

ILLINOIS POWER COMPANY

CLINTON POWER STATION

CORE OPERATING LIMITS REPORT

FOR

RELOAD 3

CYCLE 4

REVISION 2

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INTRODUCTION AND SUMMARY

The CORE OPERATING LIMITS REPORT is the Clinton-specific document that provides the values of the AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR) limits, the core flow dependent MINIMUM CRITICAL POWER RATIO (MCPR) limits ($MCPR_f$), the thermal power dependent MCPR limits ($MCPR_p$), and the LINEAR HEAT GENERATION RATE (LHGR) limits for the current operating reload cycle. These cycle-specific core operating limits are determined for each reload cycle in accordance with Technical Specification 6.9.1.9. Per the Technical Specification, these values have been determined using NRC - approved methodology and are established such that all applicable limits of the plant safety analysis are met. Plant operation within these operating limits is addressed in the applicable Technical Specifications.

LIMITS APPLICABLE TO TECHNICAL SPECIFICATION 3/4.2.1

POWER DISTRIBUTION LIMITS

AVERAGE PLANAR LINEAR HEAT GENERATION RATE

All AVERAGE PLANAR LINEAR HEAT GENERATION RATES (APLHGRs) for each type of fuel as a function of axial location and AVERAGE PLANAR EXPOSURE shall not exceed limits based on applicable MAPLHGR limit values which have been approved for the particular fuel type and axial region (lattice). The MAPLHGR limits for each fuel type are contained in Reference 4.

When manual calculations are required, all APLHGRs for each type of fuel as a function of AVERAGE PLANAR EXPOSURE shall not exceed the limits as determined below:

- a. During two-recirculation loop operation - the limits shown in Figures 2.1-3 through 2.1-7 multiplied by the smaller of either the flow-dependent MAPLHGR factor ($MAPFAC_f$) of Figure 2.1-1 or the power-dependent MAPLHGR factor ($MAPFAC_p$) of Figure 2.1-2.
- b. During single recirculation loop operation - the limits shown in Figures 2.1-3 through 2.1-7 multiplied by the smallest of $MAPFAC_f$, $MAPFAC_p$ or a factor of 0.78.

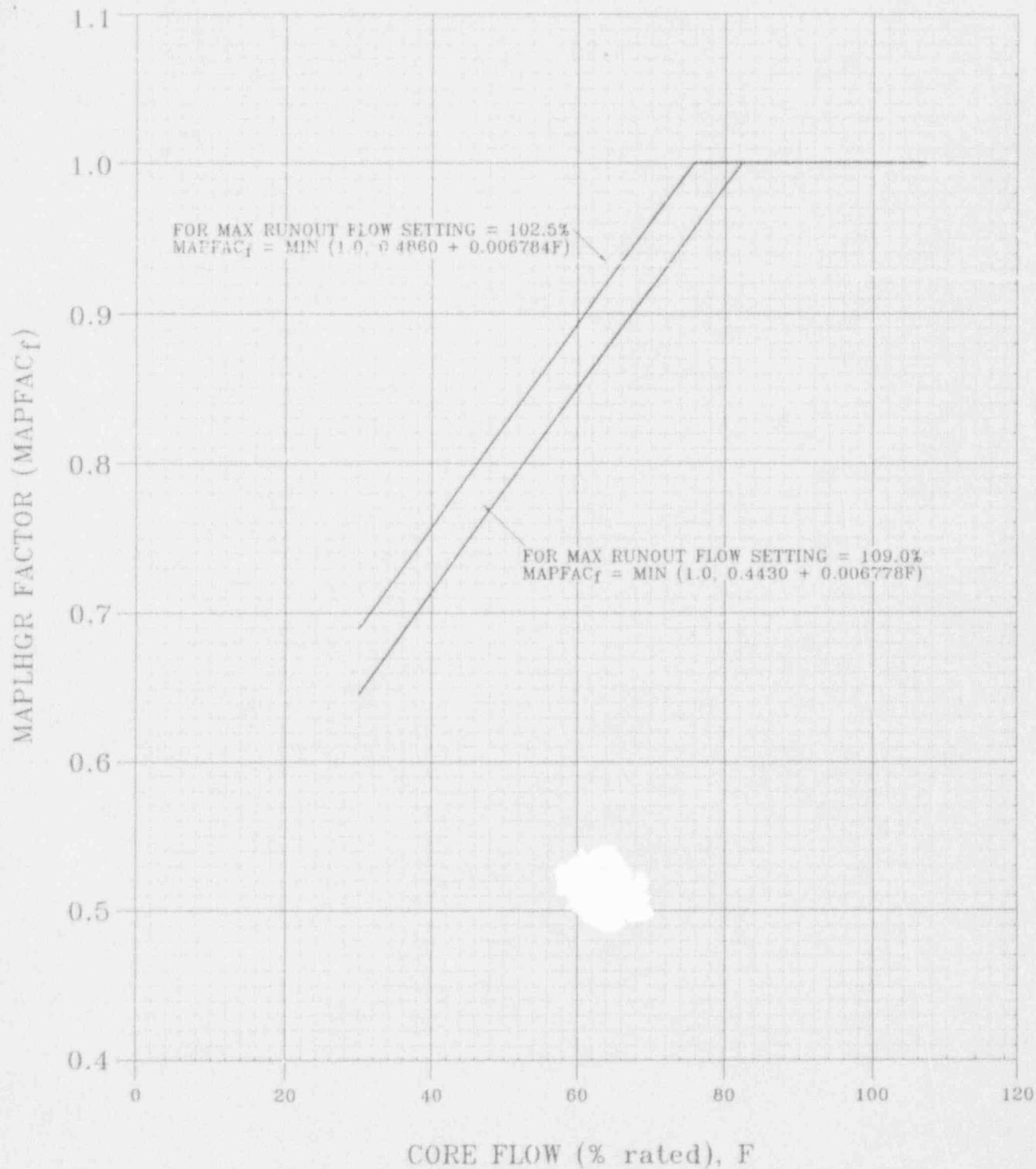


Figure 2.1-1 Flow-Dependent MAPLHGR Factors (MAPFAC_f)

