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10CFR50.36

ComEd

September 22, 2000

PSLTR: #00-0134

U.S. Nuclear Regulatory Commission
Attenion: Document Control Desk
Washington D.C. 20555

Dresden Nuclear Power Station, Unit 3
Facility Operating License No. DPR-25
NRC Docket No. 50-249

Subject: Unit 3 Cycle 17 Core Operating Limits Report

The purpose of this letter is to transmit the Core Operating Limits Report (COLR) for the upcoming operating cycle (D3C17) in accordance with Technical Specification (TS) Section 6.9.A, "Routine Reports." The analytical methods used to determine the operating limits were NRC approved. The COLR is enclosed as an attachment to this letter.

Cycle D3C17 will utilize a small exposure increase for the older Siemens Power Corporation 9X9-2 fuel. This exposure increase has been analyzed using NRC approved methodology, evaluated in accordance with 10CFR 50.59, "Changes, tests and experiments," and determined not to require NRC review prior to implementation.

Should you have any questions concerning this letter, please contact Mr. D.F. Ambler at (815) 942-2920, extension 3800.

Respectfully,

Preston Swafford

Preston Swafford
Site Vice President
Dresden Nuclear Power Station

Attachment: Core Operating Limits Report, Dresden Station Unit 3 Cycle 17, dated October 2000

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Dresden Nuclear Power Station

A001

Core Operating Limits Report

Dresden Station

Unit 3

Cycle 17

October 2000

ISSUANCE OF CHANGES SUMMARY

Affected Section	Affected Pages	Summary of Changes	Date
All	All	Original Issue Cycle 17	10/00

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REFERENCES

1. Commonwealth Edison Company Docket No. 50-249, Dresden Nuclear Power Station, Unit 3, Facility Operating License DPR-25.

2. Letter, D. M. Crutchfield (NRC) to All Power Reactor Licensees and Applicants, Generic Letter 88-16, Concerning the Removal of Cycle-Specific Parameter Limits from Technical Specifications.

3. Dresden LOCA-ECCS Analysis MAPLHGR Limits for ATRIUM-9B and 9x9-2 Fuel, EMF-98-007(P), January 1998, NFS NDIT No. 9800072 Seq. 00.

4. DG00-001047, Dresden Unit 3 Cycle 17 Plant Transient Analysis, Siemens Document EMF-2406, Revision 0, July 2000.

5. DG00-001046, Dresden Unit 3 Cycle 17 Reload Analysis, Siemens Document EMF-2421, Revision 0, July 2000.

6. DG00-000907, Dresden Unit 3 Cycle 17 Neutronics Licensing Report (NLR), July 28, 2000, TODI No. NFM0000086 Seq. 00.

7. Dresden Units 2 and 3 Generic Coastdown Analysis with ATRIUM-9B, EMF-92-149 (P) and EMF-92-149(P) Supplement 1, Revision 1, September 1996, NFS NDIT No. 960137 Seq. 00.

8. Letter, David Garber (SPC) to Dr. R. J. Chin, "Dresden Operation with Final Feedwater Temperature Reduction," DEG:00:176, July 24, 2000.

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1.0 ROD BLOCK MONITOR (RBM)

1.1 Technical Specification Reference

CTS 3.3.M - Rod Block Monitor (RBM)

ITS 3.3.2.1 - Control Rod Block Instrumentation

CTS Table 3.2.E-1 – Control Rod Block Instrumentation

CTS Table 4.2.E-1 – Control Rod Block Instrumentation Surveillance Requirements

ITS Table 3.3.2.1-1 – Control Rod Block Instrumentation

1.2 Description

The Rod Block Monitor Upscale Instrumentation Setpoints are determined from the relationships shown in Table 1.2-1.

TABLE 1.2-1

CONTROL ROD WITHDRAWAL BLOCK INSTRUMENTATION SETPOINTS

TRIP FUNCTION:	TRIP LEVEL SETTING:
Rod Block Monitor Upscale (Flow Bias)	
Dual Loop Operation	Less than or equal to (0.65 W_d plus 55)*
Single Loop Operation	Less than or equal to (0.65 W_d plus 51)*

*W_d - percent of drive flow required to produce a rated core flow of 98 Mlb/hr.

2.0 AVERAGE PLANAR LINEAR HEAT GENERATION RATE

2.1 Technical Specification References

CTS 3.11.A - AVERAGE PLANAR LINEAR HEAT GENERATION RATE

ITS 3.2.1 - AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR)

2.2 Description

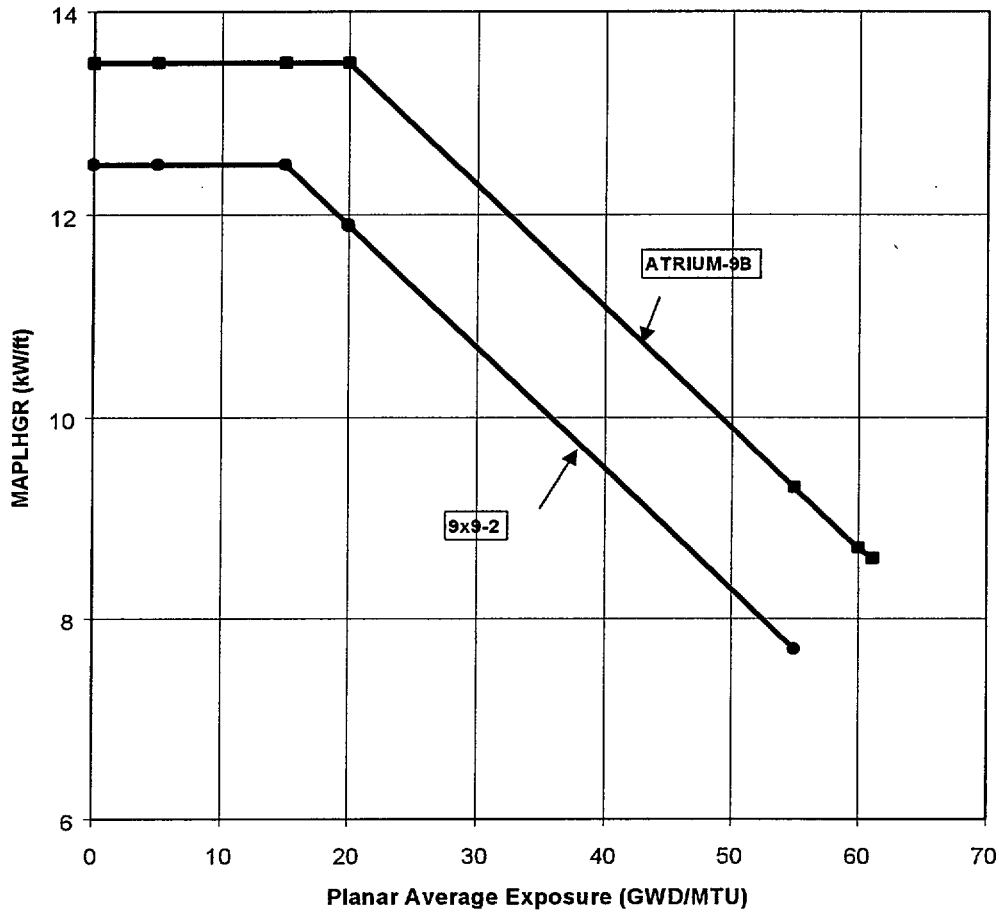
The Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) limit versus Planar Average Exposure for each fuel type is determined from Figure 2.2-1.

2.3 MAPLHGR Multipliers

The appropriate multiplicative factor, during power operation with equipment out of service, to apply to the base MAPLHGR limits specified in Section 2.2 is shown in Table 2.3-1.

