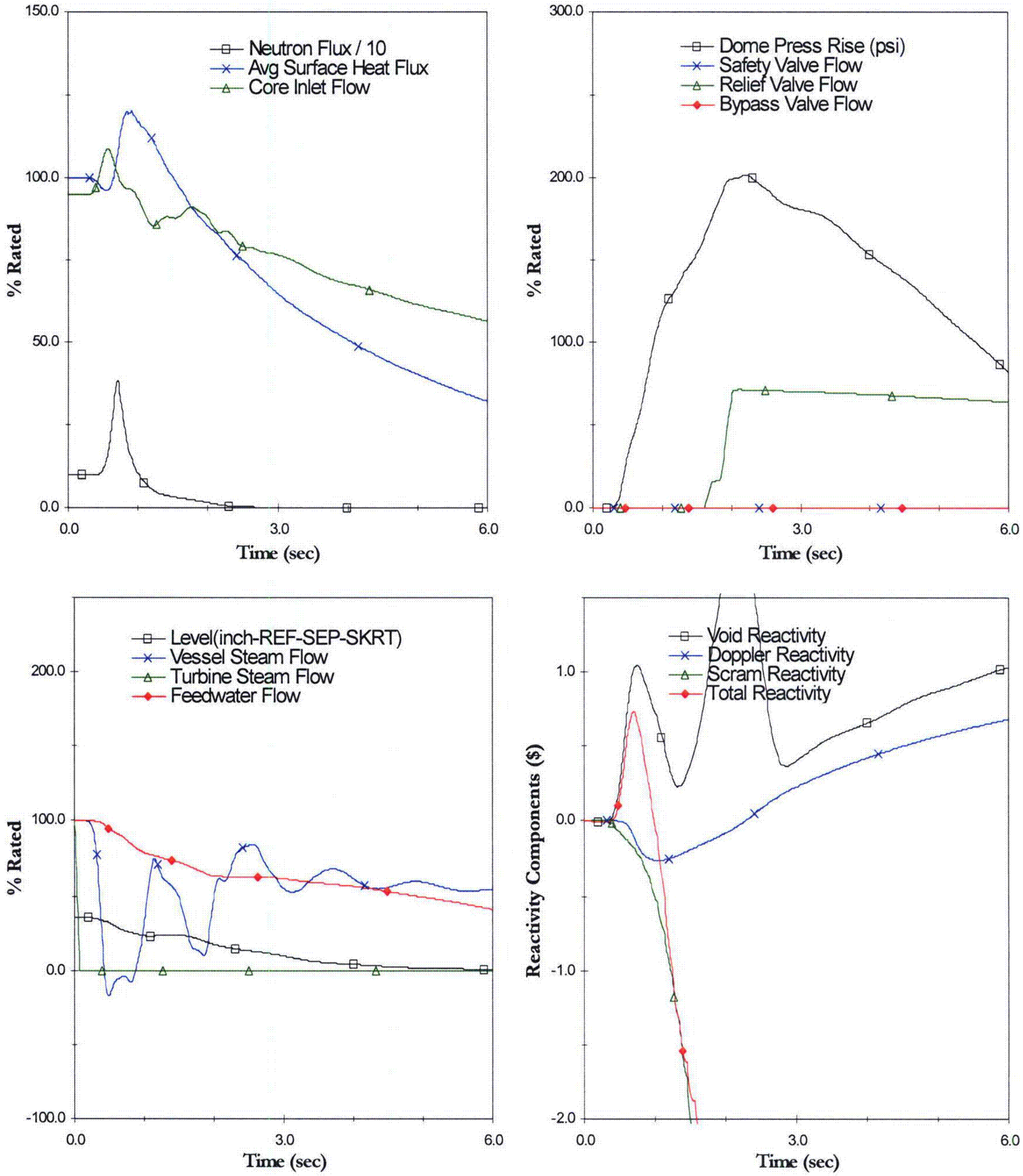

Figure 12 Plant Response to Load Rejection w/o Bypass
(EOC MELLLA (HBB))

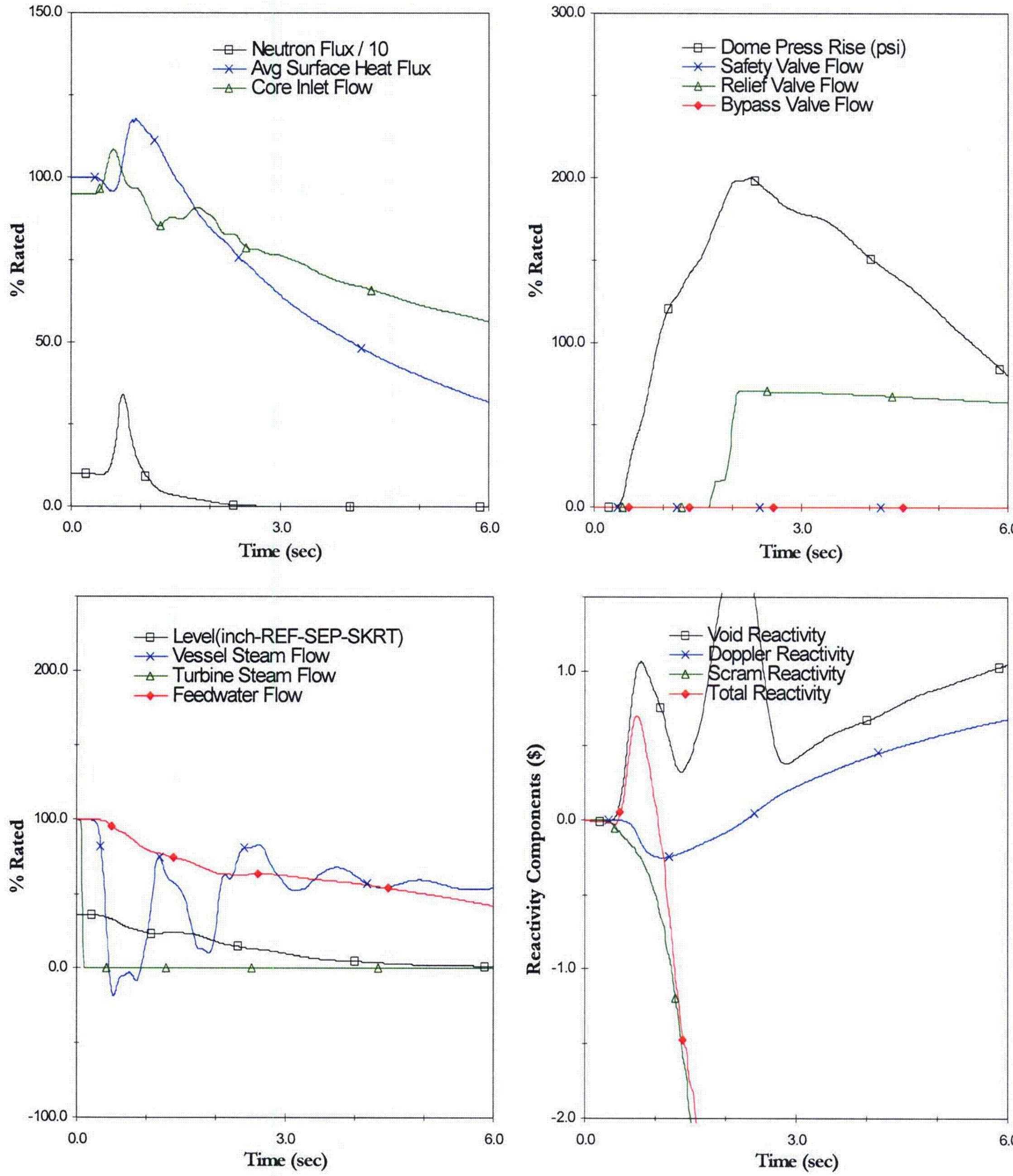

Figure 13 Plant Response to Turbine Trip w/o Bypass (EOC MELLLA (HBB))

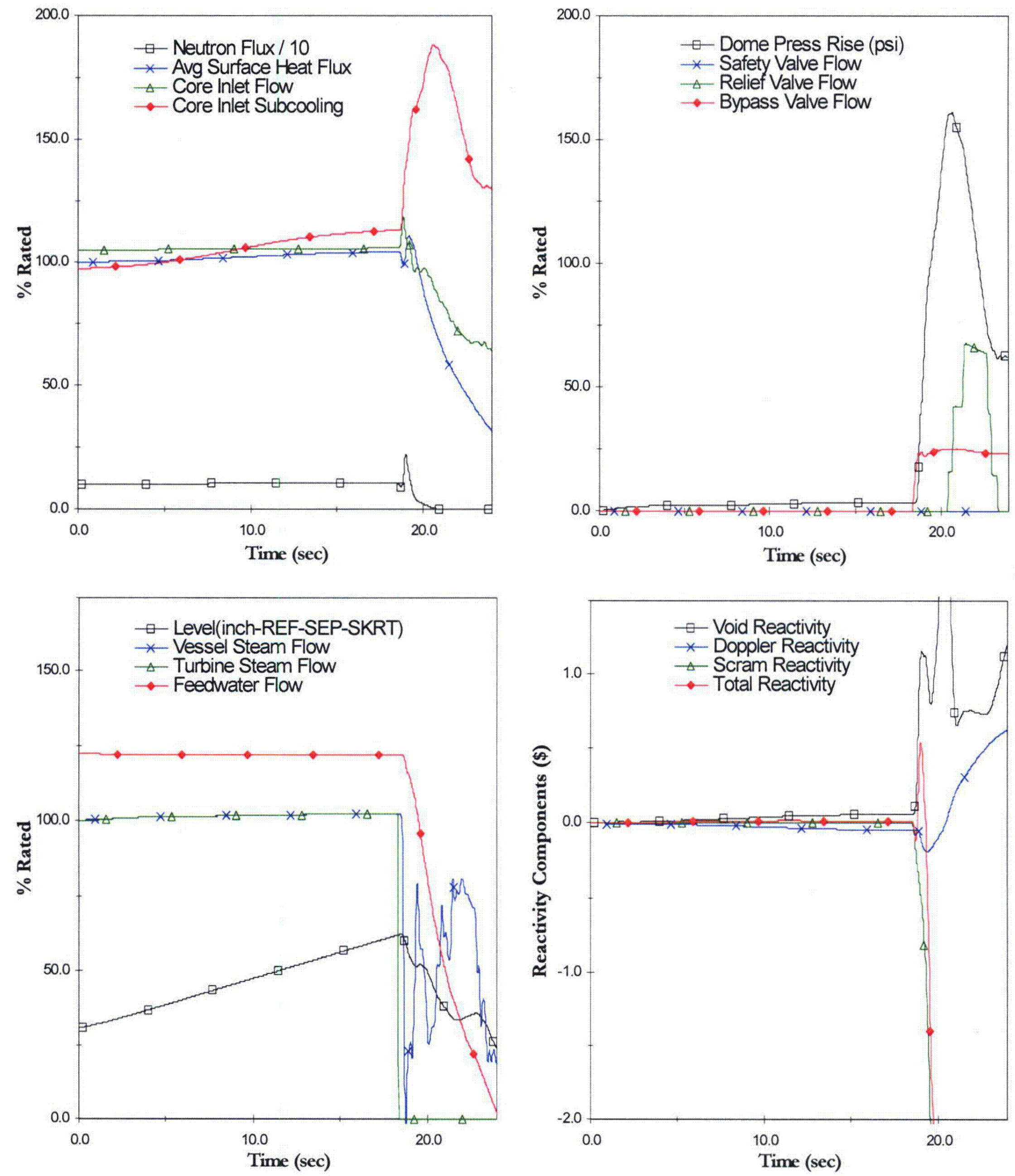

Figure 14 Plant Response to FW Controller Failure
(EOC ICF (UB))

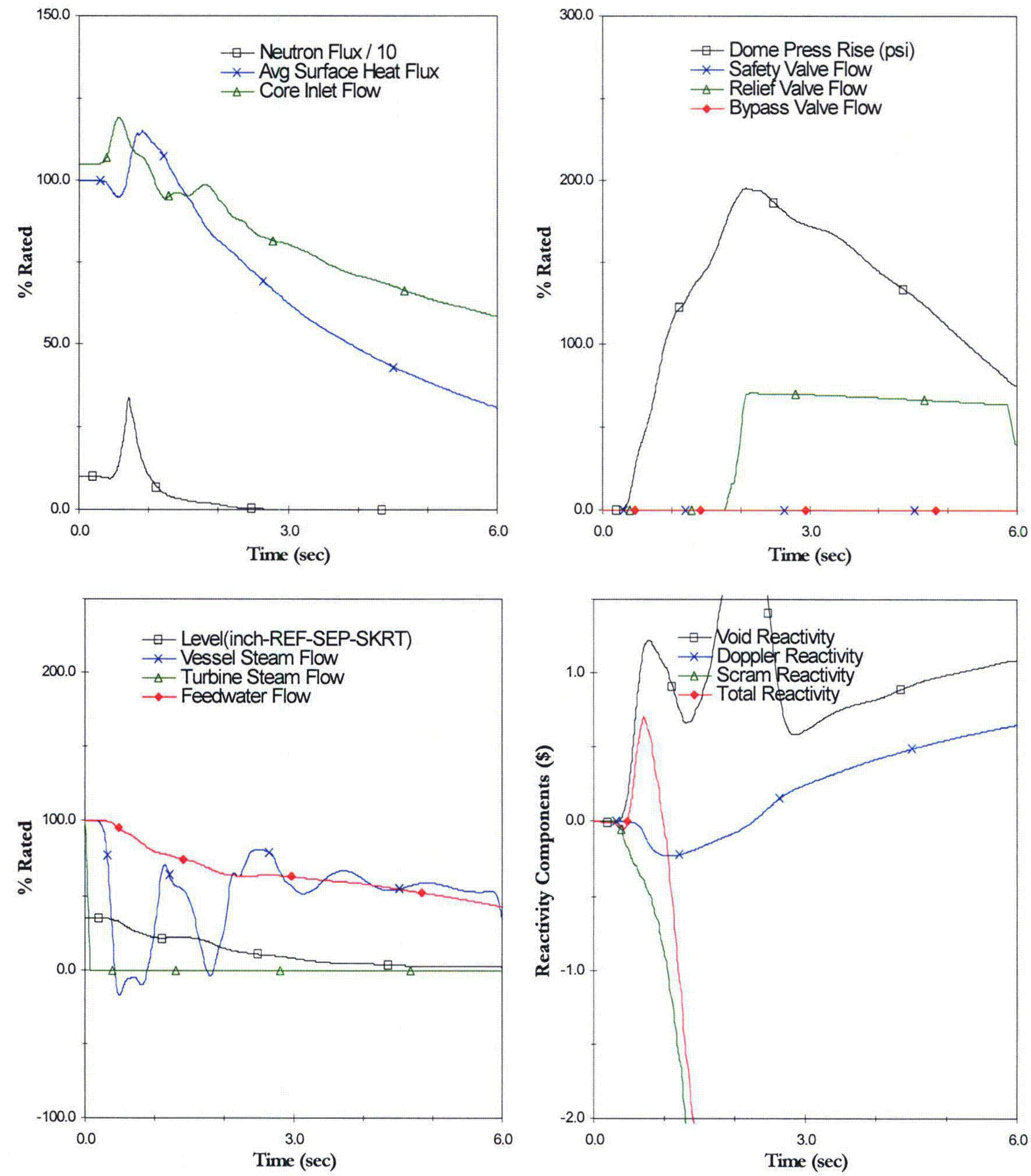

Figure 15 Plant Response to Load Rejection w/o Bypass (EOC ICF (UB))

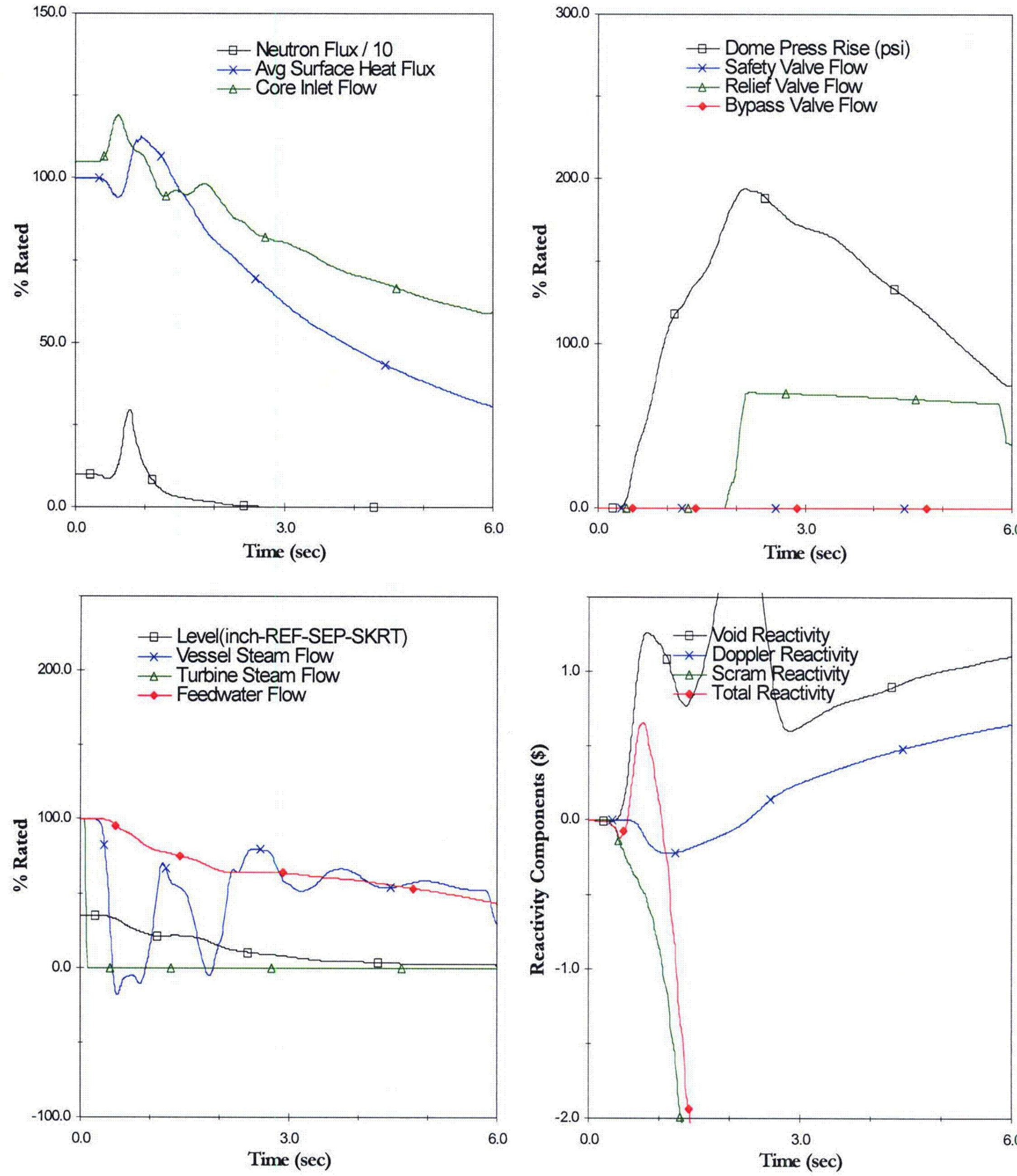

Figure 16 Plant Response to Turbine Trip w/o Bypass
(EOC ICF (UB))

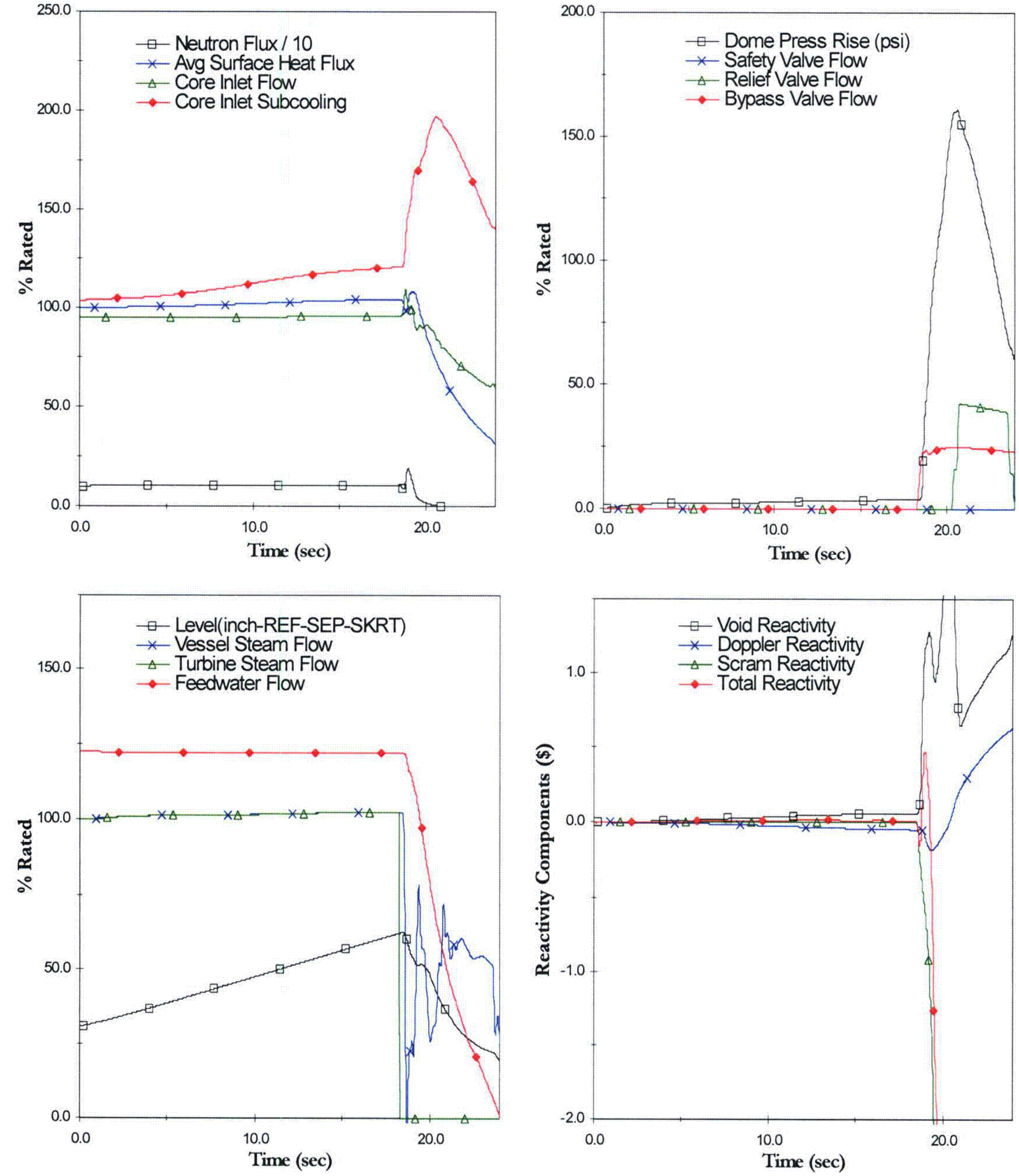

Figure 17 Plant Response to FW Controller Failure
(EOC MELLLA (UB))