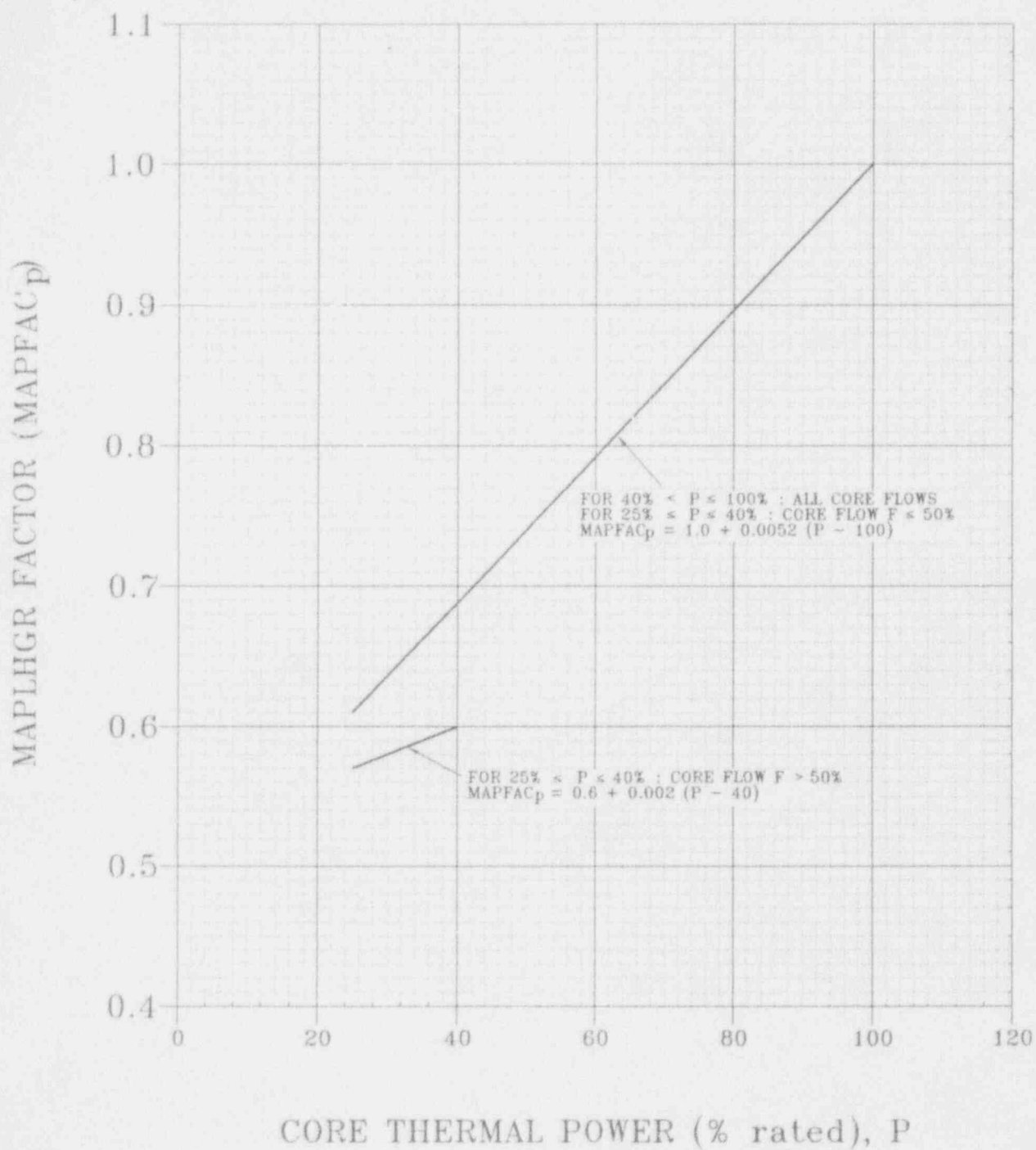


Figure 2.1-2 Power-Dependent MAPLHGR Factors (MAPFAC_p)

