

Core Operating Limits Report

Dresden Station Unit 3

Cycle 12

Revision 1

February 1990

9003070101 900222
PDR ADOCK 05000237
P PNU

Issuance of Changes Summary

Affected Section	Affected Pages	Summary of Changes	Date
All	All	Original Issue	12/89
2.0	2-2	ANF 8X8 Exposure Extension	2/90
3.0	3-2	ANF 8X8 Exposure Extension	2/90
4.0	4-2	ANF 8X8 Exposure Extension	2/90

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 Minimum Critical Power Ratio Operating Limit (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. 50-237, 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

Figure	Title/Description	Page
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	MCPR Operating Limit for Manual Flow Control	5-3
5.2-3	MCPR Operating Limit 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

<u>Trip Function</u>	<u>Trip Level Setting</u>
Rod Block Monitor Upscale (Flow Bias)	
Dual Loop Operation	Less than or equal to (0.65 Wd plus 45) (See Note)
Single Loop Operation	Less than or equal to (0.65 Wd plus 41) (See Note)

Note: 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

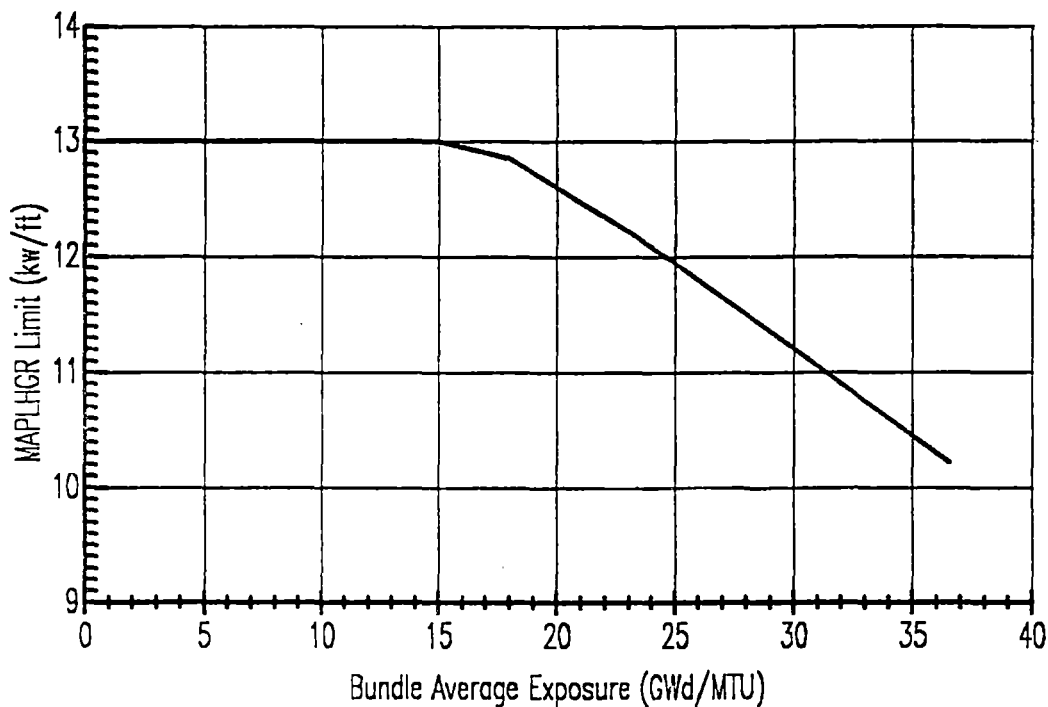
The Maximum Average Planar Linear Heat Generation Rates (MAPLHGR) versus Bundle Average Exposure for ANF 8x8 fuel is determined from Figure 2.2-1.

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.

