

**HOPE CREEK GENERATING STATION  
CORE OPERATING LIMITS REPORT  
CYCLE 7 / RELOAD 6**

June 20, 1997



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## TABLE OF CONTENTS

Section	Description	Page
1.0	INTRODUCTION .....	5
2.0	LIMITING CONDITIONS FOR OPERATION .....	6
2.1	AVERAGE PLANAR LINEAR HEAT GENERATION RATE .....	7
2.2	MINIMUM CRITICAL POWER RATIO .....	11
2.3	LINEAR HEAT GENERATION RATE .....	14
3.0	REFERENCES .....	15
APPENDIX A		
Bundle Descriptions and Composite APLHGRs for Fuel Bundle		
	GE9B-P8CWB324-9GZ1-80M-150T .....	16
APPENDIX B		
Bundle Descriptions and Composite APLHGRs for Fuel Bundle		
	GE9B-P8CWB325-11GZ1-80M-150T .....	19
APPENDIX C		
Bundle Descriptions and Composite APLHGRs for Fuel Bundle		
	GE9B-P8CWB325-11GZ2-80M-150T .....	22

**LIST OF FIGURES**

<b>Figure</b>	<b>Title</b>	<b>Page</b>
2-1	APLHGR Limit for Fuel Bundle GE9B-P8CWB324-9GZ1-80M-150T . . . . .	8
2-2	APLHGR Limit for Fuel Bundle GE9B-P8CWB325-11GZ1-80M-150T . . . . .	9
2-3	APLHGR Limit for Fuel Bundle GE9B-P8CWB325-11GZ2-80M-150T . . . . .	10
2-4	Minimum Critical Power Ratio Operating Limit . . . . .	12
2-5	Kf Multiplier Curve . . . . .	13
A-1	Lattice Definitions for Fuel Bundle GE9B-P8CWB324-9GZ1-80M-150-T . . . .	17
B-1	Lattice Definitions for Fuel Bundle GE9B-P8CWB325-11GZ1-80M-150-T . . .	20
C-1	Lattice Definitions for Fuel Bundle GE9B-P8CWB325-11GZ2-80M-150-T . . .	23

## LIST OF TABLES

Table	Title	Page
2-1	LHGR Limits . . . . .	14
A-1	APLHGR Data for Fuel Bundle GE9B-P8CWB324-9GZ1-80M-150-T . . . . .	18
B-1	APLHGR Data for Fuel Bundle GE9B-P8CWB325-11GZ1-80M-150-T . . . . .	21
C-1	APLHGR Data for Fuel Bundle GE9B-P8CWB325-11GZ2-80M-150-T . . . . .	24

## 1.0 INTRODUCTION

The purpose of this report is to provide the Core Operating Limits for the Hope Creek Generating Station Unit 1 Cycle 7 / Reload 6 operation. The limits presented here correspond to the core thermal limits for Average Planar Linear Heat Generation Rate (APLHGR), Minimum Critical Power Ratio (MCPR), MCPR Flow Adjustment Factor ( $K_f$ ), and Linear Heat Generation Rate (LHGR).

These operating limit values have been determined using NRC approved methods contained in GESTAR-II, NEDE-24011-P-A, (latest approved version), and are established such that all applicable fuel thermal-mechanical, core thermal-hydraulic, ECCS, and nuclear limits such as shutdown margin, and transient and accident analysis limits are met. Methods for the cycle specific evaluation of the Safety Limit Minimum Critical Power Ratio (SLMCPR) have been submitted for NRC approval in GESTAR-II Amendment 25, and in Hope Creek License Change Request LCR H97-05. This revision includes the effects of the Hope Creek Cycle 7 specific evaluation for SLMCPR, currently administratively controlled via PIRS item #960416162 CRFA #2 and CROD #2.

Hope Creek Technical Specifications section 3.2 references this report as the source for certain LIMITING CONDITIONS FOR OPERATION. These are included in section 2 of this document. Hope Creek Technical Specifications section 6.9.1.9 also requires that this report, including any mid-cycle revisions, shall be provided, upon issuance, to the NRC.

This document is specific to Hope Creek Unit 1 Cycle 7 / Reload 6 and shall not be applicable to any other core or cycle design. The current revision of this report covers the operation from the date of issuance to the end of cycle 7 exposure of 11,200 MWD/STU, including the power coastdown following end of effective full power capability. End of effective full power capability is reached when 100% rated power can no longer be maintained by increasing core flow (up to 105% of rated core flow), at rated feedwater temperatures, in the a 's-out configuration.

