

Core Operating Limits Report
Dresden Station Unit 3 Cycle 13

September 1991

9202030163 910930
PDR ADDCK 05000237
P PDR

ATTACHMENT 1

**CORE OPERATING LIMITS REPORT
DRESDEN UNIT 3 CYCLE 13**

Issuance of Changes Summary

Section(s) Affected	Page(s) Affected	Summary of Changes	Date
A11	A11	Original Issue	12/89
2.0	2-2	ANF 8x8 Exposure Extension	02/90
3.0	3-2	ANF 8x8 Exposure Extension	02/90
4.0	4-2	ANF 8x8 Exposure Extension	02/90
2.0	2-2	ANF 8x8 Exposure Extension	03/91
3.0	3-2	ANF 8x8 Exposure Extension	03/91
1.0	1-2	Rod Block Monitor Setpoint Change	06/91
5.0	5-1, 5-2, 5-3, 5-4	OLMCPR, OLMCPR for Manual and Automatic Flow Control	09/91

Table of Contents

	Page
References.....	iii
List of Figures.....	iv
List of Tables.....	v
1.0 Control Rod Withdrawal Block Instrumentation (3/4.2.C)....	1-1
1.1 Technical Specification Reference.....	1-1
1.2 Description.....	1-1
2.0 Average Planar Linear Heat Generation Rate (3/4.5.I).....	2-1
2.1 Technical Specification Reference.....	2-1
2.2 Description.....	2-1
2.3 MAPLHGR Multipliers.....	2-1
3.0 Local Steady State LHGR (3/4.5.J).....	3-1
3.1 Technical Specification Reference.....	3-1
3.2 Description.....	3-1
4.0 Local Transient LHGR (3/4.5.K).....	4-1
4.1 Technical Specification Reference.....	4-1
4.2 Description.....	4-1
5.0 Operating Limit Minimum Critical Power Ratio (3/4.5.L)....	5-1
5.1 Technical Specification Reference.....	5-1
5.2 Description.....	5-1

References

1. Commonwealth Edison Company Docket No. 50-249, Dresden Nuclear Power Station, Unit 3, Facility Operating License DPR-25.
2. Letter from D. M. Crutchfield to All Power Reactor Licensees and Applicants, Generic Letter 88-16; Concerning the Removal of Cycle-Specific Parameter Limits from Technical Specifications.

List of Figures

<u>Figure</u>	<u>Title/Description</u>	<u>Page</u>
2.2-1	MAPLHGR Limit versus Bundle Average Exposure ANF 8x8 Fuel.....	2-2
2.2-2	MAPLHGR Limit versus Bundle Average Exposure ANF 9x9 Fuel.....	2-3
3.2-1	Steady State Linear Heat Generation Rate (SLHGR) Limit vs. Planar Exposure.....	3-2
4.2-1	Transient Linear Heat Generation Rate (TLHGR) Limit vs. Planar Exposure for ANF 8x8 Fuel.....	4-2
4.2-2	Transient Linear Heat Generation Rate (TLHGR) Limit vs. Planar Exposure for ANF 9x9 Fuel.....	4-3
5.2-1	MCPR Limit vs Measured Scram Time to 90% Insertion - Rated Flow Conditions.....	5-2
5.2-2	Operating Limit MCPR for Manual Flow Control.....	5-3
5.2-3	Operating Limit MCPR for Automatic Flow Control.....	5-4

List of Tables

<u>Table</u>	<u>Title/Description</u>	<u>Page</u>
1.2-1	Control Rod Withdrawal Block Instrumentation Setpoints.....	1-2
2.3-1	MAPLHGR Multipliers.....	2-4

1.0 CONTROL ROD WITHDRAWAL BLOCK INSTRUMENTATION

1.1 Technical Specification Reference

Technical Specification 3.2.C - Control Rod Block Actuation

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 Wd plus 48)*
---------------------	---

Single Loop Operation	Less than or equal to (0.65 Wd plus 44)*
-----------------------	---