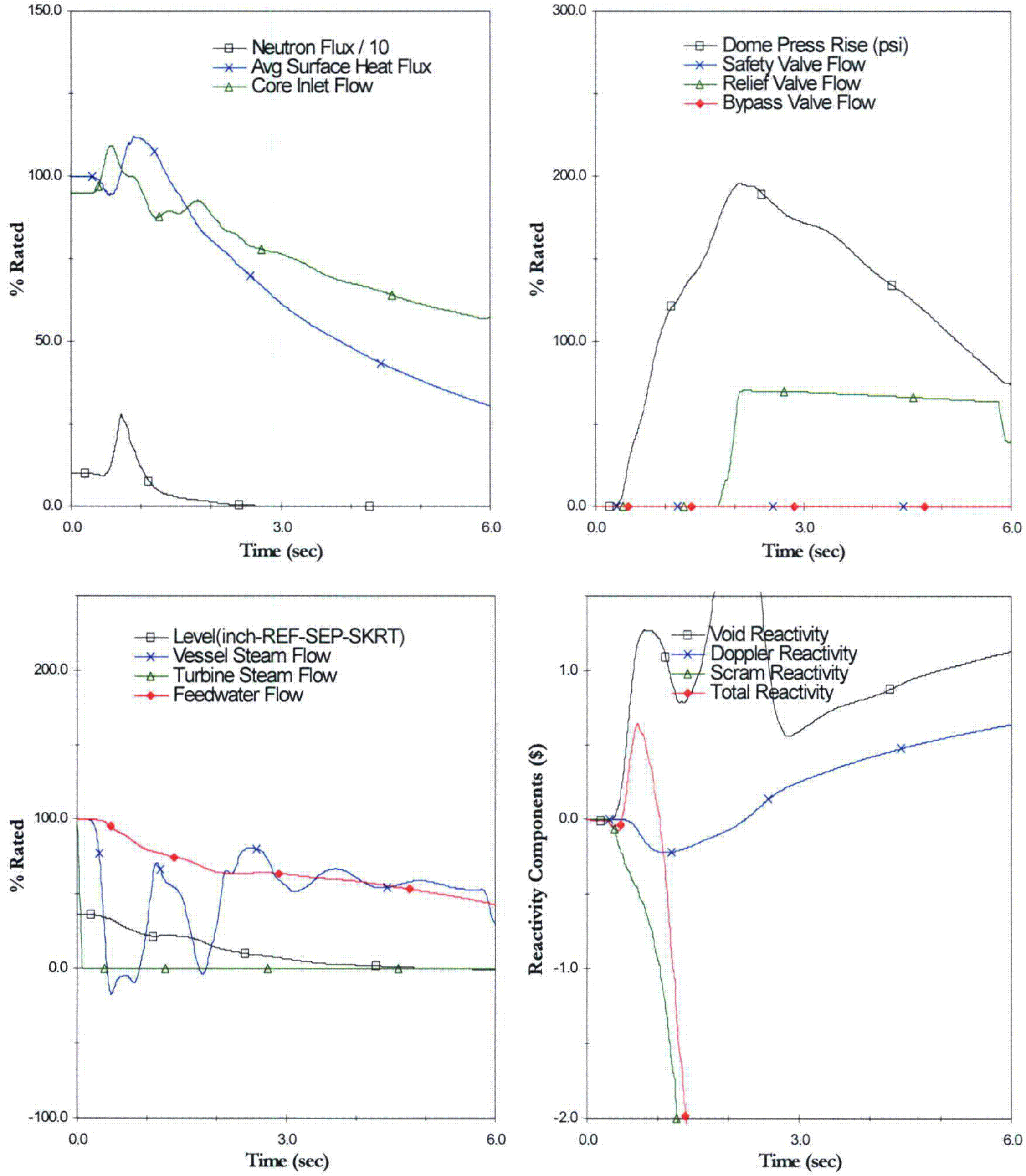

Figure 18 Plant Response to Load Rejection w/o Bypass
(EOC MELLLA (UB))

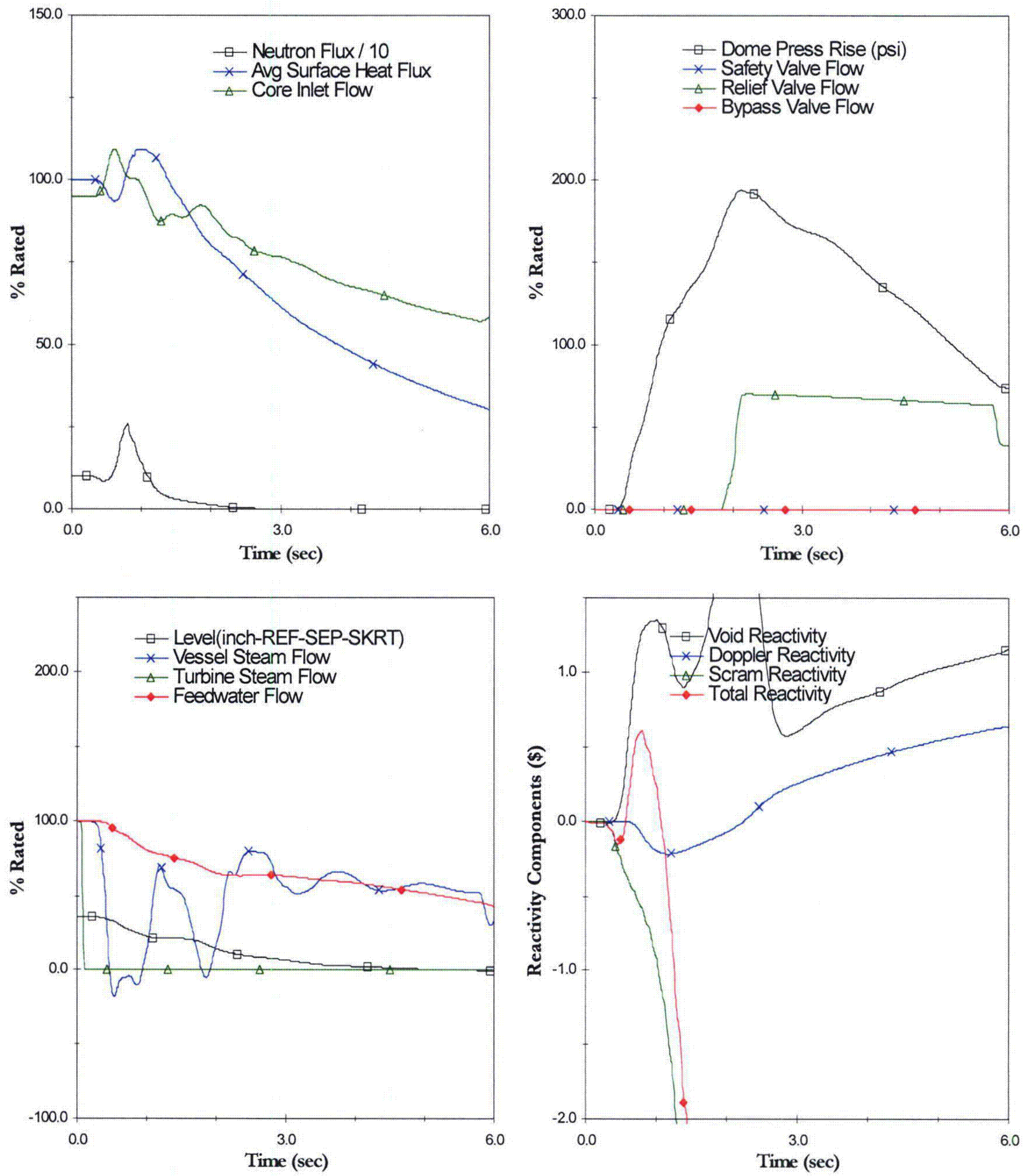

Figure 19 Plant Response to Turbine Trip w/o Bypass
(EOC MELLLA (UB))

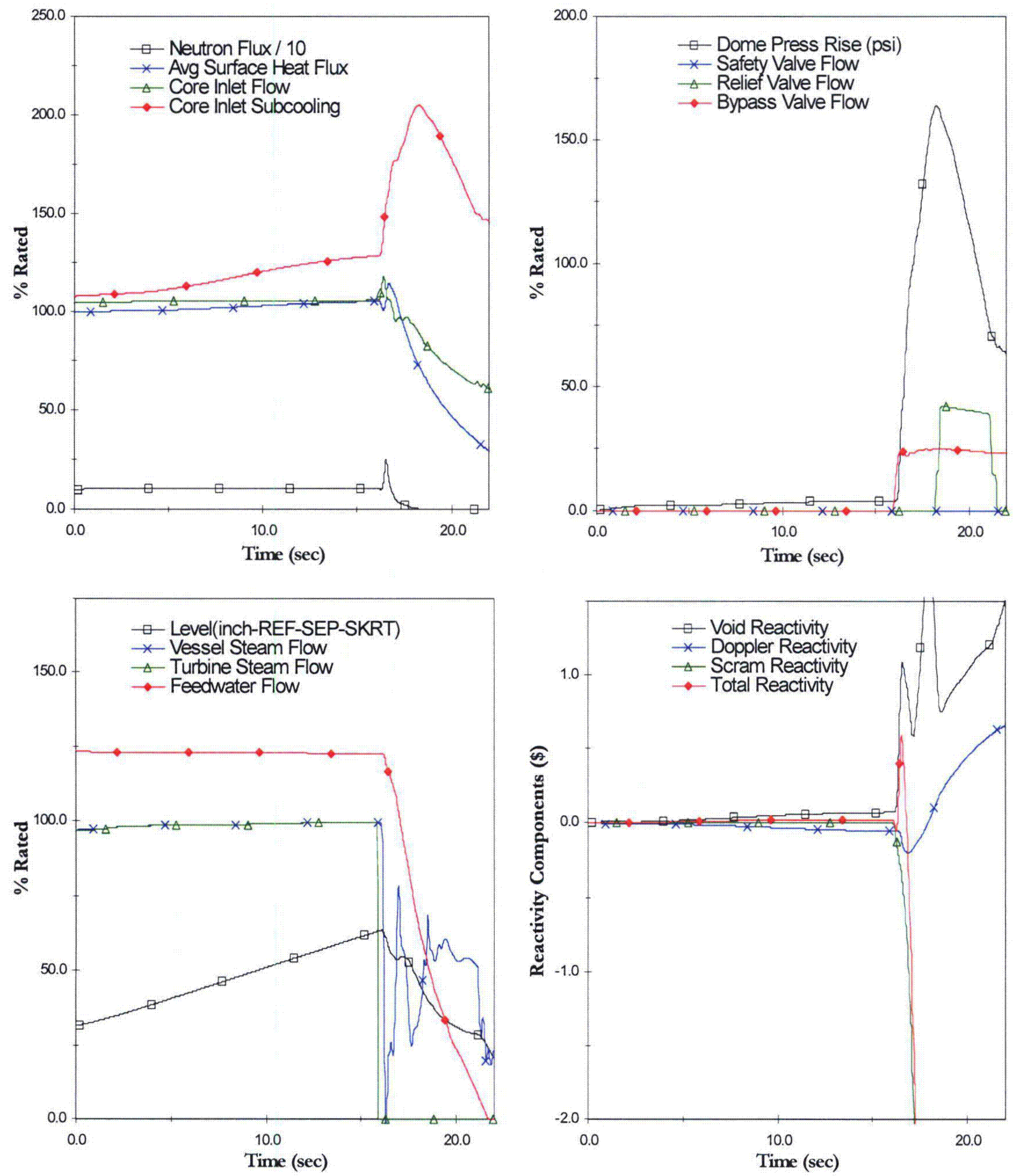

Figure 20 Plant Response to FW Controller Failure
(MOC ICF & FWTR (HBB))

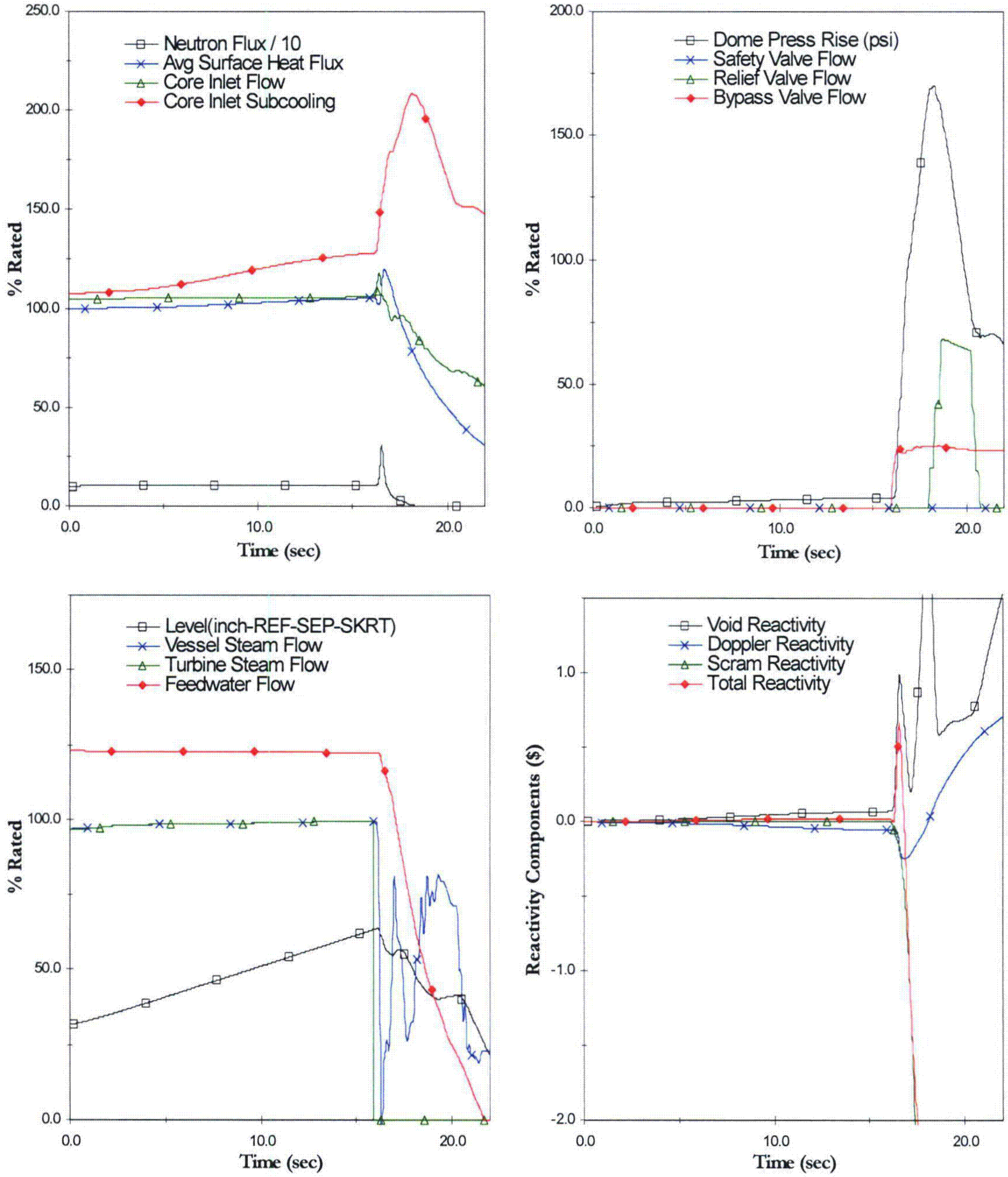

Figure 21 Plant Response to FW Controller Failure
(EOC ICF & FWTR (HBB))

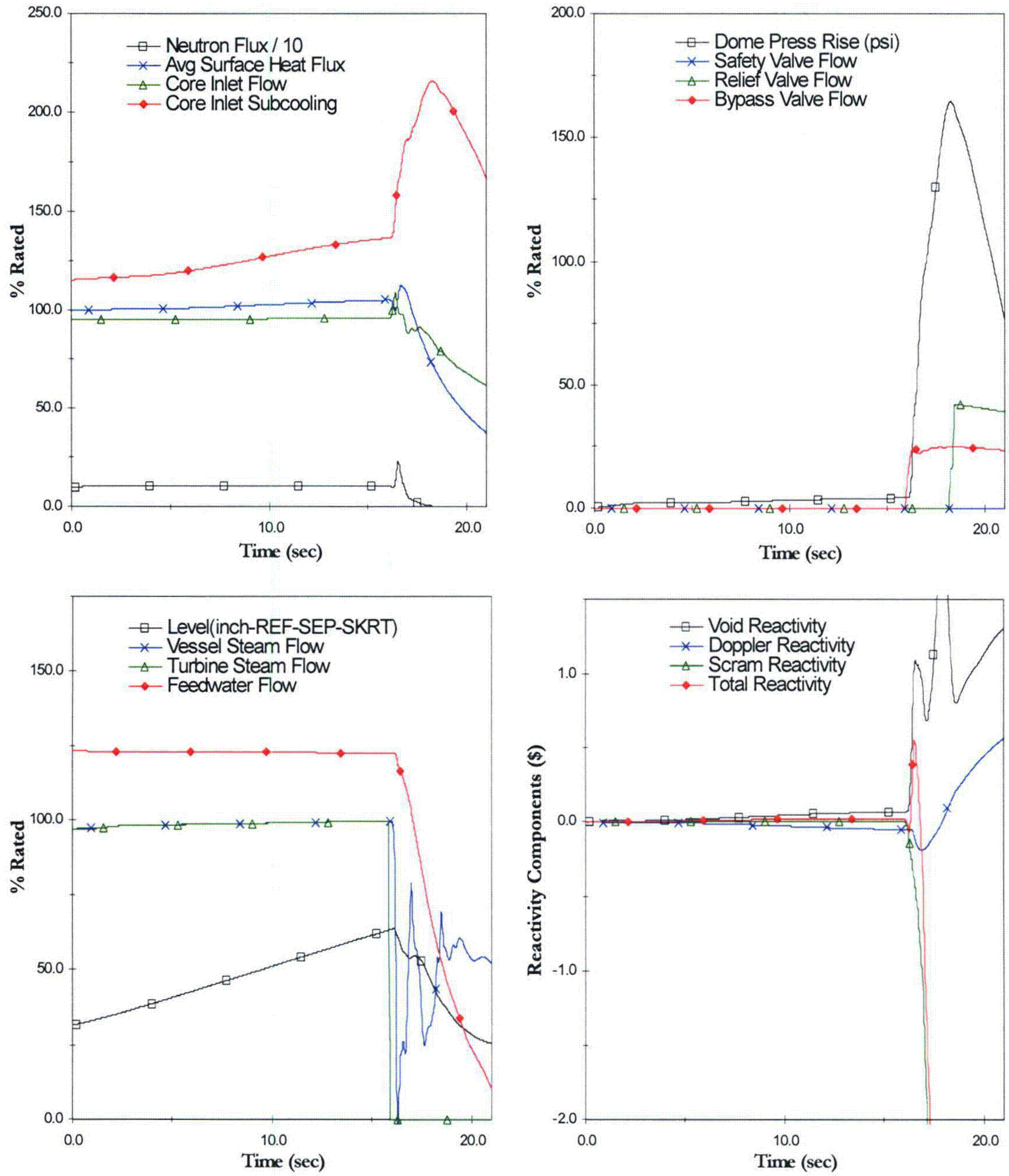

Figure 22 Plant Response to FW Controller Failure
(MOC MELLLA & FWTR (HBB))