## 2.0 LIMITING CONDITIONS FOR OPERATION

The LIMITING CONDITIONS FOR OPERATION presented in this section are referenced by the Hope Creek Technical Specifications.

<u>Tech. Spec</u>	<u>Title</u>
3/4.2.1	Average Planar Linear Heat Generation Rate
3/4.2.3	Minimum Critical Power Ratio
3/4.2.4	Linear Heat Generation Rate

## 2.1 AVERAGE PLANAR LINEAR HEAT GENERATION RATE

### LIMITING CONDITION FOR OPERATION:

All AVERAGE PLANAR LINEAR HEAT GENERATION RATES (APLHGRs) for each type of fuel as a function of AVERAGE PLANAR EXPOSURE shall not exceed the limits specified in Appendix A, Table A-1, Appendix B, Table B-1, and Appendix C, Table C-1. The limits specified shall be reduced to a value of 0.86 times the two recirculation loop operation limit when in single recirculation loop operation.

#### NOTE

The APLHGRs for the P8CWB (GE9B) fuel types are included in Appendix A, B and C to accommodate GE proprietary considerations. The Appendices will be identified to contain GE proprietary data and handled accordingly by the NRC when they receive their copy of the COLR report.

The APLHGR LCOs contained in Appendix A, B and C shall have the same consideration and treatment by PSE&G personnel as if they were in the body of the COLR. In addition, note that the APLHGR LCOs in the appendices are established in the NSSS computer for thermal limits monitoring via approved plant procedures.

When hand calculations are required, all AVERAGE PLANAR LINEAR HEAT GENERATION RATES (APLHGRs) for each type of fuel as a function of AVERAGE PLANAR EXPOSURE shall not exceed the limits specified in Figures 2-1 through 2-3. The limits specified shall be reduced to a value of 0.86 times the two recirculation loop operation limit when in single recirculation loop operation.

The accompanying figures graphically present the "Limiting" column of Tables A-1, B-1 and C-1.