FIGURE 2.2-1

MAPLHGR LIMIT VS PLANAR AVERAGE EXPOSURE



Planar Average Exposure (GWD/MTU)	MAPLHGR Limit (kW/ft) 9x9-2	MAPLHGR Limit (kW/ft) ATRIUM-9B (offset & non-offset)
0	12.5	13.5
5	12.5	13.5
15	12.5	13.5
20	11.9	13.5
55	7.7	9.3
60		8.7
61.1		8.6

TABLE 2.3-1

EQUIPMENT OUT OF SERVICE MAPLHGR LIMIT MULTIPLIERS

Technical Specifications		Scenario	Multiplicative Factor, 9x9-2	Multiplicative Factor, ATRIUM-9B (offset & non-offset)
CTS 3.11.A,	Average Planar LHGR	Single Loop Operation (SLO)	0.90	0.90
ITS 3.2.1	AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR)			
CTS 3.6.A Action 1.d	Recirculation Loops			
ITS 3.4.1	Recirculation Loops Operating			

3.0 STEADY STATE LHGR

3.1 Technical Specification Reference

CTS 3.11.D - STEADY STATE LINEAR HEAT GENERATION RATE

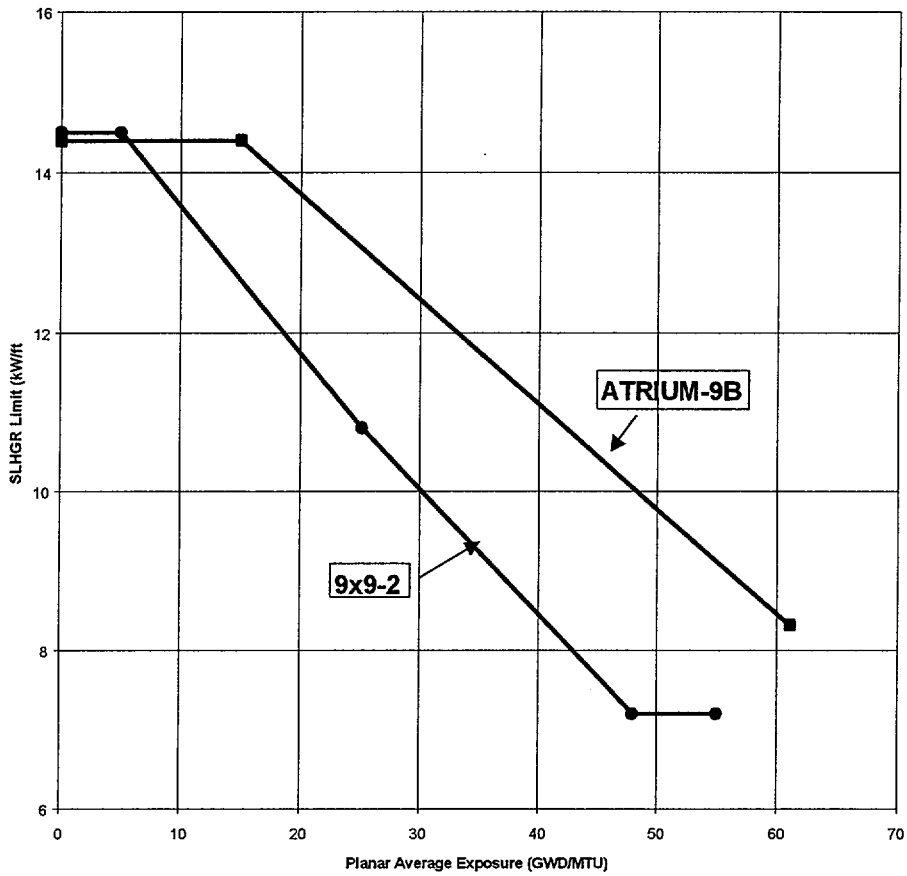
ITS 3.2.3 - LINEAR HEAT GENERATION RATE (LHGR)

3.2 Description

The Steady State LHGR (SLHGR) limit versus Planar Average Exposure for each fuel type is determined from Figure 3.2-1.

FIGURE 3.2-1

STEADY STATE LHGR (SLHGR) LIMIT VS. PLANAR AVERAGE EXPOSURE



Planar Average Exposure (GWD/MTU)	SLHGR Limit (kW/ft) ATRIUM-9B (offset & non-offset)
0.0	14.4
15.0	14.4
61.1	8.32

Planar Average Exposure (GWD/MTU)	SLHGR Limit (kW/ft) 9x9-2
0.0	14.5
5.0	14.5
25.2	10.8
48.0	7.2
55.0	7.2

4.0 TRANSIENT LHGR

4.1 Technical Specification Reference

CTS 3.11.B - TRANSIENT LINEAR HEAT GENERATION RATE

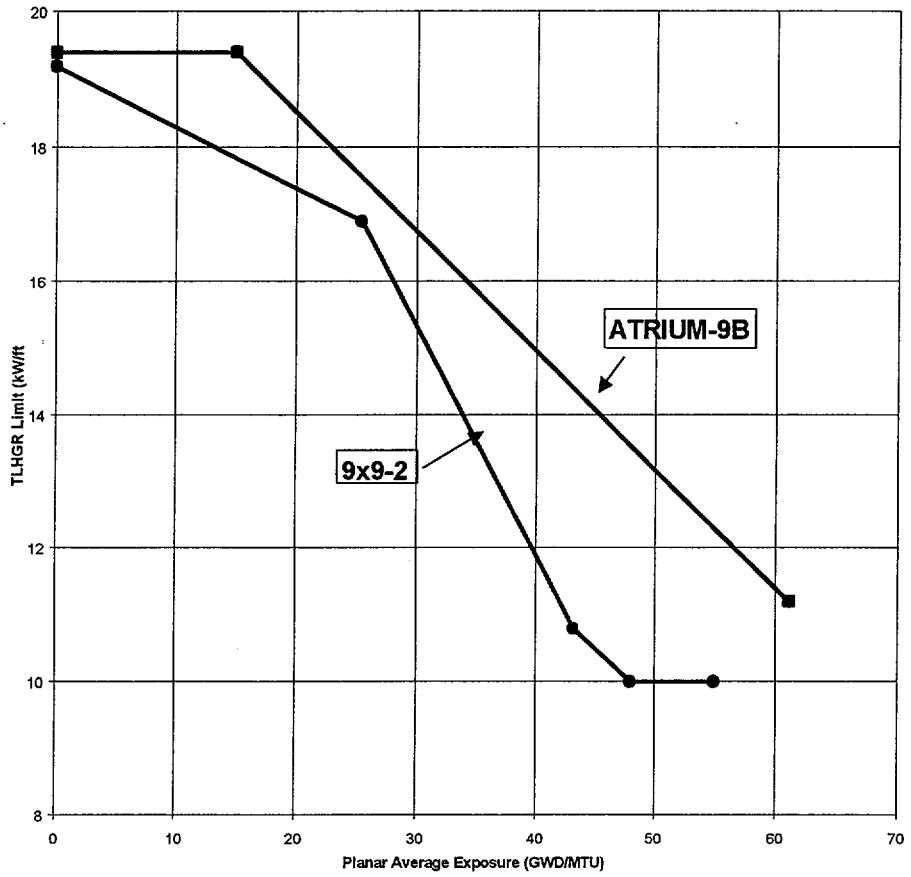
ITS 3.2.4 - Average Power Range Monitor (APRM) Gain and Setpoint

4.2 Description

The Transient LHGR (TLHGR) limit versus Planar Average Exposure for each fuel type is determined from Figure 4.2-1.

FIGURE 4.2-1

TRANSIENT LHGR (TLHGR) LIMIT VS. PLANAR AVERAGE EXPOSURE



Planar Average Exposure (GWD/MTU)	TLHGR Limit (kW/ft) ATRIUM-9B (offset & non-offset)
0.0	19.4
15.0	19.4
61.1	11.2

Planar Average Exposure (GWD/MTU)	TLHGR Limit (kW/ft) 9x9-2
0.0	19.2
25.4	16.9
43.2	10.8
48.0	10
55.0	10

5.0 MINIMUM CRITICAL POWER RATIO

5.1 Technical Specification References

CTS 3.11.C - MINIMUM CRITICAL POWER RATIO

ITS 3.2.2 - MINIMUM CRITICAL POWER RATIO (MCPR)

ITS 3.7.7 - The Main Turbine Bypass System

5.2 Description

The Operating Limit MCPR is the maximum of either the rated conditions Operating Limit MCPR (as amended) or the reduced core flow Operating Limit MCPR ($MCPR_f$):

A. The rated conditions Operating Limit MCPR[1,2] is:

9x9-2	1.43
ATRIUM-9B	1.43

When necessary, the rated conditions Operating Limit MCPR (above) is adjusted by any or all of the following:

1) Recirculation Loop Pump Operation:

   When in SLO, add the appropriate Operating Limit MCPR adder from Table 5.2-1.

2) Main Turbine Bypass System:

   a) One Main Turbine Bypass Valve may be inoperable[3]; no OLMCPR adjustment is required.

   b) If two or more of the Main Turbine Bypass System Valves are inoperable[3], apply the appropriate Operating Limit MCPR adder provided in Figure 5.2-2.

   c) If the main turbine bypass valve system valve open operation is slower than nominal (e.g. slow opening times), apply the appropriate Operating Limit MCPR adder provided in Figure 5.2-2.

---

[1] The OLMCPRs calculated for D3C17 are based on Technical Specification Scram Insertion Speeds (CTS 3.3.E & ITS 3.1.4).

[2] Includes the effects of operating within the Reactor Steam Dome Pressure per Table 5.2-2.

[3] Ensure the unit's licensing basis permits operation with one or more Main Turbine Bypass Valves inoperable prior to utilizing the associated penalty.