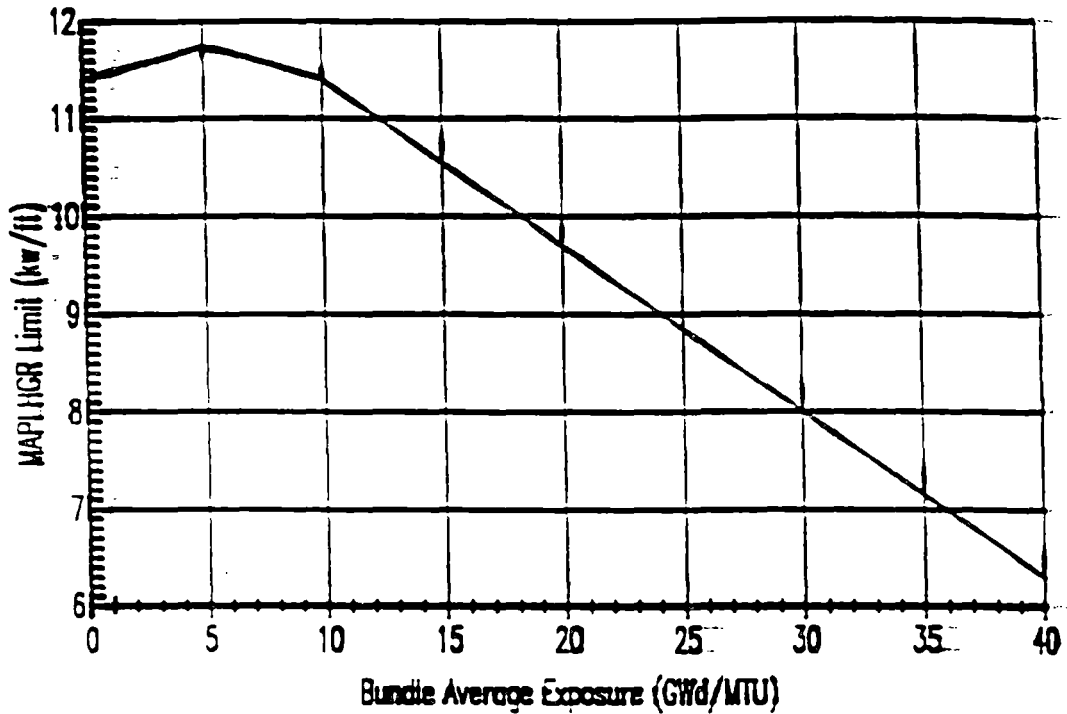
Figure 2.2-1
 MAPLHGR Limit vs. Bundle Average Exposure
 ANF 8x8 Fuel



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

<u>Bundle Average Exposure (GWd/MTU)</u>	<u>MAPLHGR Limit, Kw/ft</u>
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

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



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

<u>Bundle Average Exposure (GWD/MTU)</u>	<u>MAPLHGR Limit, Kw/ft</u>
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 Out of Service.	0.89	0.76
3.5.I and 3.6.H.3.f	Average Planar LHGR Recirc Pump Flow Limitations	Single Loop Operation	0.91	0.91
3.5.I and 3.6.H.3.f	Average Planar LHGR Recirc Pump Flow Limitations	Single Loop Operation and One Relief Valve Out of Service.	0.89	0.76

3.0 LOCAL STEADY STATE LHGR

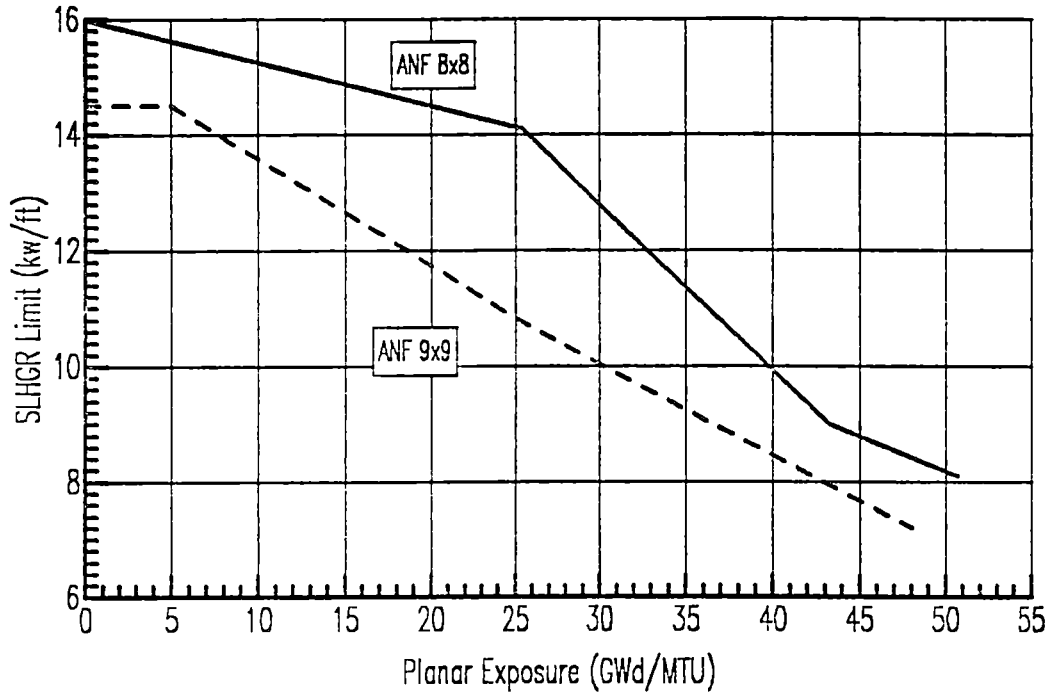
3.1 Technical Specification Reference

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 Linear Heat Generation Rate (SLHGR) Limit
vs. Planar Exposure