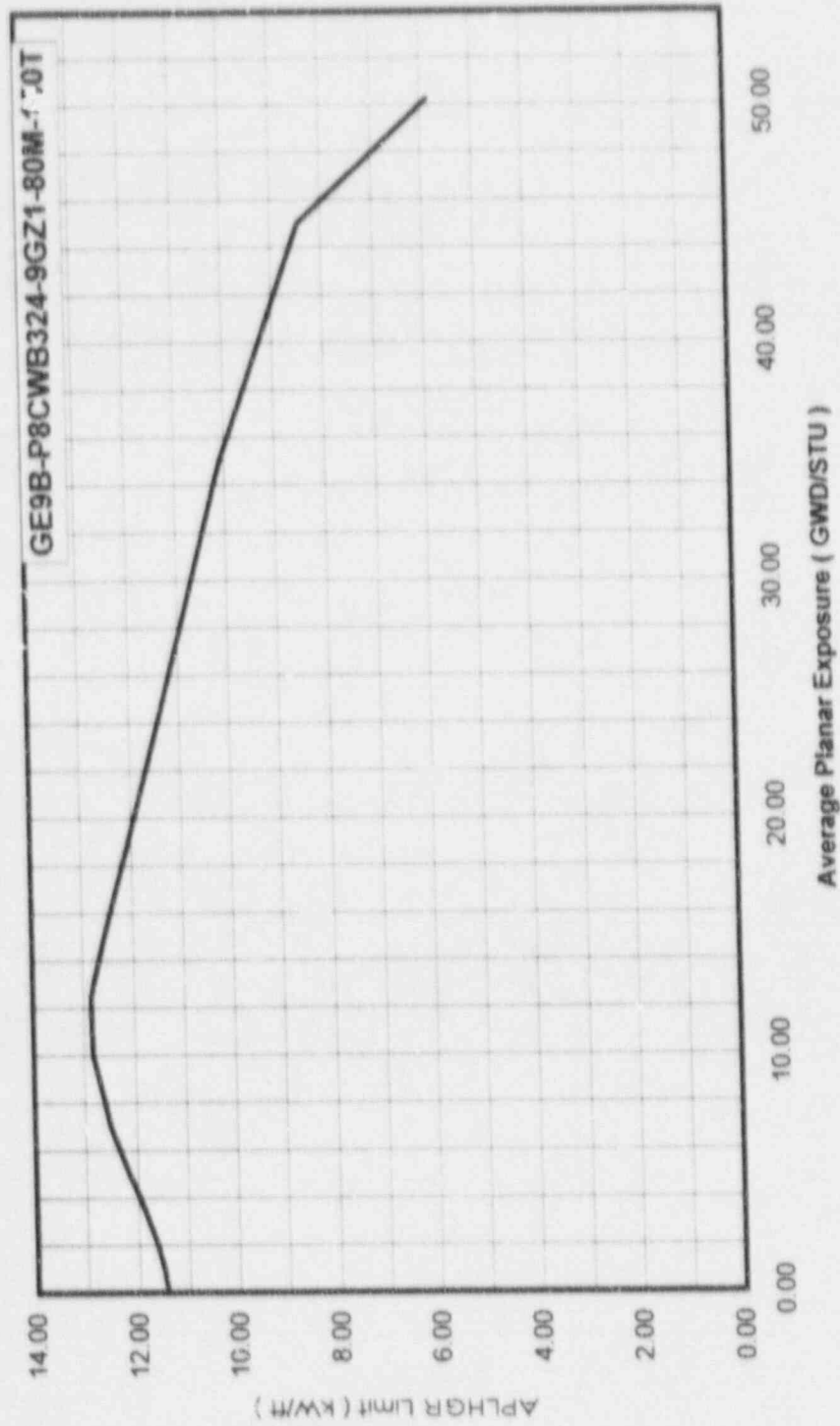


Figure 2-1 APLHGR Limit for Fuel Bundle GE9B-P8CWB324-9GZ1-80M-150T



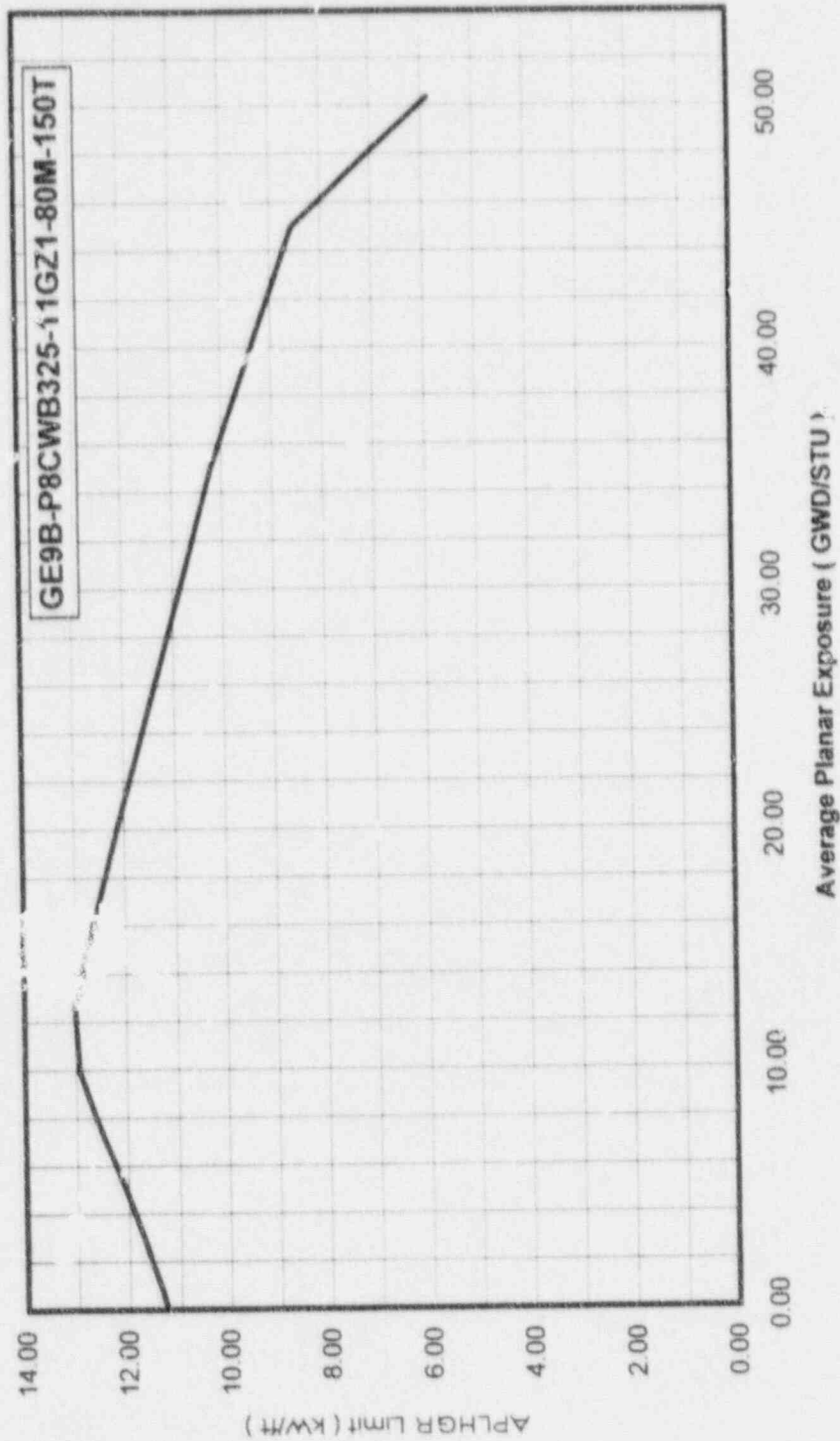


Figure 2-2 APLHGR Limit for Fuel Bundle GE9B-P8CWB325-11GZ1-80M-150T

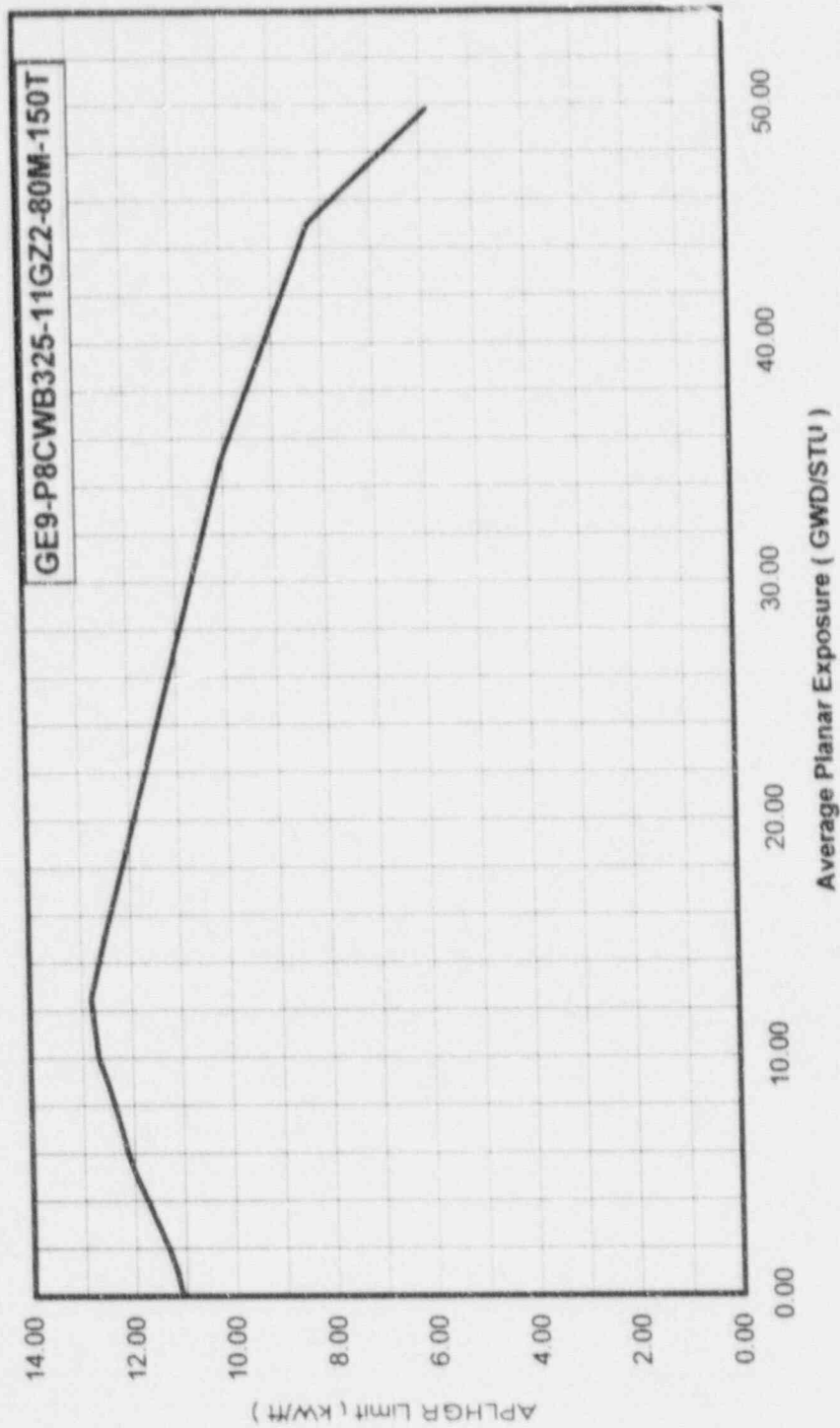


Figure 2-3 APLHGR Limit for Fuel Bundle GE9B-P8CWB325-11GZ2-80M-150T

## 2.2 MINIMUM CRITICAL POWER RATIO

### LIMITING CONDITION FOR OPERATION

The MINIMUM CRITICAL POWER RATIO (MCPR) shall be equal to or greater than the MCPR limit specified in Figure 2-4 times the  $K_f$  curve value specified in Figure 2-5.

The  $K_f$  curve requires an adjustment be made to the MCPR limit for bundle flows below 0.4 Mlb/ft<sup>2</sup>-hr. This adjustment has been incorporated in Fig. 2-5.

The MCPR limit must be increased by 3% if the core inlet subcooling exceeds 70 BTU/lbm.

The MCPR limit is a function core average scram speed, EOC-RPT operability, and Main Turbine Bypass operability.

Core average scram speed,  $\tau$  (Tau), is defined by Hope Creek Technical Specification 3.2.3.

End-of-Cycle Recirculation Pump Trip system operability is defined per Hope Creek Technical Specification 3.3.4.2.

Main Turbine Bypass operability is defined per Hope Creek Technical Specification 3.7.7.

#### NOTE

Methods for the cycle specific evaluation of the Safety Limit Minimum Critical Power Ratio (SLMCPR) have been submitted for NRC approval in GESTAR-II Amendment 25, and in Hope Creek License Change Request LCR H97-05. Figure 2-4 in this revision includes the effects of the Hope Creek Cycle 7 specific evaluation for SLMCPR, currently administratively controlled via PIRS item #960416162 CRFA #1 and CROD #2.