3) Reactor Core Average Exposure:

a) Operation at core average exposures up to and including 30,837 MWD/MTU[4] is limited to 100% CTP; no OLMCPR adjustment is required.

b) Operation at core average exposures greater than 30,837 MWD/MTU is limited to the lower of 100% CTP and either of the following:

i) When core thermal power is maintained below the nominal power (CTP_{nom} below), no OLMCPR adjustment is required (see Table 5.2-1).

$$CTP_{nom}\ (\%\,\text{rated}) \leq 100 - 10 * \left(\frac{\text{current core average exposure (MWD/MTU)} - 30{,}837\ \text{(MWD/MTU)}}{1000} \right)$$

ii) Or, when the core thermal power is permitted to exceed the nominal power (CTP_{nom}) but is limited to below the maximum overpower (CTP_{max} below)[4], apply the appropriate 15% CTP Overshoot Operating Limit MCPR adder presented in Table 5.2-1:

$$CTP_{max}\ (\%\,\text{rated}) \leq 100 - 10 * \left(\frac{\text{current core average exposure (MWD/MTU)} - 32{,}337\ \text{(MWD/MTU)}}{1000} \right)$$

B. Reactor Core Flow:

1) Core flow must be maintained ≤108% of rated[5].

2) The reduced core flow Operating Limit MCPR ($MCPR_f$)[6]:

a) During Manual Flow Control, the $MCPR_f$ for each fuel type at any core flow condition can be determined from Figure 5.2-1 using the appropriate core flow rate.

b) Automatic Flow Control is not supported for this operating cycle.

C. The following additional conditions are supported without penalty:

- 40% TIP channels unavailable
- 50% LPRMs unavailable
- 2500 EFPH[7] LPRM calibration interval
- 4 Safety Valves OOS[8]
- 1 Relief Valve OOS[9]

---

[4] Includes up to 100°F reduced feedwater temperature from normal.
[5] Ensure the unit's licensing basis permits operation above 100% of rated core flow prior to using ICF.
[6] Note that the presented OLMCPR Adders are not required to be applied to the $MCPR_f$ value.
[7] Effective Full Power Hours (2000 EFPH + 25% Tech Spec grace time)
[8] Ensure the unit's licensing basis permits operation with one or more Safety Valves inoperable prior to crediting this flexibility.
[9] Ensure the unit's licensing basis permits operation with one or more Relief Valves inoperable prior to crediting this flexibility.

TABLE 5.2-1

OPERATING LIMIT MCPR ADDERS

Operating Scenario	**9x9-2**	**ATRIUM-9B (offset & non-offset)**
Single Recirculation Loop Operation:	0.01	0.01
Main Turbine Bypass System:	Figure 5.2-2	Figure 5.2-2
Reactor Core Average Exposure:	--	--
Operation **through** a Core Average Exposure of 30,837 MWD/MTU[10]:	0.00	0.00
Operation **beyond** a Core Average Exposure of 30,837 MWD/MTU:	--	--
No CTP Overshoot	0.00	0.00
Maximum of 15% CTP Overshoot[11]	0.03	0.03

[10] Includes up to 100°F reduced feedwater temperature from normal.
[11] The 0.03 MCPR Operating Limit adder with 15% CTP Overshoot includes the effects of 100°F feedwater temperature reduction.

TABLE 5.2-2

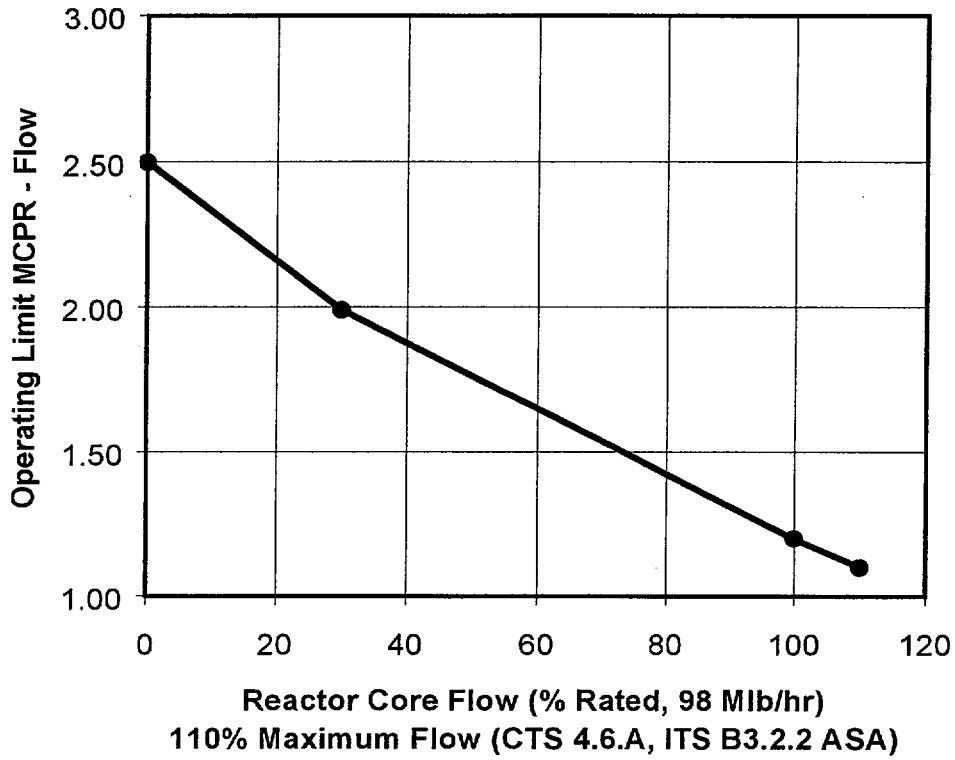
REACTOR STEAM DOME PRESSURE OPERATING BAND

Core Thermal Power (%RCTP)	Reactor Steam Dome Pressure (psia)		
	Maximum[12]	Nominal	Minimum[13]
100	1020	1020	1005
95	1020	1012	997
90	1020	1005	990
<90	1020	variable	unrestricted

[12] ≤1005 psig (1020 psia; CTS 3.6.L, ITS 3.4.10)
[13] Linear interpolation is permitted

FIGURE 5.2-1

OPERATING LIMIT MCPR FOR MANUAL FLOW CONTROL

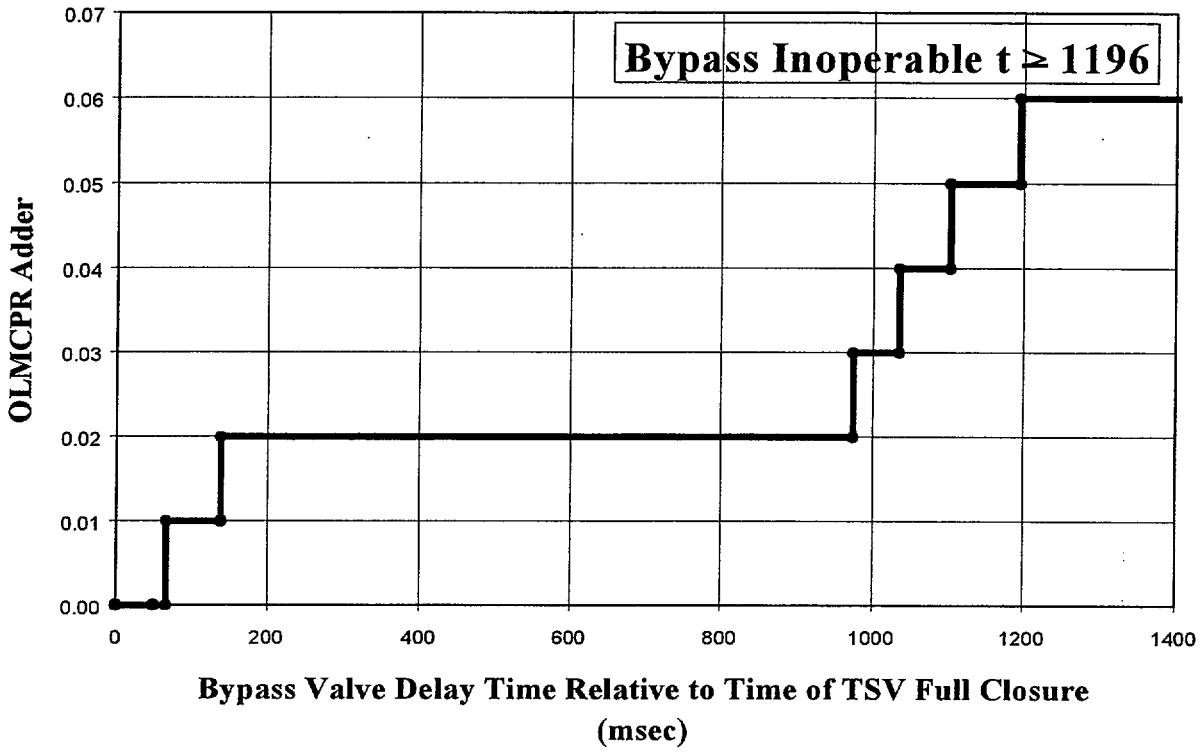


Reactor Core Flow (% Rated)	Operating Limit MCPR - Flow ATRIUM-9B (offset & non-offset) and 9x9-2
110	1.10
100	1.20
30	1.99
0	2.50

FIGURE 5.2-2

MAIN TURBINE BYPASS VALVE OLMCPR ADDERS

ATRIUM-9B (offset & non-offset) & 9x9-2



Bypass Valve Delay Time (msec)	OLMCPR Adder[14,15] (ΔCPR) ATRIUM-9B (offset and non-offset) & 9x9-2
$0 \leq t \leq 67$	0
$67 < t \leq 139$	0.01
$139 < t \leq 975$	0.02
$975 < t \leq 1036$	0.03
$1036 < t \leq 1103$	0.04
$1103 < t \leq 1196$	0.05
$t > 1196$	0.06
Two or more Main Turbine Bypass Valves inoperable[15]	0.06

[14] Includes the effects of one bypass valve inoperable.
[15] Ensure the unit's licensing basis permits operation with one or more Main Turbine Bypass Valves inoperable prior to utilizing the associated penalty.

