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CORE OPERATING LIMITS REPORT  
HOPE CREEK GENERATING STATION  
CYCLE 6 / RELOAD 5

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## 1.0 INTRODUCTION

The purpose of this report is to provide a description of the Core Operating Limits for the Hope Creek Generating Station Unit 1 Cycle 6 operation. The specific parameter limits are : Average Planar Linear Heat Generation Rate (APLHGR); Minimum Critical Power Ratio (MCPR); Flow Adjustment Factor,  $K_f$ ; and Linear Heat Generation Rate (LHGR). These values have been determined using NRC-approved methodology (REF. 1) and are established such that all applicable limits, namely; fuel thermal-mechanical, core thermal-hydraulic, ECCS, and nuclear limits such as shutdown margin, and transient and accident analysis limits; of the plant safety analysis are met.

This report is intended to be used for operation of the Hope Creek reactor core and for the training of the operations staff with respect to the cycle specific aspects of core operation.

The Hope Creek Technical Specifications references this report as the source for certain LIMITING CONDITIONS FOR OPERATION. These are included in section 2 of this document.

This document is specific to Hope Creek Cycle 6 / Reload 5 and shall not be applicable to any other core or cycle design.

## 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 this report.

All APLHGRs for bundle type P8CRB300L as a function of AVERAGE PLANAR EXPOSURE shall not exceed the limits shown in Figure 2-1. When hand calculations are required, the APLHGRs for each lattice type (excluding natural Uranium) in bundle P8CWB325-11GZ2, P8CWB325-11GZ1 and P8CWB324-9GZ1 as a function of AVERAGE PLANAR EXPOSURE shall not exceed the limits shown in Figure 2-2, Figure 2-3, and Figure 2-4, respectively. The limits of these figures shall be reduced to a value of 0.86 times the two recirculation loop operation limit when in single recirculation loop operation.