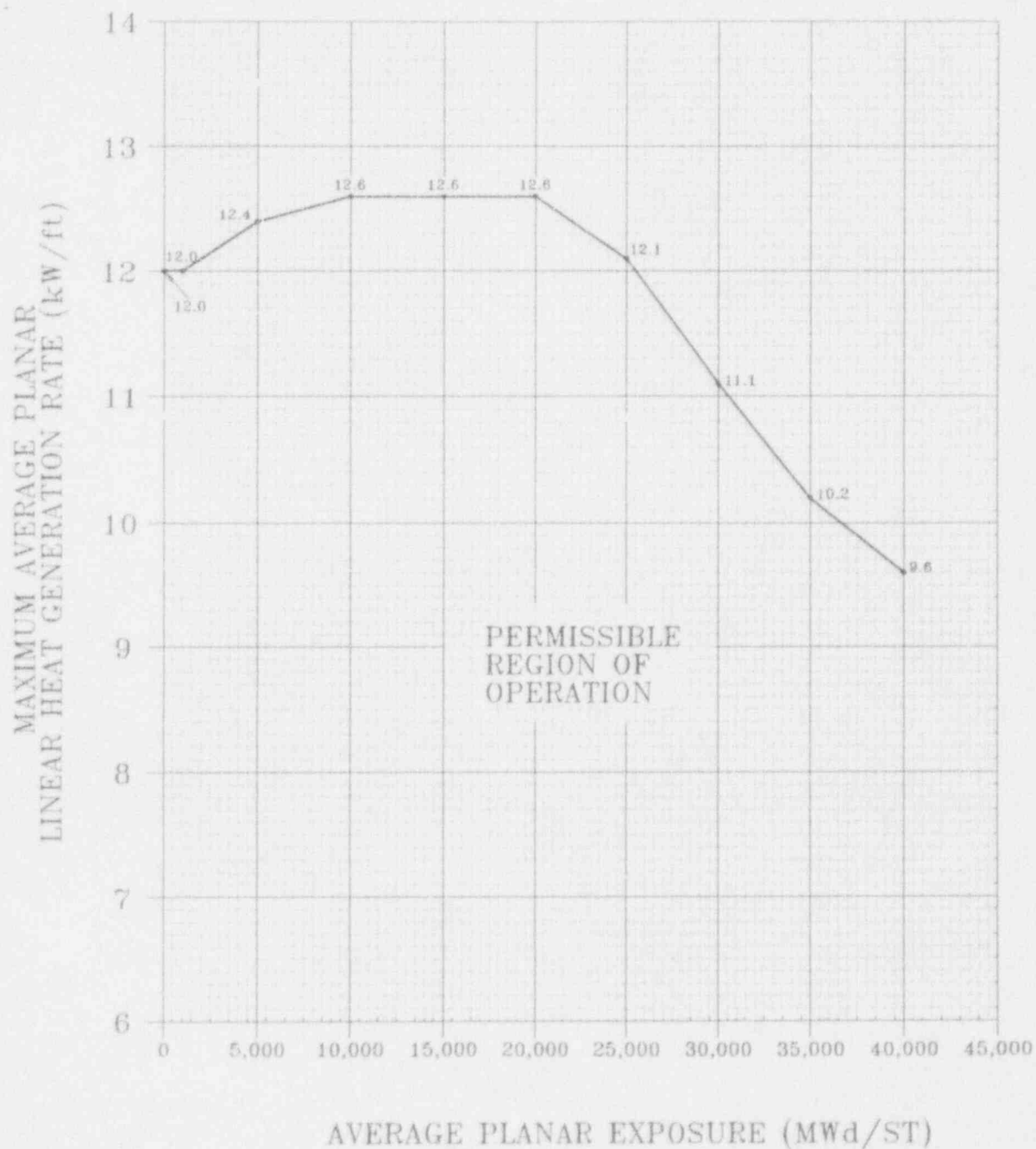


Figure 2.1-3 Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) Versus Average Planar Exposure, Initial Core Fuel Type - High Enrichment P8SRB200