ANF 8x8 Fuel	
Exposure	LHGR
0.0	16.0
25.4	14.1
43.2	9.0
50.7	8.1

ANF 9x9 Fuel	
Exposure	LHGR
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

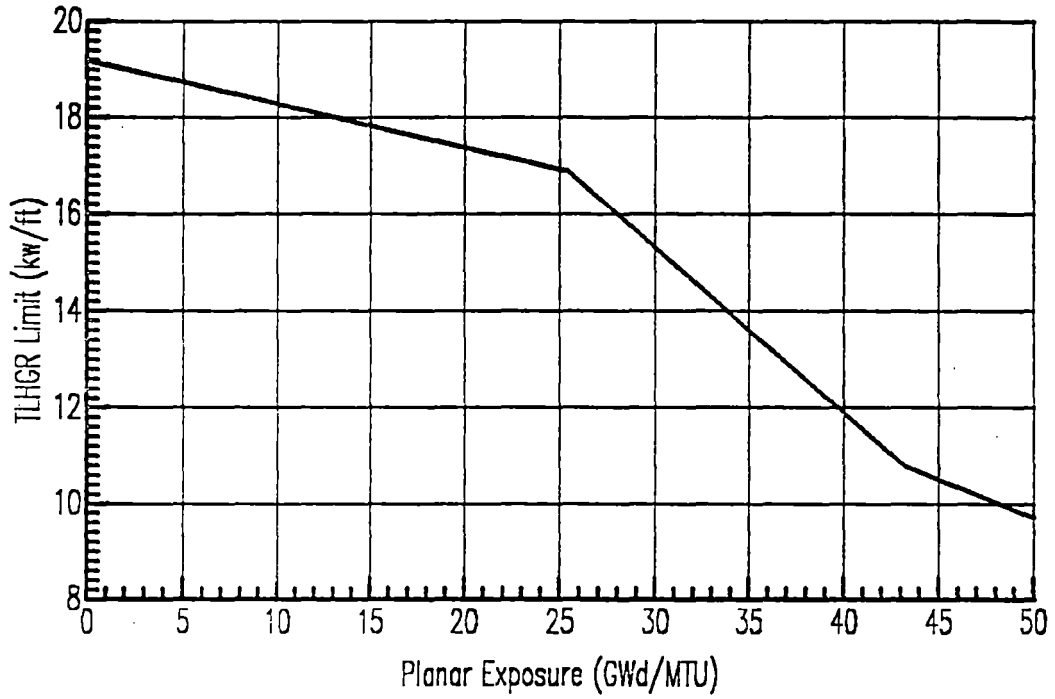
Technical Specification 3.5.K - Local Transient LHGR