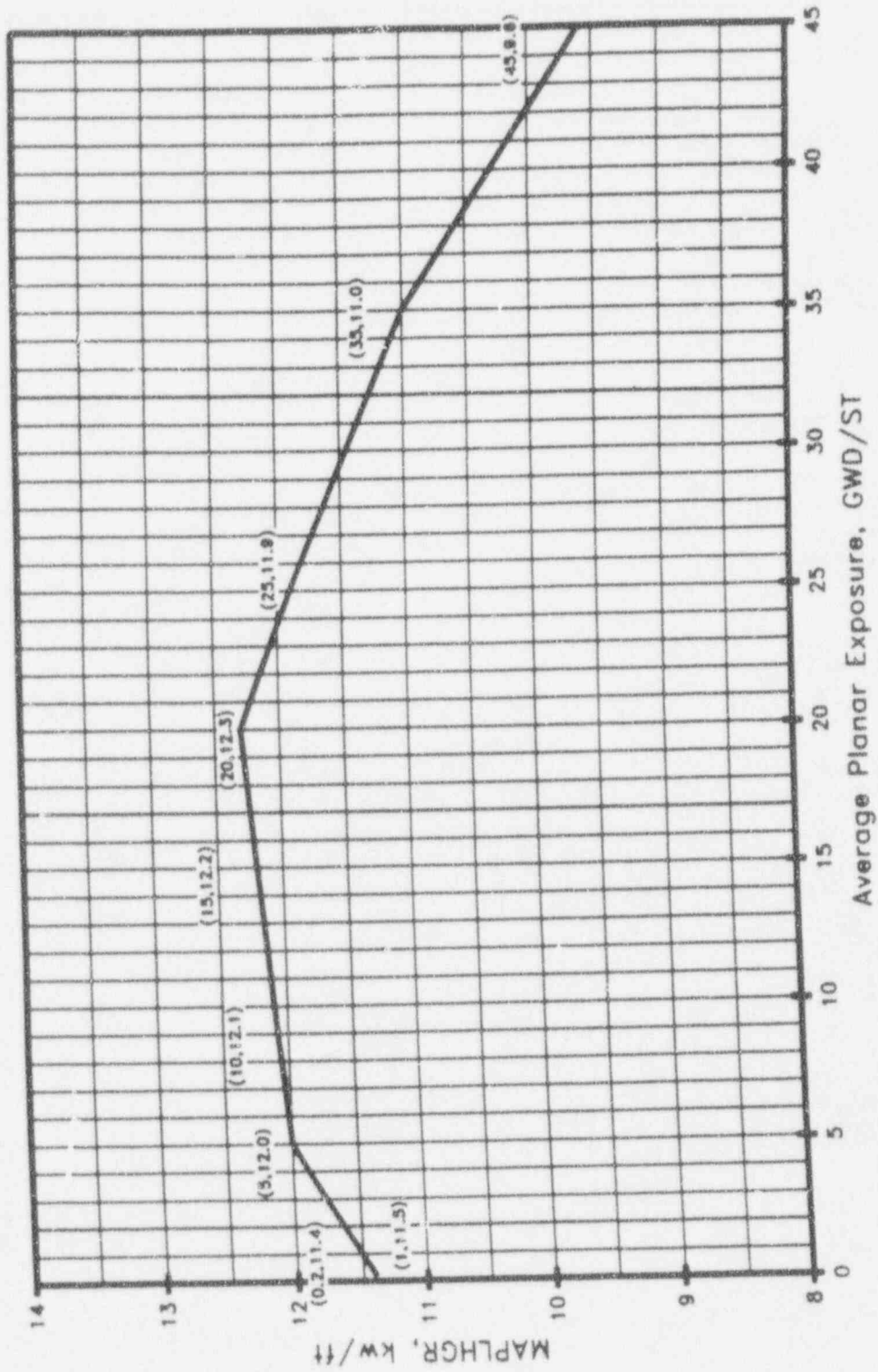


Fig. 2-1 MAPLHGR Versus Exposure for Fuel Bundle Type P8CRB300L

