

ILLINOIS POWER COMPANY

CLINTON POWER STATION

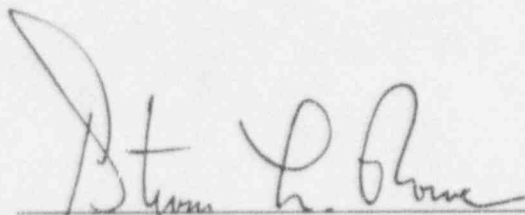
CORE OPERATING LIMITS REPORT

FOR

RELOAD 5

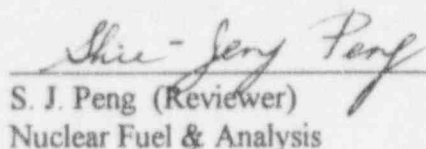
CYCLE 6

REVISION 0



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Nuclear Fuel & Analysis

15 APRIL 1995
Date



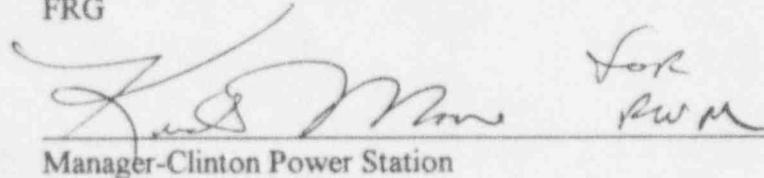
S. J. Peng (Reviewer)
Nuclear Fuel & Analysis

4/5/95
Date



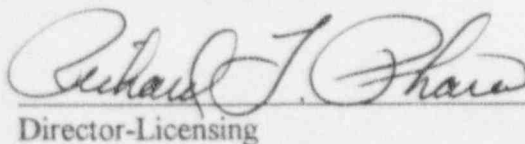
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INTRODUCTION AND SUMMARY

The CORE OPERATING LIMITS REPORT (Reference 1) 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 core thermal power-dependent MCPR limits ($MCPR_p$), the LINEAR HEAT GENERATION RATE (LHGR) limits, and the simulated thermal power time constant for the current operating reload cycle. These cycle-specific core operating limits are determined for each reload cycle in accordance with Technical Specification 5.6.5. Per the Technical Specification, these values have been determined using NRC-approved methodology (References 2, 3) 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 LCO 3.2.1

POWER DISTRIBUTION LIMITS

AVERAGE PLANAR LINEAR HEAT GENERATION RATE

All AVERAGE PLANAR LINEAR HEAT GENERATION RATES (APLHGR's) 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 bundle type and bundle axial region (lattice). The MAPLHGR limits for each fuel bundle type and lattice are contained in Reference 4; the associated MAPLHGR multipliers can be found in Figures 2.1-1 and 2.1-2 which are consistent with Reference 3.

When manual calculations are required, all APLHGR's for each fuel bundle type 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 (Reference 5) multiplied by the smaller of either the core flow-dependent MAPLHGR factor ($MAPFAC_f$) of Figure 2.1-1, or the core thermal 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.