6.0 METHODOLOGY

The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC in the latest approved revision or supplement of the topical reports describing the methodology. These Methodologies are listed in Technical Specification (CTS) 6.9.A.6.b (ITS 5.6.5.b).

Core Operating Limits Report

Dresden Unit 3 Cycle 17

Reload and Transient Analyses Results

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[1] Since the LRNB and TTNB produce approximately the same system response, the figures depicting the LRNB analysis results are also representative of the TTNB analysis.

D3C17 CYCLE SPECIFIC ANALYSES RESULTS

This section provides the ΔCPR results and the core response figures corresponding to the D3C17 transient analyses. The cycle specific results provided in this section correspond to the Chapter 15 UFSAR sections which refer to the Core Operating Limits Report (COLR) for the current cycle information. The corresponding UFSAR sections are also provided.

TABLE 1

D3C17 TRANSIENT ANALYSES ΔCPR RESULTS

Event (% Power/ % Flow)	UFSAR Section	ATRIUM-9B[2] & 9x9-2 ΔCPR	
		Prior to EOFP[3] & coastdown w/o overpower	After EOFP coastdown with 15% overpower and/or FFTR
Load Rejection No Bypass (100/108)	15.2.2	0.33	0.36
Load Rejection No Bypass (100/100)	15.2.2	0.29	0.32
Load Rejection No Bypass (100/87)	15.2.2	0.25	---[4]
Turbine Trip No Bypass (100/108)	15.2.3	0.33	0.36
Turbine Trip No Bypass (100/100)	15.2.3	0.29	0.32
Turbine Trip No Bypass (100/87)	15.2.3	0.25	---[4]
Feedwater Flow Controller Failure (100/108)	15.1.2	0.31	0.33
Feedwater Flow Controller Failure (100/100)	15.1.2	0.30	0.31
Feedwater Flow Controller Failure (100/87)	15.1.2	0.26	---[4]

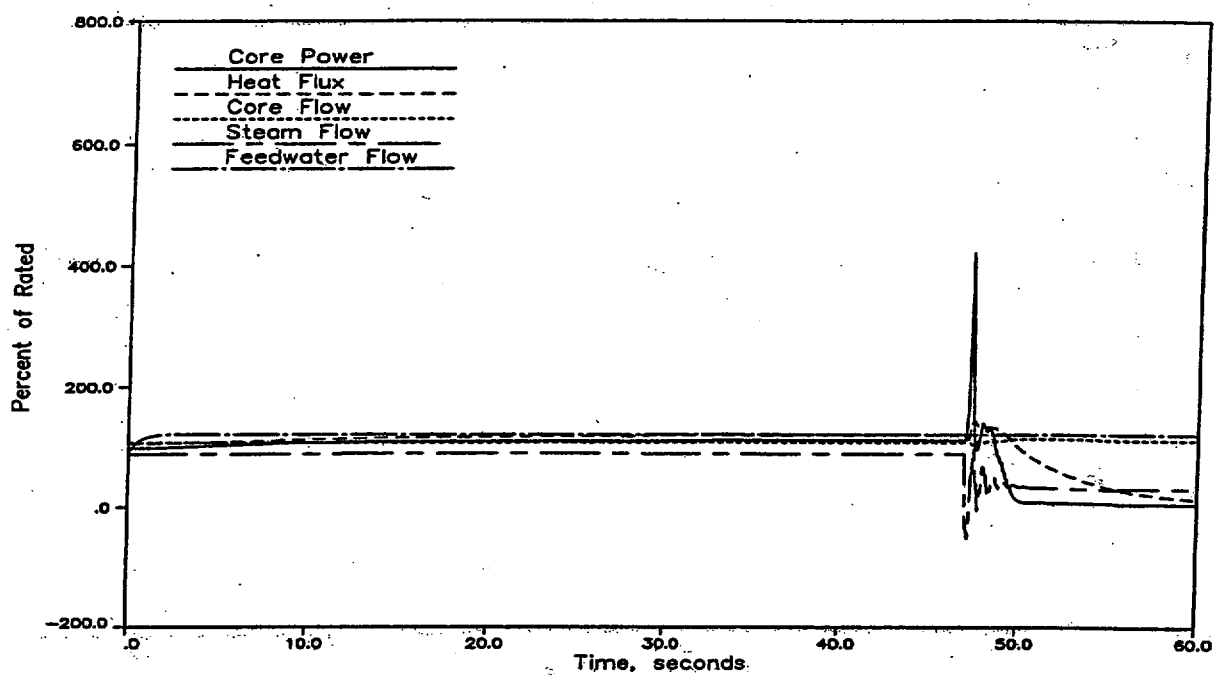
[2] Results presented are for both the offset and non-offset design
[3] EOFP corresponds to a core average exposure of 30,837 MWD/MTU
[4] By definition, coastdown occurs when unable to maintain 100% RCTP at rated core flow. Therefore it is impossible to be at 100% RCTP at 87% core flow.

Event (% Power/ % Flow)	UFSAR Section	ATRIUM-9B[2] & 9x9-2 ΔCPR	
		Prior to EOFP[3] & coastdown w/o overpower	After EOFP coastdown with 15% overpower and/or FFTR
Feedwater Flow Controller Failure with FHOOS[5] (100/108)	15.1.2	0.33	0.34
Feedwater Flow Controller Failure with FHOOS[5] (100/100)	15.1.2	0.32	0.33
Feedwater Flow Controller Failure with FHOOS[5] (100/87)	15.1.2	0.29	---[4]
Loss of Feedwater Heating	15.1.1	0.21	0.21
Control Rod Withdrawal Error	15.4.2	0.33	0.33
Fuel Loading Error-Mislocated Bundle	15.4.7	0.24	0.24
Fuel Loading Error-Misoriented Bundle	15.4.8	0.10	0.10

[5] Feedwater Heaters Out Of Service, up to 100°F of Feedwater temperature reduction

FIGURE 1

Feedwater Controller Failure (FWCF) at 100% Core Thermal Power/ 108% Core Flow with Feedwater Heaters Out of Service (FHOOS) Key Parameters (UFSAR 15.1.2)