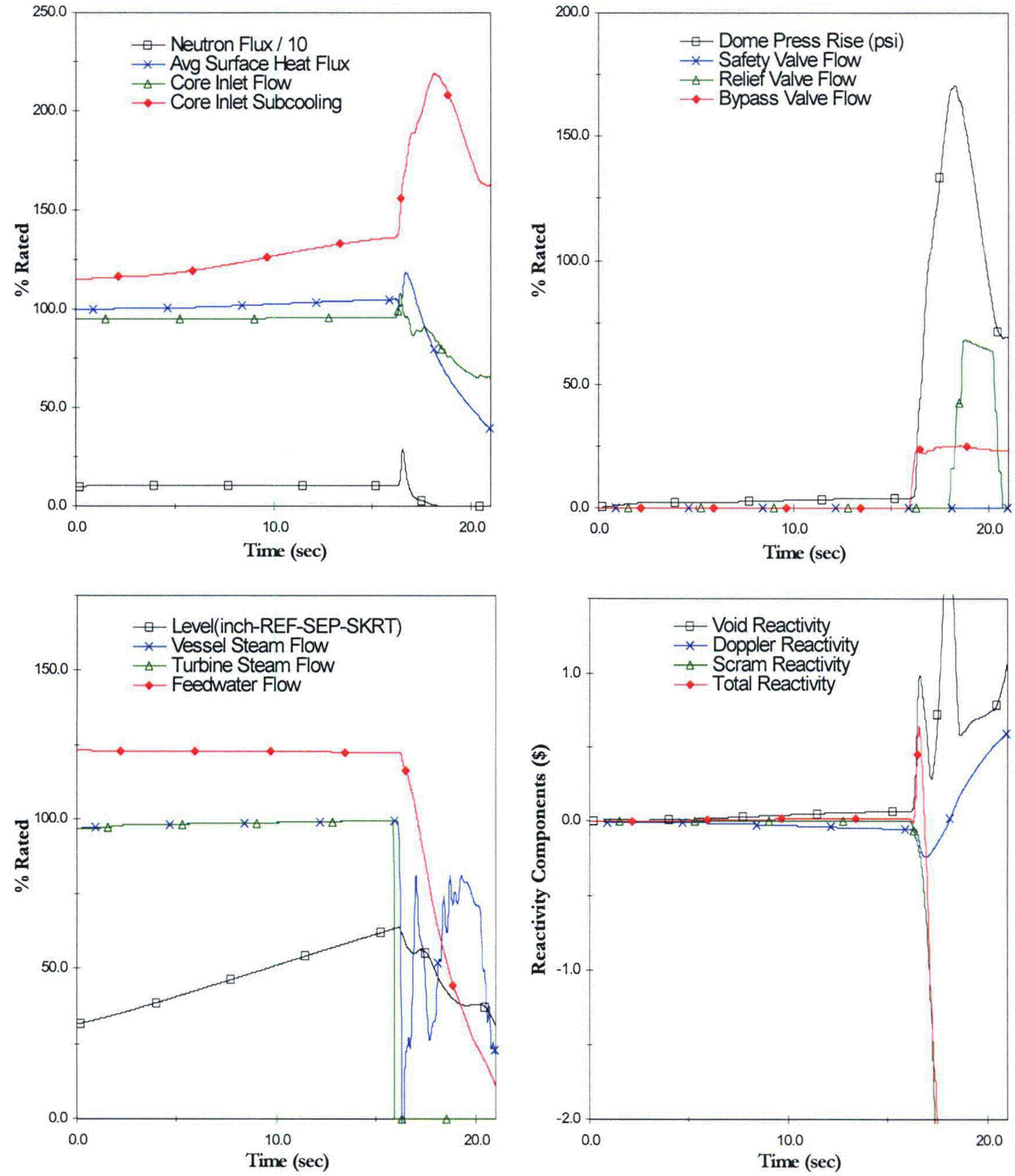

Figure 23 Plant Response to FW Controller Failure
(EOC MELLLA & FWTR (HBB))

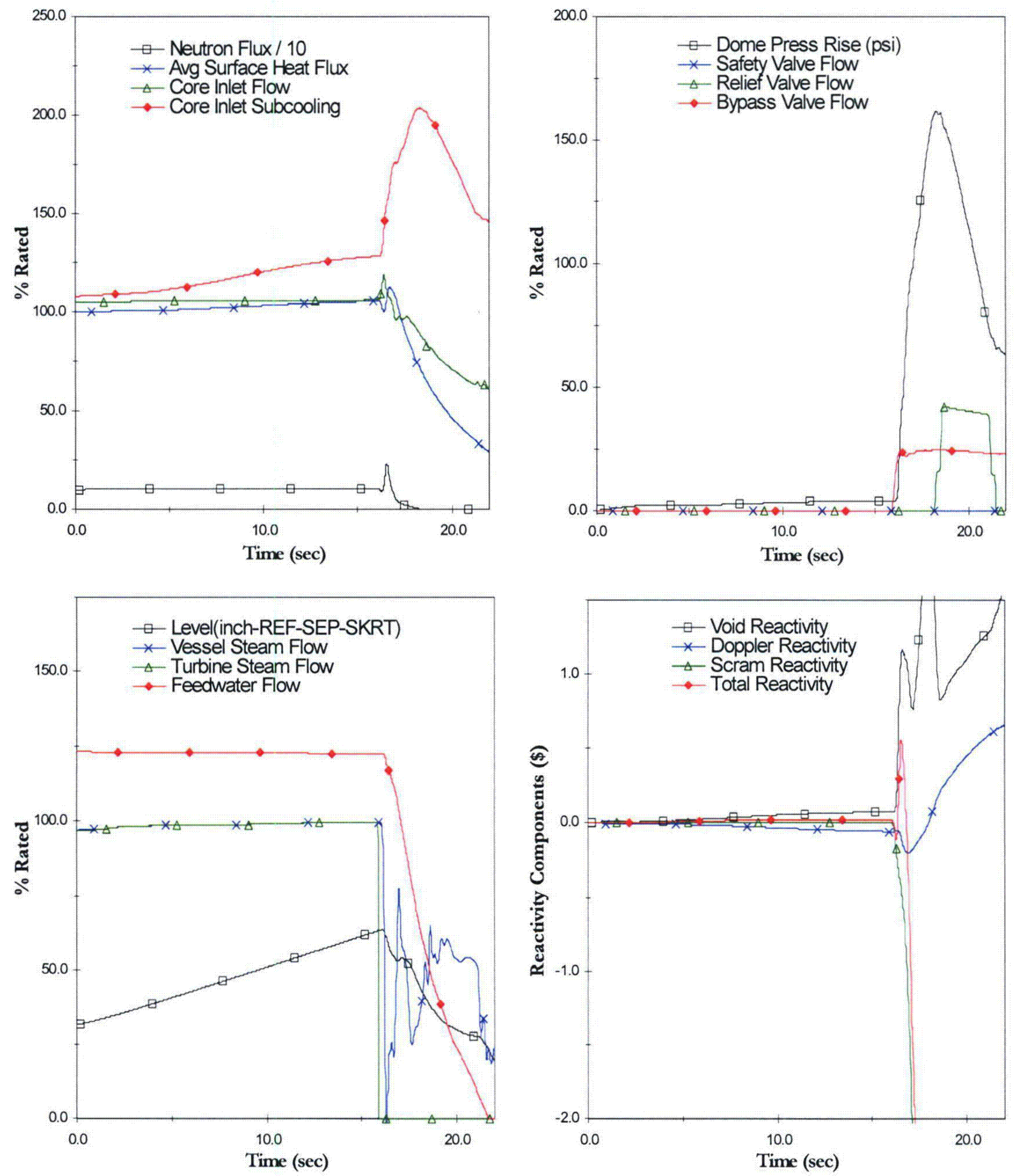

Figure 24 Plant Response to FW Controller Failure
(EOC ICF & FWTR (UB))

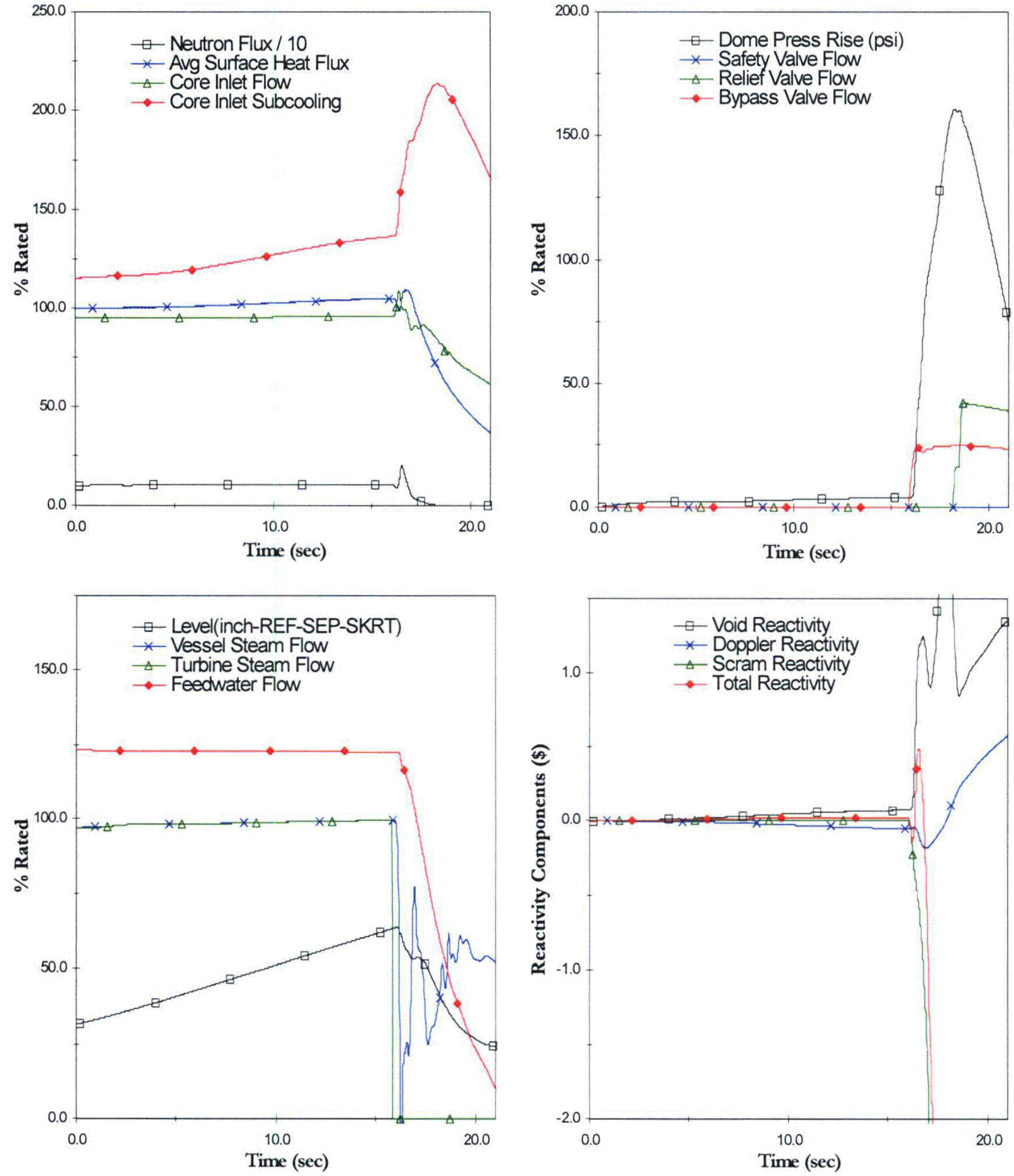

Figure 25 Plant Response to FW Controller Failure
(EOC MELLLA & FWTR (UB))

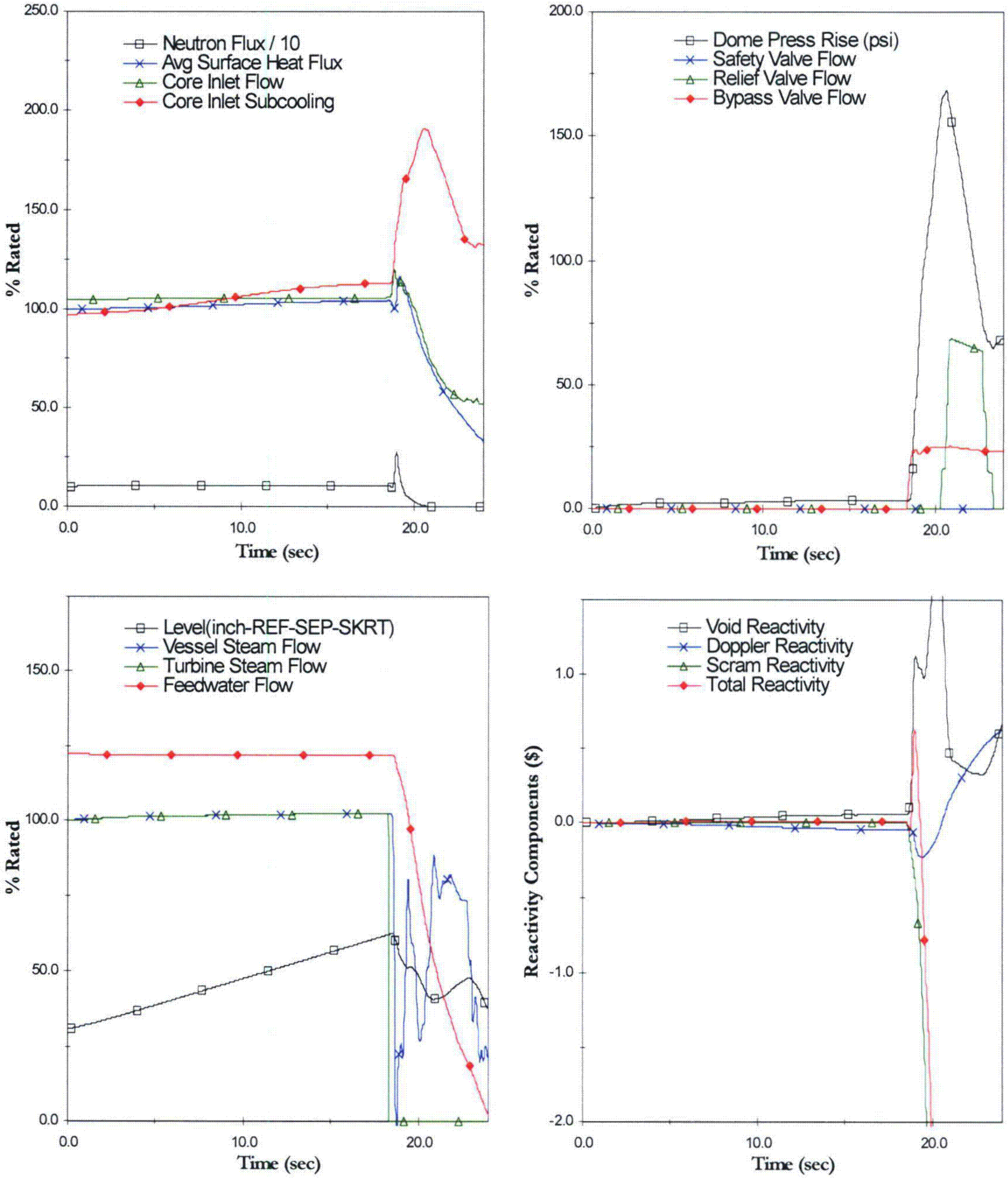

Figure 26 Plant Response to FW Controller Failure
(MOC ICF with RPTOOS (HBB))

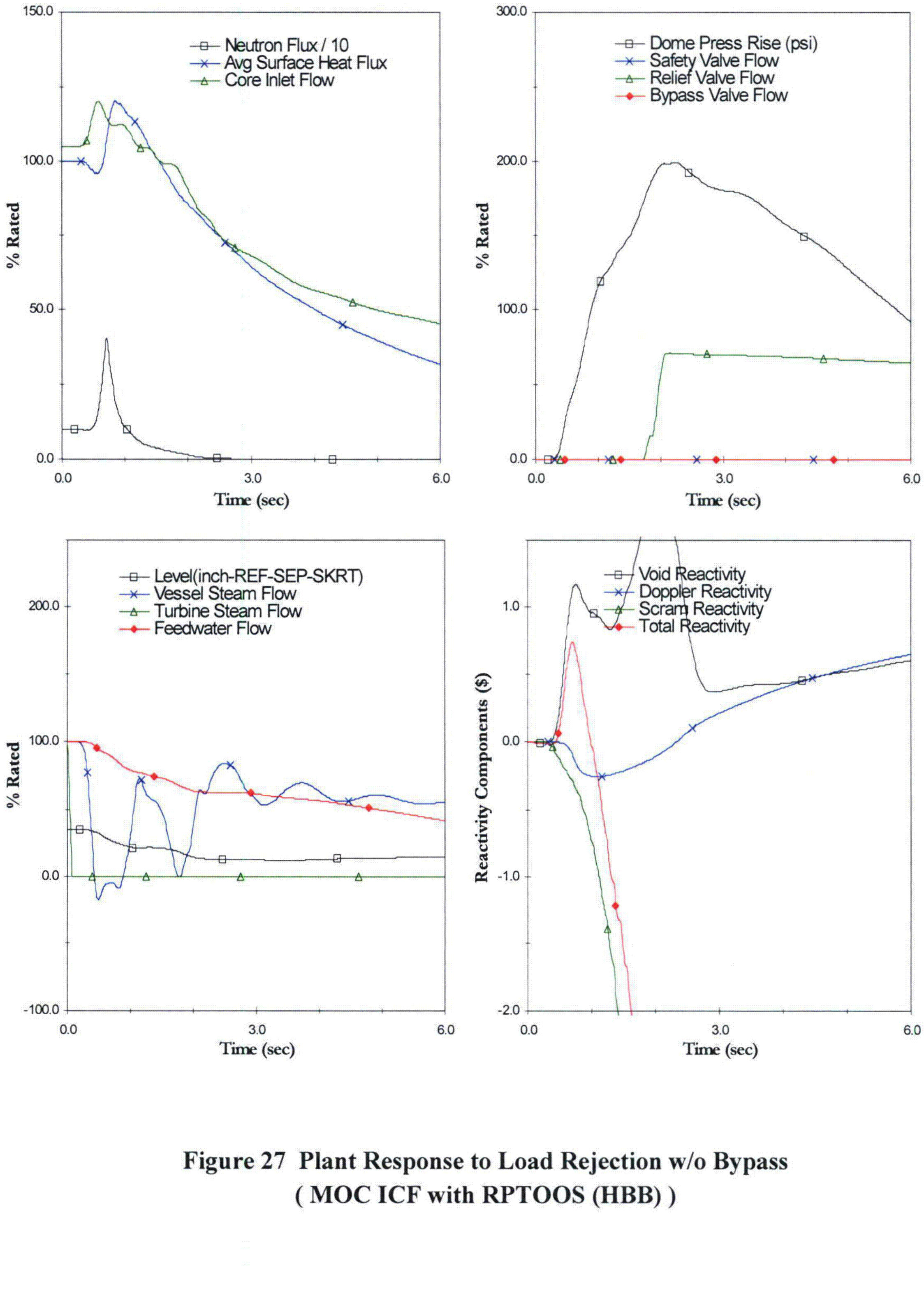

Figure 27 Plant Response to Load Rejection w/o Bypass (MOC ICF with RPTOOS (HBB))

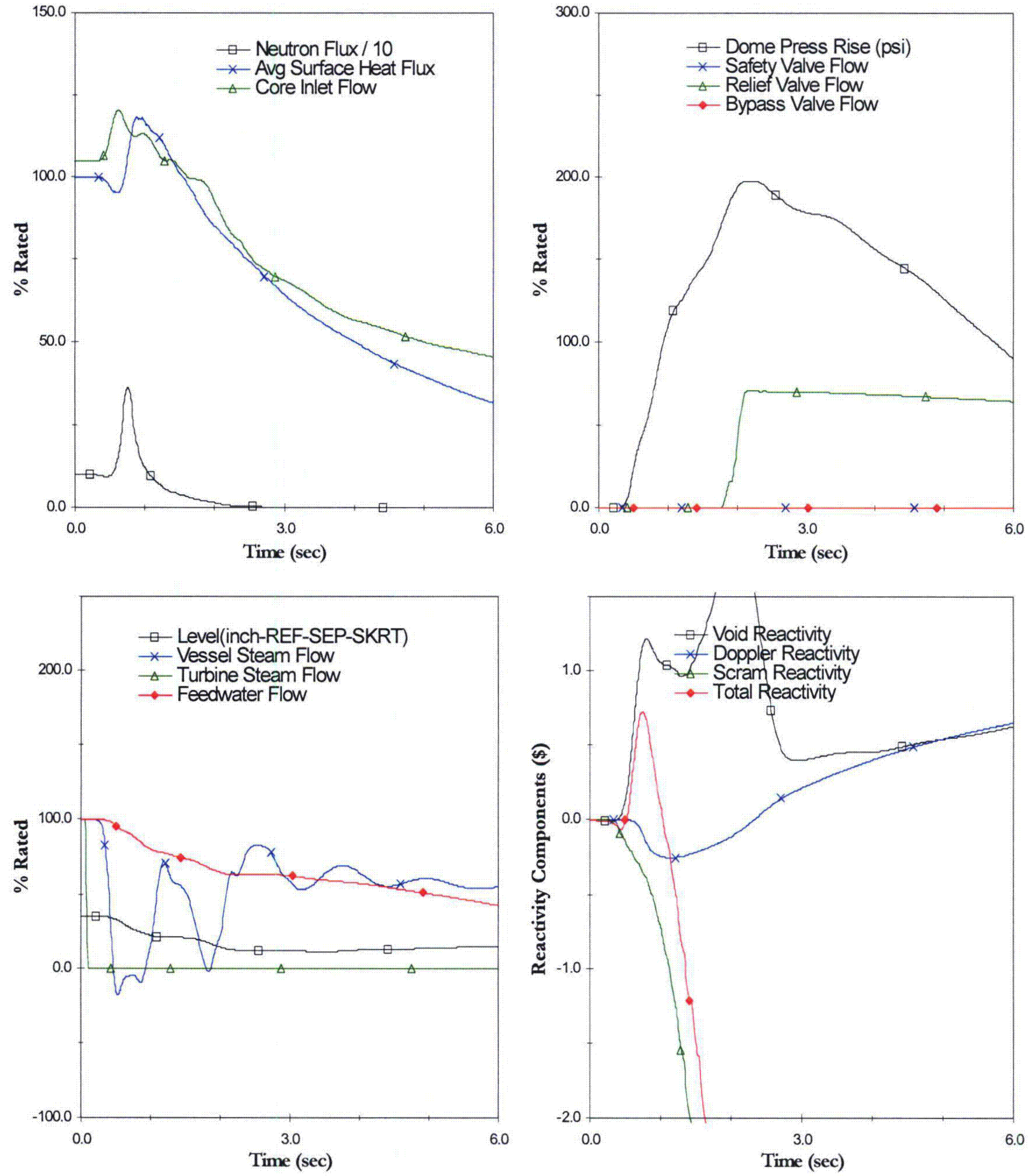

Figure 28 Plant Response to Turbine Trip w/o Bypass (MOC ICF with RPTOOS (HBB))