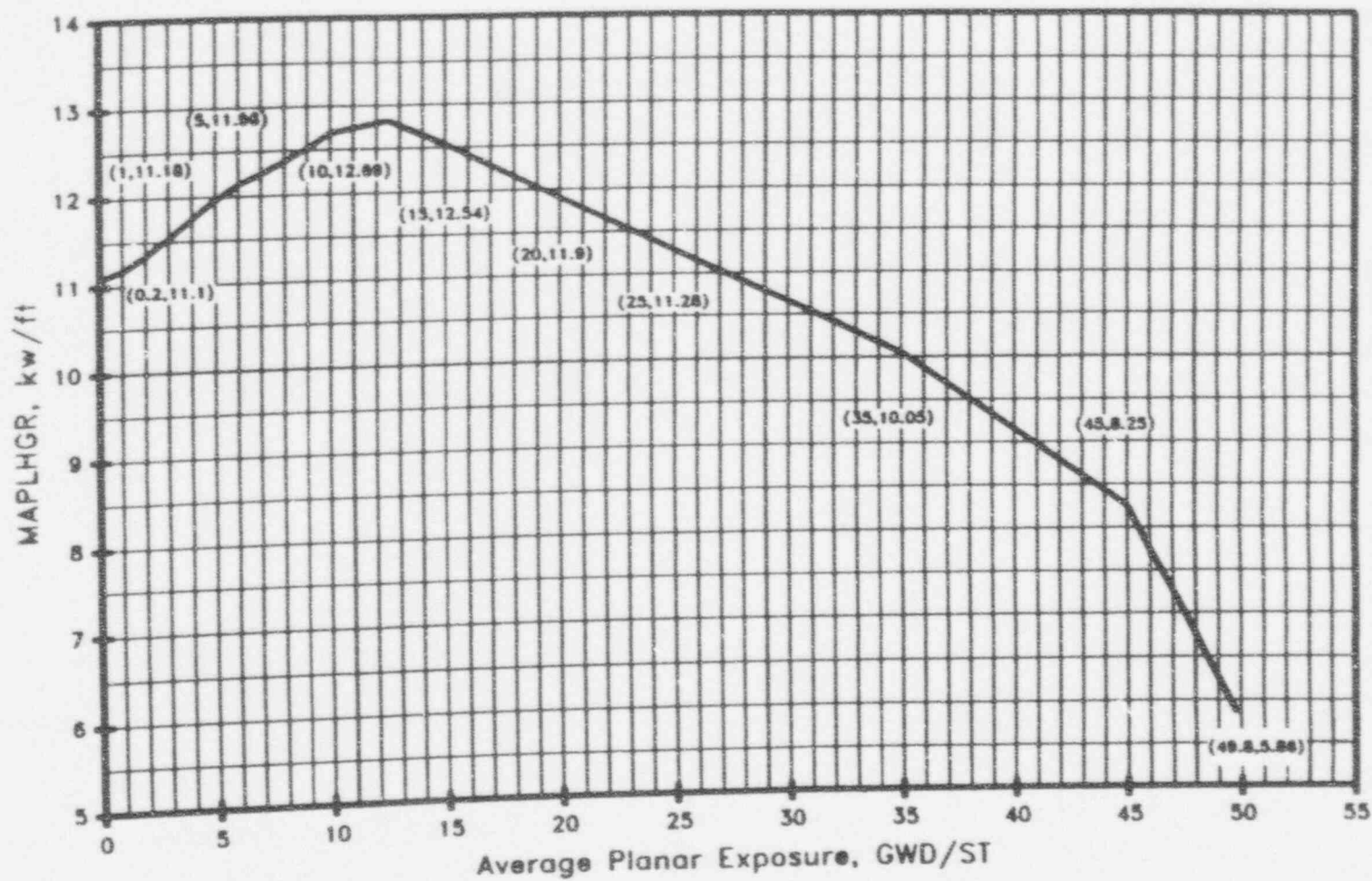


Fig. 2-2 MAPLHGR Versus Exposure for the Most Limiting Lattice  
of Fuel Bundle Type PBCWB325-11GZ2