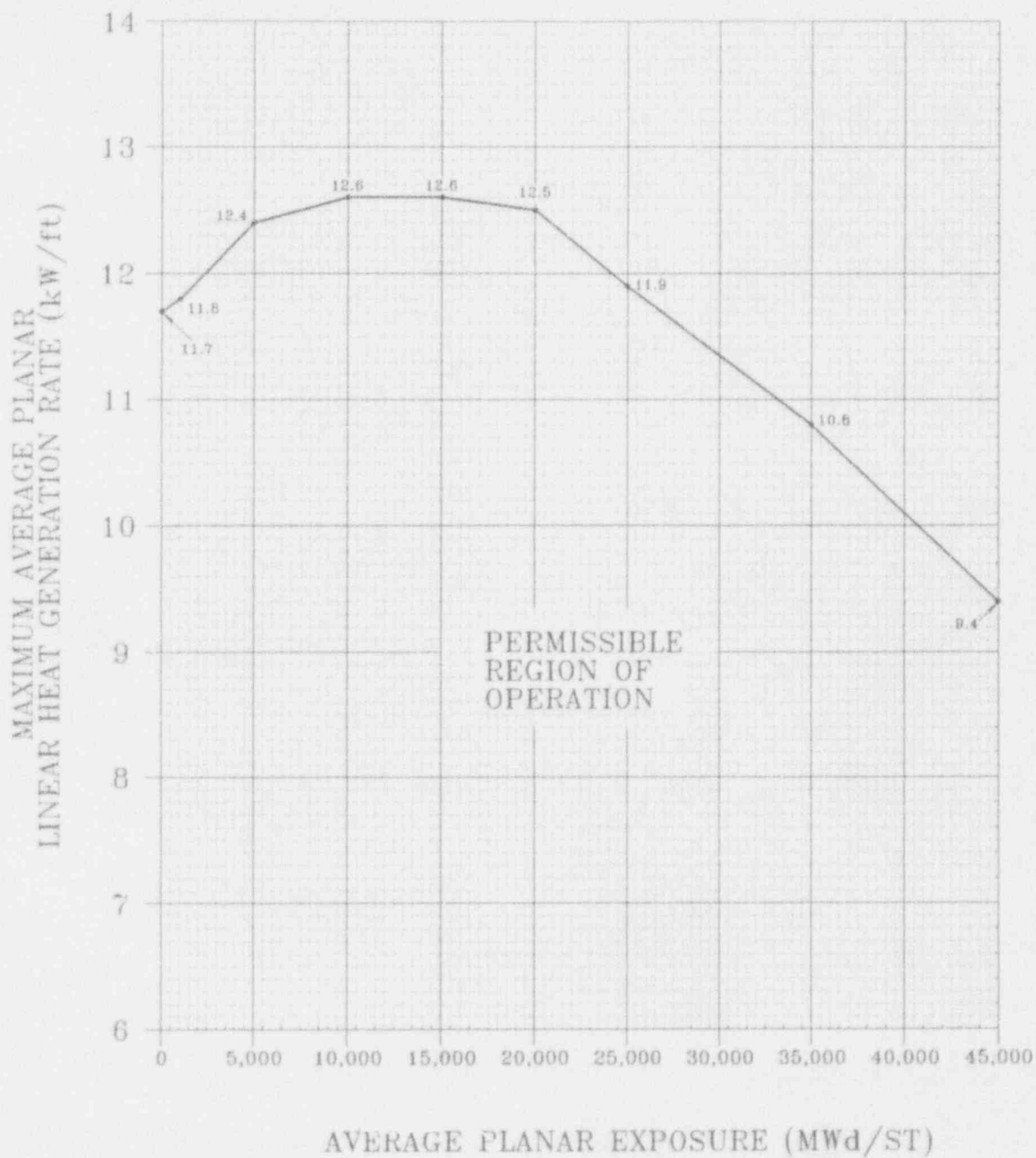


Figure 2.1-4 Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) Versus Average Planar Exposure - Reload 1 Fuel Type BP8SRB284L

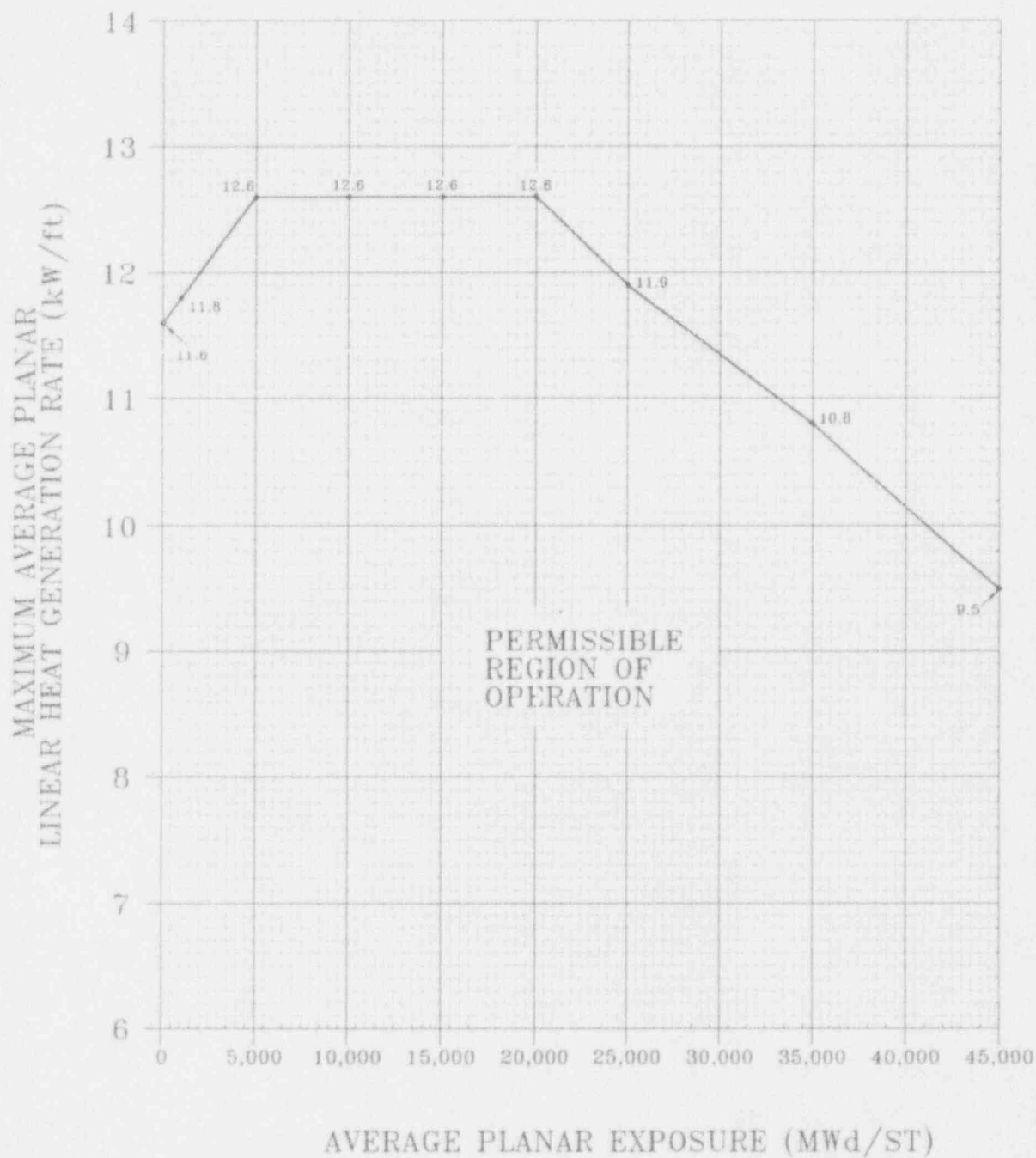


Figure 2.1-5 Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) Versus Average Planar Exposure - Reload 1 Fuel Type BP8SRB284LC