4.2 Description

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

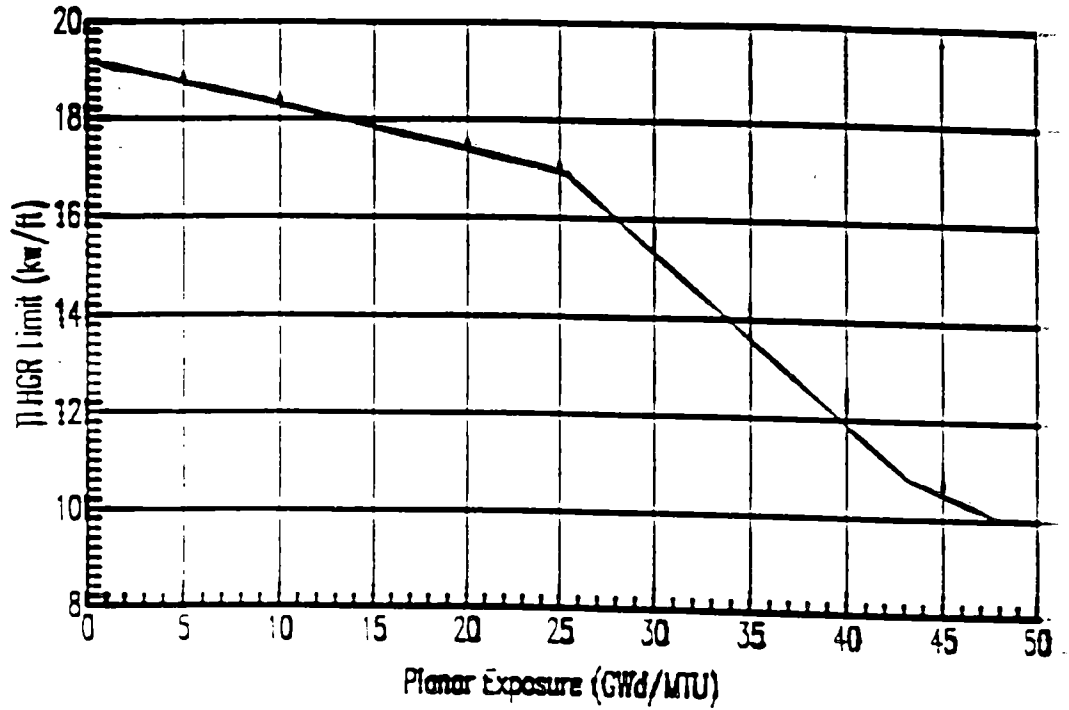
The TLHGR limit versus Average Planar Exposure for ANF 9x9 fuel is determined from Figure 4.2-2.

Figure 4.2-1
 Transient Linear Heat Generation Rate (TLHGR) Limit
 vs. Planar Exposure for ANF 8x8 Fuel



<u>Exposure</u>	<u>LHGR</u>
0.0	19.2
25.4	16.9
43.2	10.8
50.0	9.7

Figure 4.2-2
 Transient Linear Heat Generation Rate (TLHGR) Limit
 vs. Planar Exposure for ANF 9x9 Fuel