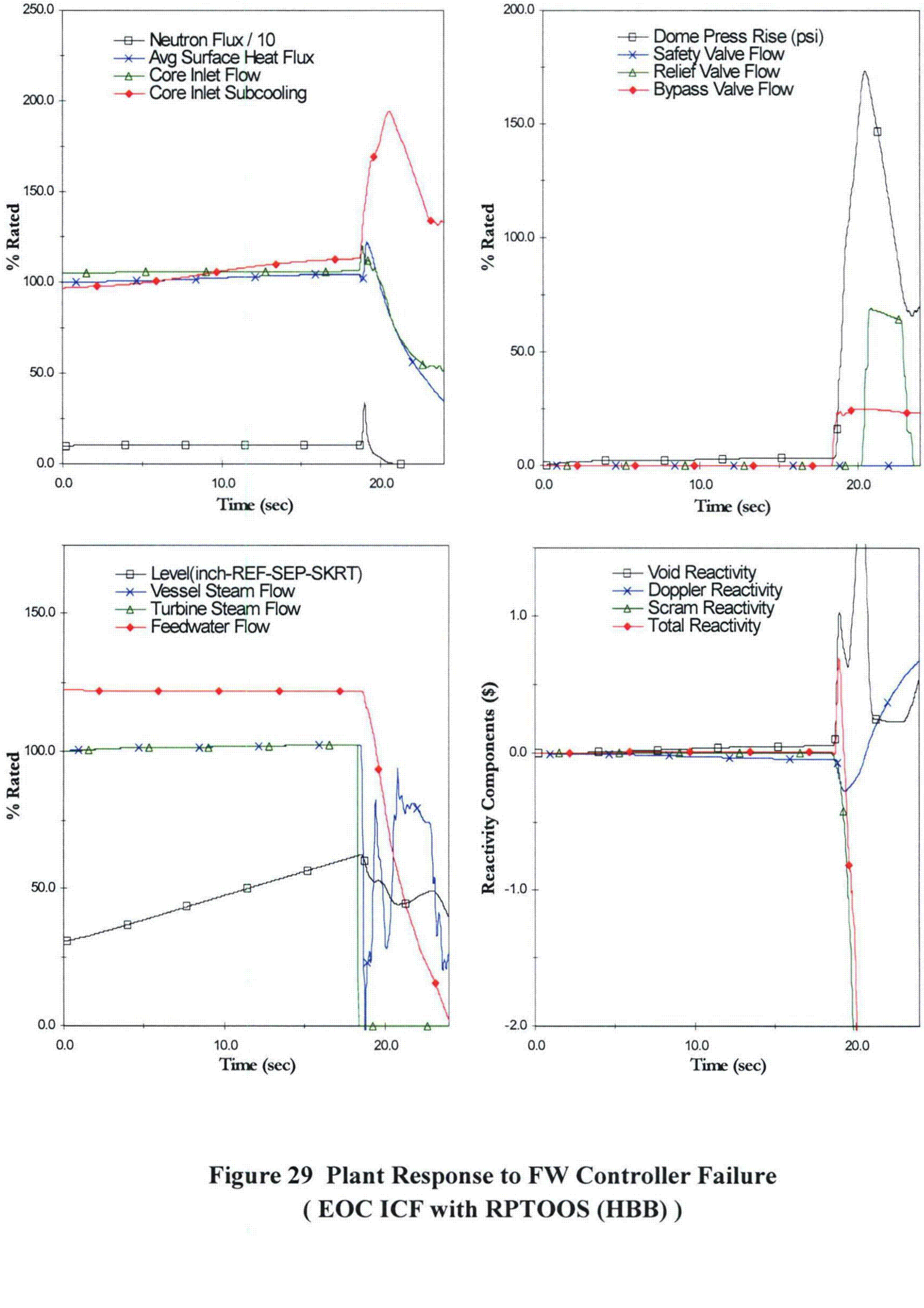

Figure 29 Plant Response to FW Controller Failure
(EOC ICF with RPTOOS (HBB))

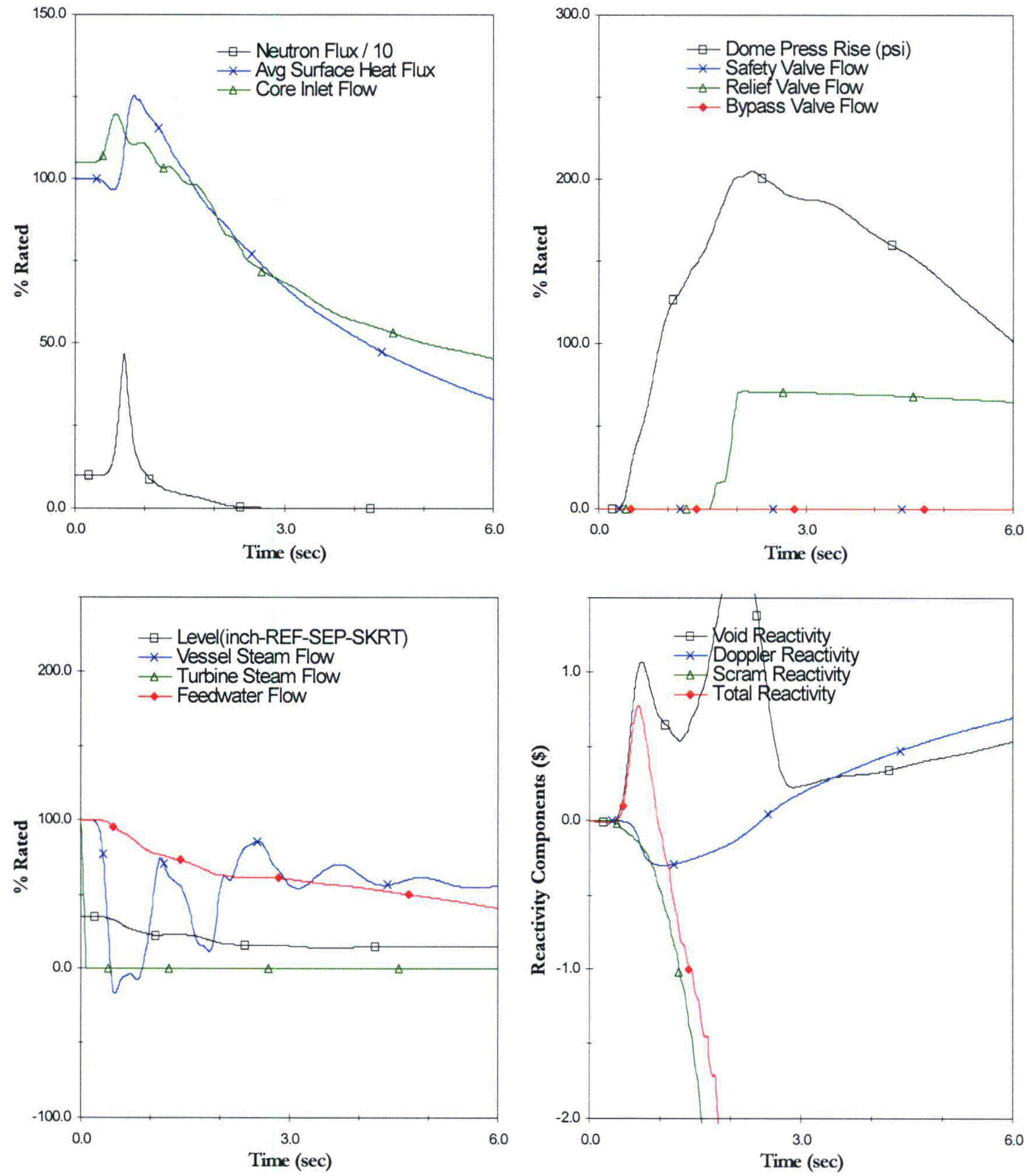

**Figure 30 Plant Response to Load Rejection w/o Bypass
(EOC ICF with RPTOOS (HBB))**

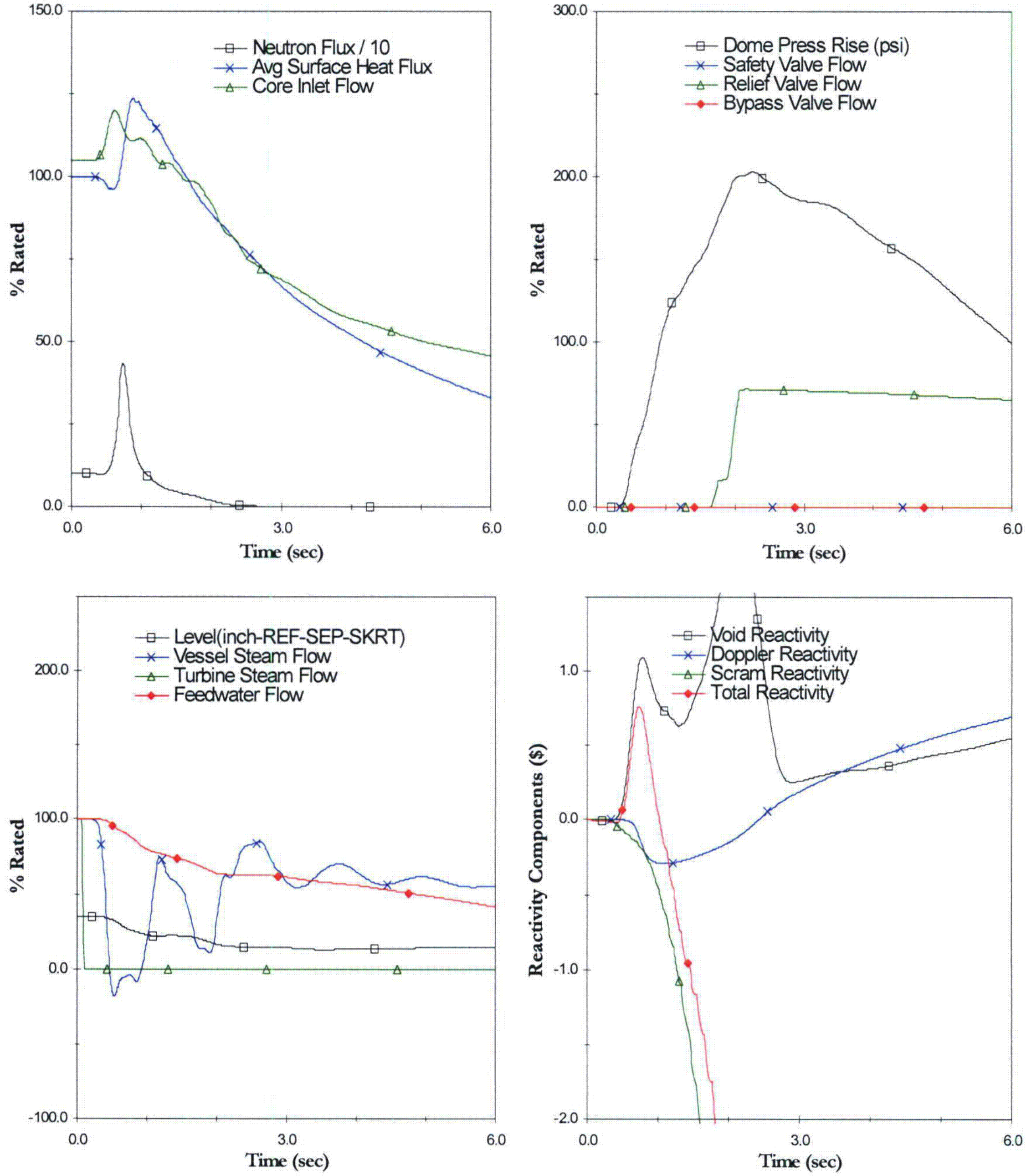

Figure 31 Plant Response to Turbine Trip w/o Bypass (EOC ICF with RPTOOS (HBB))

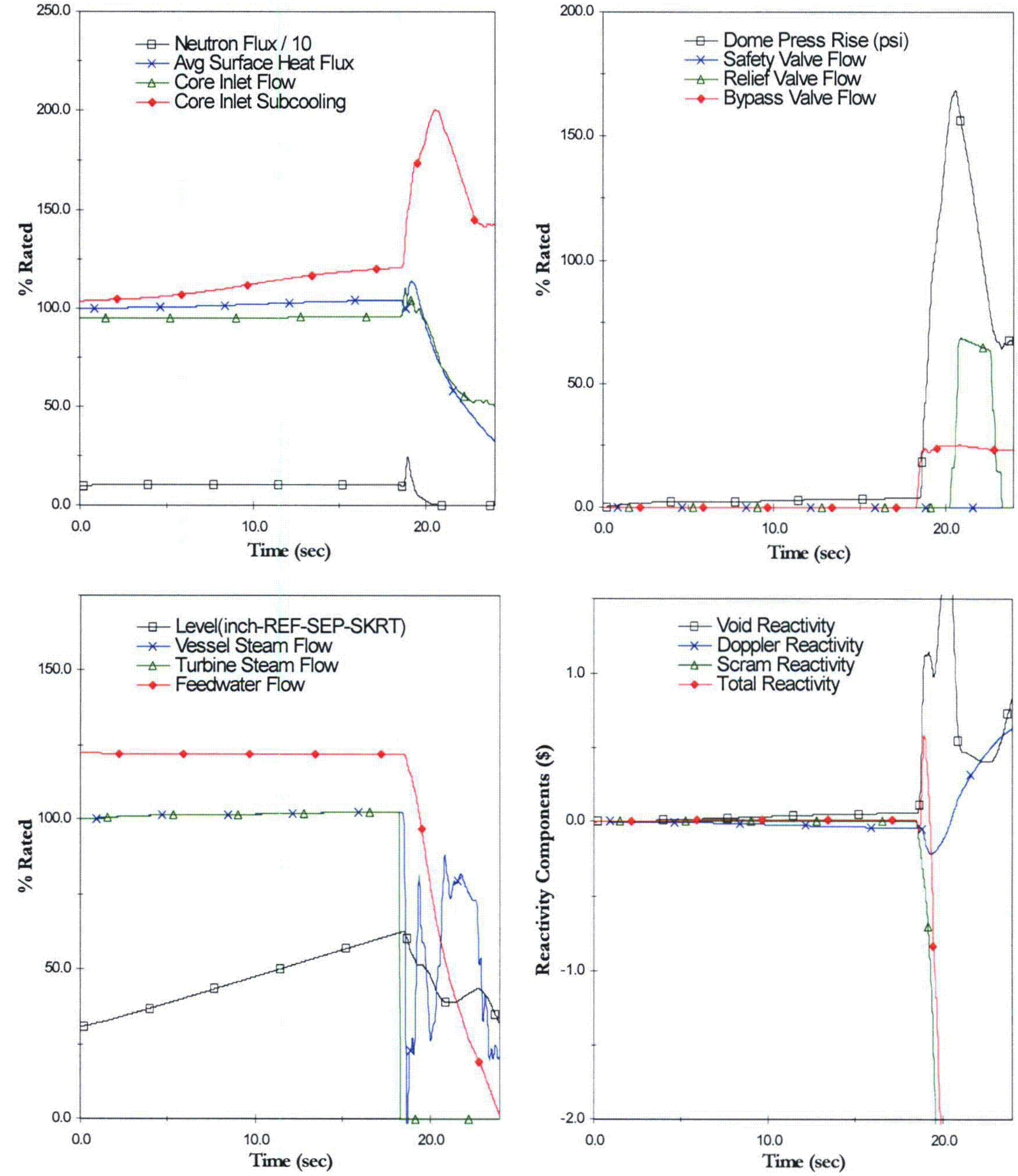

Figure 32 Plant Response to FW Controller Failure
(MOC MELLLA with RPTOOS (HBB))

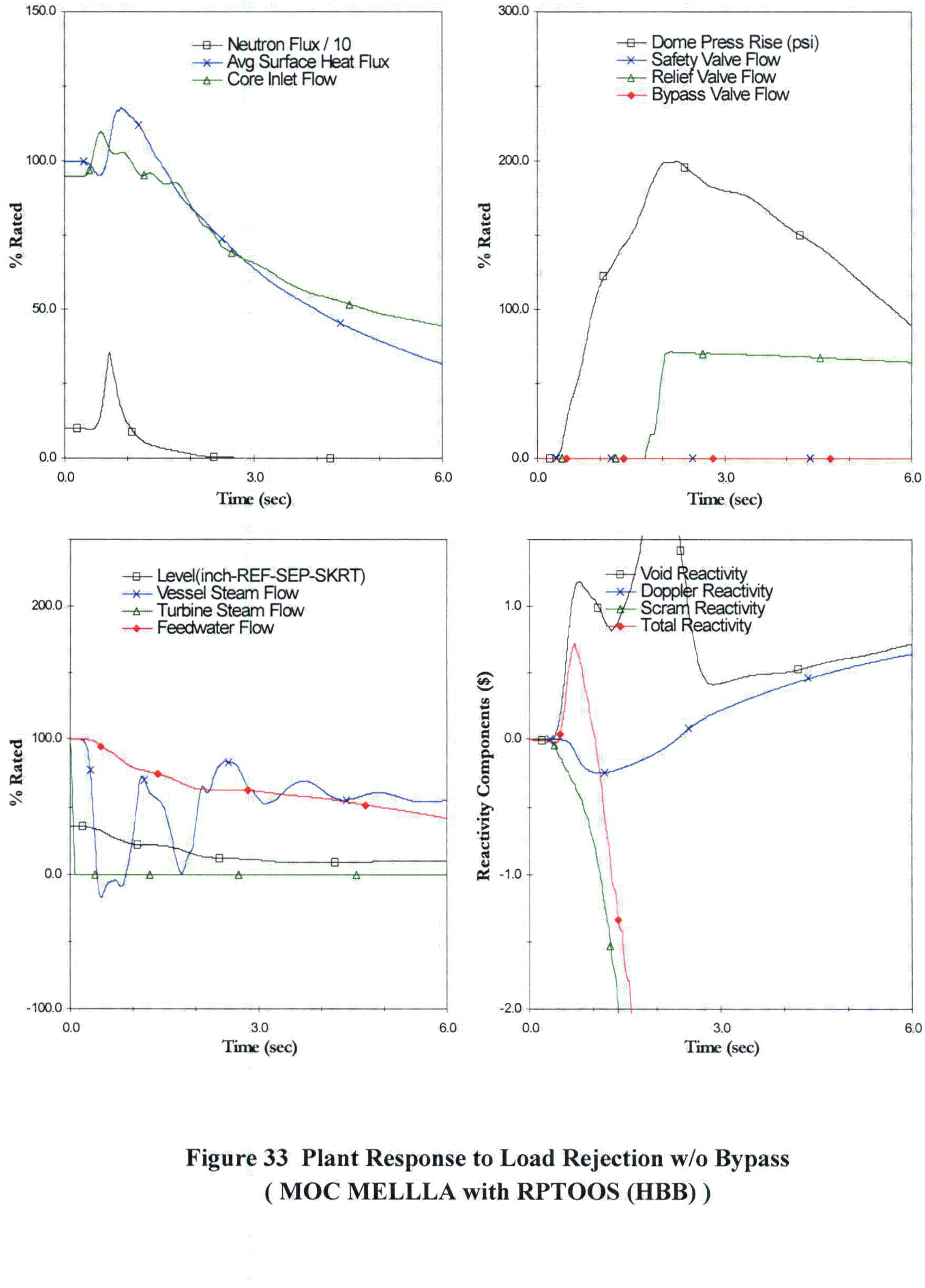

Figure 33 Plant Response to Load Rejection w/o Bypass (MOC MELLLA with RPTOOS (HBB))