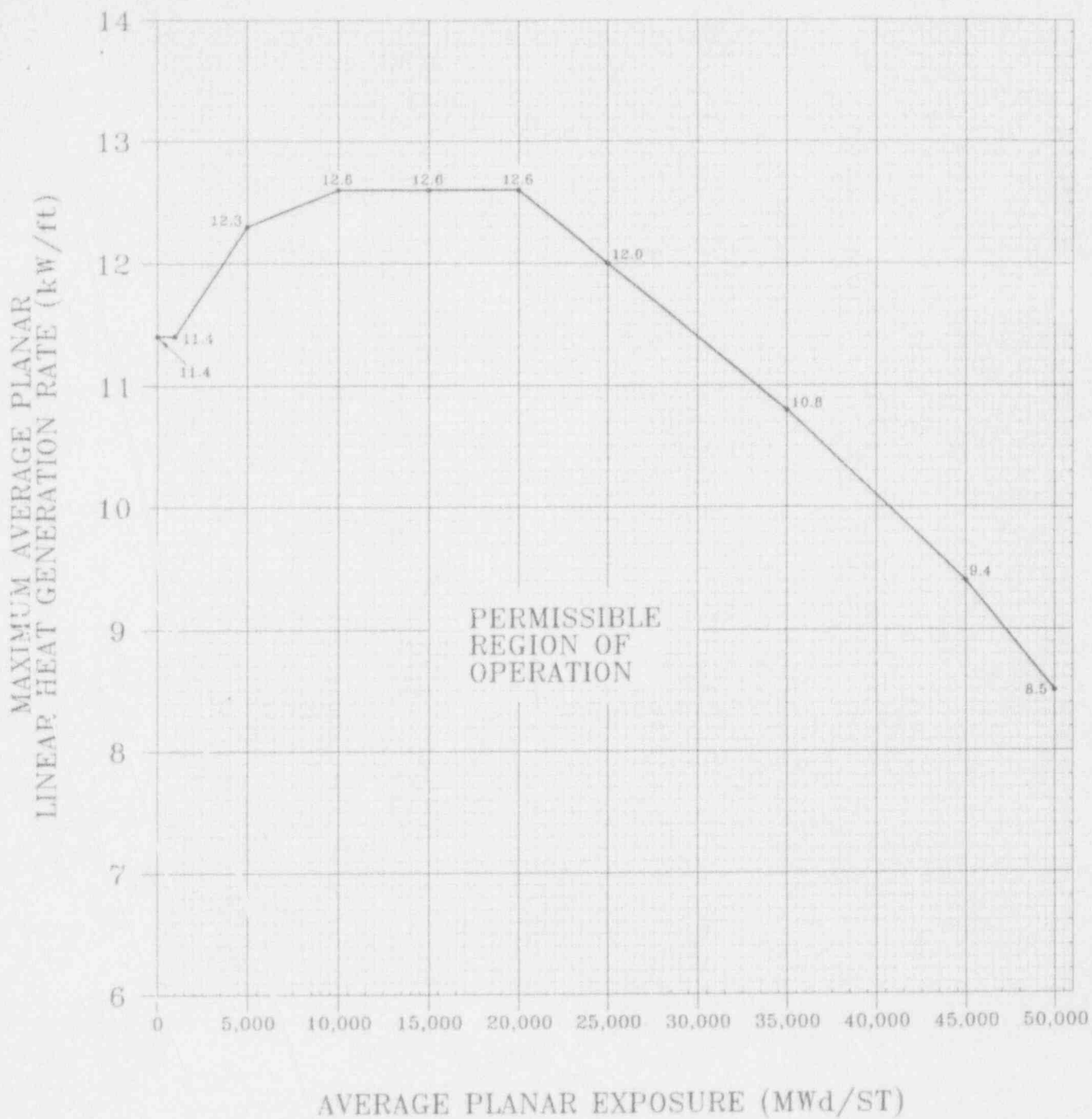


Figure 2.1-6 Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) Versus Average Planar Exposure - Reload 2 Fuel Type BP8SRB299LA