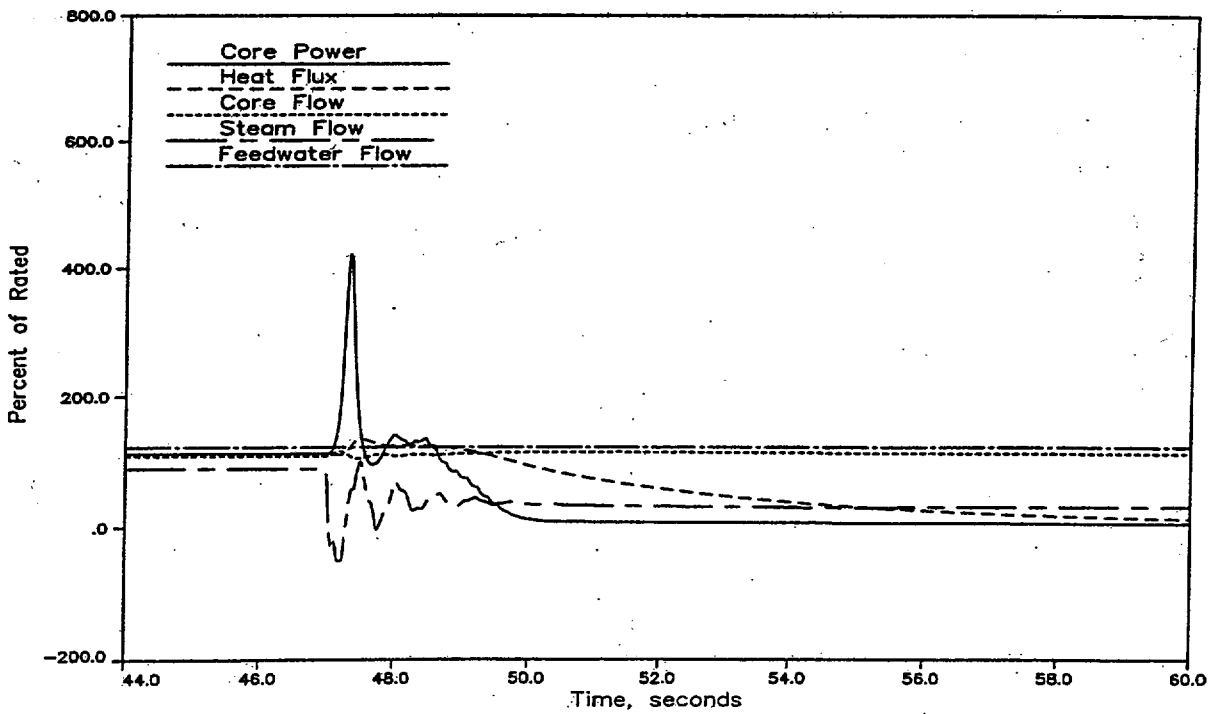
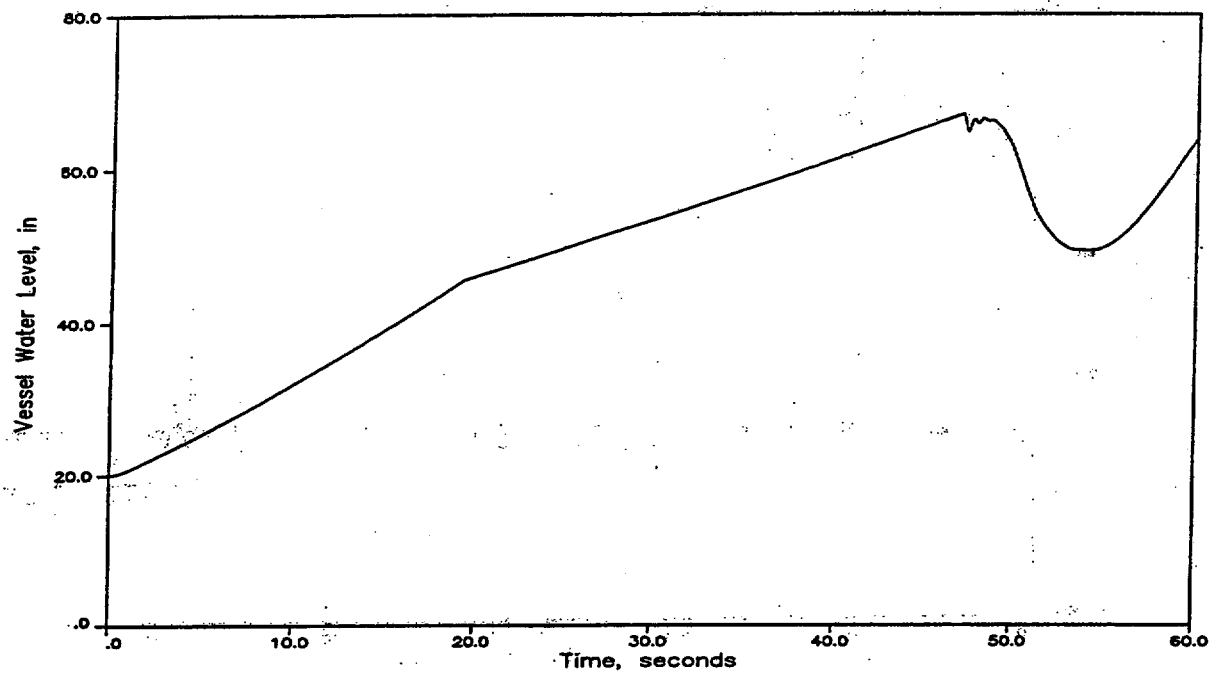


FIGURE 2

Feedwater Controller Failure (FWCF) at 100% Core Thermal Power/ 108% Core Flow with Feedwater Heaters Out of Service (FHOOS) Vessel Water Level (UFSAR 15.1.2)



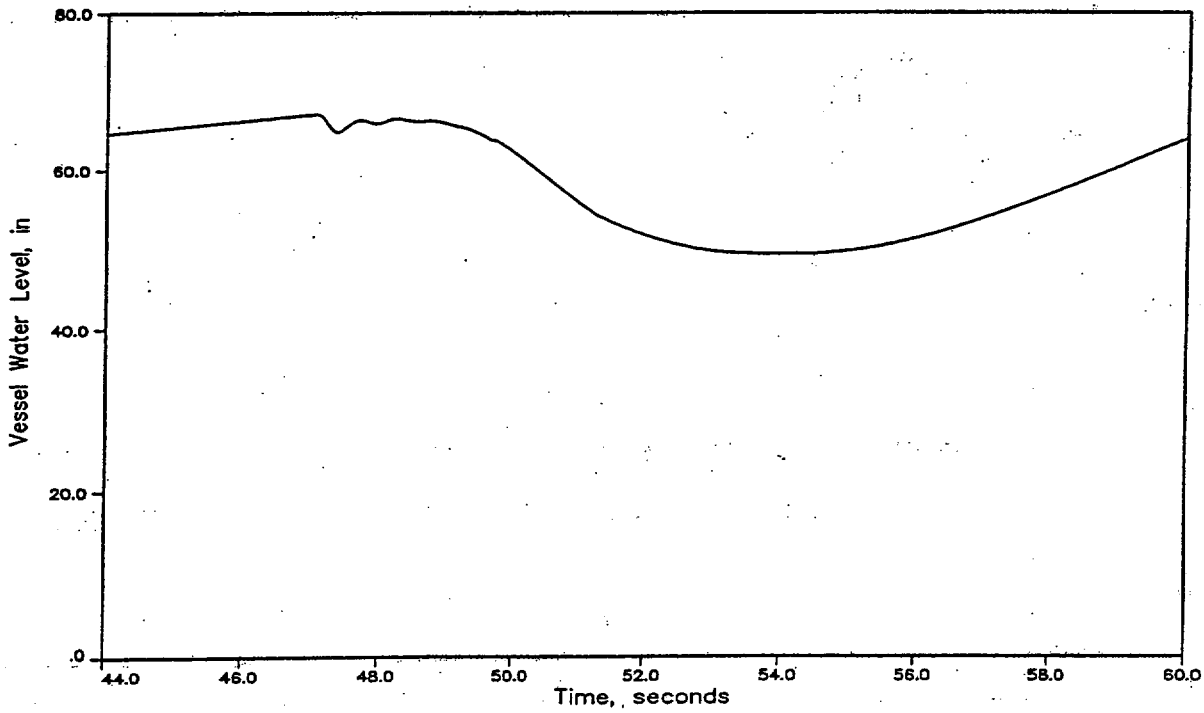
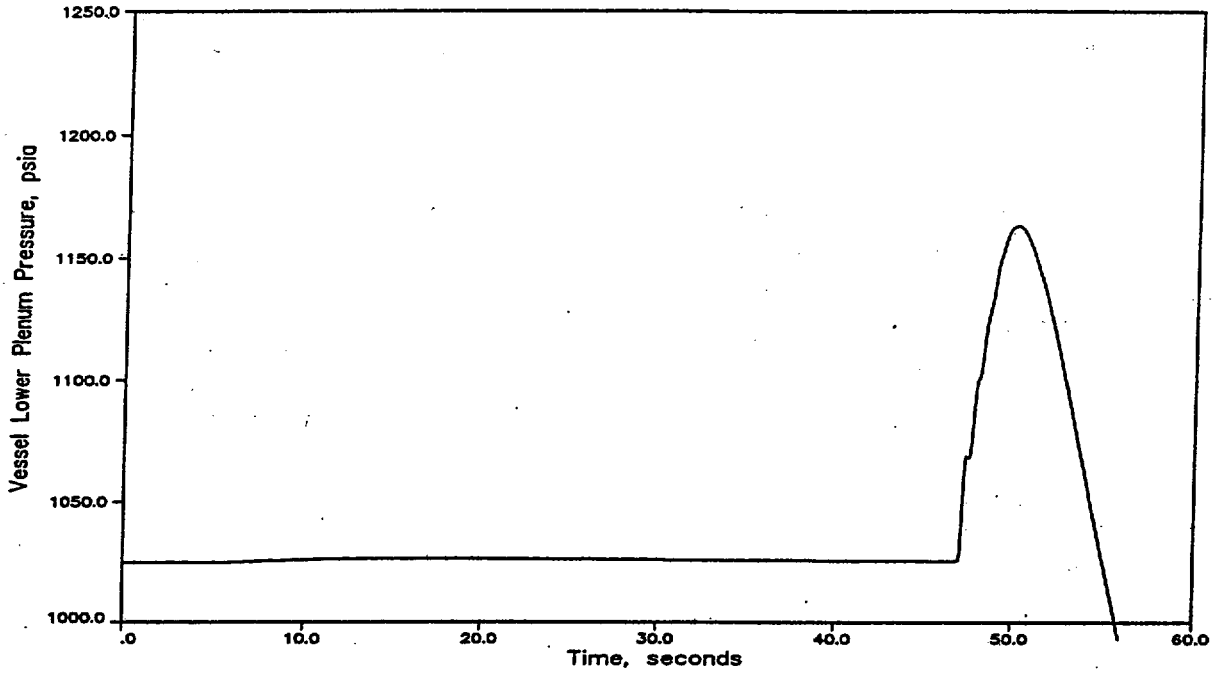