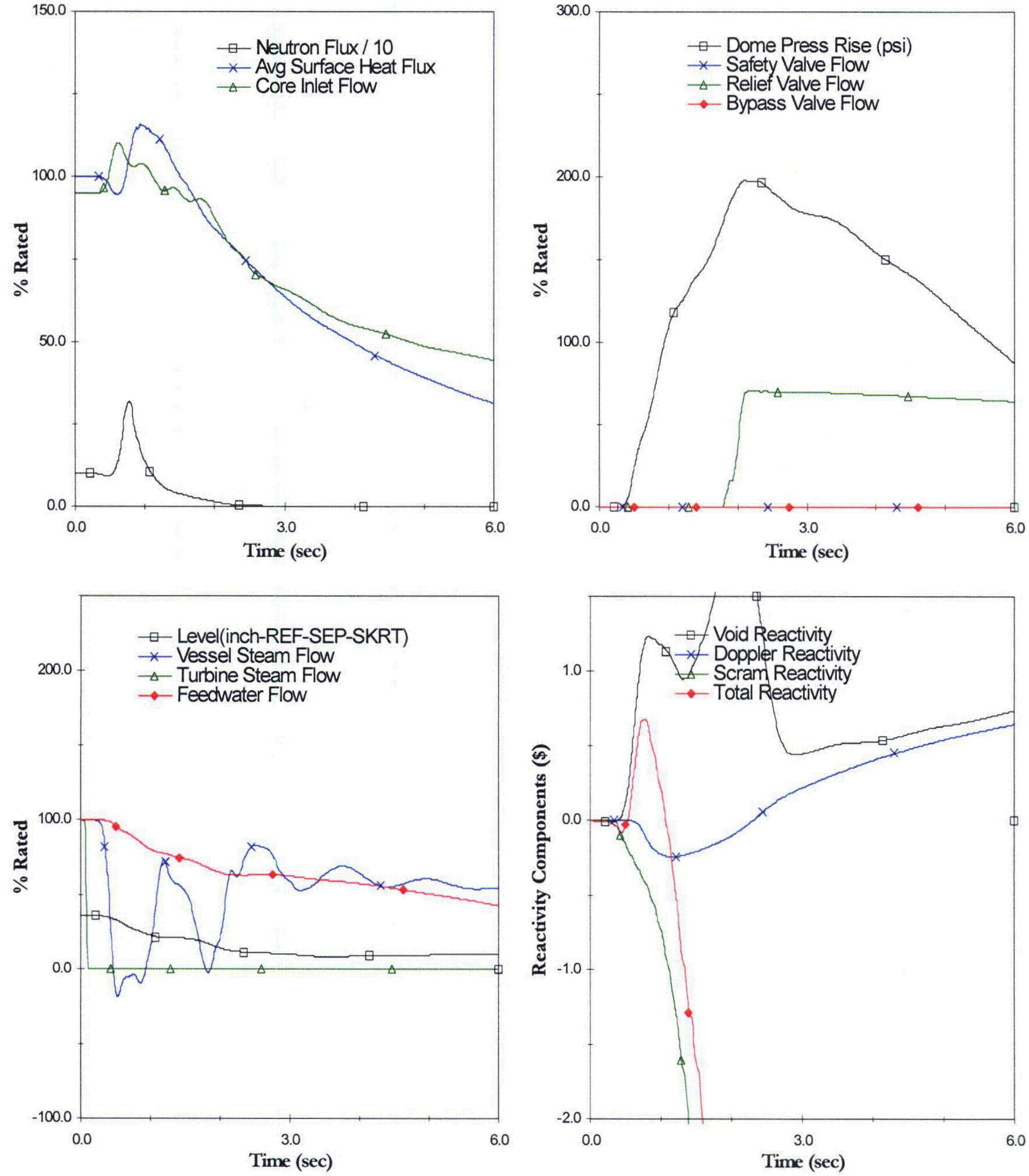

Figure 34 Plant Response to Turbine Trip w/o Bypass (MOC MELLLA with RPTOOS (HBB))

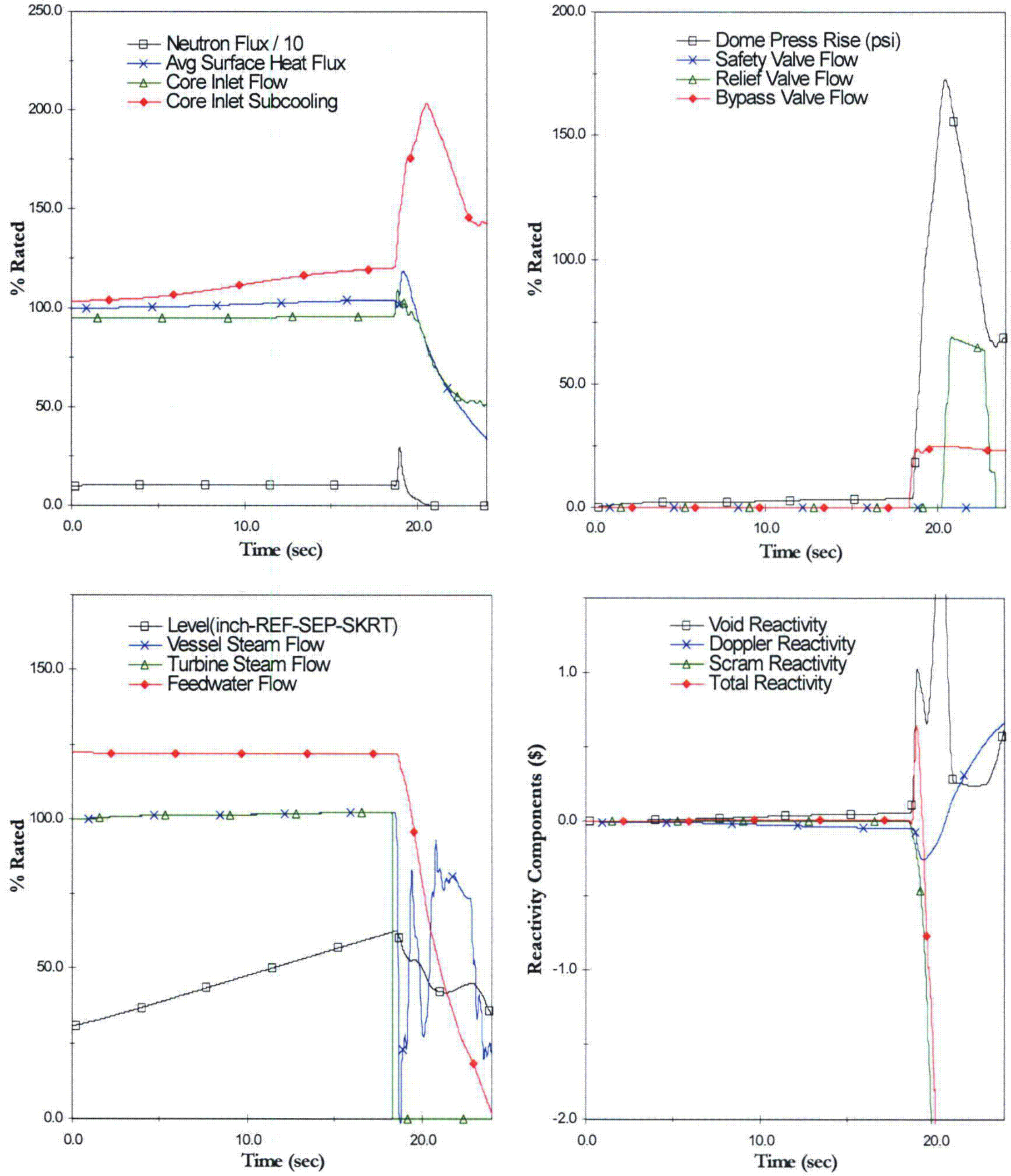

Figure 35 Plant Response to FW Controller Failure
(EOC MELLLA with RPTOOS (HBB))

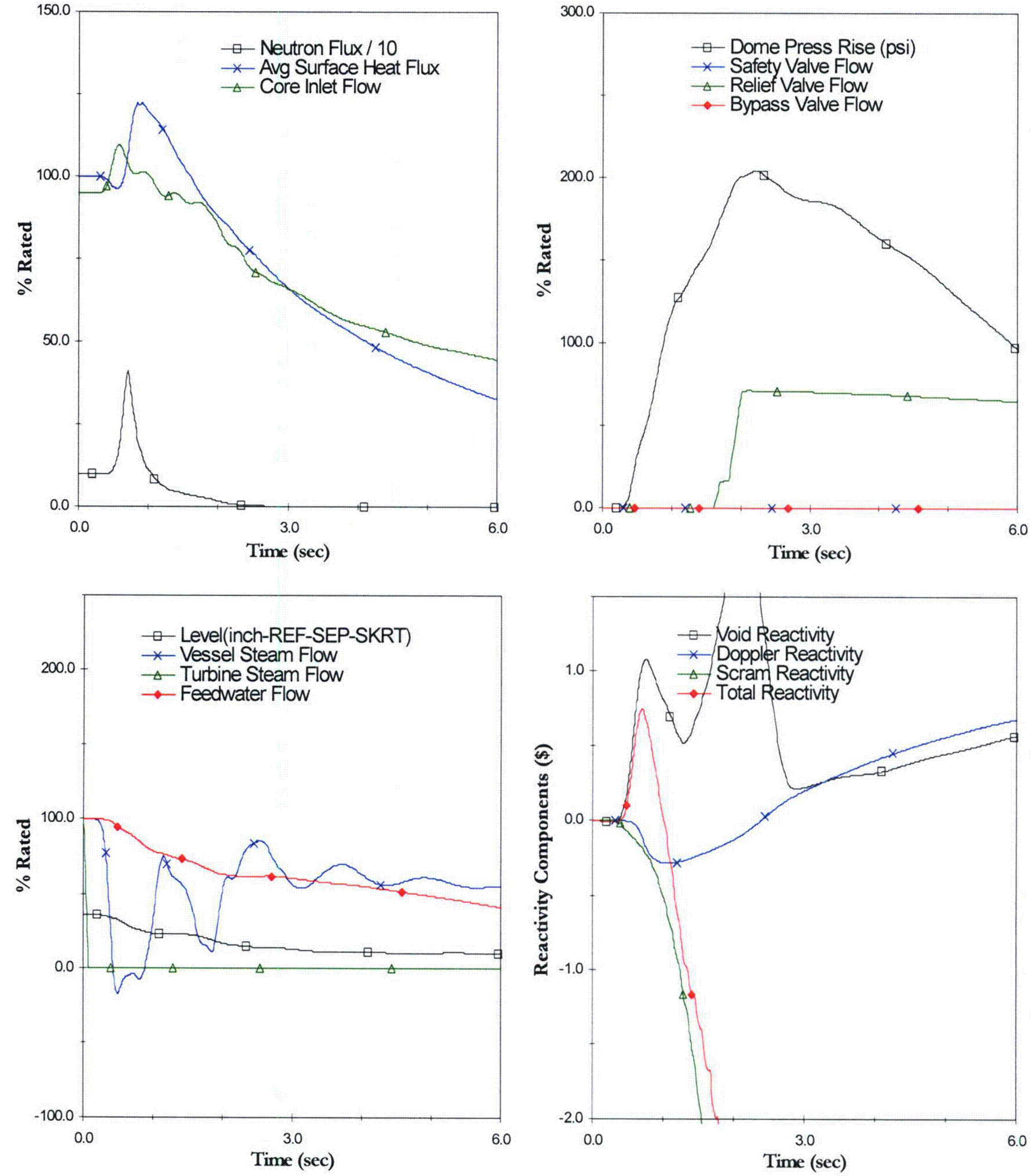

Figure 36 Plant Response to Load Rejection w/o Bypass
(EOC MELLLA with RPTOOS (HBB))

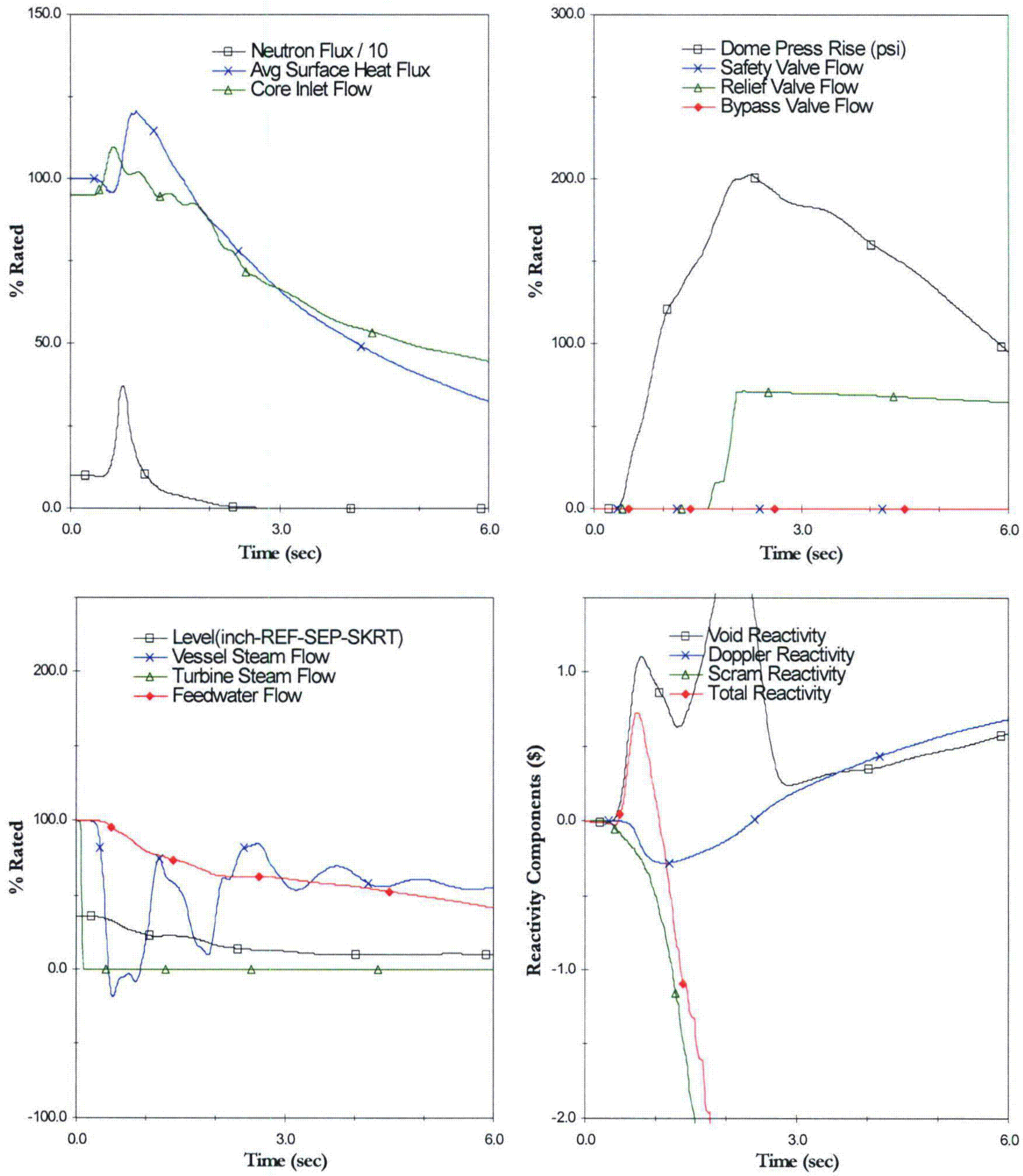

**Figure 37 Plant Response to Turbine Trip w/o Bypass
(EOC MELLLA with RPTOOS (HBB))**

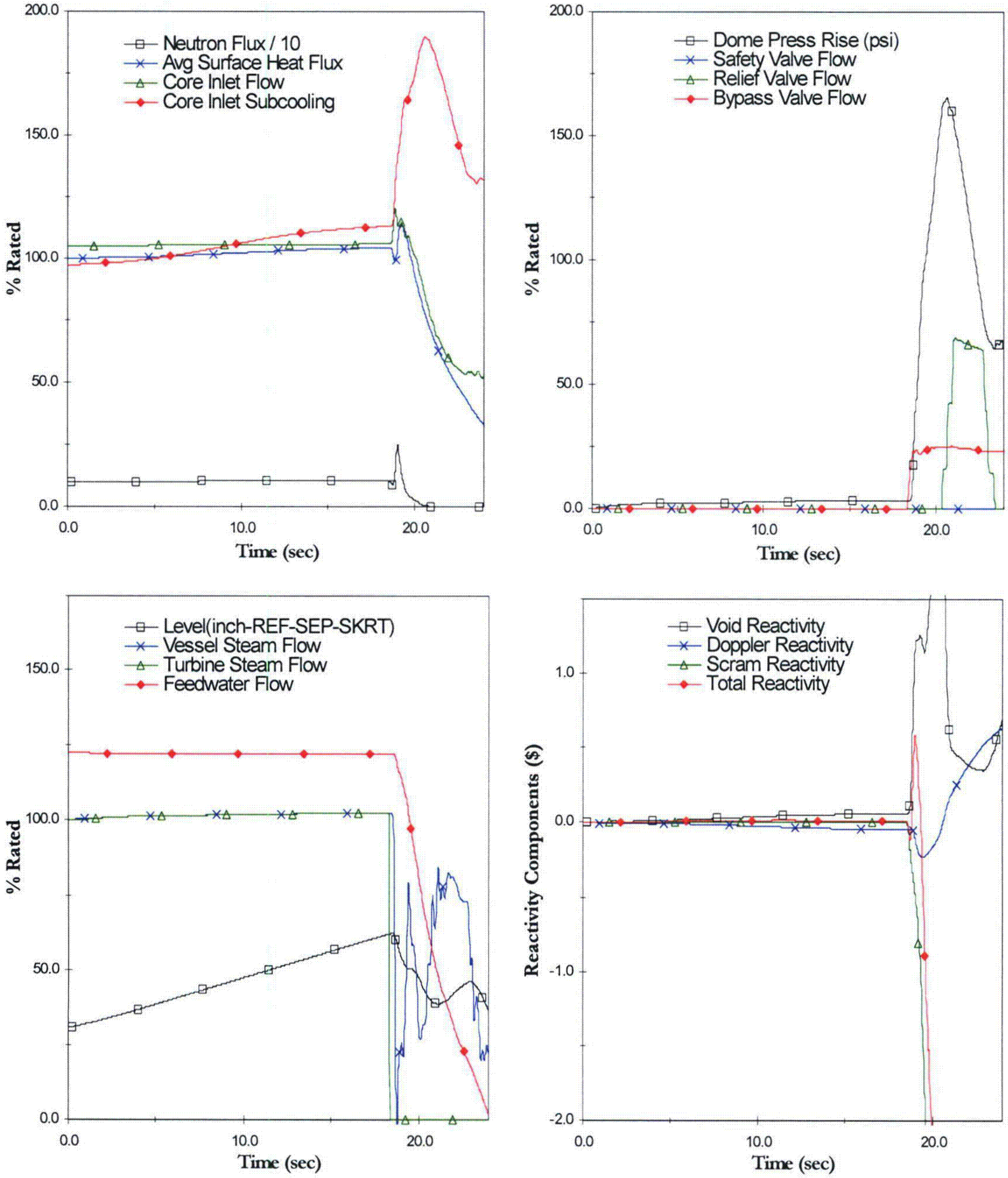

Figure 38 Plant Response to FW Controller Failure
(EOC ICF with RPTOOS (UB))

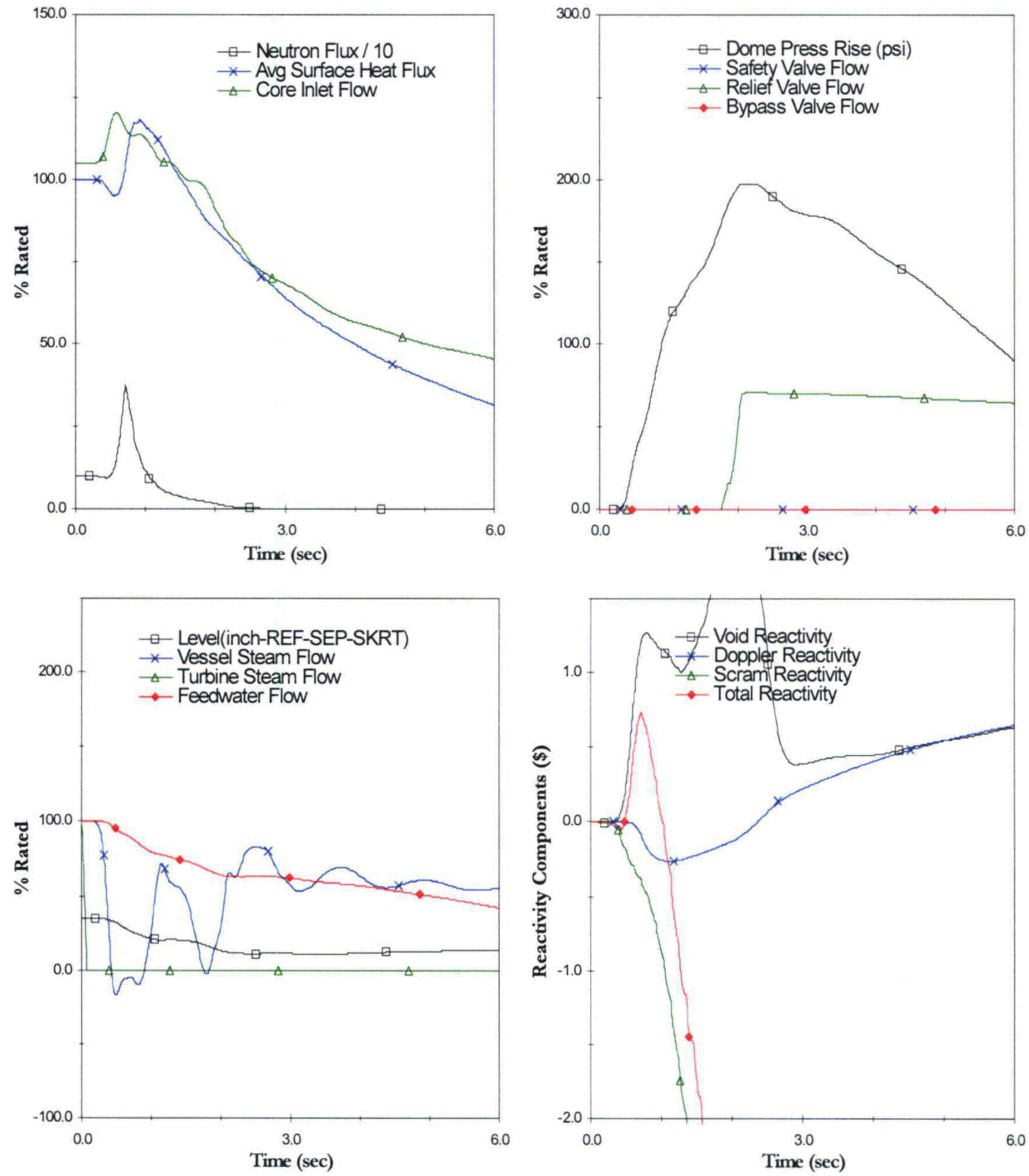

Figure 39 Plant Response to Load Rejection w/o Bypass
(EOC ICF with RPTOOS (UB))