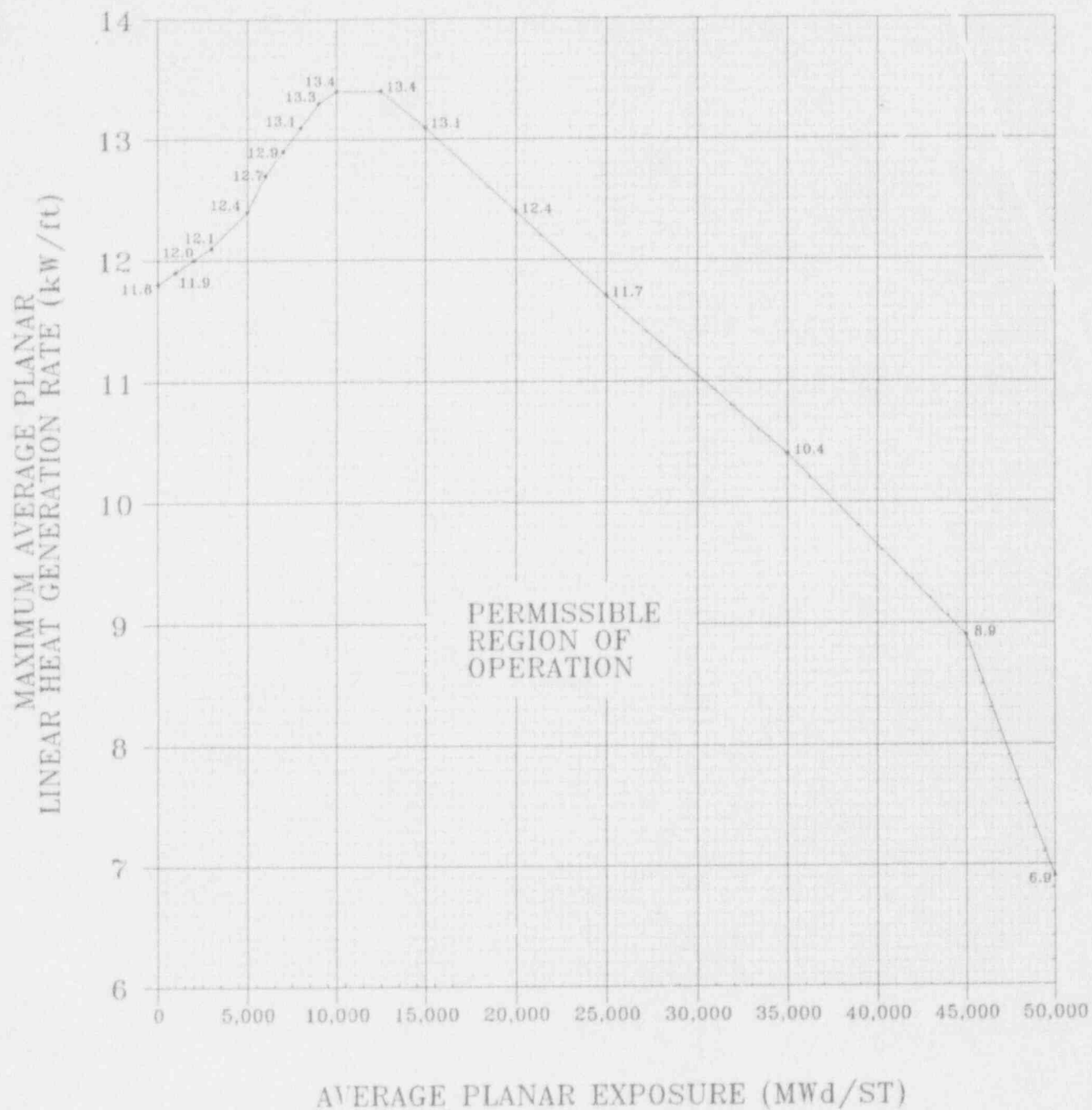


Figure 2.1-7 Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) Versus Average Planar Exposure, Reload 3 Fuel Type - GE8B-P8SQB301-10GZ-120M-150-T

LIMITS APPLICABLE TO TECHNICAL SPECIFICATION 3/4.2.3

POWER DISTRIBUTION LIMITS

MINIMUM CRITICAL POWER RATIO

The MINIMUM CRITICAL POWER RATIO (MCPR) shall be equal to or greater than both the $MCPR_f$ limits at indicated core flow and THERMAL POWER for each fuel type as shown in Figures 2.2-1a and 2.2-1b and the $MCPR_p$ limits at indicated core flow and THERMAL POWER and ΔT^* as shown in Figure 2.2-2.

- * This ΔT refers to any reduction of rated feedwater temperature (420°F), such as prolonged removal of feedwater heater(s) from service with both reactor recirculation loops in operation.

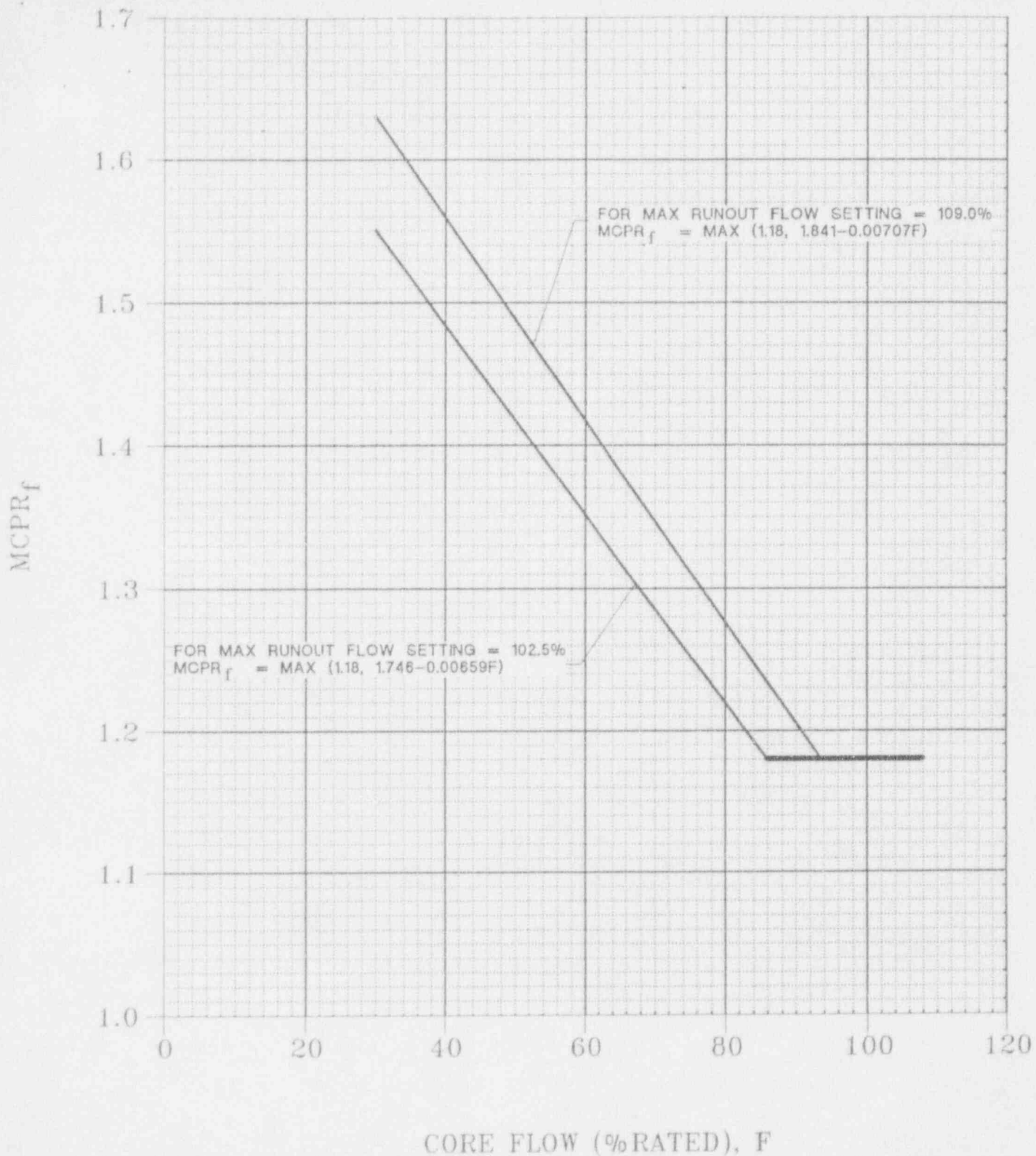


Figure 2.2-1a CLINTON $MCPR_f$ VERSUS CORE FLOW,
 FUEL TYPES OTHER THAN RELOAD 3 FUEL TYPE
 GE8B-P8SQB301-10GZ-120M-150-T