*Wd - 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

Section 2.2: Technical Specification 3.5.I - Average Planar LHGR

Section 2.3: See Table 2.3-1

2.2 Description

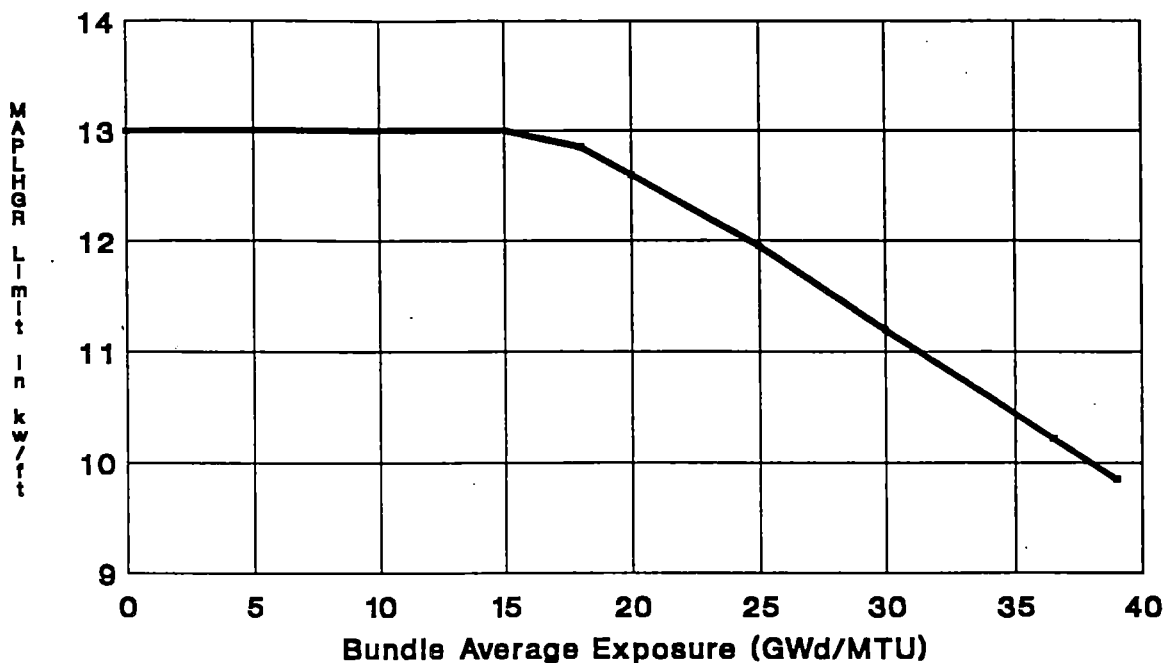
The Maximum Average Planar Linear Heat Generation Rates (MAPLHGR) versus Bundle Average Exposure for ANF 8x8 fuel is determined from Figure 2.2-1.

The Maximum Average Planar Linear Heat Generation Rates (MAPLHGR) versus Bundle Average Exposure for ANF 9x9 fuel is determined from Figure 2.2-2.

2.3 MAPLHGR Multipliers

The appropriate multiplicative factors to apply to the base MAPLHGR limits specified in Section 2.2 are shown in Table 2.3-1.

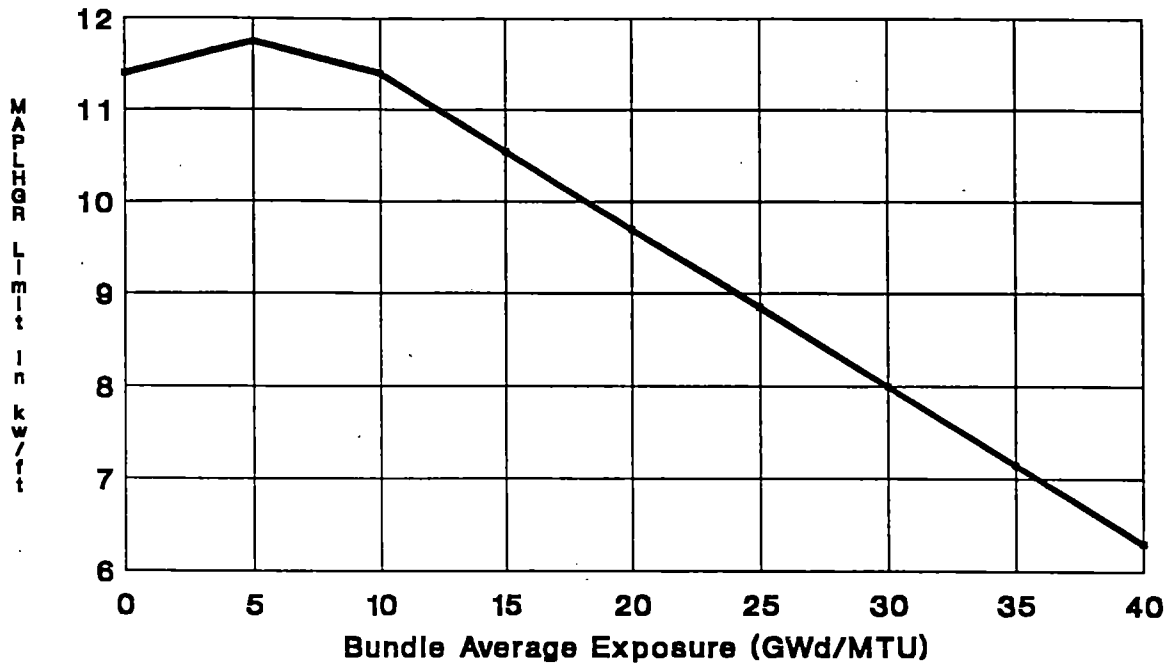
**Figure 2.2-1
MAPLHGR Limit vs. Bundle Avg. Exposure
ANF 8x8 Fuel**