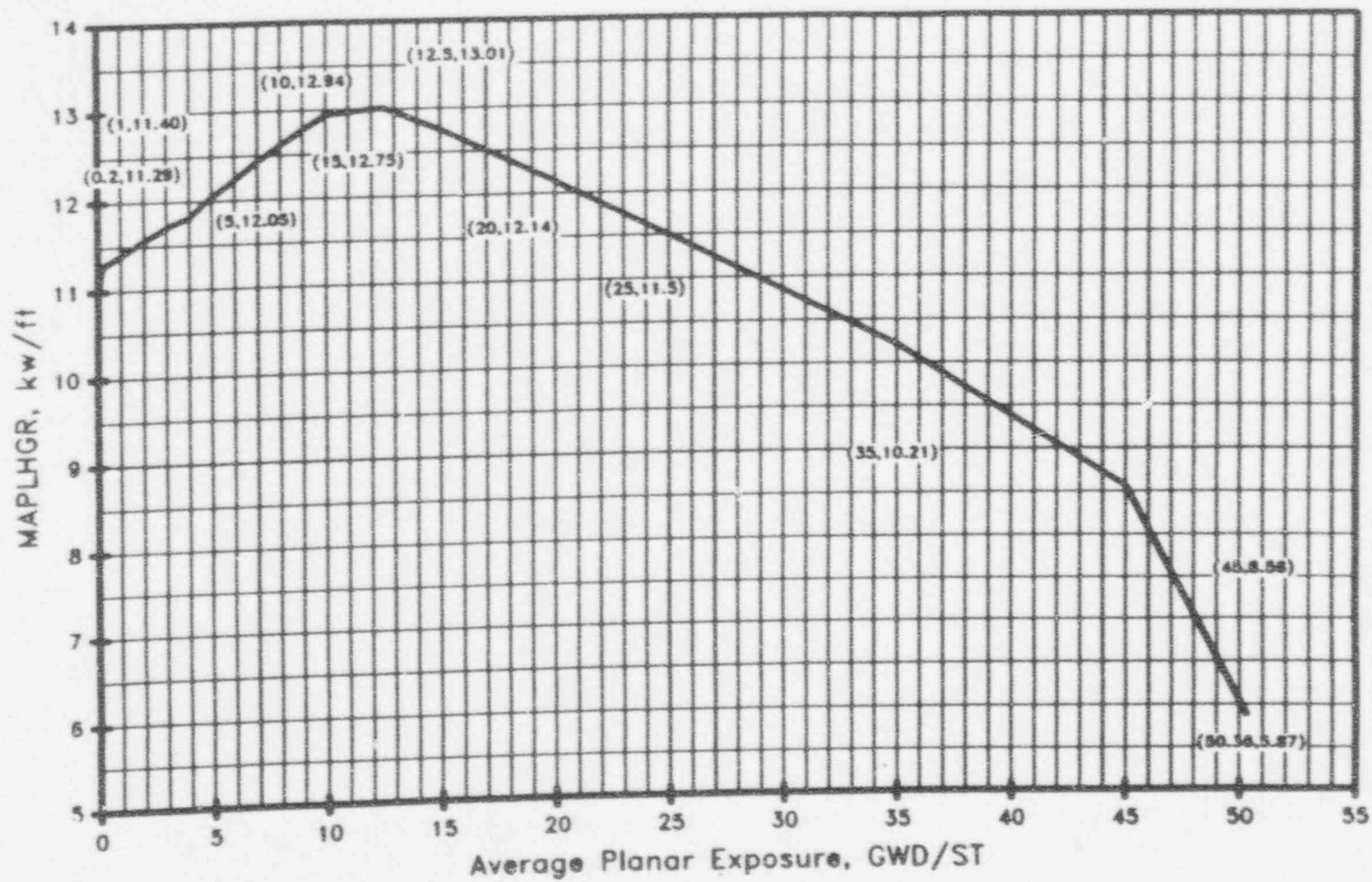


Fig. 2-3 MAPLHGR Versus Exposure for the Most Limiting Lattice of Fuel Bundle Type P8CWB325-11GZ1