FIGURE 3

Feedwater Controller Failure (FWCF) at 100% Core Thermal Power/ 108% Core Flow with Feedwater Heaters Out of Service (FHOOS) Vessel Pressure Response (UFSAR 15.1.2)



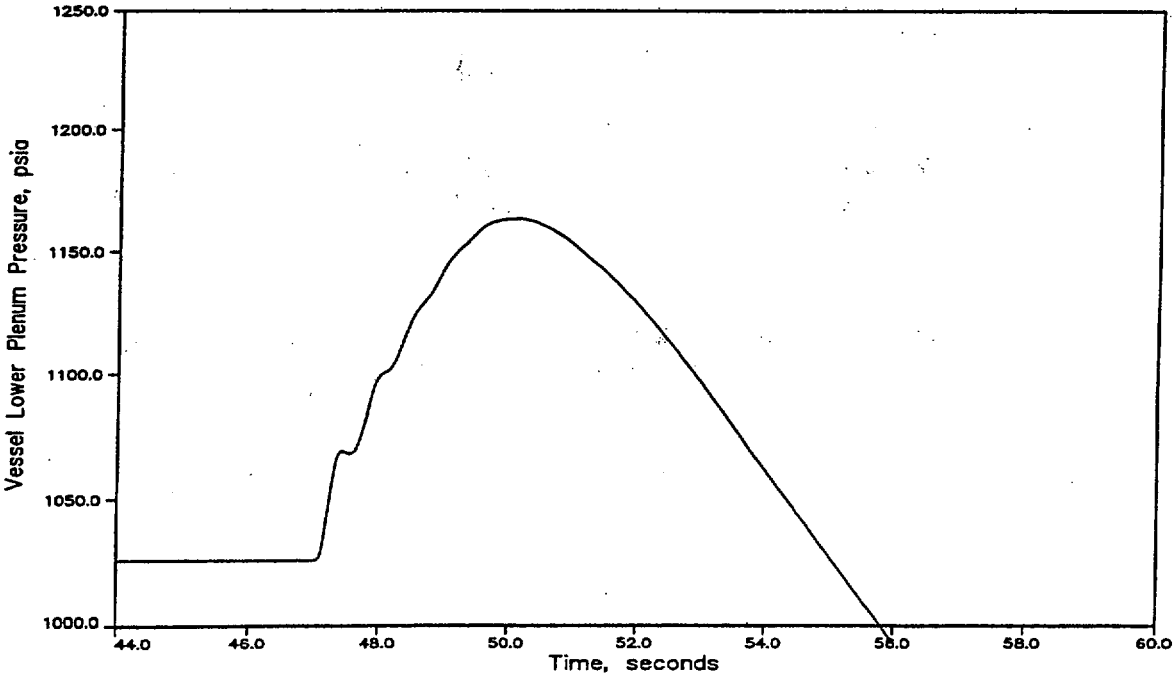


FIGURE 4

Load Rejection No Bypass (LRNB)
at 100% Core Thermal Power/ 108% Core Flow
Key Parameters
(UFSAR 15.2.2)

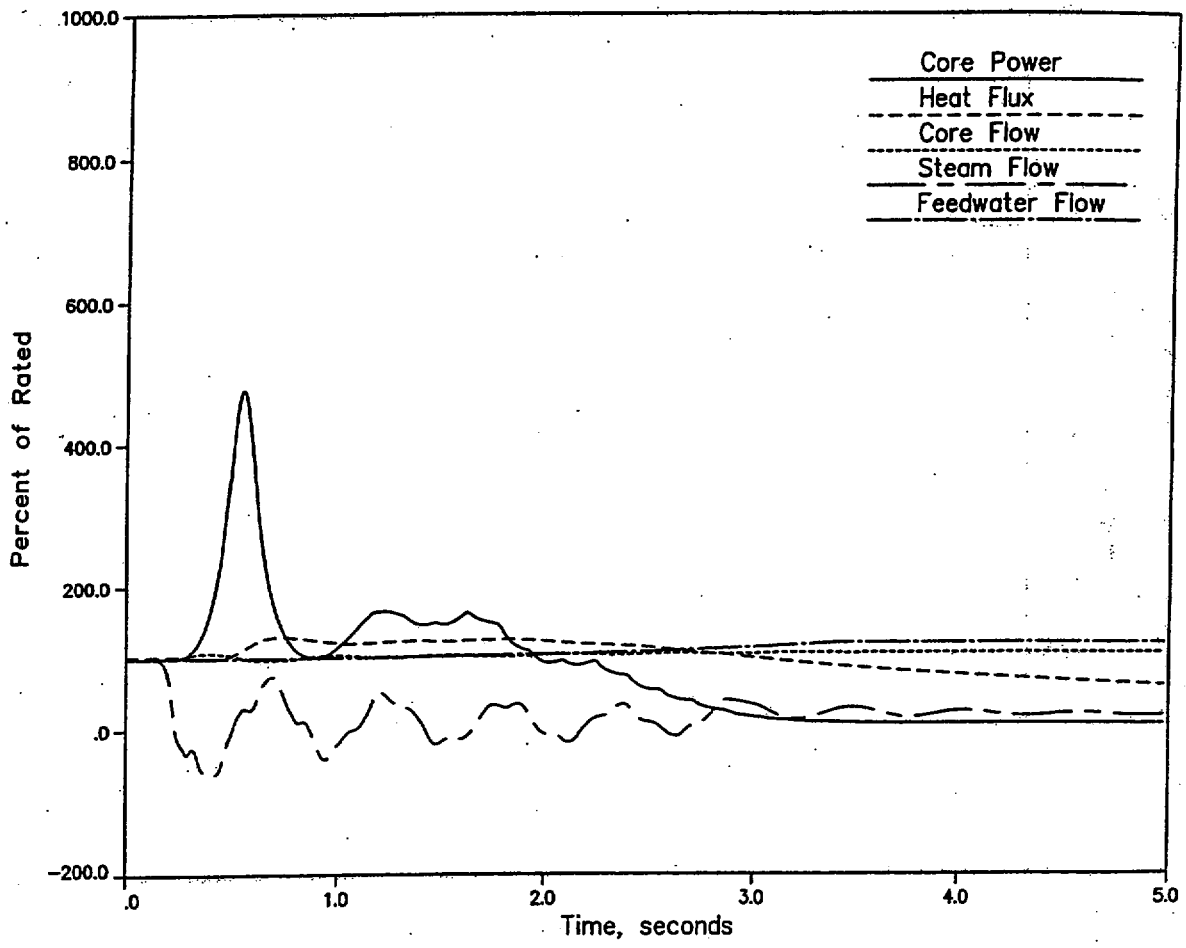


FIGURE 5

Load Rejection No Bypass (LRNB)
at 100% Core Thermal Power/ 108% Core Flow
Vessel Water Level
(UFSAR 15.2.2)