The above graph is based on the following MAPLHGR summary for ANF 8x8 fuel design.

Bundle Average Exposure (Gwd/MTU)	MAPLHGR Limit, Kw/ft
0	13.00
10	13.00
15	13.00
18	12.85
20	12.60
25	11.95
30	11.20
36.5	10.22
39	9.85

**Figure 2.2-2
MAPLHGR Limit vs. Bundle Avg. Exposure
ANF 9x9 Fuel**



The above graph is based on the following MAPLHGR summary for ANF 9x9 fuel design.

Bundle Average Exposure (Gwd/MTU)	MAPLHGR Limit, Kw/ft
0	11.40
5	11.75
10	11.40
15	10.55
20	9.70
25	8.85
30	8.00
35	7.15
40	6.30

Table 2.3-1
MAPLHGR Multipliers

Specification	Title of TS	Scenario	Multiplicative Factors	
			8x8	9x9
3.5.D.2	Automatic Pressure Relief Subsystems	One Relief Valve OOS.	0.89	0.76
3.5.I & 3.6.H.3.f	Average Planar LHGR Recirculation Pump Flow Limitations	Single Loop Operation (SLO)	0.91	0.91
3.5.I & 3.6.H.3.f	Average Planar LHGR Recirculation Pump Flow Limitations	One Relief Valve OOS & SLO.	0.89	0.76