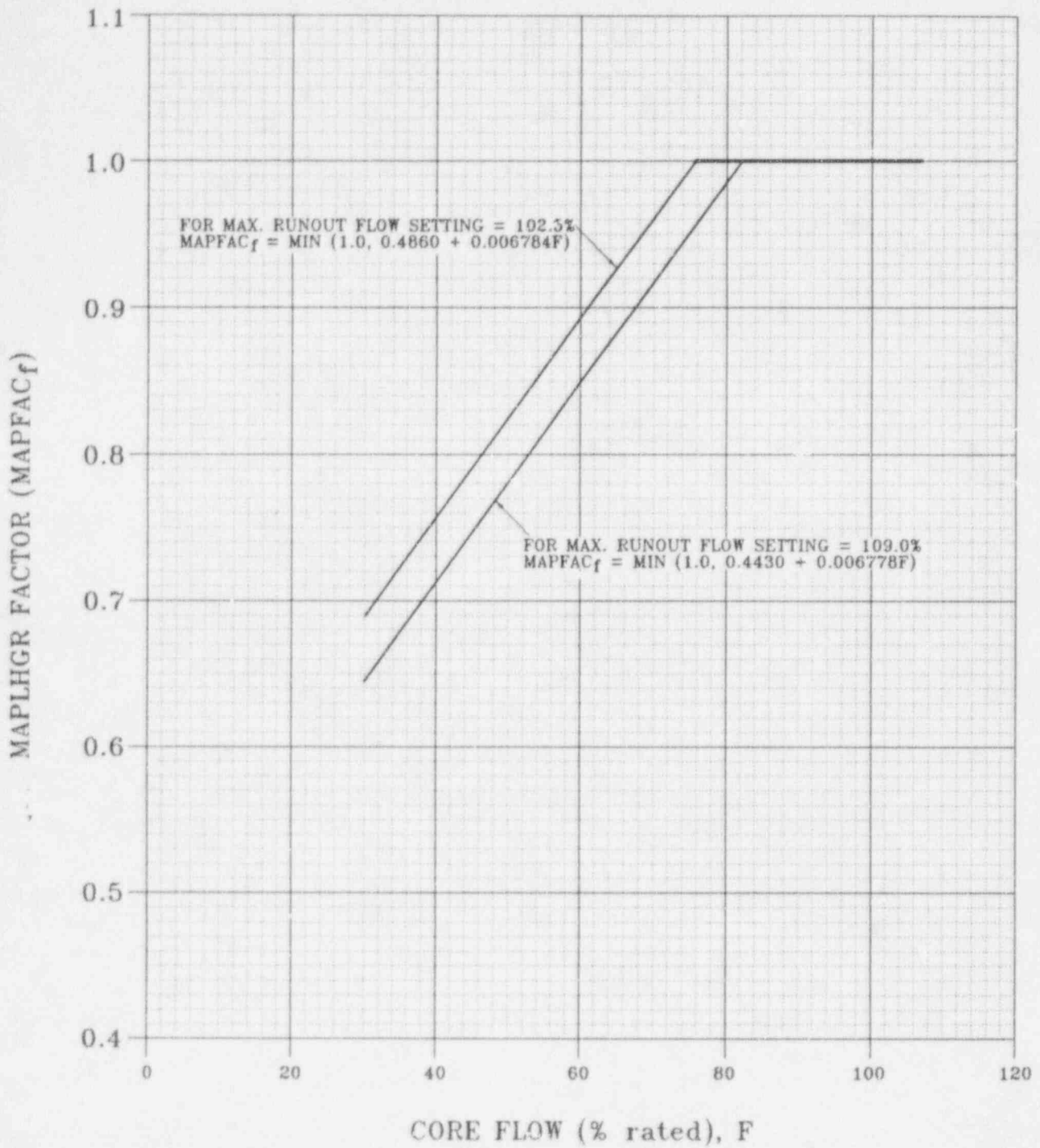


Figure 2.1-1 Flow-Dependent MAPLHGR Factors (MAPFAC_f)