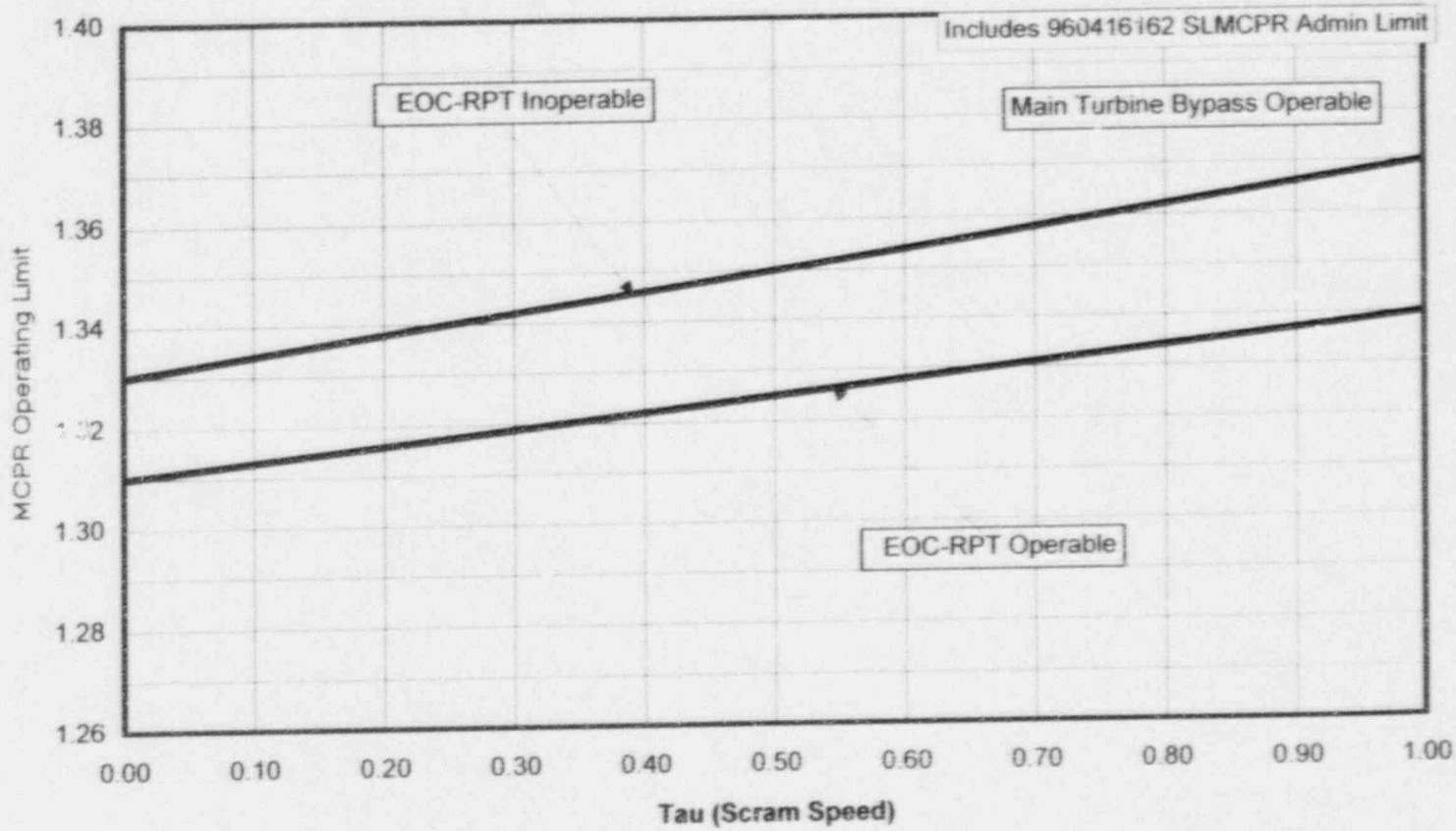
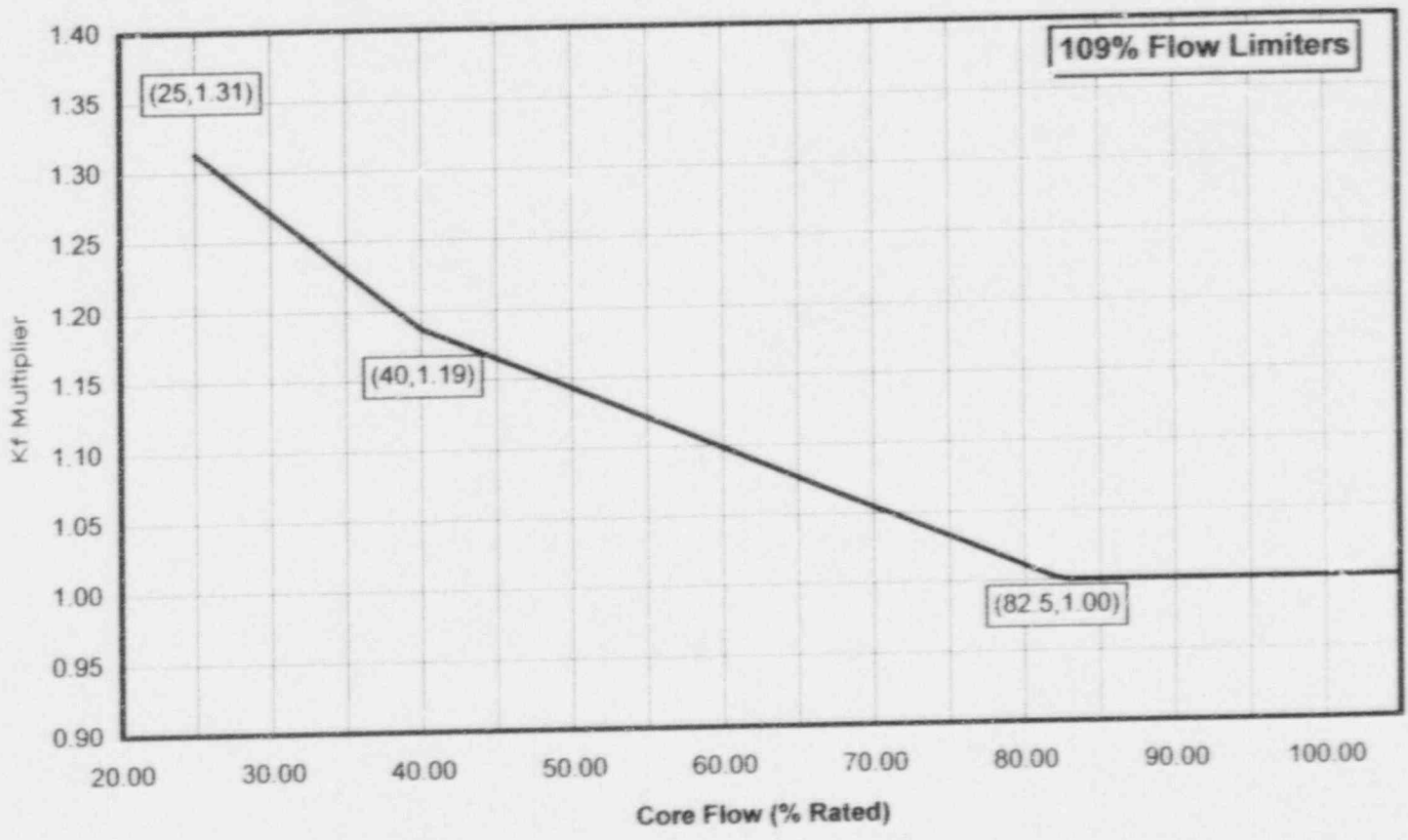