3.0 LOCAL STEADY STATE LHGR

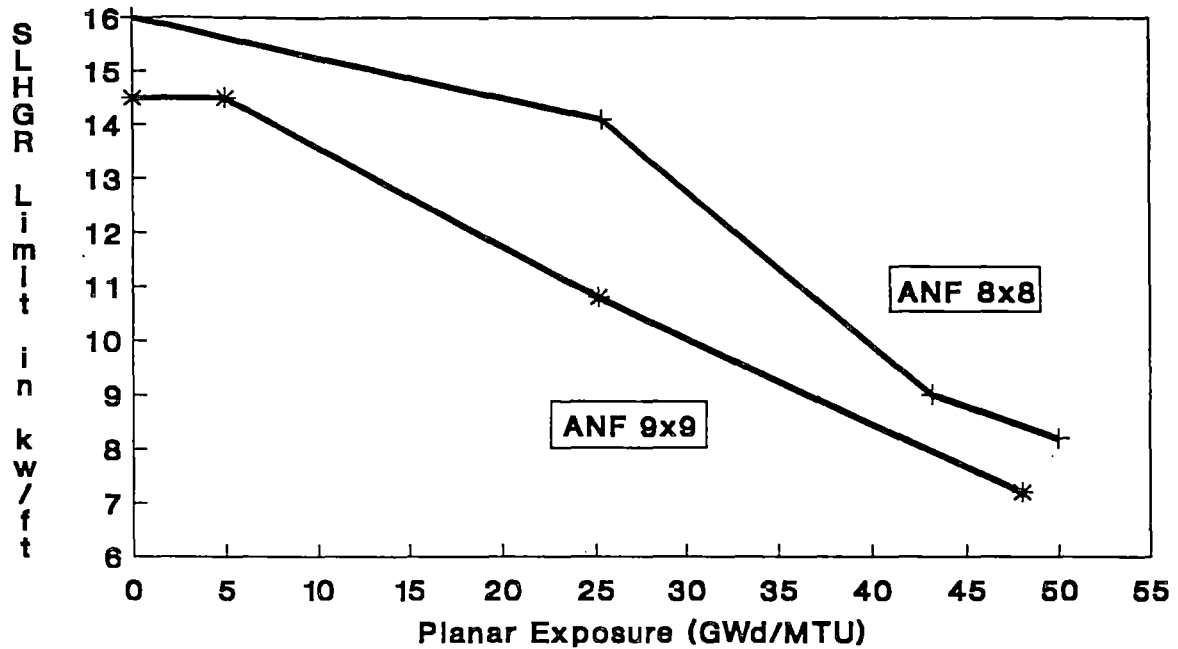
3.1 Technical Specification Reference

Technical Specification 3.5.J - Local Steady State LHGR

3.2 Description

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

**Figure 3.2-1
Steady State LHGR (SLHGR)
Versus Planar Exposure**



ANF 8x8 Fuel	
Exposure (GWd/MTU)	LHGR (kw/ft)
0.0	16.0
25.4	14.1
43.2	9.0
50.0	8.2

ANF 9x9 Fuel	
Exposure (GWd/MTU)	LHGR (kw/ft)
0.0	14.5
5.0	14.5
25.2	10.8
48.0	7.2

4.0 LOCAL TRANSIENT LHGR

4.1 Technical Specification Reference

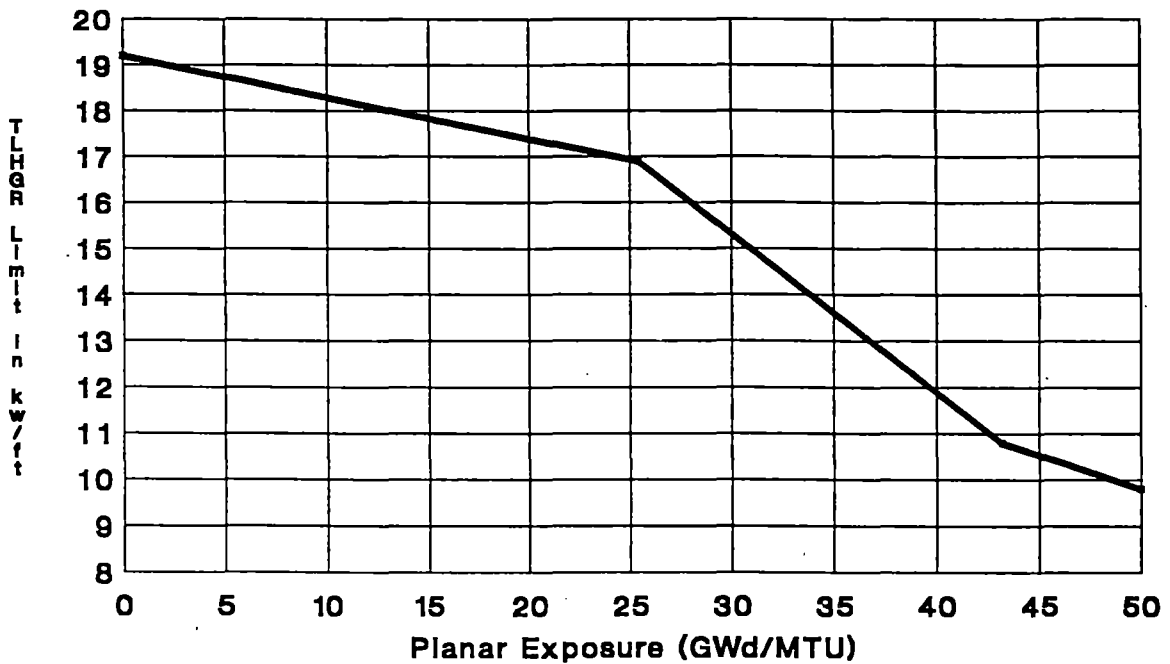
Technical Specification 3.5.K - Local Transient LHGR

4.2 Description

The Local Transient LHGR (TLHGR) limit versus Average Planar Exposure for ANF 8x8 fuel is determined from Figure 4.2-1.