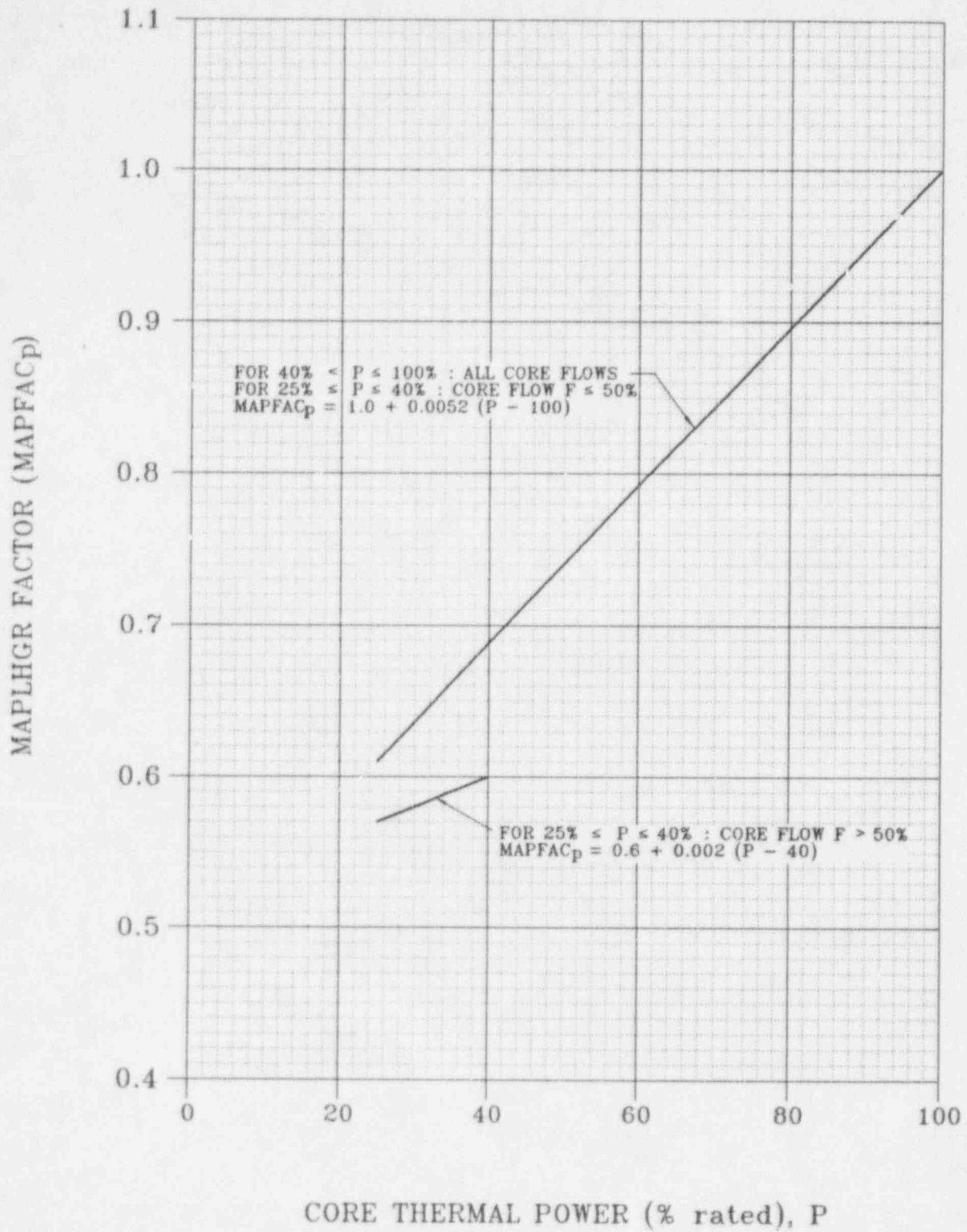


Figure 2.1-2 Power-Dependent MAPLHGR Factors (MAPFAC_p)