Figure 2-4 Minimum Critical Power Ratio Operating Limit

Figure 2-5 Kf Multiplier Curve



### 2.3 LINEAR HEAT GENERATION RATE

#### LIMITING CONDITION FOR OPERATION

The LINEAR HEAT GENERATION RATE (LHGR) shall not exceed the limits specified in Table 2-1.

Table 2-1 LHGR Limits

<u>Fuel Type</u>	<u>LHGR Limit (Kw/ft)</u>
GE9B-P8CWB324-9GZ1	14.4
GE9B-P8CWB325-11GZ1	14.4
GE9B-P8CWB325-11GZ2	14.4

### 3.0 REFERENCES

1. "General Electric Standard Application For Reactor Fuel", General Electric Company, NEDE-24011-P-A, Revision 10, February, 1991.
2. Nuclear Fuel Section Vendor Technical Document NFU-VTDGE91-040-00  
"Supplemental Reload Licensing Submittal for Hope Creek Generating Station Unit 1 Reload 3, Cycle 4, Supplement 1", General Electric Company, 23A6526AA, Rev.0, Supplement 1, January, 1991.
3. Nuclear Fuel Section Vendor Technical Document NFU-VTDGE93-077-00  
"Lattice-Dependent MAPLHGR Report for Hope Creek Generating Station Unit 1, Reload 5, Cycle 6", General Electric Company, 23A7219AA, Rev.0, November, 1993.
4. Nuclear Fuel Section Vendor Technical Document NFU-VTDGE95-131-00  
"Supplemental Reload Licensing Report for Hope Creek Generating Station Unit 1, Reload 6 Cycle 7", General Electric Company, 24A5173, Rev 0, November, 1995.
5. DER # DEH 93-00183, "Resolution of the TVAPS issue".
6. Nuclear Fuel Section Safety Evaluation HCR.8-0003, approved 1/18/95.
7. Nuclear Fuel Section Safety Evaluation HCR.8-0006, approved 6/5/97.
8. R.J.Redu to USNRC Document Control Desk, "Proposed Amendment 25 to GE Licensing Topical Report NEDE-24011-P-A (GESTAR-II) on Cycle Specific Safety Limit MCPR", RJR-96-133, MFN-179-96, December 13, 1996. (Copy stored in NFSI 96-432)
9. Louis F. Storz to USNRC Document Control Desk, "Request for Change to Technical Specifications, Safety Limit Minimum Critical Power Ratio, Hope Creek Generating Station, Facility Operating License NPF-57, Docket No. 50-354", LR-N97187, LCR H97-05, March 31, 1997.
10. Nuclear Fuel Section Safety Evaluation HCR.8-0007, approved 6/20/97.