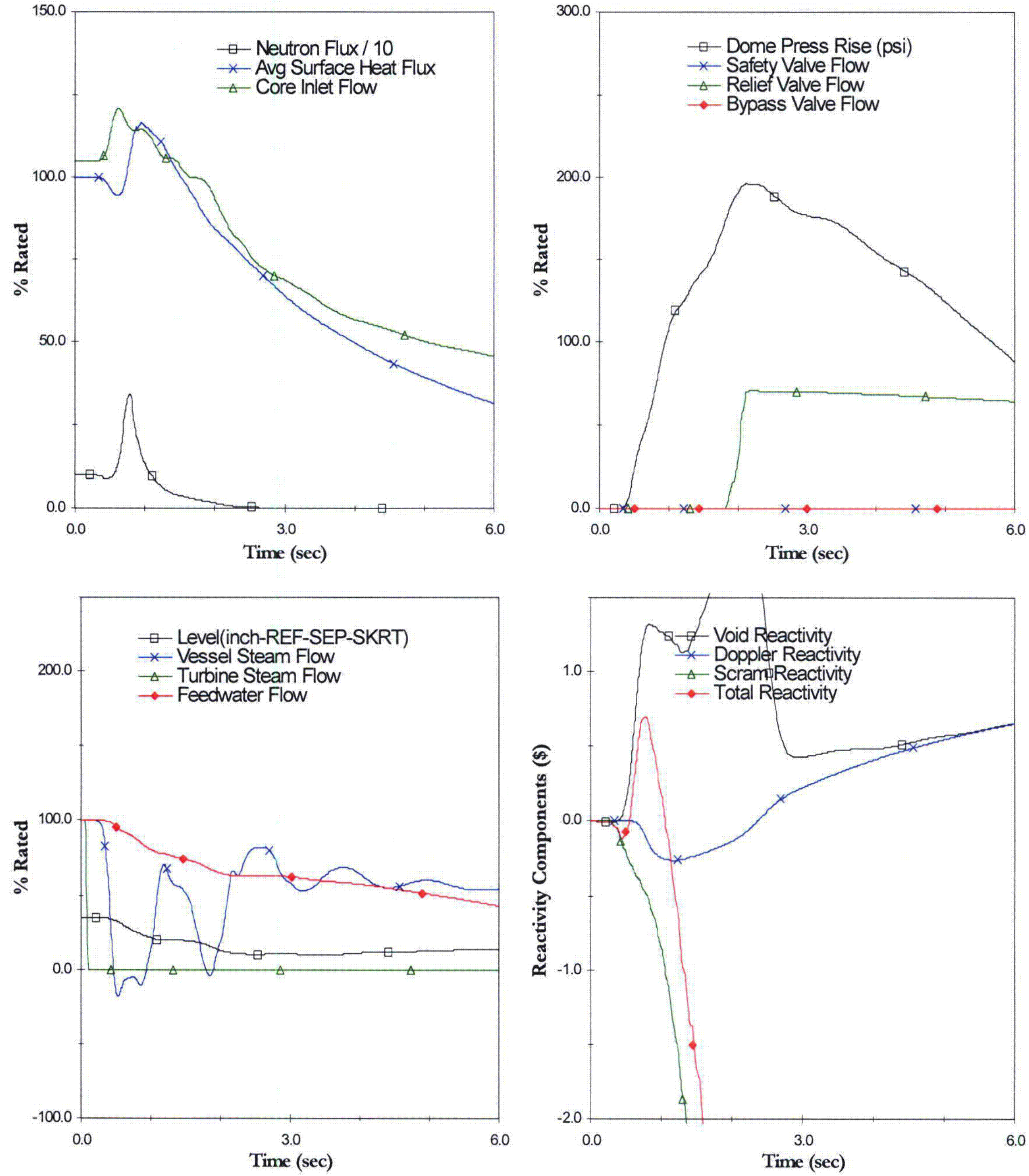

Figure 40 Plant Response to Turbine Trip w/o Bypass (EOC ICF with RPTOOS (UB))

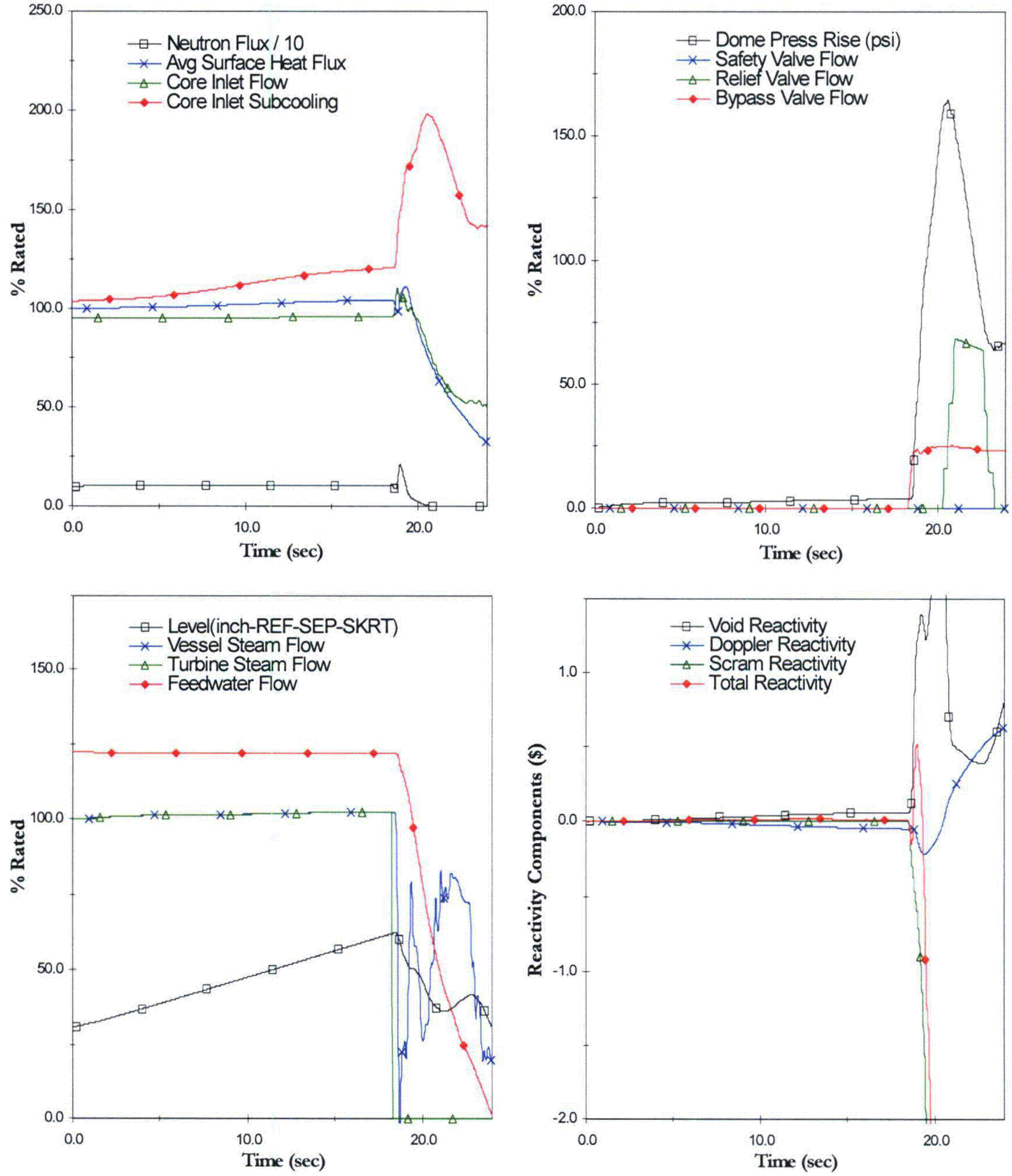

Figure 41 Plant Response to FW Controller Failure
(EOC MELLLA with RPTOOS (UB))

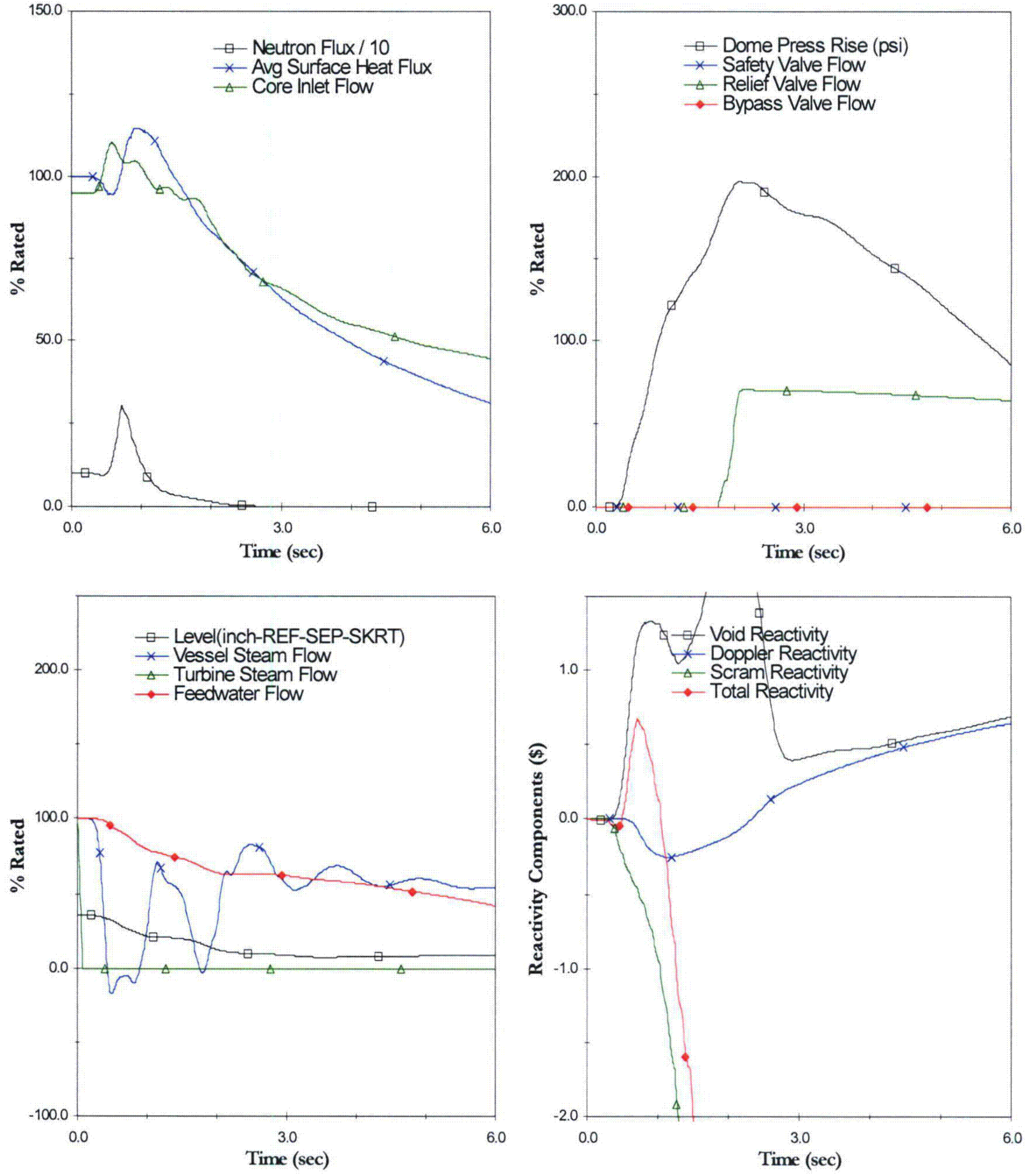

Figure 42 Plant Response to Load Rejection w/o Bypass (EOC MELLLA with RPTOOS (UB))

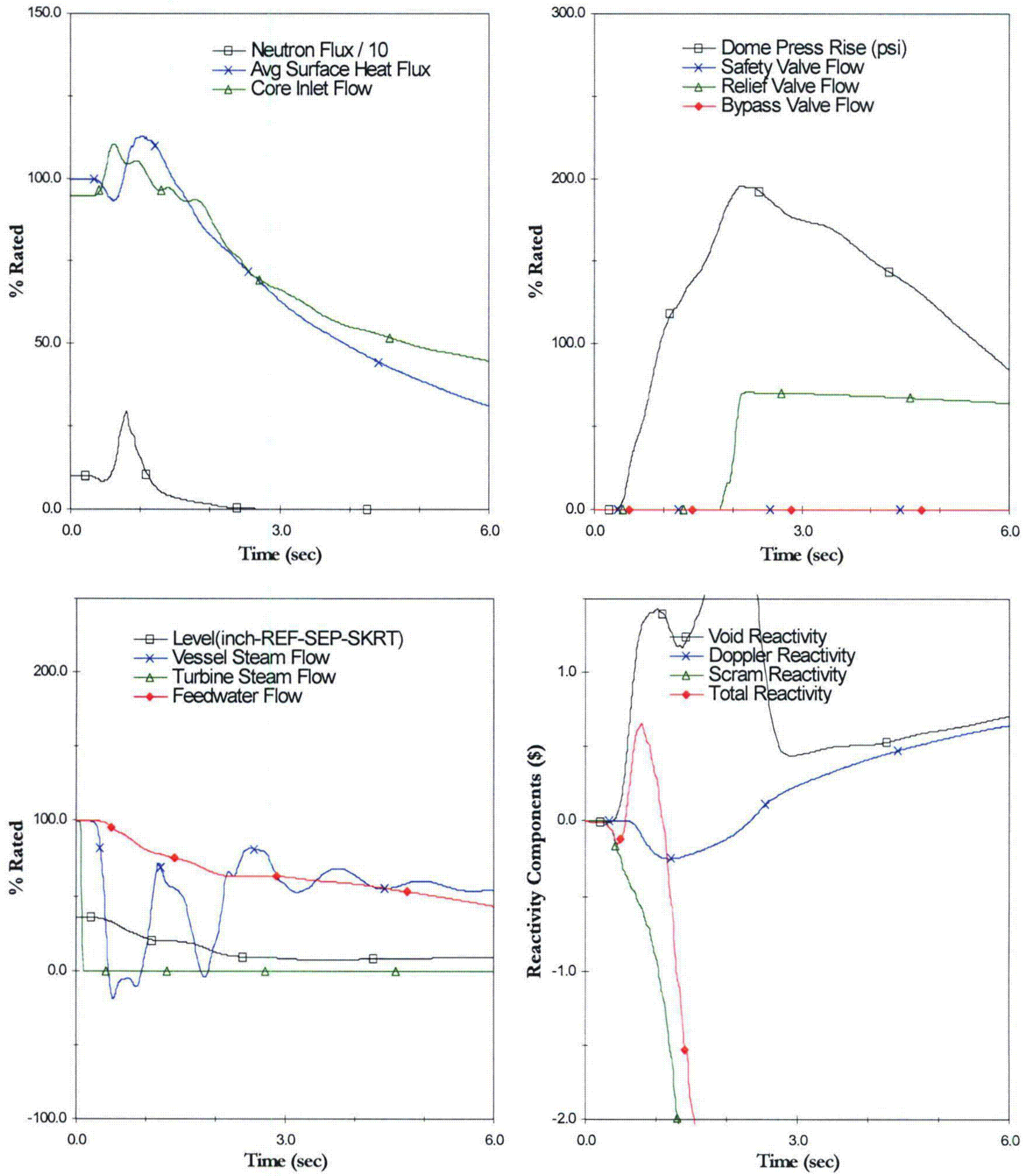

Figure 43 Plant Response to Turbine Trip w/o Bypass
(EOC MELLLA with RPTOOS (UB))

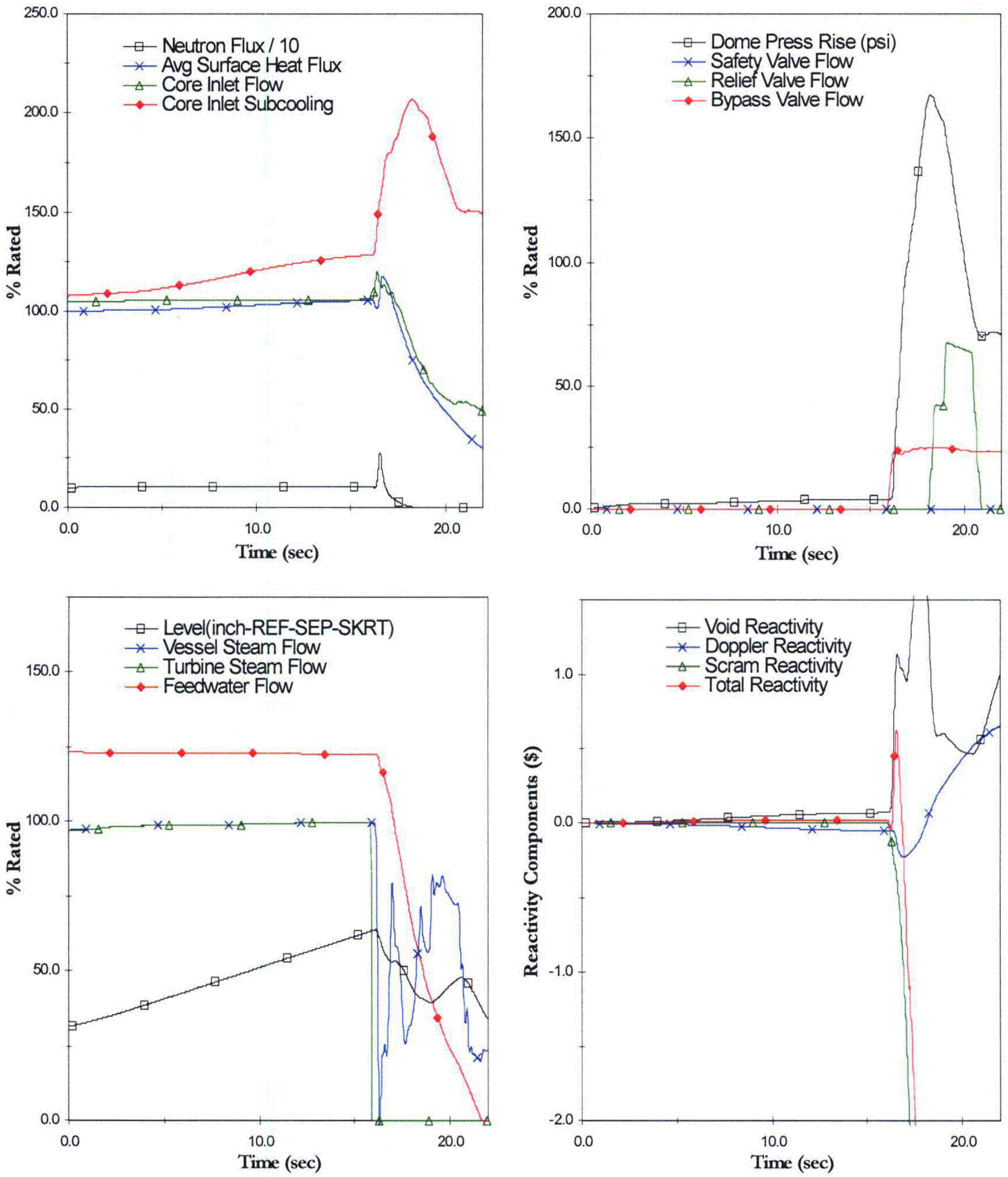

Figure 44 Plant Response to FW Controller Failure
(MOC ICF & FWTR with RPTOOS (HBB))