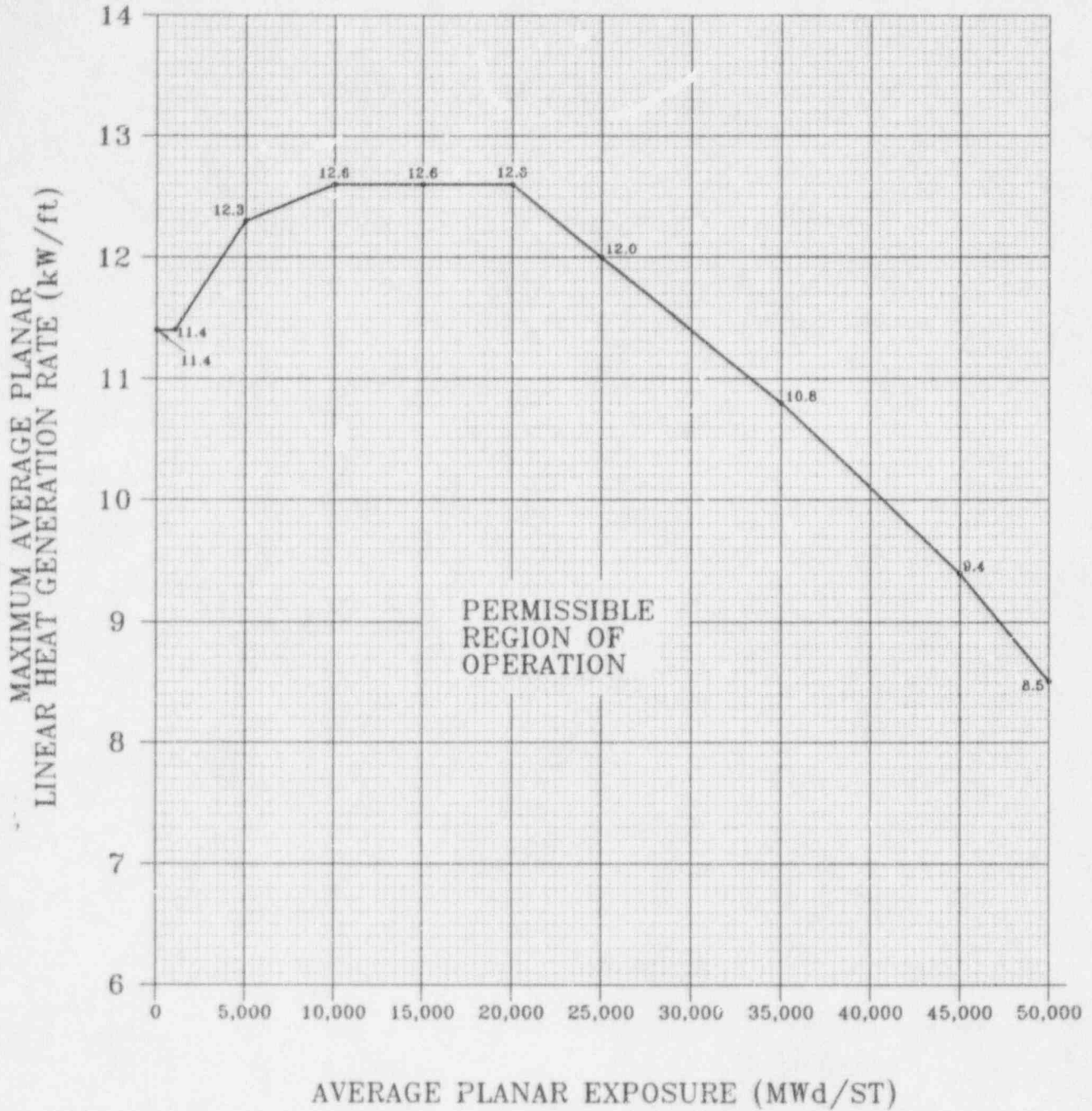


Figure 2.1-3 Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) Versus Average Planar Exposure - Reload 2 Fuel Type BP8SRB299LA (BP8x8R)