<u>Exposure</u>	<u>LHGR</u>
0.0	19.2
25.4	16.9
43.2	10.8
48.0	10.0

5.0 MINIMUM CRITICAL POWER RATIO OPERATING LIMIT

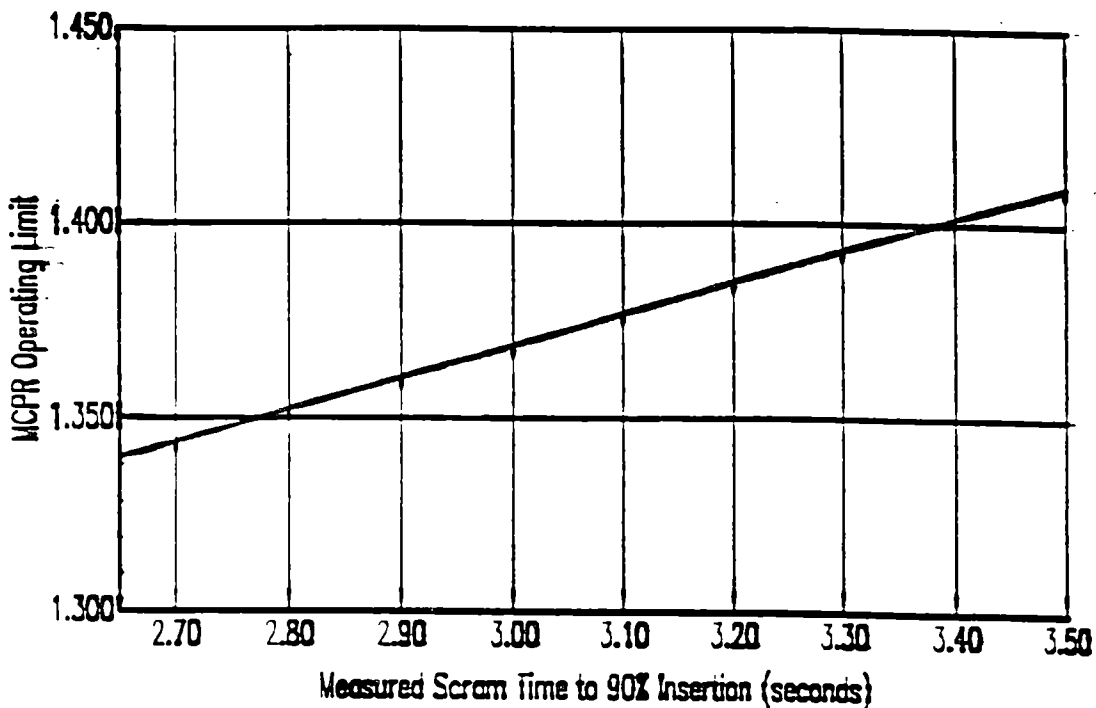
5.1 Technical Specification References

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

5.2 Description

- a. The MCPR Operating Limit at rated flow versus measured scram time is shown in Figure 5.2-1. The MCPR Operating Limit is 1.34 or greater whenever the measured 90% insertion time is 2.65 seconds or less.
- b. During Manual Flow Control, the MCPR Operating Limit at reduced flow rates can be determined from:
 - i. Figure 5.2-2 using the appropriate flow rate, or
 - ii. The rated flow MCPR Operating Limit determined via Figure 5.2-1,
whichever is greater.
- c. During Automatic Flow Control, the MCPR Operating Limit at reduced flow rates can be determined from Figure 5.2-3 using the appropriate flow rate and rated flow MCPR Operating Limit, 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
 Rated Flow Conditions

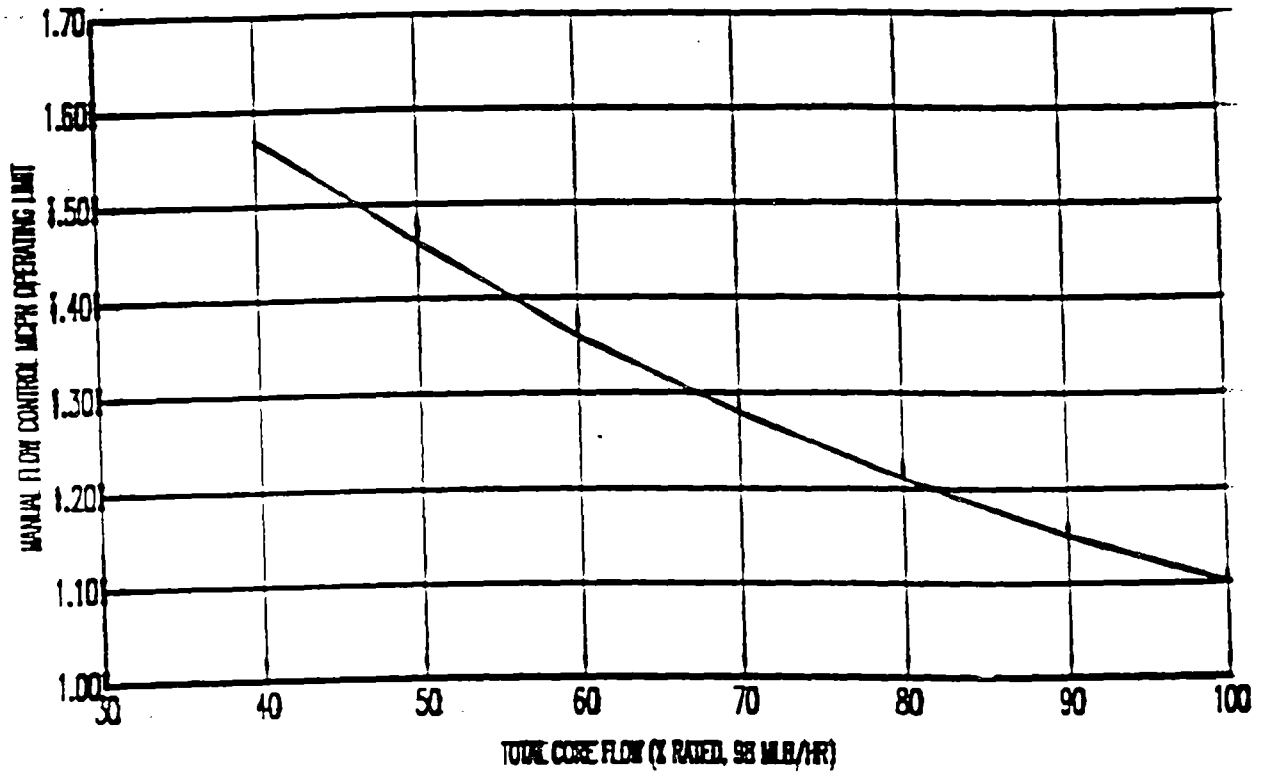


The above graph demonstrates the following dependence of the MCPR Operating Limit versus measured scram time to 90% insertion for all resident fuel types:

$$\text{MCPR LCO} = 1.34 + (\text{Tave} - 2.65) * 0.083$$

where Tave is the average insertion time to the 90% insertion point for all control rods in the core.