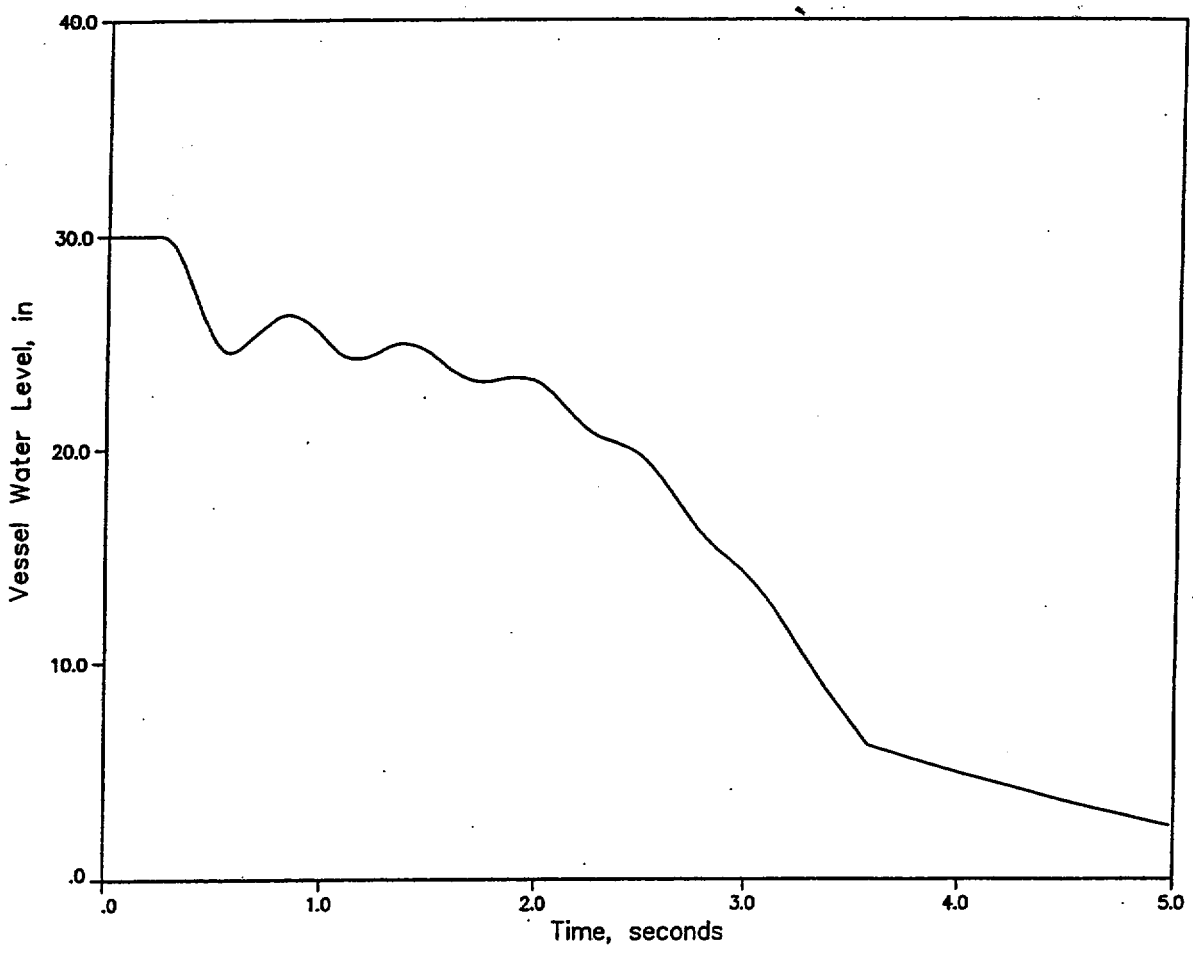


FIGURE 6

Load Rejection No Bypass (LRNB)
at 100% Core Thermal Power/ 108% Core Flow
Vessel Pressure Response
(UFSAR 15.2.2)

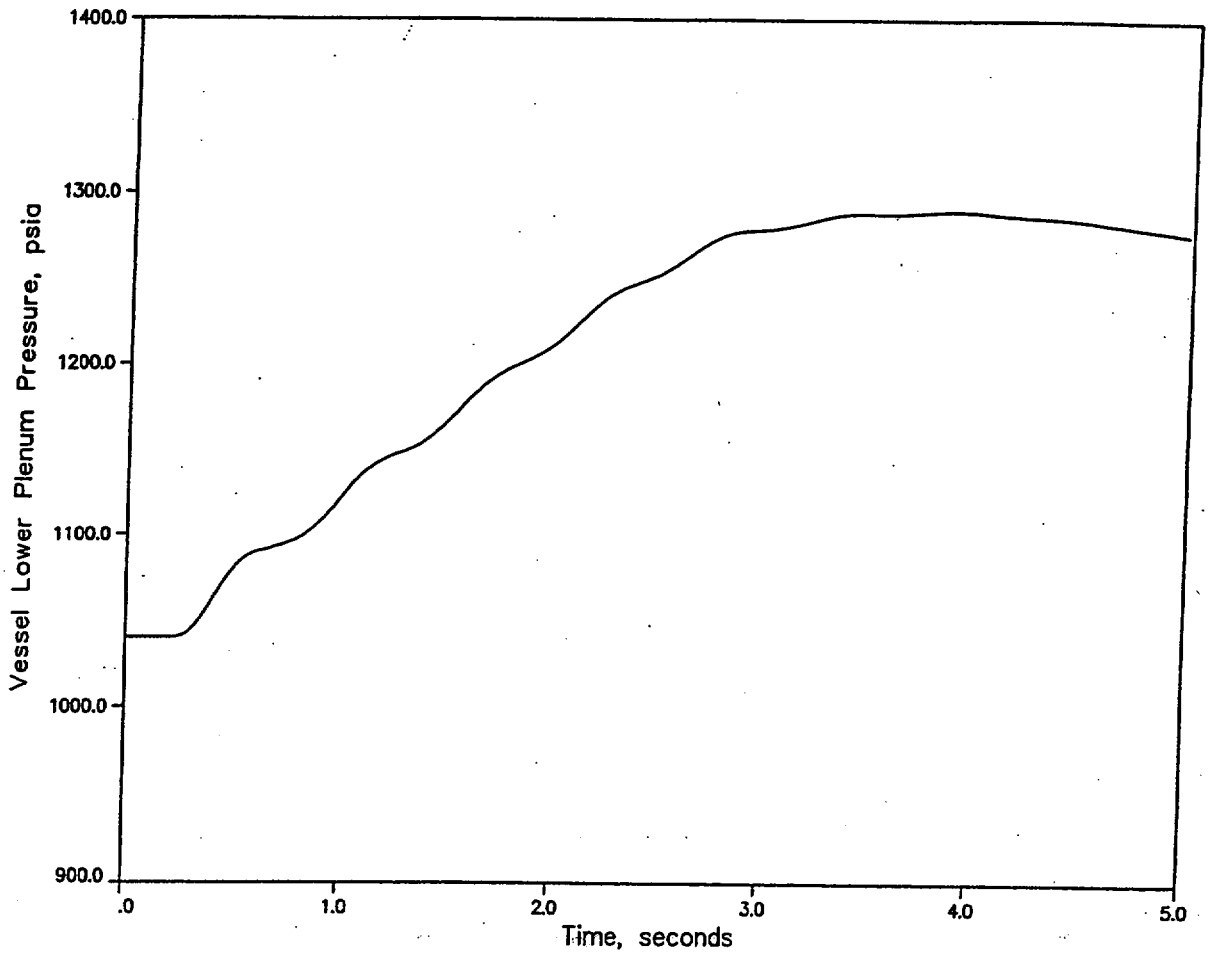


FIGURE 7

Main Steam Line Isolation Valve (MSIV) Closure at 100% Core Thermal Power/ 87% Core Flow Key Parameters (UFSAR 15.2.4)

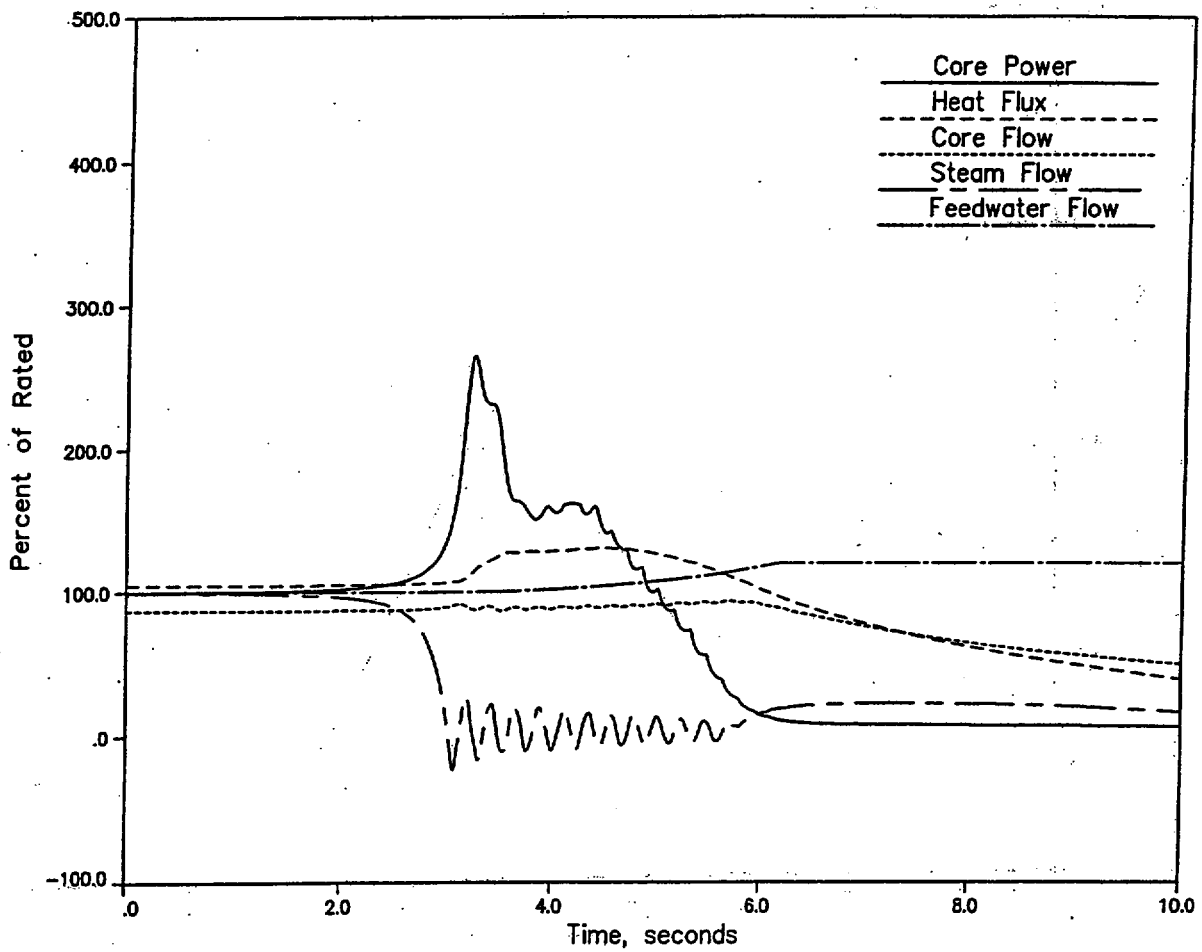


FIGURE 8

Main Steam Line Isolation Valve (MSIV) Closure at 100% Core Thermal Power/ 87% Core Flow Vessel Water Level (UFSAR 15.2.4)