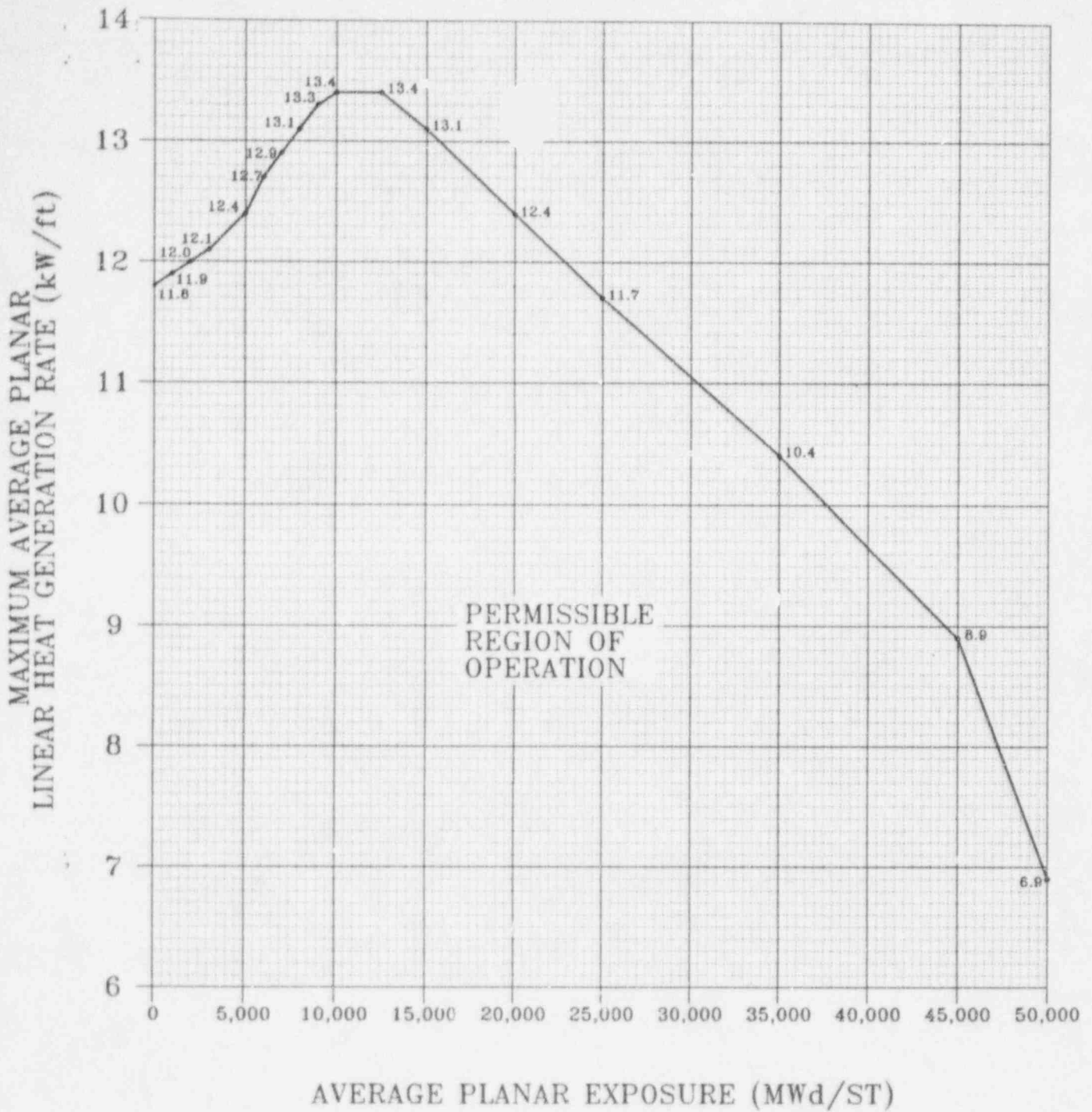


Figure 2.1-4 Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) Versus Average Planar Exposure, Reload 3 Fuel Type - GE8B-P8SQB301-10GZ-120M-150-T