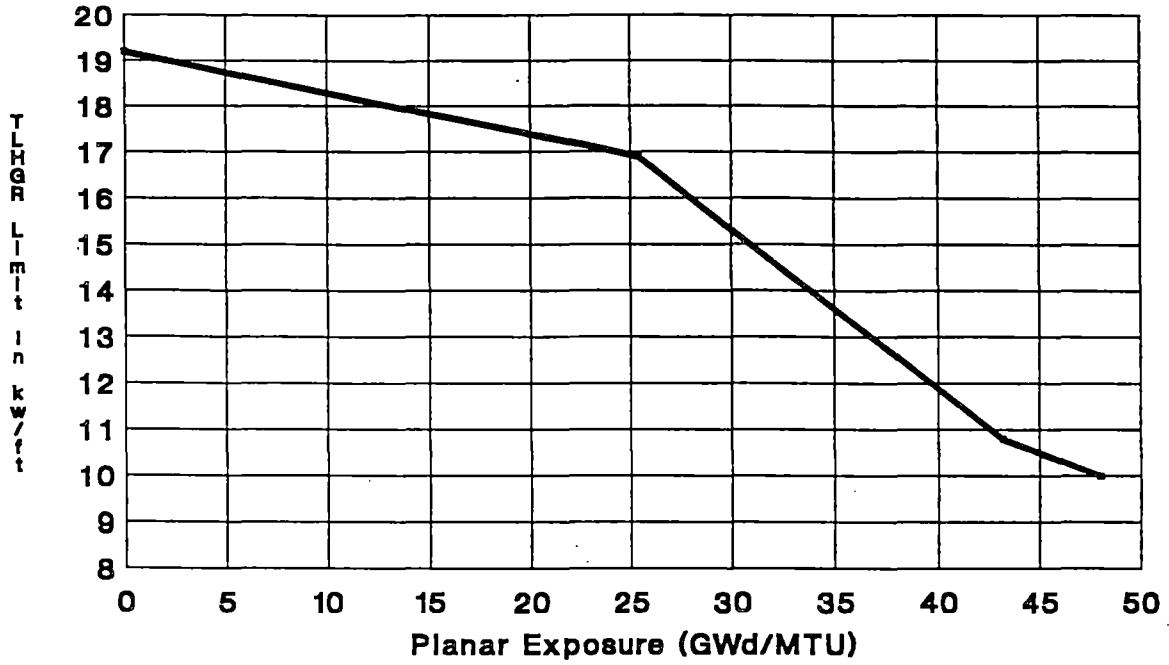
The TLHGR limit versus Average Planar Exposure for ANF 9x9 fuel is determined from Figure 4.2-2.

**Figure 4.2-1
 Transient LHGR (TLHGR) Versus
 Planar exposure for ANF 8x8 Fuel**



Exposure (Gwd/MTU)	LHGR (Kw/ft)
0	19.2
25.4	16.9
43.2	10.8
50.0	9.7

**Figure 4.2-2
 Transient LHGR (TLHGR) Versus
 Planar exposure for ANF 9x9 Fuel**



Exposure (GWd/MTU)	LHGR (Kw/ft)
0	19.2
25.4	16.9
43.2	10.8
48.0	10.0

5.0 MINIMUM CRITICAL POWER RATIO OPERATING LIMIT

5.1 Technical Specification References

Technical Specification 3.5.L - Minimum Critical Power Ratio (MCPR)