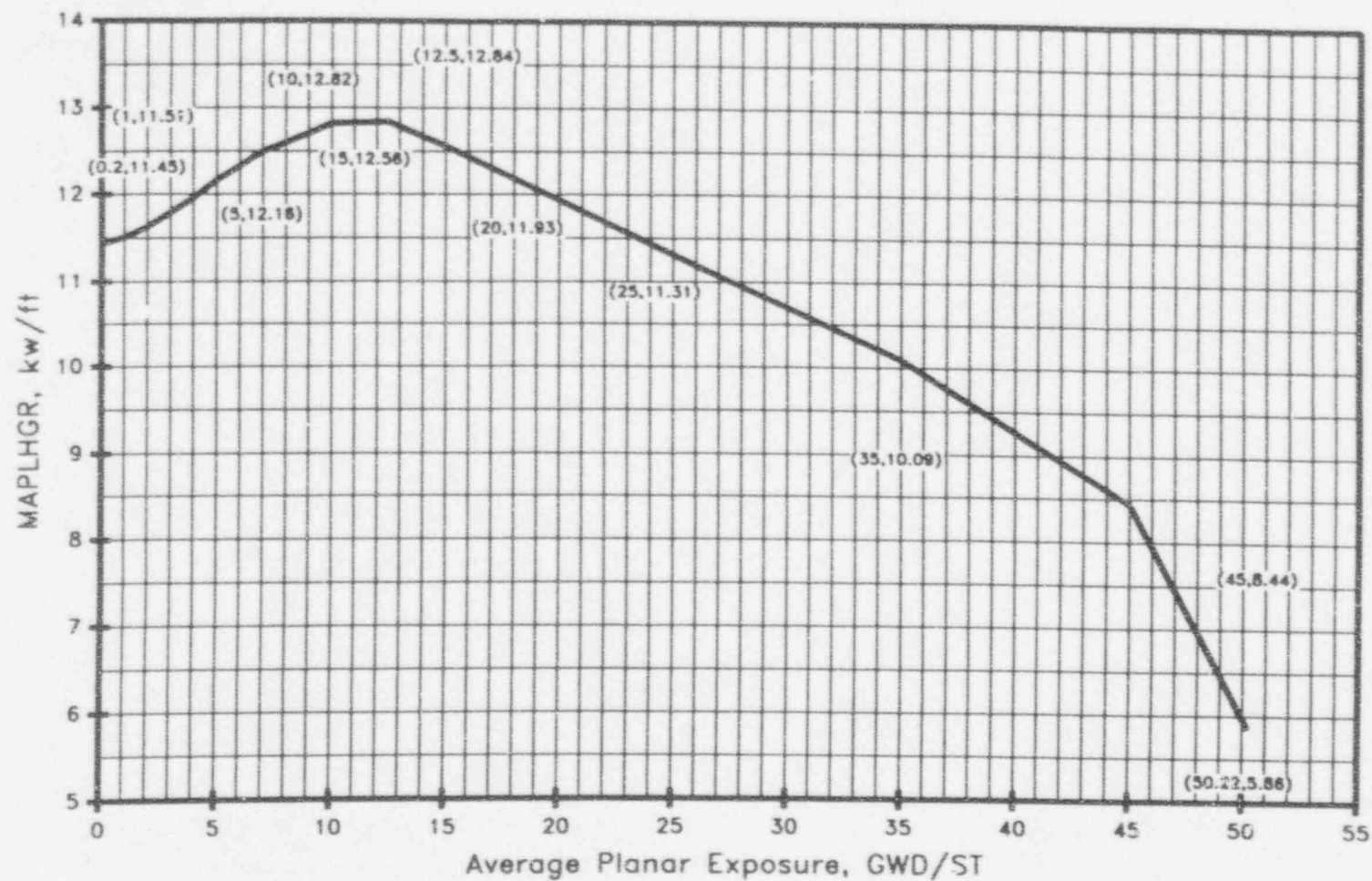


Fig. 2-4 MAPLHGR Versus Exposure for the Most Limiting Lattice of Fuel Bundle Type PBCWB324-9GZ1

## 2.2 MINIMUM CRITICAL POWER RATIO

**LIMITING CONDITION FOR OPERATION:** The MINIMUM CRITICAL POWER RATIO (MCPR) shall be equal to or greater than the CPR limit times the  $k_f$  curve.

The CPR limit is shown in Figure 2-5 for GE9B bundles and in Figure 2-6 for GE7B bundles. The  $K_f$  curve is shown in Figure 2-7.

It requires an adjustment to the  $K_f$  values for bundle flows below 0.4 Mlb/ft<sup>2</sup>-hr, this adjustment is incorporated in Fig. 2-7. It also requires the incorporation of a 3% adjustment factor if inlet subcooling exceeds 70 Btu/lbm.

The CPR limit is a function of Core Average Exposure, and core average scram speed,  $\tau$  (Tau), defined by Technical Specification 3.2.3.

End-of-Cycle Recirculation Pump Trip system status is defined operable or inoperable per Technical Specification 3.3.4.2.

Mair Turbine Bypass must be operable per Technical Specification 3.7.7.