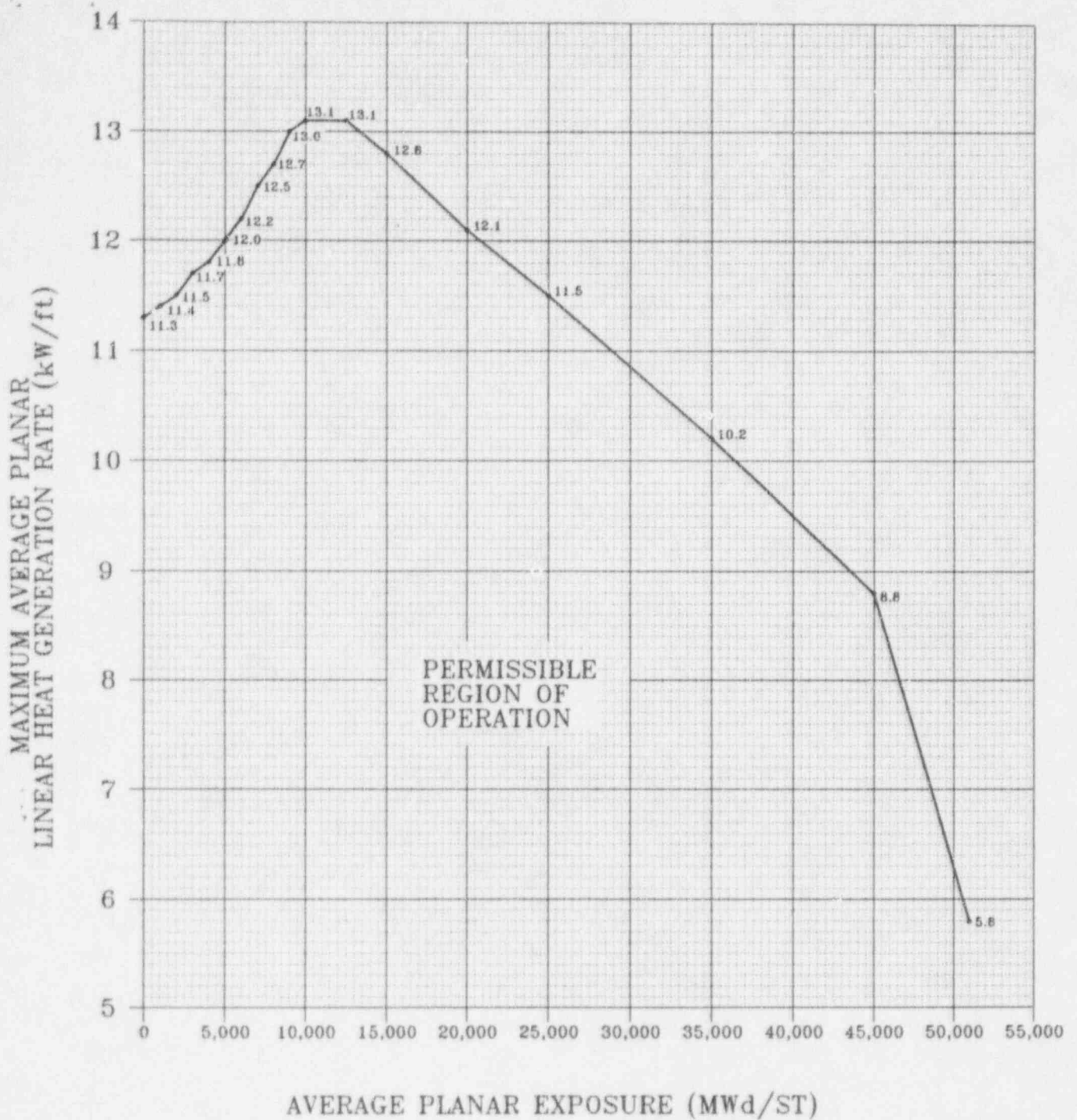


Figure 2.1-5 Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) Versus Average Planar Exposure - Reload 4 Fuel Type - GE10-P8SXB322-10GZ-120M-150-T

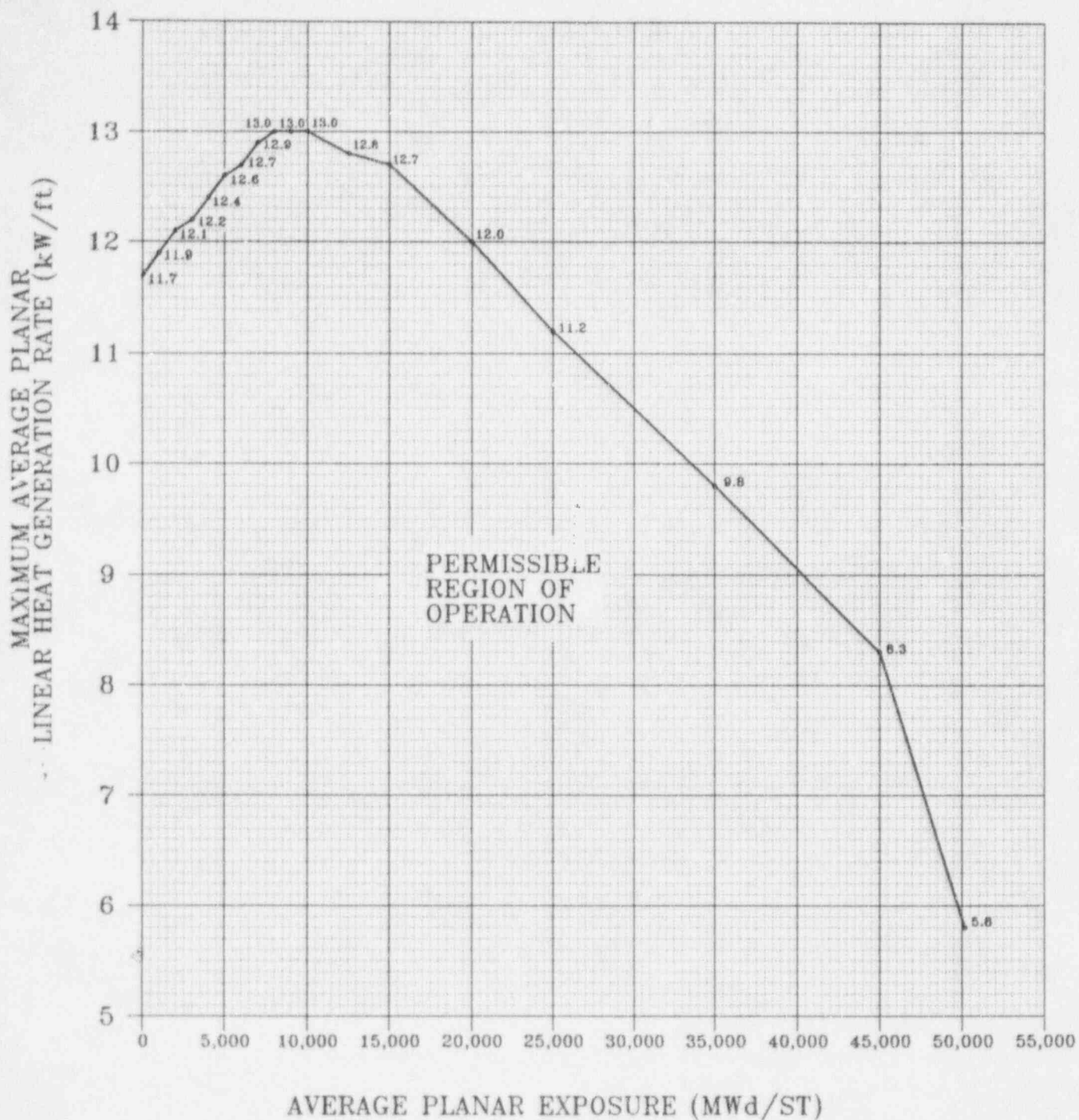


Figure 2.1-6 Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) Versus Average Planar Exposure - Reload 5 Fuel Type - GE10-P8SXB346-10GZ-120M-150-T