5.2 Description

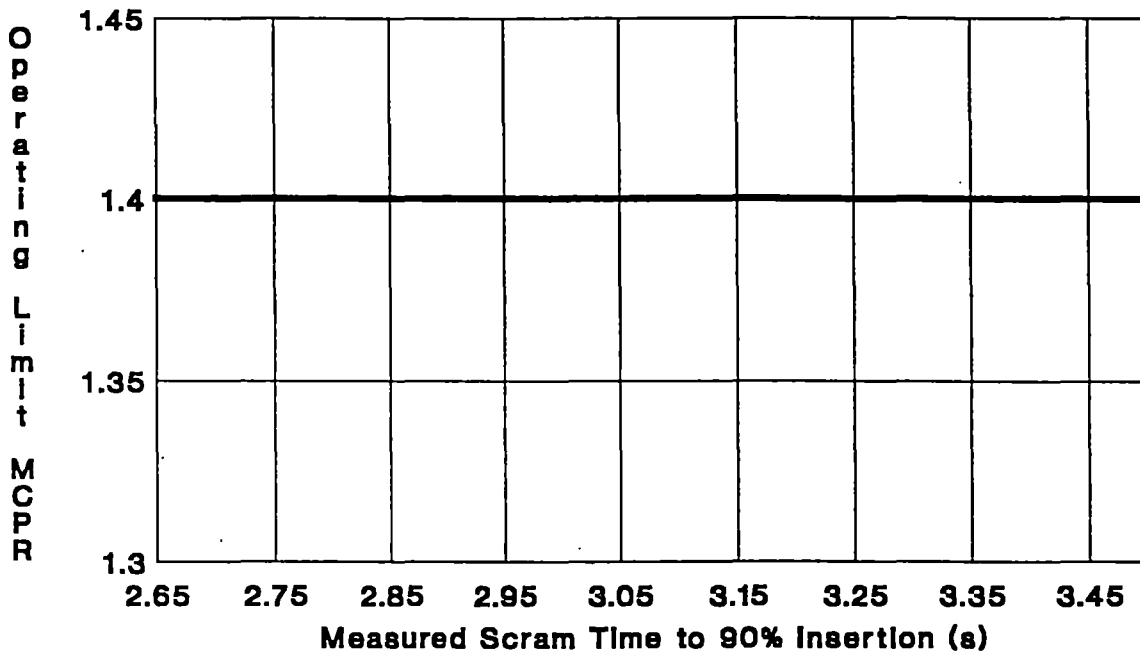
a. The Operating Limit MCPR at rated output versus measured scram time is shown in Figure 5.2-1. The Operating Limit MCPR is 1.40 or greater whenever the measured 90% insertion time is 3.50 seconds or less.

b. During Manual Flow Control, the Operating Limit MCPR at reduced core flow conditions can be determined from:

- i. Figure 5.2-2 using the appropriate flow rate, or
- ii. The Operating Limit MCPR determined via Figure 5.2-1, whichever is greater.

c. During Automatic Flow Control, the Operating Limit MCPR at reduced flow rates is determined from Figure 5.2-3 using the appropriate flow rate and the Operating Limit MCPR, which is obtained from Figure 5.2-1. Linear interpolation between the curves on Figure 5.2-3 is permissible.

**Figure 5.2-1
MCPR Limit vs. Measured Scram Time
to 90% Insertion**

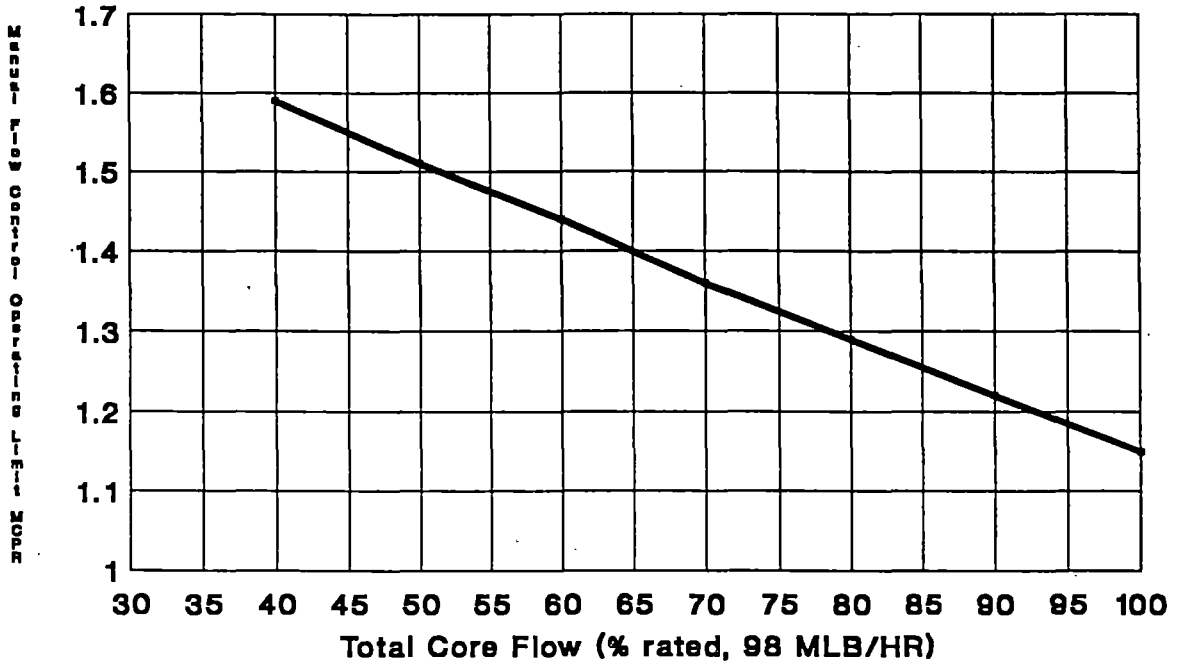


The above graph demonstrates the following dependence of the Operating Limit MCPR versus measured scram time to 90% insertion for all resident fuel types:

$$\text{MCPR LCO} = 1.40$$

Note that the Operating Limit MCPR is not a function of scram time assuming the Technical Specification scram time limit of 3.50 seconds (or less) to 90% insertion time is met.

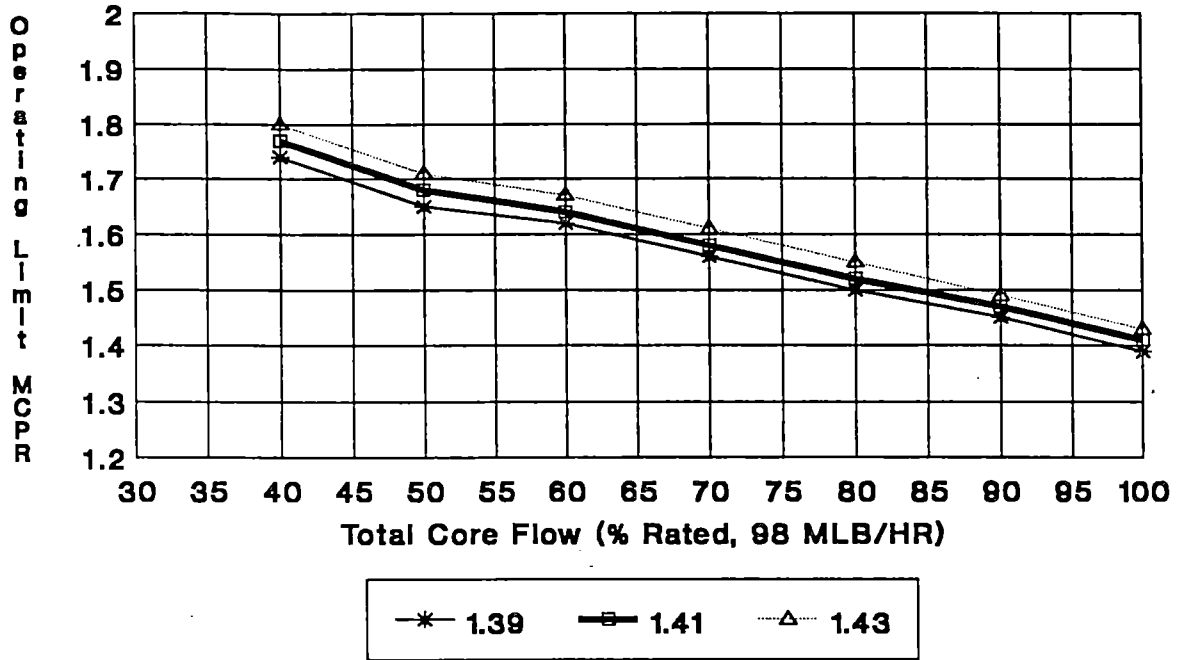
**Figure 5.2-2
Operating Limit MCPR
For Manual Flow Control**



The above curve is based on the following Operating Limit MCPR summary for Manual Flow Control and all fuel types:

Total Core Flow (% rated)	Operating Limit MCPR
100	1.15
90	1.22
80	1.29
70	1.36
60	1.44
50	1.51
40	1.59

**Figure 5.2-3
Operating Limit MCPR
For Automatic Flow Control**



The above curve is based on the following Operating Limit MCPR summary for Automatic Flow Control and all fuel types:

Total Core Flow (%Rated)	Operating Limit MCPR		
	1.39	1.41	1.43
100	1.39	1.41	1.43
90	1.45	1.47	1.49
80	1.50	1.52	1.55
70	1.56	1.58	1.61
60	1.62	1.64	1.67
50	1.65	1.68	1.71
40	1.74	1.77	1.80

*Column Headers are Operating Limit MCPRs at rated output.

ATTACHMENT 2

REVISED

CORE OPERATING LIMITS REPORT

DRESDEN UNIT 2 CYCLE 13