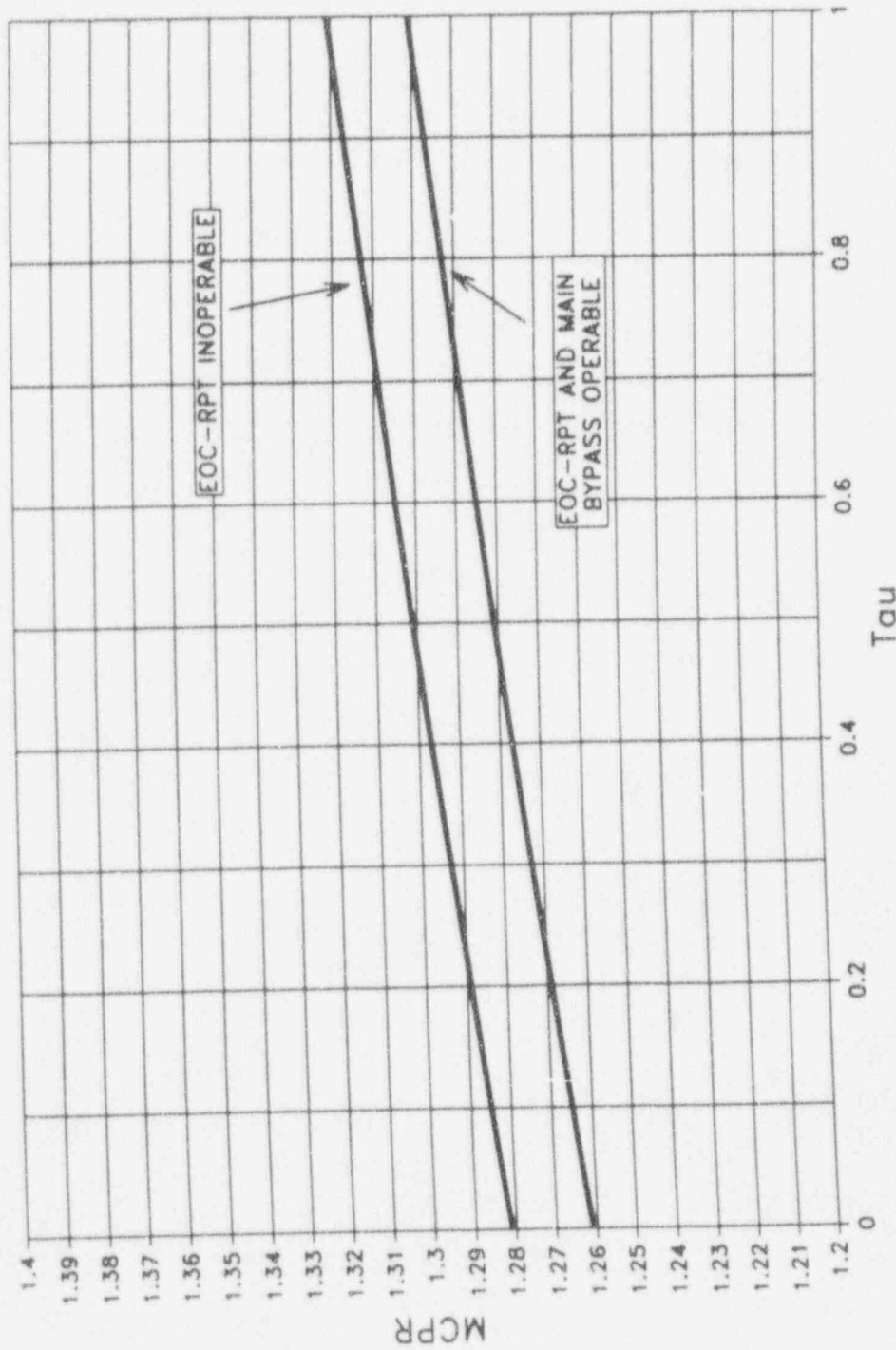


Fig. 2-5 MCPR Versus  $\tau$  At Rated Flow For Fuel Bundle Type GE9B From BOC To EOC