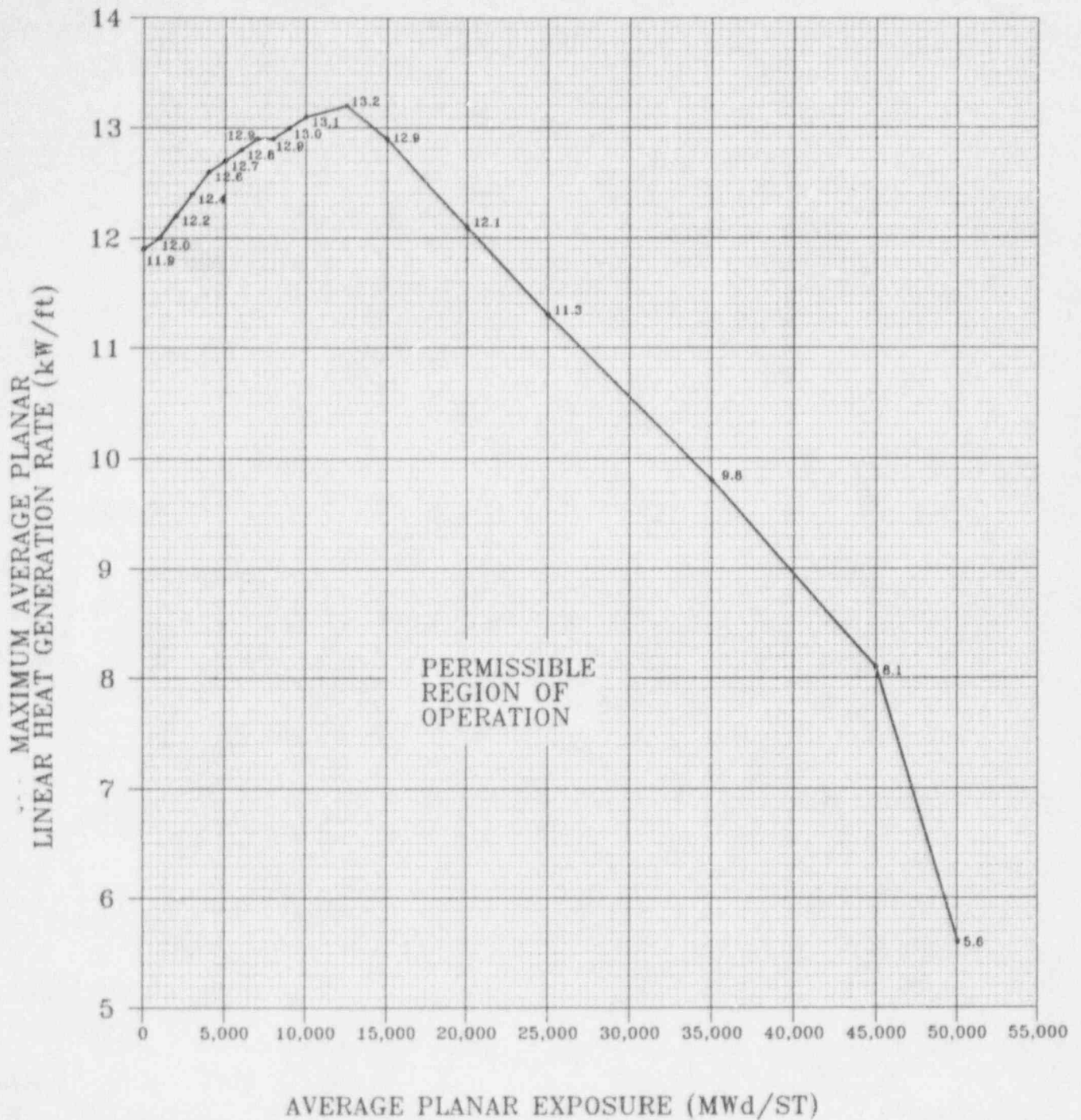


Figure 2.1-7 Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) Versus Average Planar Exposure - Reload 5 Fuel Type - GE10-P8SXB348-10GZ-120M-150-T

LIMITS APPLICABLE TO TECHNICAL SPECIFICATION LCO 3.2.2

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 core THERMAL POWER for each fuel bundle type as shown in Figures 2.2-1a and 2.2-1b, and the $MCPR_p$ limits at indicated core flow and core THERMAL POWER and ΔT^* as shown in Figure 2.2-2. These MCPR limits are consistent with Reference 5.