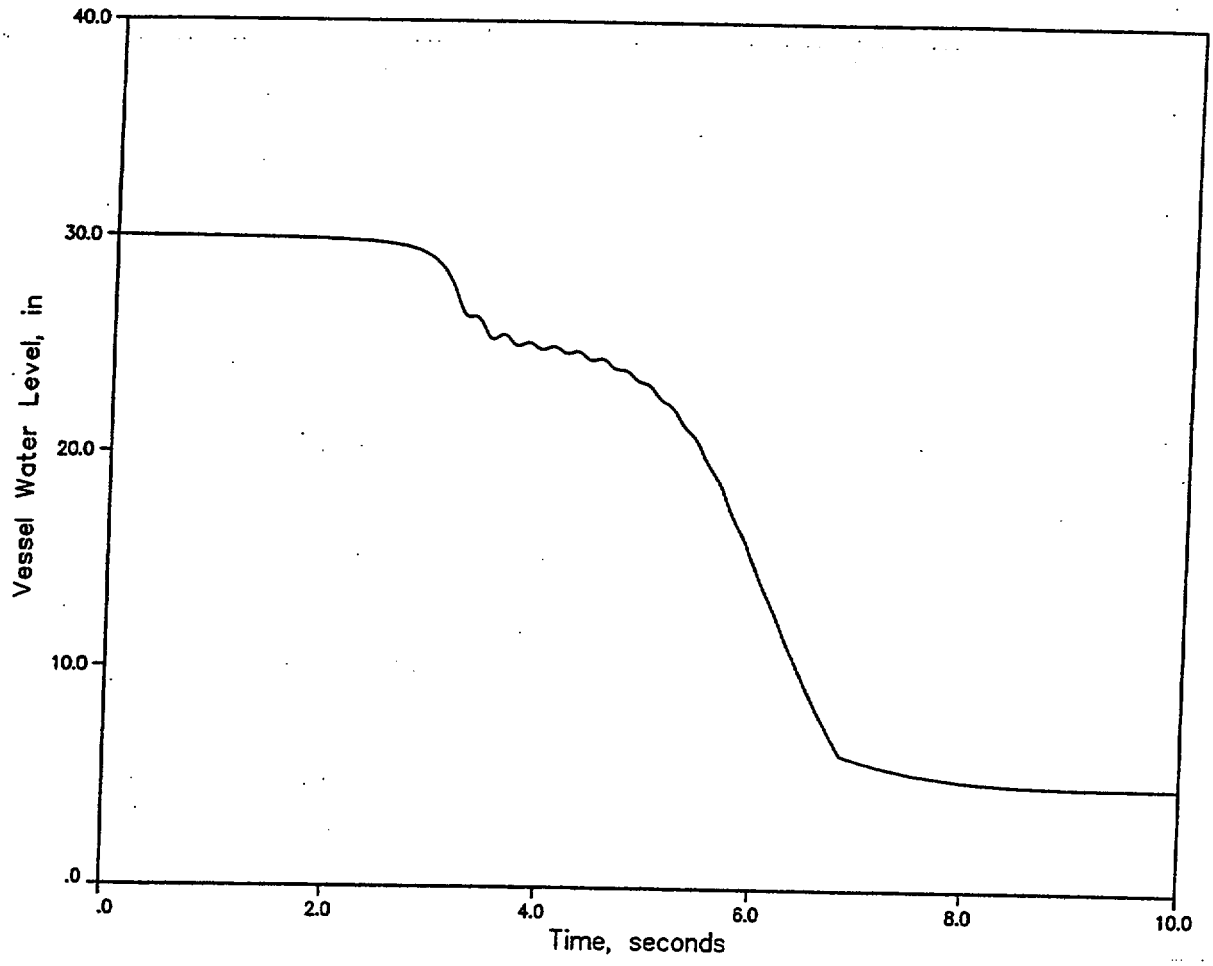
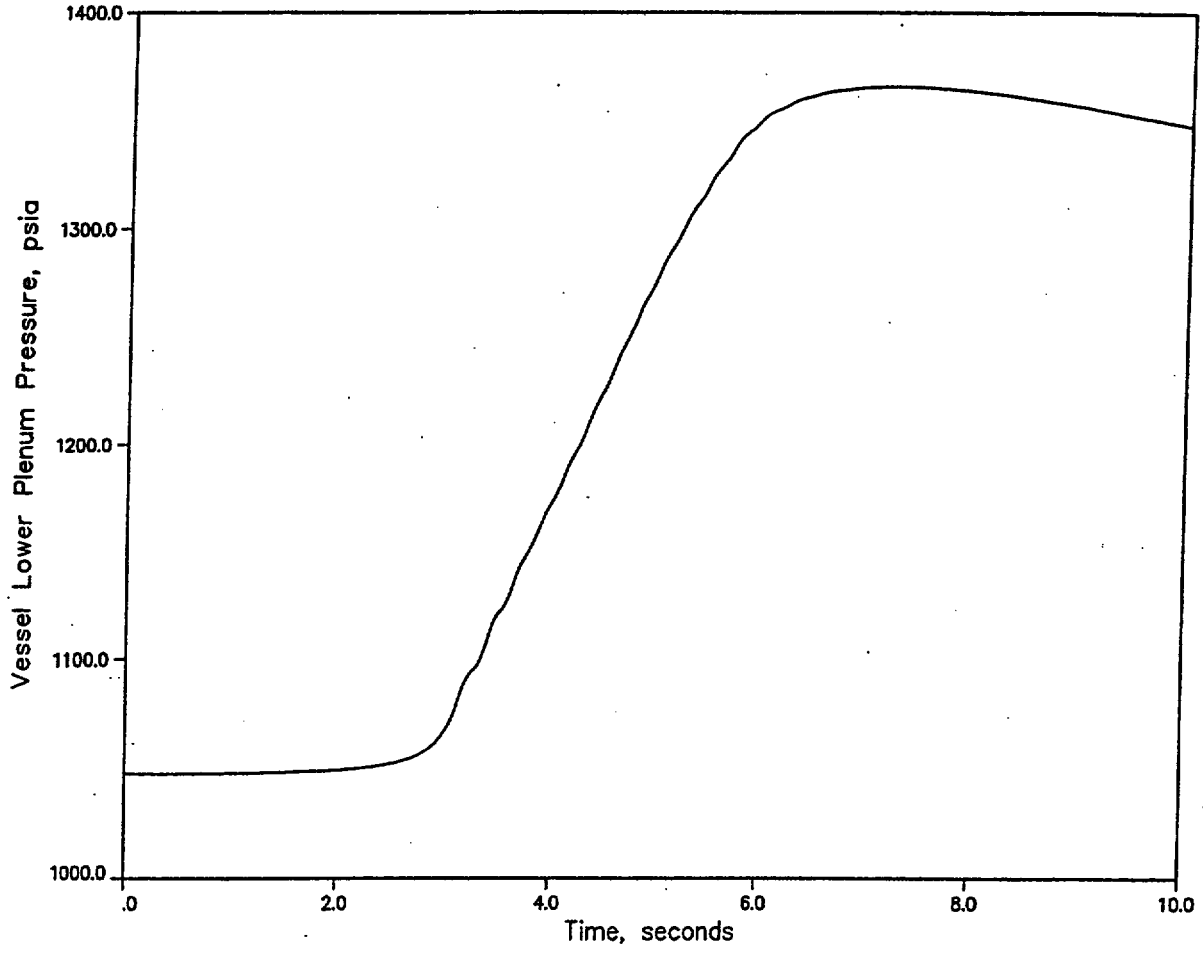


FIGURE 9

Main Steam Line Isolation Valve (MSIV) Closure at 100% Core Thermal Power/ 87% Core Flow Vessel Pressure Response (UFSAR 15.2.4)