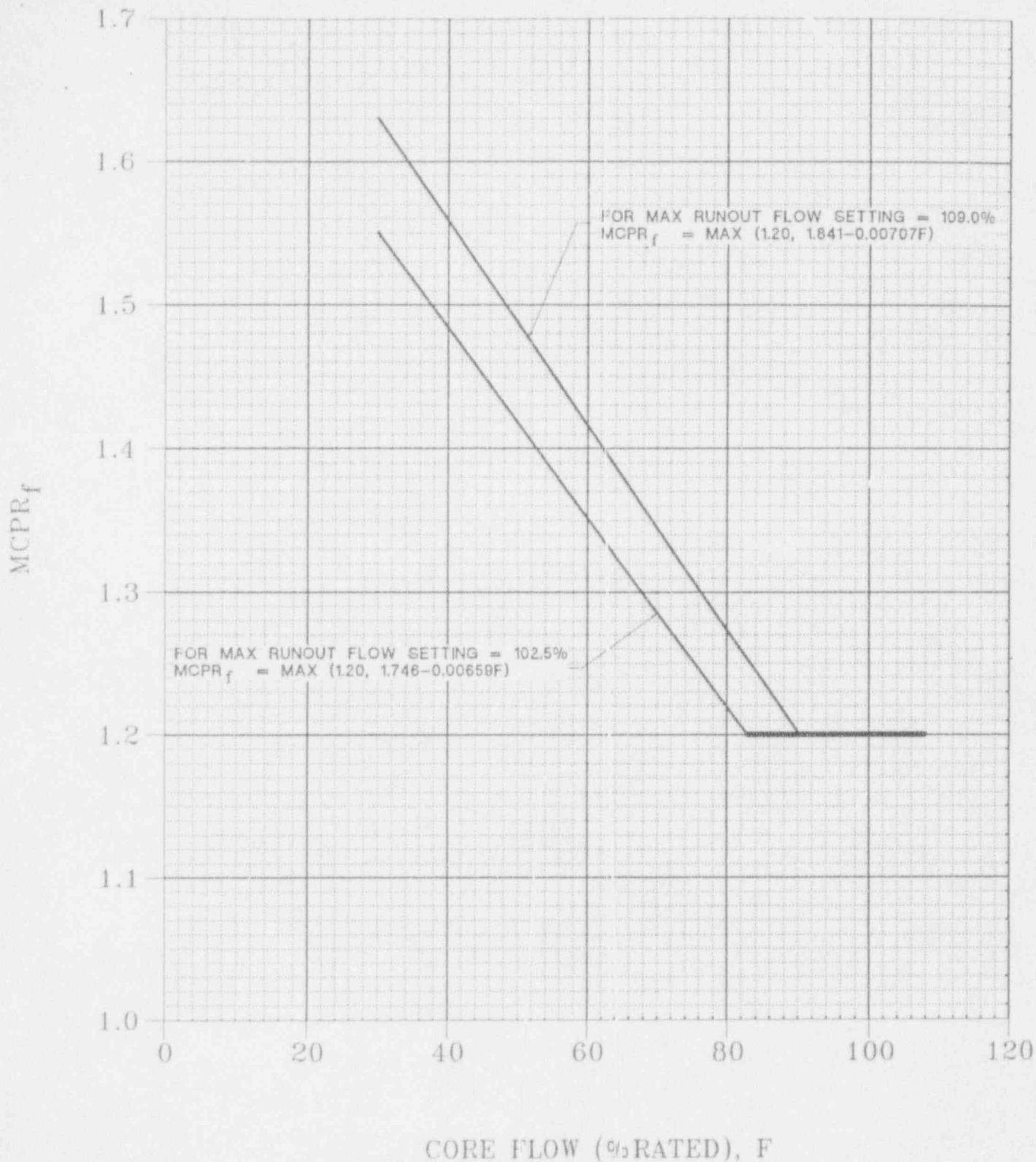


Figure 2.2-1b CLINTON $MCPR_f$ VERSUS CORE FLOW,
 RELOAD 3 FUEL TYPE
 GE8B-P8SQB301-10GZ-120M-150-T

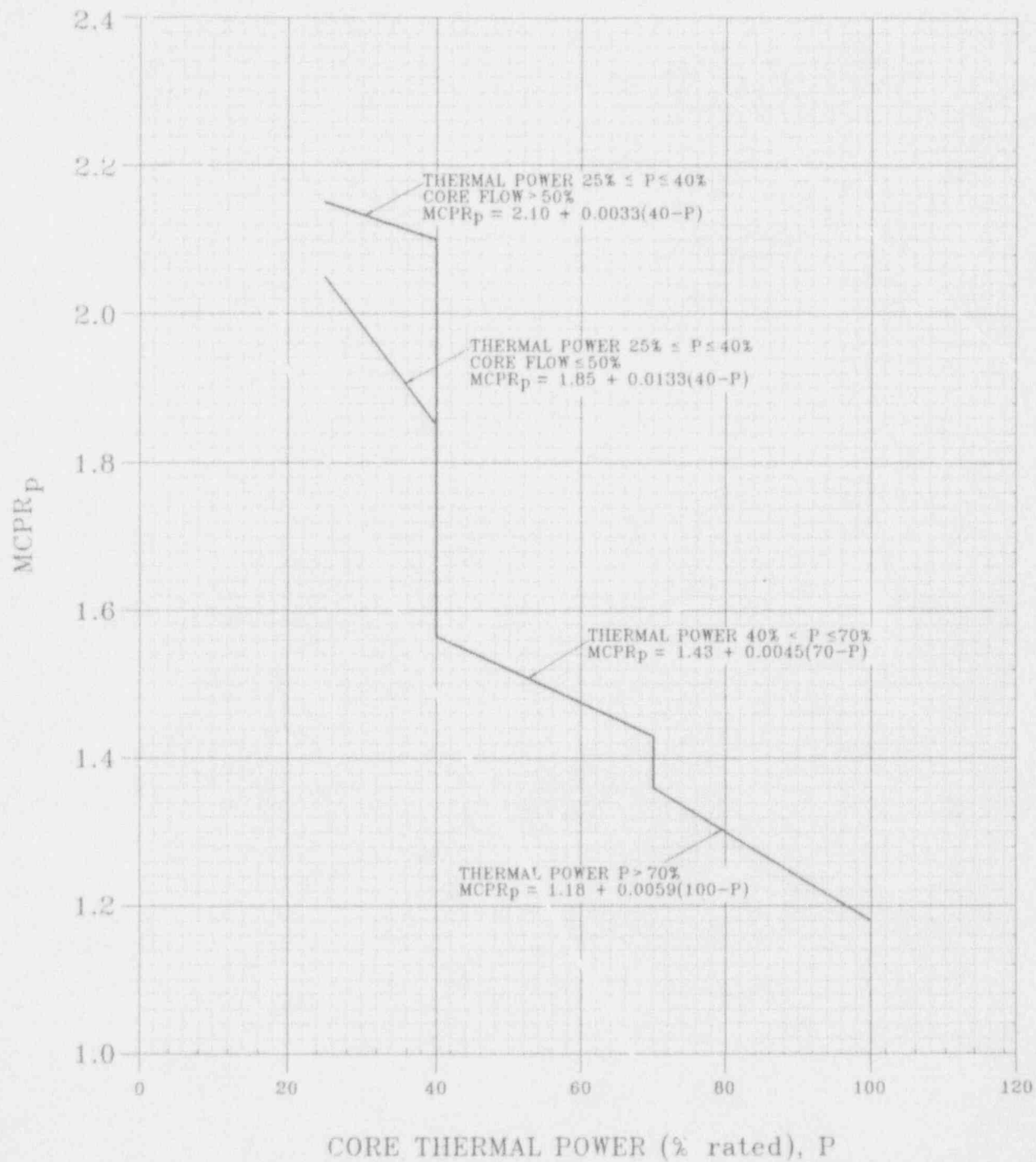


Figure 2.2-2 Clinton MCPR_p Versus Power for $\Delta T \leq 50^\circ\text{F}$ and Core Flow $\leq 107\%$

LIMITS APPLICABLE TO TECHNICAL SPECIFICATION 3/4.2.4

POWER DISTRIBUTION LIMITS

LINEAR HEAT GENERATION RATE

The LINEAR HEAT GENERATION RATE (LHGR) for each type of fuel shall not exceed the limits specified below:

- a. A maximum LHGR of 13.4 kW/ft for the following fuel types -

P8SRB200
BP8SRB284L
BP8SRB284LC
BP8SRB299LA

- b. A maximum LHGR of 14.4 kW/ft for the following fuel type -

GE8B-P8SQB301-10GZ-120M-150-T

LIMITS APPLICABLE TO TECHNICAL SPECIFICATIONS 2.2.1 AND 3/4.3.1

SIMULATED THERMAL POWER TIME CONSTANT

The Average Power Range Monitor (APRM) simulated thermal power time constant shall be between 5.4 seconds and 6.6 seconds.

REFERENCES

1. CPS Technical Specification 6.9.1.9, CORE OPERATING LIMITS REPORT.
2. General Electric Standard Application for Reactor Fuel (GESTAR), NEDE-240 11-P-A, as amended (latest approved version).