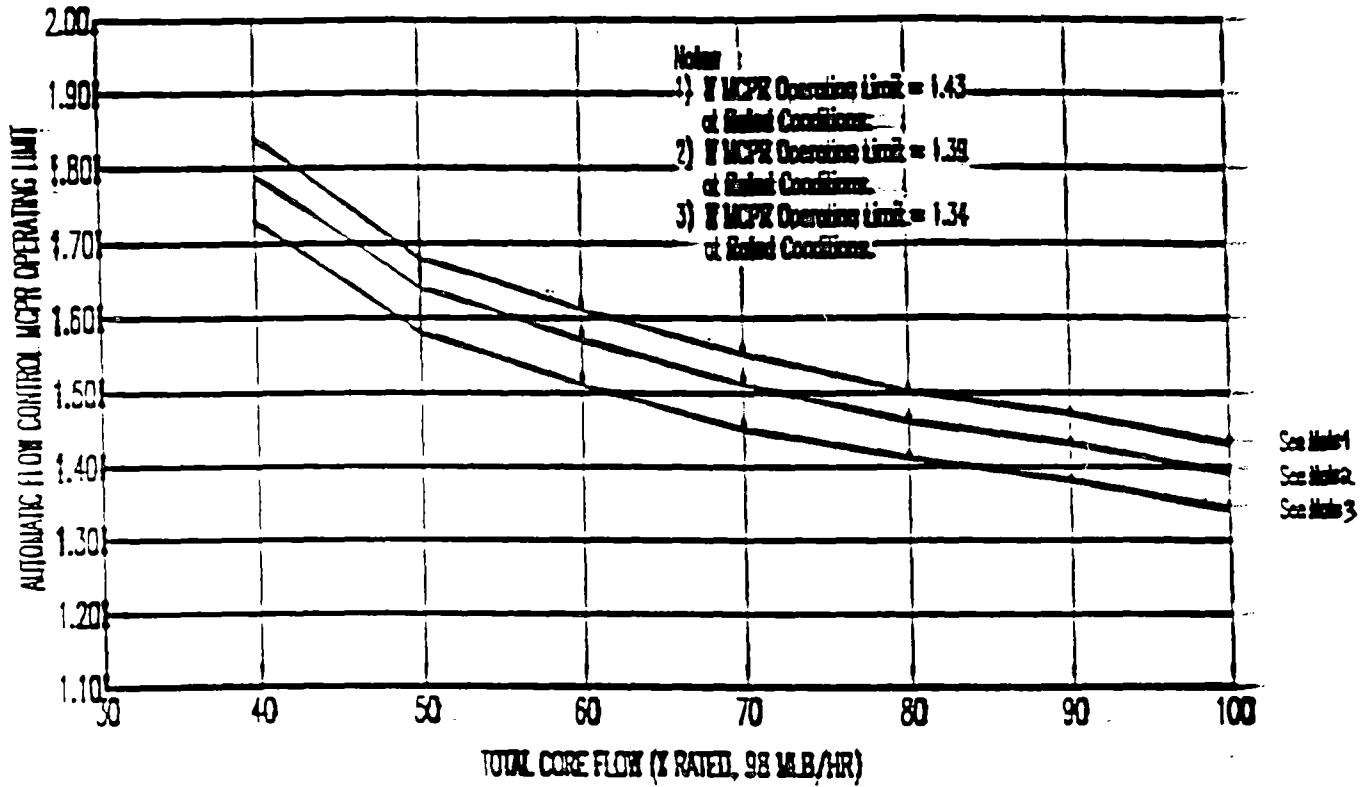
Figure 5.2-2
 MCPR Operating Limit for Manual Flow Control



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

<u>Total Core Flow (% Rated)</u>	<u>MCPR Operating Limit</u>
100	1.10
90	1.15
80	1.21
70	1.28
60	1.36
50	1.46
40	1.57

Figure 5.2-3
 MCPR Operating Limit for Automatic Flow Control



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

Total Core Flow (% Rated)	MCPR Operating Limit*		
	1.34	1.39	1.43
100	1.34	1.39	1.43
90	1.38	1.43	1.47
80	1.41	1.46	1.50
70	1.45	1.51	1.55
60	1.51	1.57	1.61
50	1.58	1.64	1.68
40	1.72	1.78	1.84

* Column Headers are MCPR operating limits at rated flow.