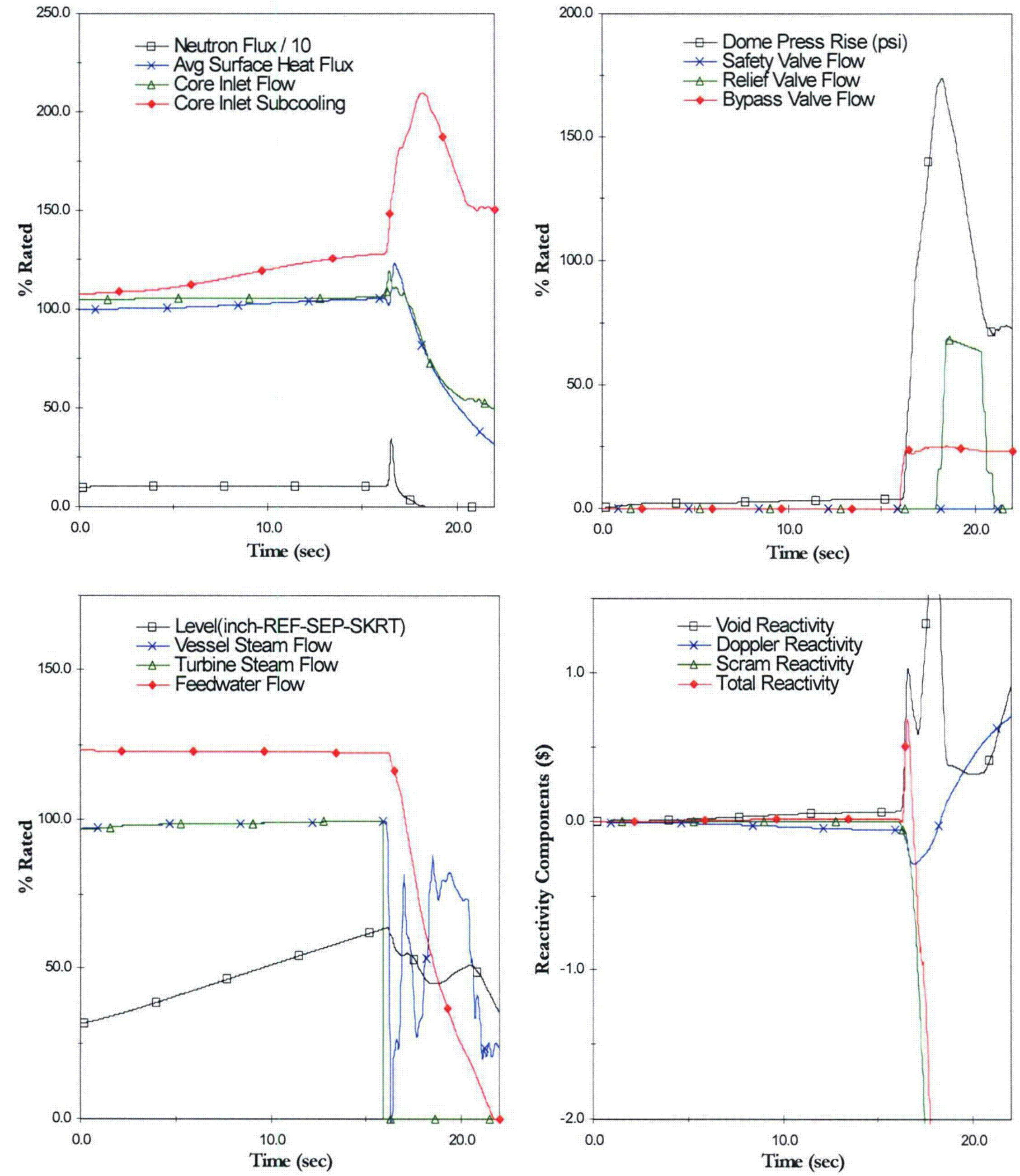

Figure 45 Plant Response to FW Controller Failure (EOC ICF & FWTR with RPTOOS (HBB))

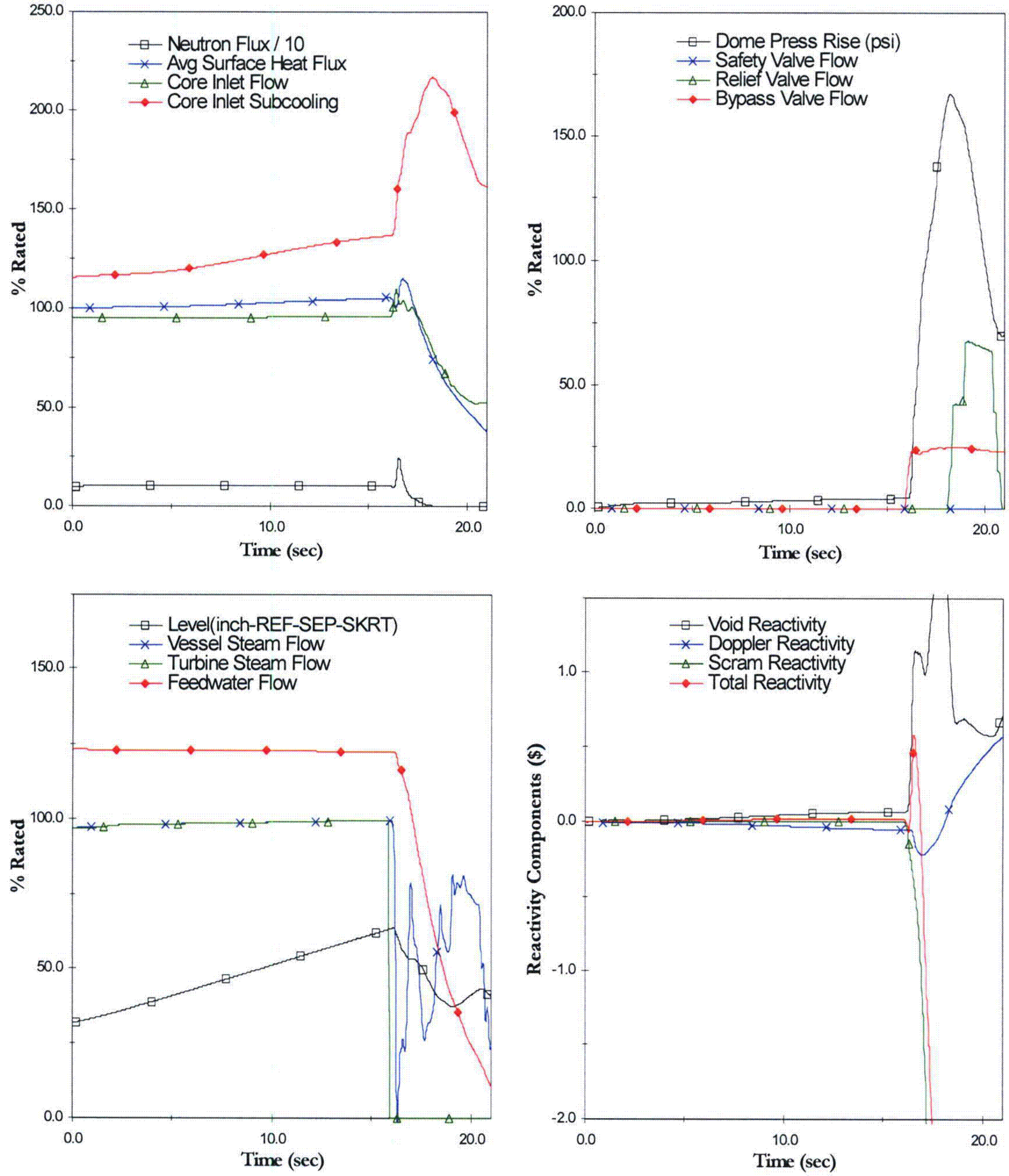

**Figure 46 Plant Response to FW Controller Failure
(MOC MELLLA & FWTR with RPTOOS (HBB))**

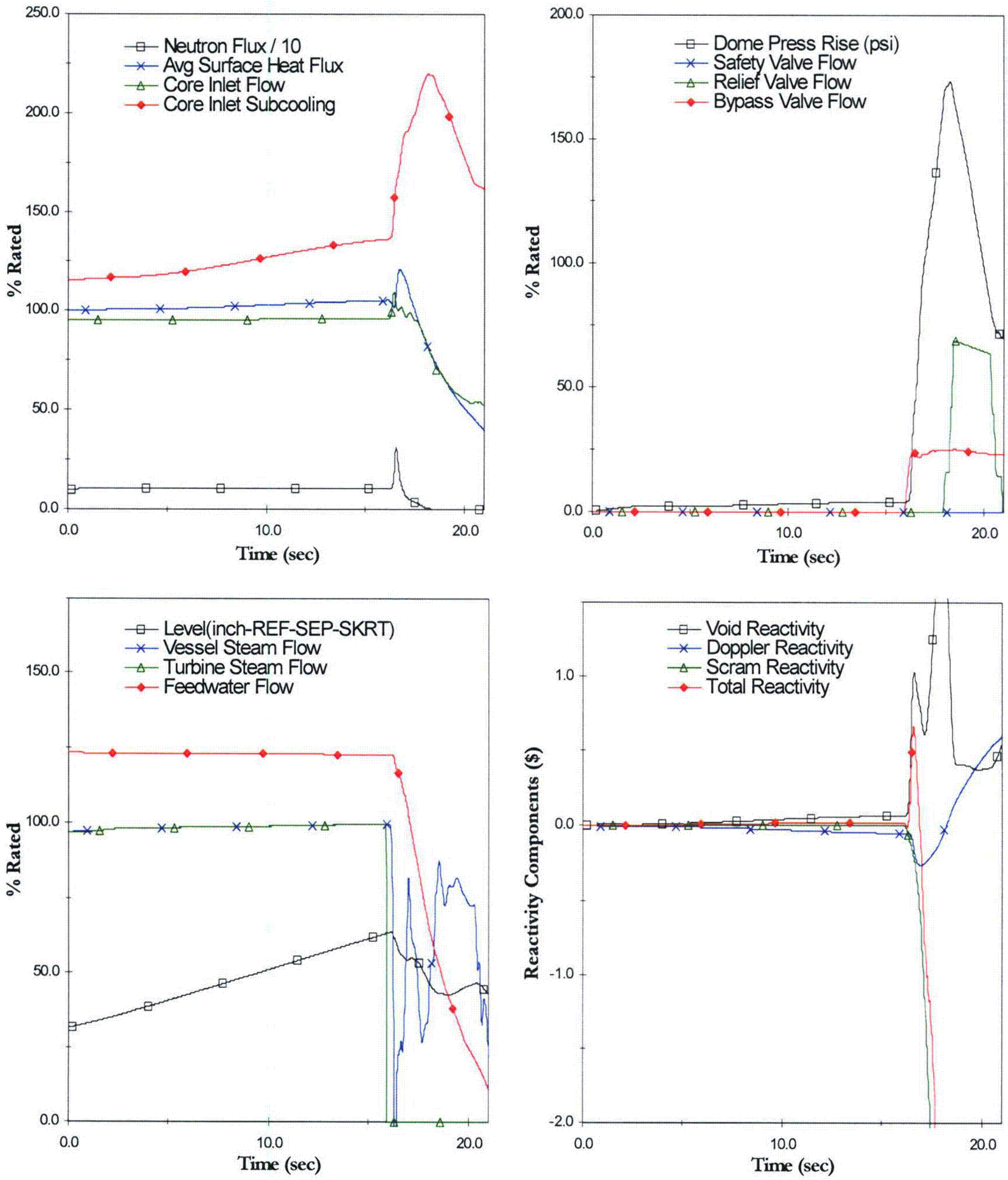

Figure 47 Plant Response to FW Controller Failure
(EOC MELLLA & FWTR with RPTOOS (HBB))

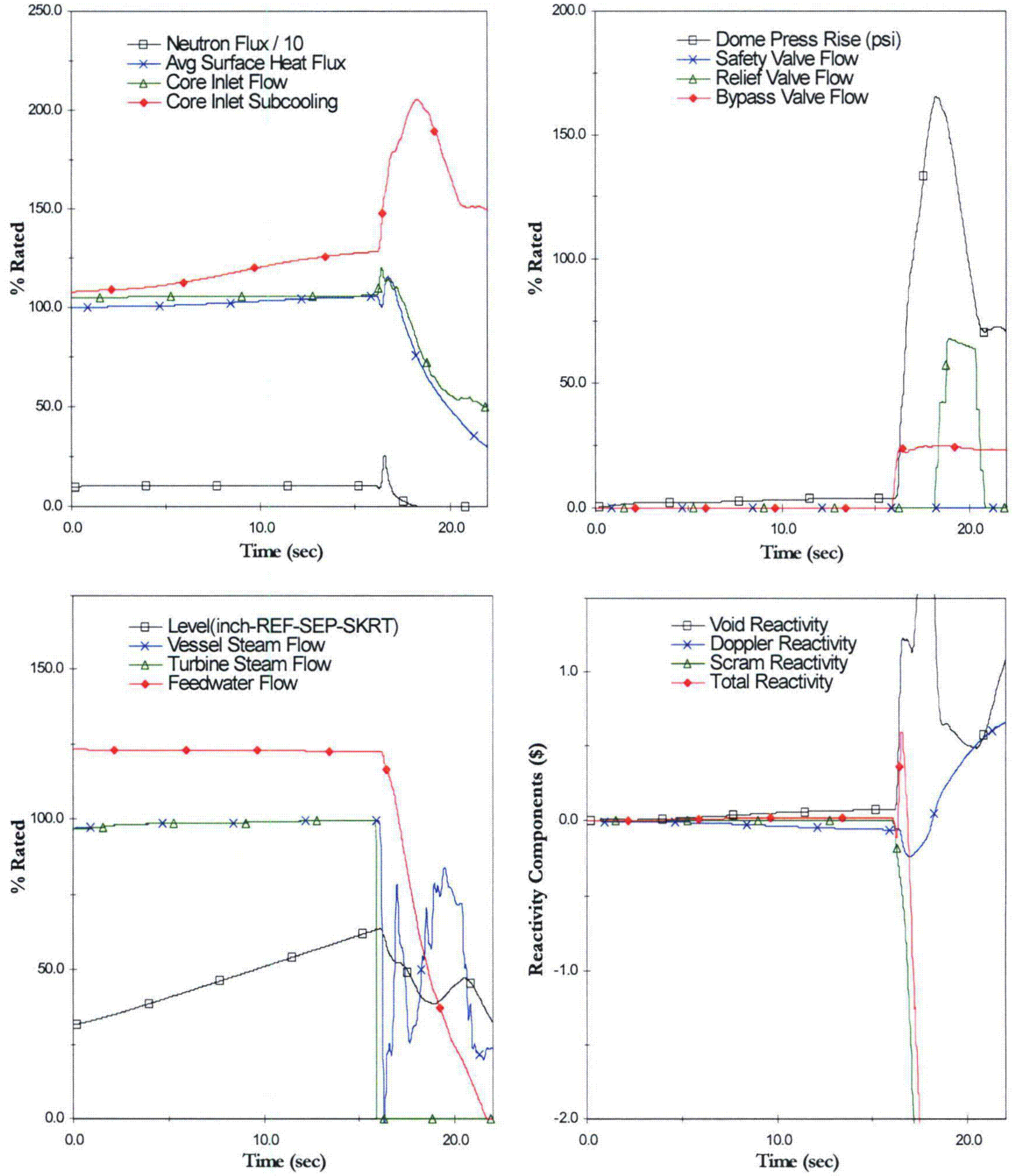

Figure 48 Plant Response to FW Controller Failure
(EOC ICF & FWTR with RPTOOS (UB))

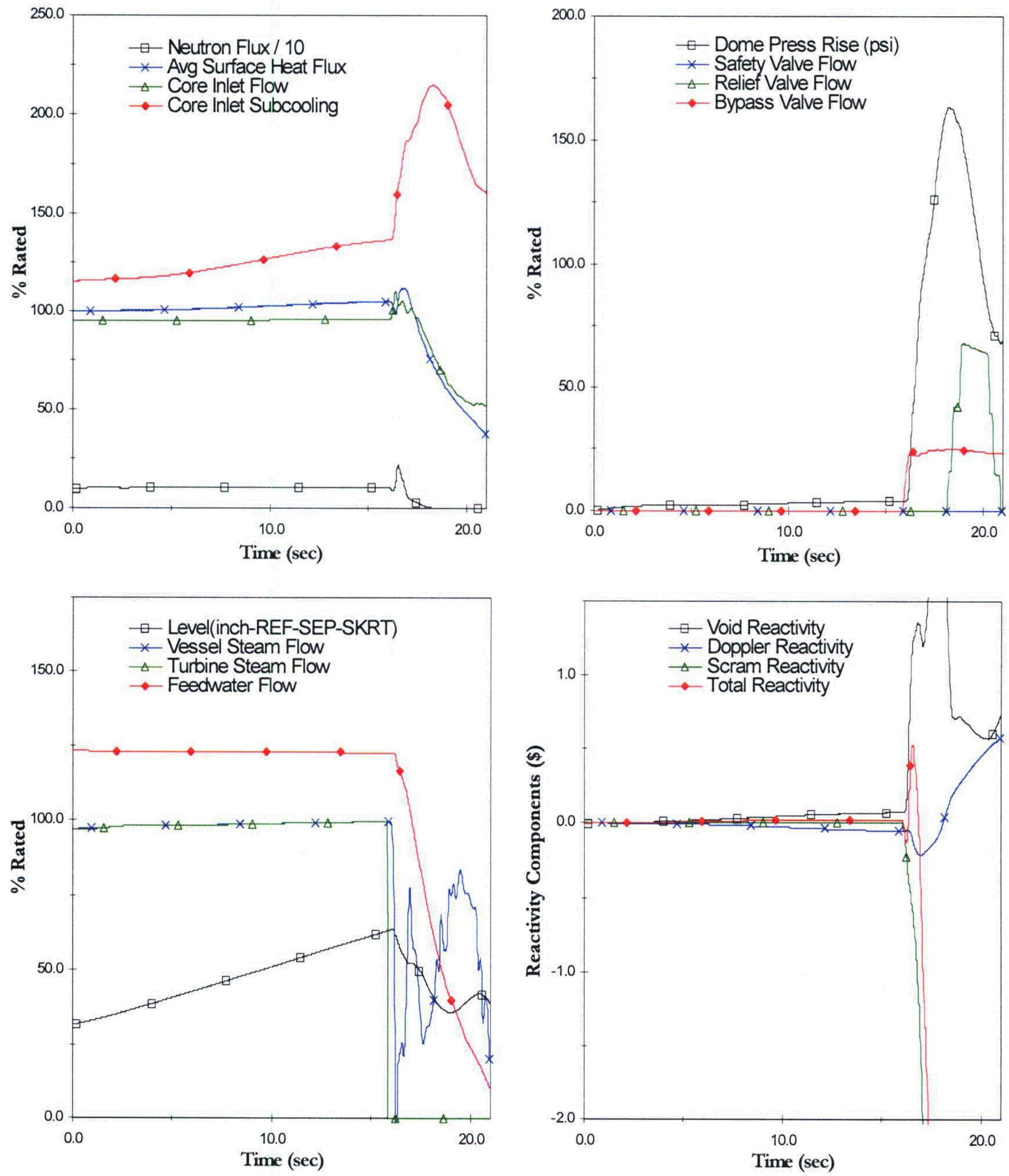

Figure 49 Plant Response to FW Controller Failure (EOC MELLLA & FWTR with RPTOOS (UB))

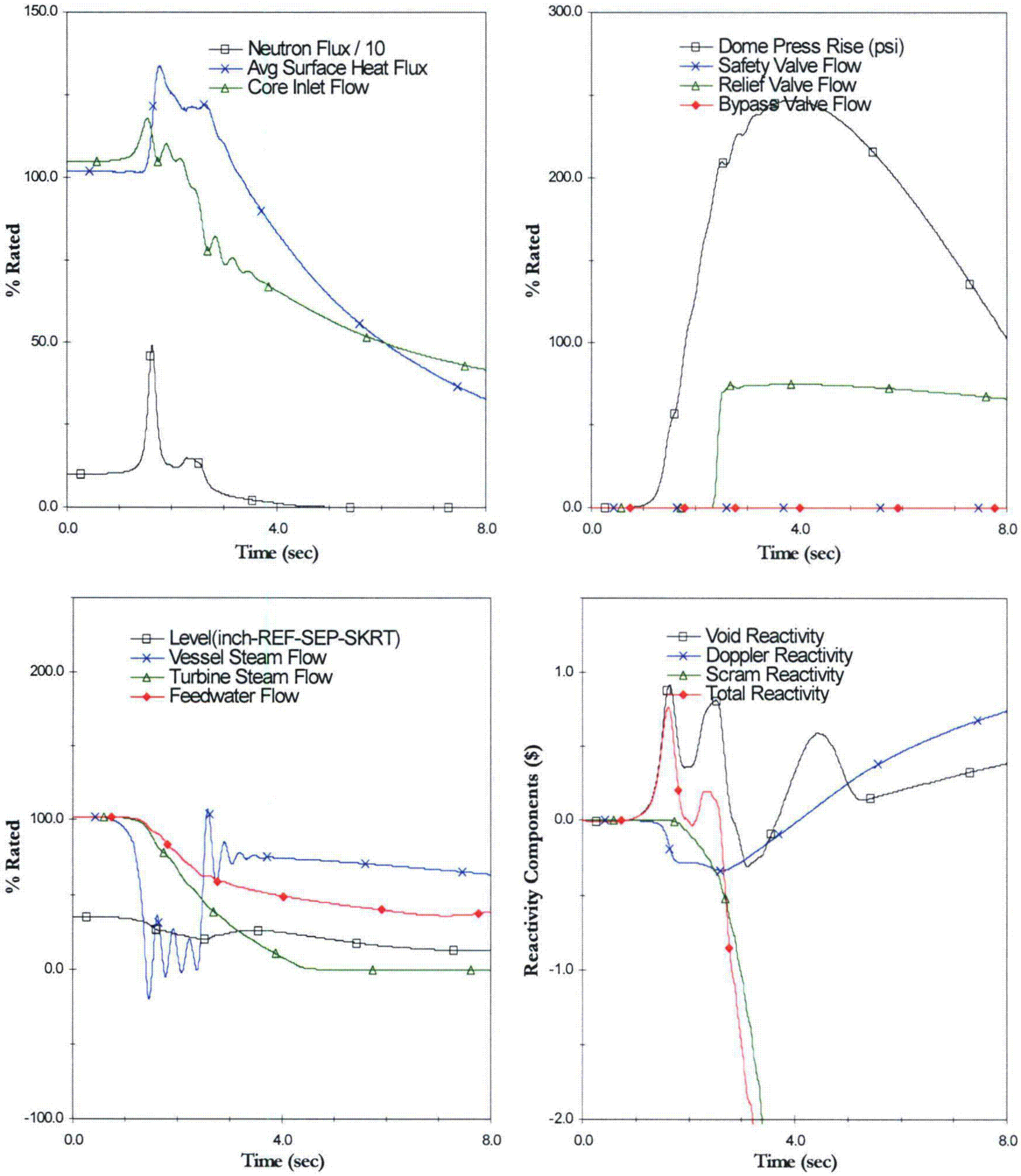

Figure 50 Plant Response to MSIV Closure (Flux Scram) - ICF (HBB)