3. Maximum Extended Operating Domain and Feedwater Heater Out-of-Service Analysis for Clinton Power Station, NEDC-31546P, August 1988.
- 4.A. CPS Updated Safety Analysis Report, Table 6.3-6, "MAPLHGR, MAXIMUM LOCAL OXIDATION, AND PEAK CLADDING TEMPERATURE VERSUS EXPOSURE.
- 4.B. Document 23A5921, Revision 0, "Supplemental Reload Licensing Submittal for Clinton Power Station Unit 1 Reload 1, Cycle 2," August 1988.
- 4.C. Document 23A5976, Revision 0, "Supplemental Reload Licensing Submittal for Clinton Power Station Unit 1 Reload 2, Cycle 3," July 1990.
- 4.D. Document 23A7144AA, Revision 0, Supplement 1, "Supplemental Reload Licensing Report for Clinton Power Station Unit 1 Reload 3, Cycle 4, "January 1992.
5. Letter JTW: 92-085, J. T. Worthington (GE) to J. A. Miller (IP), "Clinton Cycle 4 Rotated Bundle Analysis," May 19, 1992.
6. Letter JSP: U-602085, J. S. Perry (IP) to Nuclear Regulatory Commission, "Clinton Power Station Proposed Amendment of Facility Operating License No. NPF-62" [LS-92-004], February 11, 1993.
7. Letter DVP: D. V. Pickett (NRC) to F. A. Spangenberg (IP), "Issuance of Amendment [75] (TAC NO. M85816)," May 25, 1993.