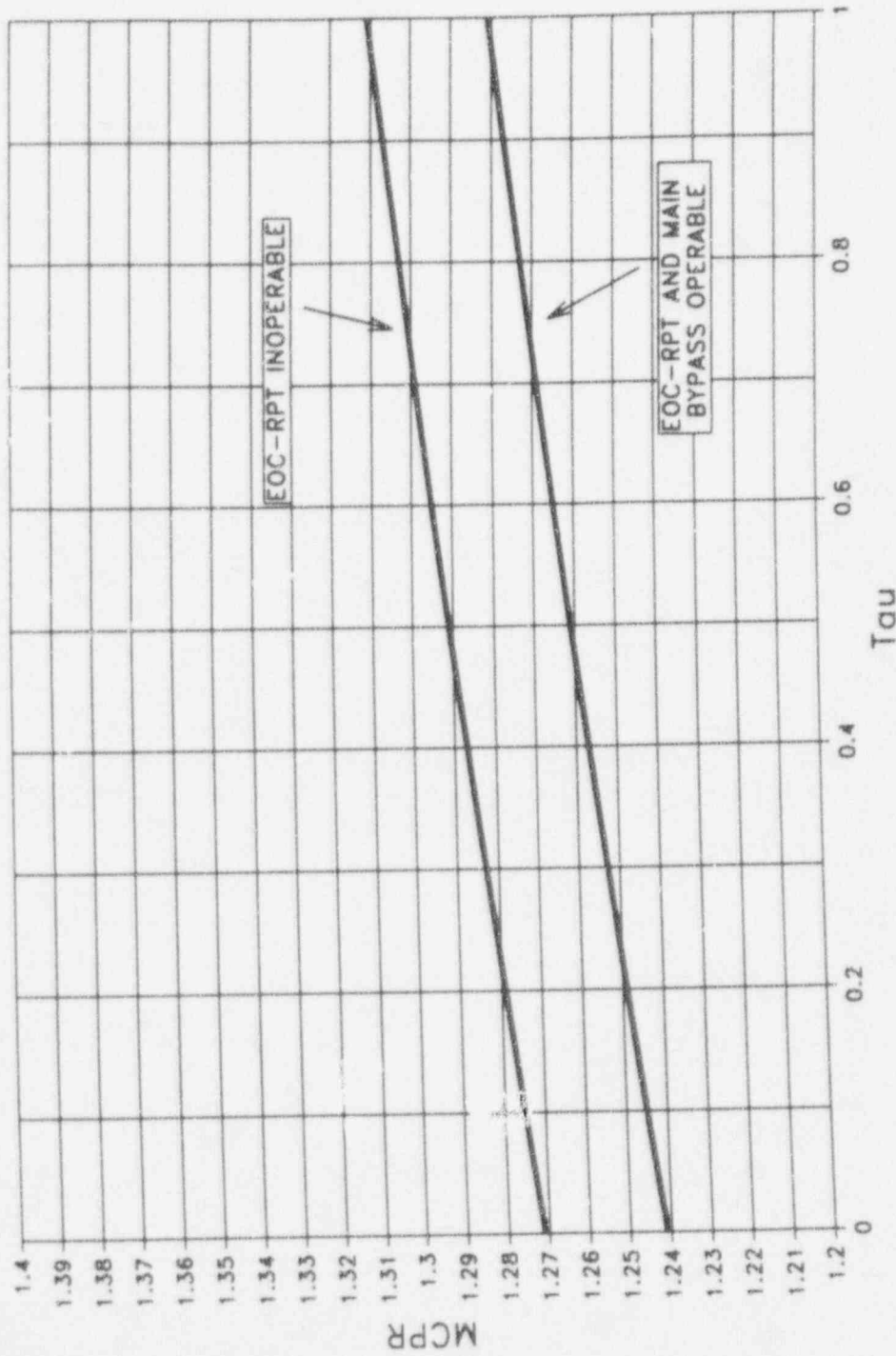


Fig. 2-6 MCPR Versus Tau At Rated Flow For Fuel Bundle Type GE7B From BOC To EOC



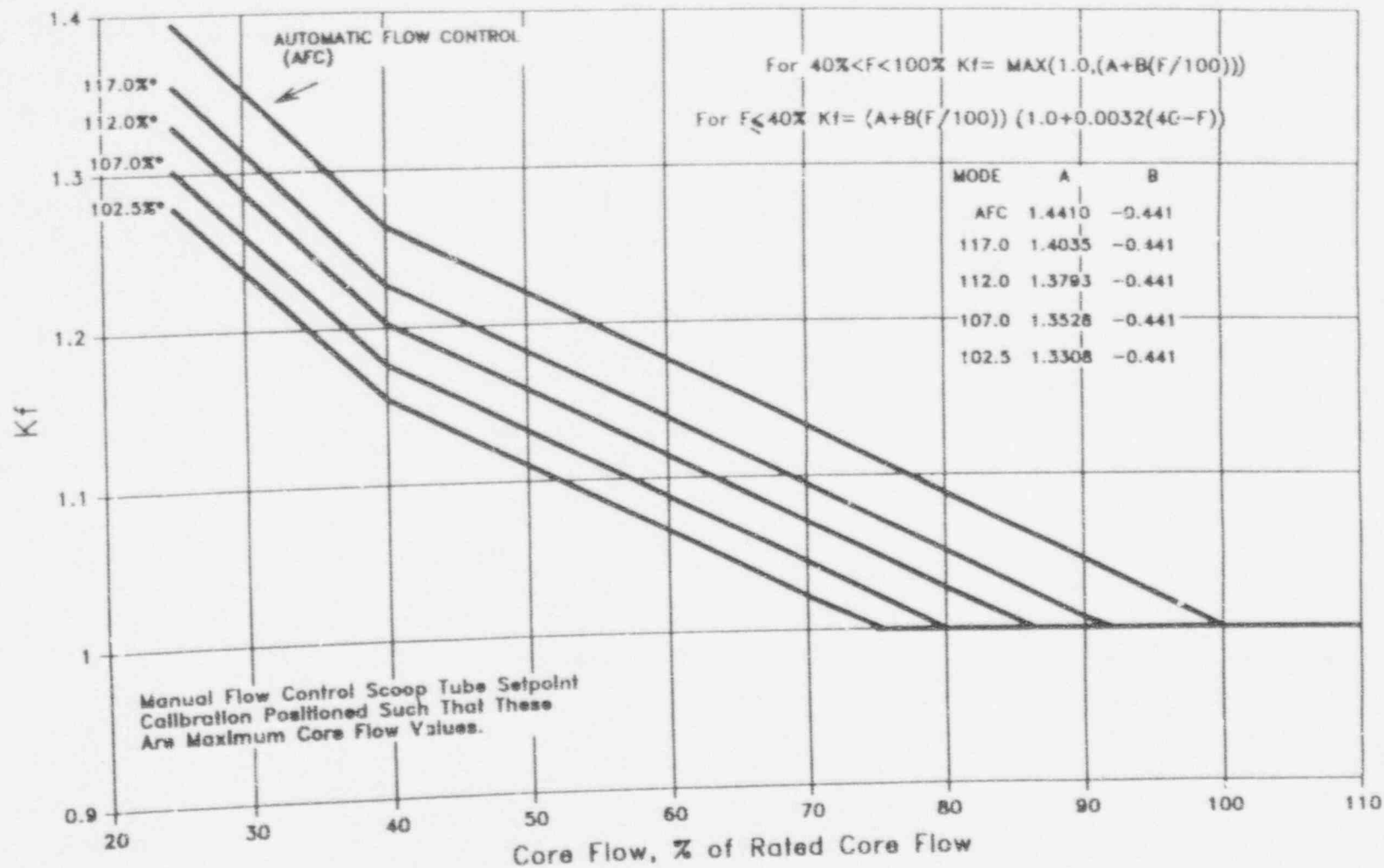


Fig. 2-7 Kf Versus Core Flow



### 2.3 LINEAR HEAT GENERATION RATE

LIMITING CONDITION FOR OPERATION : The LINEAR HEAT GENERATION RATE (LHGR) for each type of fuel shall not exceed the applicable limits:

TABLE 2-1 LHGR Limits

<u>Fuel Type</u>	<u>LHGR Limit (Kw/ft)</u>
GE7B-P8CRB300L	13.4
GE9B-P8CWB325-11GZ1	14.4
GE9B-P8CWB325-11GZ2	14.4
GE9B-P8CWB324-9GZ1	14.4

3.0 REFERENCES

1. "General Electric Standard Application For Reactor Fuel", NEDE-24011-P-A, Revision 10, February, 1991.
2. R.B. Linford, "Analytical Methods of Plant Transient Evaluation for the GE BWR", NEDO-10802, February 1973.
3. "Qualification of the One Dimensional Core Transient Model for Boiling Water Reactors", NEDO-24154, October 1978.
4. A.D.Vaughn (General Electric) to E.S. Rosenfeld (PSE&G), "MAPLHGR Limits for Hope Creek Reload 1 Fuel Assemblies", December 8, 1987, NFUI-87-552.
5. A.D.Vaughn (General Electric) to E.S. Rosenfeld (PSE&G), "Hope Creek Reload 3 GE9B Fuel Data", November 19, 1990, NFUI 90-437.
6. "General Electric Standard Application For Reactor Fuel", Safety Evaluation Report For Application of Amendment 15, NEDE-24011-P-A, Revision 9, September, 1988.
7. NFU-VTDGE93-076-00, "Supplemental Reload Licensing Submittal for Hope Creek Generating Station Unit 1, Reload 5 Cycle 6", General Electric Company, 23A7219, Rev 0, November, 1993.
8. NFU-VTDGE93-077-00, "Lattice-Dependent MAPLHGR Report for Hope Creek Generating Station Unit 1, Reload 5, Cycle 6", 23A7219AA, Rev.0, November, 1993

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