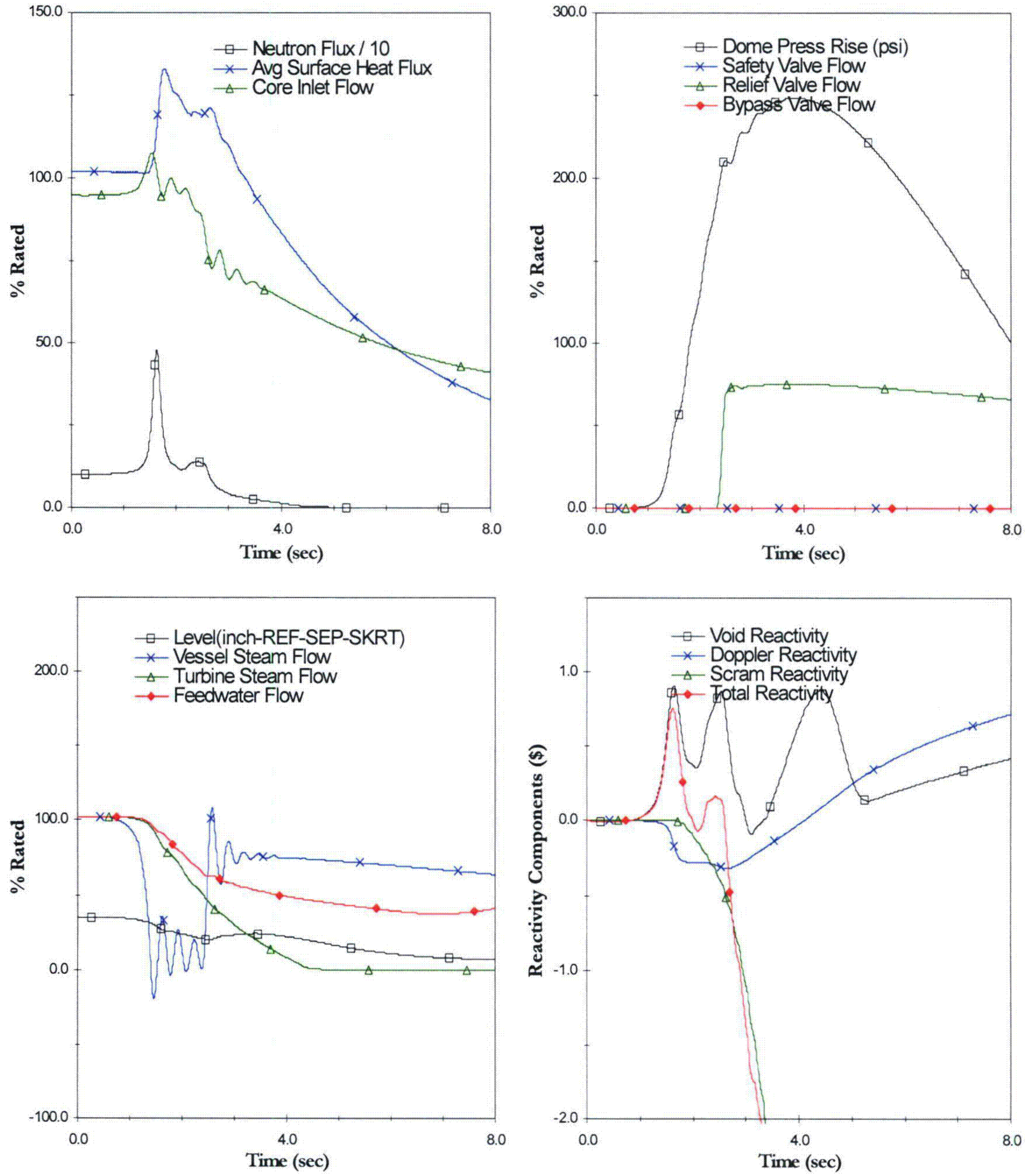

Figure 51 Plant Response to MSIV Closure (Flux Scram) - MELLLA (HBB)

Appendix A
Analysis Conditions

The reactor operating conditions used in the reload licensing analysis for this plant and cycle are presented in Table A-1. The pressure relief and safety valve configuration for this plant are presented in Table A-2. Additionally, the operating flexibility options listed in Section 8 are supported by the reload licensing analysis.

Table A-1 Reactor Operating Conditions

Parameter	Analysis Value			
	ICF NFWT	LCF NFWT	ICF RFWT	LCF RFWT
Thermal power, MWt	3840.0	3840.0	3840.0	3840.0
Core flow, Mlb/hr	105.0	94.8	105.0	94.8
Reactor pressure (core mid-plane), psia	1036.0	1034.0	1030.1	1028.1
Inlet enthalpy, Btu/lb	526.3	523.8	522.4	519.6
Non-fuel power fraction	0.036	0.036	0.036	0.036
Steam flow, Mlb/hr	16.80	16.78	16.28	16.27
Dome pressure, psig	1005.0	1005.0	999.4	999.4
Turbine pressure, psig	945.8	945.9	943.6	943.7

Table A-2 Pressure Relief and Safety Valve Configuration

Valve Type	Number of Valves	Lowest Setpoint (psig)
Safety/Relief Valve	14	1141.2

Appendix B

Decrease In Core Coolant Temperature Events

The Loss-of-Feedwater Heating event was analyzed at 100% rated power using the BWR Simulator Code. The use of this code is permitted in GESTAR II. The transient plots, neutron flux and heat flux values normally reported in Section 9 are not an output of the BWR Simulator Code; therefore, those items are not included in this document. The OLMCPR result is shown in SRLR Section 11.

In addition, the Inadvertent HPCI start-up event was determined to be non-limiting.

Appendix C
ARTS Power and Flow Dependent Limits

The off-rated power and flow dependent limits in Reference C-1 have been verified for Hope Creek Cycle 15 EPU with the exception of the MCPRf limit. For MCPRf, the MCPR is set to the ECCS initial MCPR limit for flows greater than 80.8%. The Safety Limit MCPR for Hope Creek Cycle 15 EPU is 1.08 and the reference Safety Limit MCPR used in Reference C-1 is 1.07.

Power Dependent MCPRp and Kp Limits

Analyses performed in support of Reference C-1 confirmed that the Kp limits provided bound the range between Pbypass and the PLU enabling power level.

Operating Limit MCPRp = Kp * Operating Limit MCPR(100)

For P < 24%, No Thermal Limits Required

Pbypass = 24% Rated Power

Kp for ≥ 24% P

POWER	LIMIT
24.0	1.561
45.0	1.280
60.0	1.150
100.0	1.000

Power Dependent LHGRFACp Limits

Analyses performed in support of Reference C-1 confirmed that the LHGRFACp limits provided bound the range between P-bypass and the PLU enabling power level.

LHGRp = LHGRFACp * LHGRstd

For P < 24%, No Thermal Limits Required

Pbypass = 24% Rated Power

LHGRFACp for ≥ 24% P

POWER	LIMIT
24.0	0.603
100.0	1.000

Flow Dependent MCPRf Limits

Flat portion of MCPRf limit curve is changed from 1.20 (Reference C-1) to 1.25 consistent with ECCS-LOCA Initial Operating MCPR. The MCPRf limit curve is not adjusted for the 0.01 OLMCPR adder (extended operating domain licensing commitments) as the MCPRf curve exceeds the required MCPR by more than the 0.01 at all flow conditions.

Operating Limit MCPRf = MAX(1.25, [A(F)*W(C)/100 + B(F)])

A(F) = -0.598 and B(F) = 1.733

MCPRf limits are based on a 1.08 SLMCPR and the equation coefficients have been scaled appropriately

Max Runout Flow = 109.0%

FLOW	LIMIT
30.0	1.55
80.8	1.25
109.0	1.25

Flow Dependent LHGRFACf Limits

LHGRf = LHGRFACf * LHGRstd

Max Runout Flow = 109.0%

FLOW	LIMIT
30.0	0.500
50.0	0.782
82.2	1.000
109.0	1.000

References:

C-1. NEDC-33158P, *Fuel Transition Report for Hope Creek Generating Station,* Supplement 1, Revision 1, April 2005.

Appendix D
Option B Licensing Basis

The NRC has concluded that a statistical approach (Option B) may be used for pressurization events analyzed with ODYN (References D-1 and D-2). The GEMINI statistical scram speed is provided in Table D-1.

Table D-1 GEMINI Methods: CRD Control Fraction vs. Time in BWR/2-5

	0%	5%	20%	50%	90%	100%
$\bar{X}$ (sec)	0.200	.324	.694	1.459	2.535	2.804
σ (sec)	- -	.014	.016	.031	.070	- -

The NRC Staff requires that, "in order to take credit for conservatism in the scram speed performance, it must be demonstrated that there is insufficient reason to reject the plant-specific scram speed as being within the distribution assumed in the statistical analysis".

General Electric presents the following procedure as one that satisfies the Staff's objectives for scram conformance. It should be noted that some utilities using ODYN Option B might desire to establish their own conformance procedures.

The procedure consists of testing, at the 5 percent significance level, the scram surveillance data at the 20 percent insertion position which is generated several times each cycle as required in the Reactivity Control System Technical Specification (20 percent insertion is representative of that portion of the scram most affecting the pressurization transient). The unique rod notch position closest to 20 percent (and the appropriately adjusted time of insertion) is expected to be utilized in actual plant application of this generic concept. For most plants, the surveillance requirements are as follows:

(1) all control rods are measured at beginning of cycle (BOC), and

(2) X% of control rods are measured every 120 days during cycle (X is plant-dependent and ranges from 10 to 50).

At the completion of each surveillance test performed in compliance with the technical specifications surveillance requirements, the average value of all surveillance data at the 20 percent insertion position generated in the cycle to date is to be tested at the 5 percent significance level against the distribution assumed in the ODYN analyses. The surveillance information which each plant, using this procedure, will have to retain throughout the fuel cycle is the number of active control rods measured for each surveillance test (the first test is at the BOC and is denoted N_1; the i[th] test denoted N_i and the average scram time to the 20 percent insertion position for the active rods measured in test i denoted τ_i.

The equation used to calculate the overall average of all the scram data generated to date in the cycle is:

$$\tau_{ave} = \frac{\sum_{i=1}^{n} N_i \tau_i}{\sum_{i=1}^{n} N_i} \qquad (1)$$

where:

$n=$ number of surveillance tests performed to date in the cycle;

$\sum_{i=1}^{n} N_i =$ total number of active rods measured to date in the cycle; and

$\sum_{i=1}^{n} N_i \tau_i =$ sum of the scram time to the 20 percent insertion position of all active rods measured to date in the cycle to comply with the Technical Specification surveillance requirements.

The average scram time, τ_{ave}, is tested against the analysis mean using the following equation:

$$\tau_{ave} \le \tau_B \qquad (2)$$

where:

$$\tau_B = \mu + 1.65 \sqrt{\left(\frac{N_1}{\sum_{i=1}^{n} N_i} \right)} \sigma \qquad (3)$$

The parameters μ and σ are the mean and standard deviation of the distribution for average scram insertion time to the 20 percent position used in the ODYN Option B analysis.

If the cycle average scram time satisfies the Equation 2 criterion, continued plant operation under the ODYN Option B operating limit minimum critical power ratio (OLMCPR) for pressurization events is permitted. If not, the OLMCPR for pressurization events must be re-established, based on a linear interpolation between the Option B and Option A OLMCPRs.

The equation to establish the new operating limit for pressurization events is given below:

$$OLMCPR_{New} = OLMCPR_{Option\,B} + \frac{\tau_{ave} - \tau_B}{\tau_A - \tau_B} \Delta OLMCPR \qquad (4)$$

where: τ_{ave} and τ_B are defined in Equations 1 and 3, respectively;

τ_A = the technical specification limit on core average scram time to the 20 percent insertion position.

ΔOLMCPR = the difference between the OLMCPR calculated using Option A and that using Option B for pressurization events.

The control fractions presented in Table D-1 are based on a ratio of distance inserted to control rod stroke. Alternatively, scram times are expressed as a function of notch position. Table D-2 provides notch positions that correspond to approximately 20% control fraction. These notch positions and times can be used in equations 1 through 4.

Table D-2 GEMINI Methods: CRD Notch Positions for τ_B Determination

Notch Position	μ (pickup)	μ (dropout)	σ (pickup)	σ (dropout)
39	0.655	0.672	0.016	0.016
38	0.706	0.724	0.016	0.017
37	0.759	0.777	0.017	0.018
36	0.813	0.830	0.018	0.019

References:

D-1. *Safety Evaluation for the General Electric Topical Report – Qualification of the One-Dimensional Core Transient Model for Boiling Water Reactors*, NEDO-24154 and NEDE-24154-P, Volumes II, III, and USNRC, 1 June 1980.

D-2. *Revised Supplementary Information Regarding Amendment 11 to GE Licensing Topical Report,* NEDE-24011-P-A, Letter, J. S. Charnley (GE) to H. N. Berkow (NRC), January 16, 1986.

Appendix E
Reactor Recirculation Pump Seizure Event

The reactor recirculation pump seizure event is analyzed for Single Loop Operation (SLO) at HCGS (Reference E-1). This analysis was performed for the HCGS Cycle 13 transition cycle with GE14 and SV96P fuel in the core and transient analysis inputs that are consistent with the Reload 12/Cycle 13 analyses.

The SLO OLMCPR of 1.51 is required so that the reference SLO SLMCPR of 1.12 is protected in the event of a seizure of the recirculation pump in the active loop. If the cycle-specific Safety Limit Minimum Critical Power Ratio (SLMCPR) changes then the SLO OLMCPR may be adjusted by the following factor:

(Cycle Specific SLMCPR / 1.12)

Thus, for HCGS Cycle 15 EPU with a SLO SLMCPR of 1.10 the SLO OLMCPR required is:

1.51 * (1.10/1.12) = 1.48

An additional 0.01 penalty is added to the SLO OLMCPR to support EPU operation (Reference E-2). The resulting SLO OLMCPR is equal to 1.49. In order to protect the required SLO OLMCPR of 1.49 (based on a SLO SLMCPR of 1.10) the TLO full power OLMCPR of 1.30 or greater is necessary.

References:

E-1. *Fuel Transition Report for Hope Creek Generating Station*, NEDC-33158P, Revision 4, March 2005.

E-2. *Final Safety Evaluation for NEDC-33173P Applicability of GE Methods to Expanded Operating Domains*, January 2008.

Appendix F
Feedwater Temperature Reduction

The feedwater temperature reduction analysis provided in this report is intended to support the Hope Creek license condition 2.C11. The feedwater heating capacity should be such that at 100% core power, feedwater temperature would be at least 409°F.

Normal operational variation in dome pressure (defined as +/- 10 psi) is acceptable as this variation has a negligible effect on the OLMCPR.

Appendix G
NEDC-33173P Safety Evaluation – Supplementary Information Requirements

Limitation/Condition 6 (R-factor)

The plant specific R-factor calculation at a bundle level was performed consistent with lattice axial void conditions expected for the hot channel operating state applicable to this cycle of operation. For Hope Creek Cycle 15 at the EPU licensed power level, a 70% void profile was used for the calculation of bundle R-factors.

Limitations/Conditions 10 and 11 (Thermal/Mechanical Overpower)

The Thermal Overpower and Mechanical Overpower limiting results have been confirmed to have more than 10% margin to the design limits for all fuel types. Table G-1 summarizes the percent margin to the Thermal Overpower and Mechanical Overpower limits.

Table G-1 Margin to Thermal Overpower and Mechanical Overpower Limits

Criteria	GE14	SVEA96
Thermal Overpower Margin	39%	13%
Mechanical Overpower Margin	39%	22%

Limitation/Condition 17 (Steady State 5 Percent Bypass Voiding)

The bypass voiding condition was evaluated for the licensed core loading and confirmed that the bypass void fraction remained below 5 percent at all LPRM levels when operating at steady-state conditions within the licensed upper boundary. For a power/flow condition that conservatively bounded the licensed power/flow upper boundary, the bypass void fraction at the D level LPRM location was calculated to be 4.5 %.

Appendix H
List of Acronyms

Acronym	Description
ΔCPR	Delta Critical Power Ratio
Δk	Delta k-effective
2RPT	Two Recirculation Pump Trip
ADS	Automatic Depressurization System
ADSOOS	Automatic Depressurization System Out of Service
AOO	Anticipated Operational Occurrence
APRM	Average Power Range Monitor
ARTS	APRM, Rod Block and Technical Specification Improvement Program
BOC	Beginning of Cycle
BSP	Backup Stability Protection
Btu	British thermal unit
BWROG	Boiling Water Reactor Owners Group
COLR	Core Operating Limits Report
CLTP	Current Licensing Thermal Power
CPR	Critical Power Ratio
DIVOM	Delta CPR over Initial MCPR vs. Oscillation Magnitude
DR	Decay Ratio
DS/RV	Dual Mode Safety/Relief Valve
ECCS	Emergency Core Cooling System
ELLLA	Extended Load Line Limit Analysis
EOC	End of Cycle (including all planned cycle extensions)
EOR	End of Rated (All Rods Out 100%Power / 100%Flow / NFWT)
EPU	Extended Power Uprate
ER	Exclusion Region
FFWTR	Final Feedwater Temperature Reduction
FMCPR	Final MCPR
FOM	Figure of Merit
FWCF	Feedwater Controller Failure
FWHOOS	Feedwater Heaters Out of Service
FWTR	Feedwater Temperature Reduction
GDC	General Design Criterion
GESTAR	General Electric Standard Application for Reactor Fuel
GETAB	General Electric Thermal Analysis Basis
GSF	Generic Shape Function
HAL	Haling Burn
HBB	Hard Bottom Burn
HBOM	Hot Bundle Oscillation Magnitude
HCOM	Hot Channel Oscillation Magnitude
HFCL	High Flow Control Line
HPCI	High Pressure Coolant Injection

Acronym	Description
ICA	Interim Corrective Action
ICF	Increased Core Flow
IMCPR	Initial MCPR
IVM	Initial Validation Matrix
Kf	Off-rated flow dependent OLMCPR multiplier
Kp	Off-rated power dependent OLMCPR multiplier
L8	Turbine Trip on high water level (Level 8)
LCF	Low Core Flow
LHGR	Linear Heat Generation Rate
LHGRFACf	Off-rated flow dependent LHGR multiplier
LHGRFACp	Off-rated power dependent LHGR multiplier
LOCA	Loss of Coolant Accident
LPRM	Local Power Range Monitor
LRHBP	Load Rejection with Half Bypass
LRNBP	Load Rejection without Bypass
LTR	Licensing Topical Report
MAPFACf	Off-rated flow dependent MAPLHGR multiplier
MAPFACp	Off-rated power dependent MAPLHGR multiplier
MAPLHGR	Maximum Average Planar Linear Heat Generation Rate
MCPR	Minimum Critical Power Ratio
MCPRf	Off-rated flow dependent OLMCPR
MCPRp	Off-rated power dependent OLMCPR
MELLLA	Maximum Extended Load Line Limit Analysis
MELLLA+	MELLLA Plus
MOC	Middle of Cycle
MRB	Maximal Region Boundaries
MSIV	Main Steam Isolation Valve
MSIVOOS	Main Steam Isolation Valve Out of Service
MSR	Moisture Separator Reheater
MSROOS	Moisture Separator Reheater Out of Service
MTU	Metric Ton Uranium
MWd	Megawatt day
MWd/ST	Megawatt days per Standard Ton
MWd/MT	Megawatt days per Metric Ton
MWt	Megawatt Thermal
NBP	No Bypass
NCL	Natural Circulation Line
NFWT	Normal Feedwater Temperature
NOM	Nominal Burn
NTR	Normal Trip Reference
OLMCPR	Operating Limit MCPR
OOS	Out of Service
OPRM	Oscillation Power Range Monitor
Pbypass	Reactor power level below which the TSV position and the TCV fast closure scrams are bypassed
Pdome	Peak Dome Pressure

Acronym	Description
Psl	Peak Steam Line Pressure
Pv	Peak Vessel Pressure
PCT	Peak Clad Temperature
PHE	Peak Hot Excess
PLHGR	Peak Linear Heat Generation Rate
PLU	Power Load Unbalance
PLUOOS	Power Load Unbalance Out of Service
PRFDS	Pressure Regulator Failure Downscale
PROOS	Pressure Regulator Out of Service
Q/A	Heat Flux
RBM	Rod Block Monitor
RC	Reference Cycle
RCF	Rated Core Flow
RFWT	Reduced Feedwater Temperature
RPS	Reactor Protection System
RPT	Recirculation Pump Trip
RPTOOS	Recirculation Pump Trip Out of Service
RV	Relief Valve
RVM	Reload Validation Matrix
RWE	Rod Withdrawal Error
SC	Standard Cycle
SL	Safety Limit
SLMCPR	Safety Limit Minimum Critical Power Ratio
SLO	Single Loop Operation
SRLR	Supplemental Reload Licensing Report
S/RV	Safety/Relief Valve
SRVOOS	Safety/Relief Valve(s) Out of Service
SS	Steady State
SSV	Spring Safety Valve
STU	Short Tons (or Standard Tons) of Uranium
TBV	Turbine Bypass Valve
TBVOOS	Turbine Bypass Valves Out of Service
TCV	Turbine Control Valve
TCVOOS	Turbine Control Valve Out of Service
TCVSC	Turbine Control Valve Slow Closure
TLO	Two Loop Operation
TRF	Trip Reference Function
TSIP	Technical Specifications Improvement Program
TSV	Turbine Stop Valve
TSVOOS	Turbine Stop Valve Out of Service
TT	Turbine Trip
TTHBP	Turbine Trip with Half Bypass
TTNBP	Turbine Trip without Bypass
UB	Under Burn