- * 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.

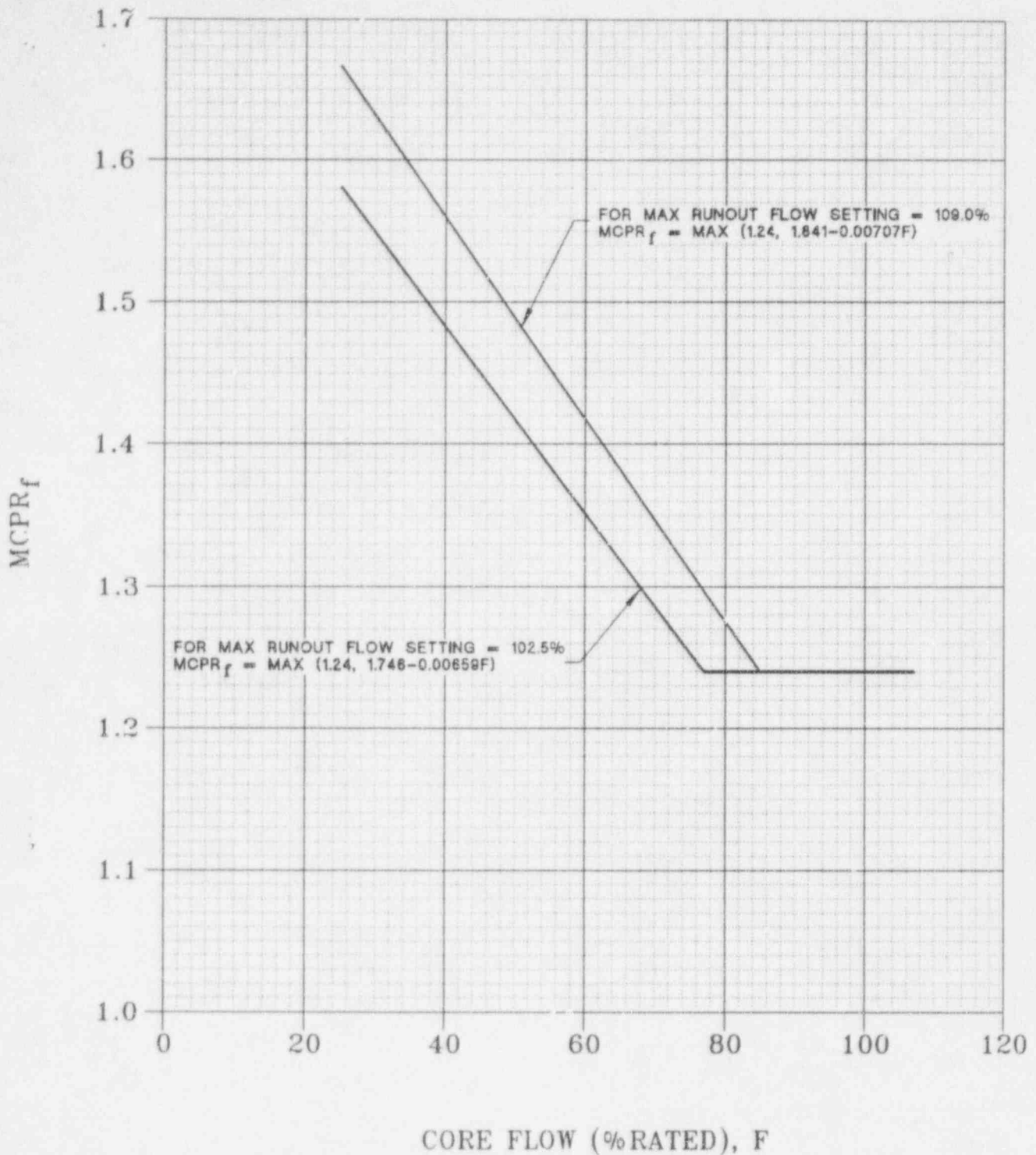


Figure 2.2-1a CLINTON MCPR_f VERSUS CORE FLOW,
 RELOAD FUEL TYPES OTHER THAN GE10

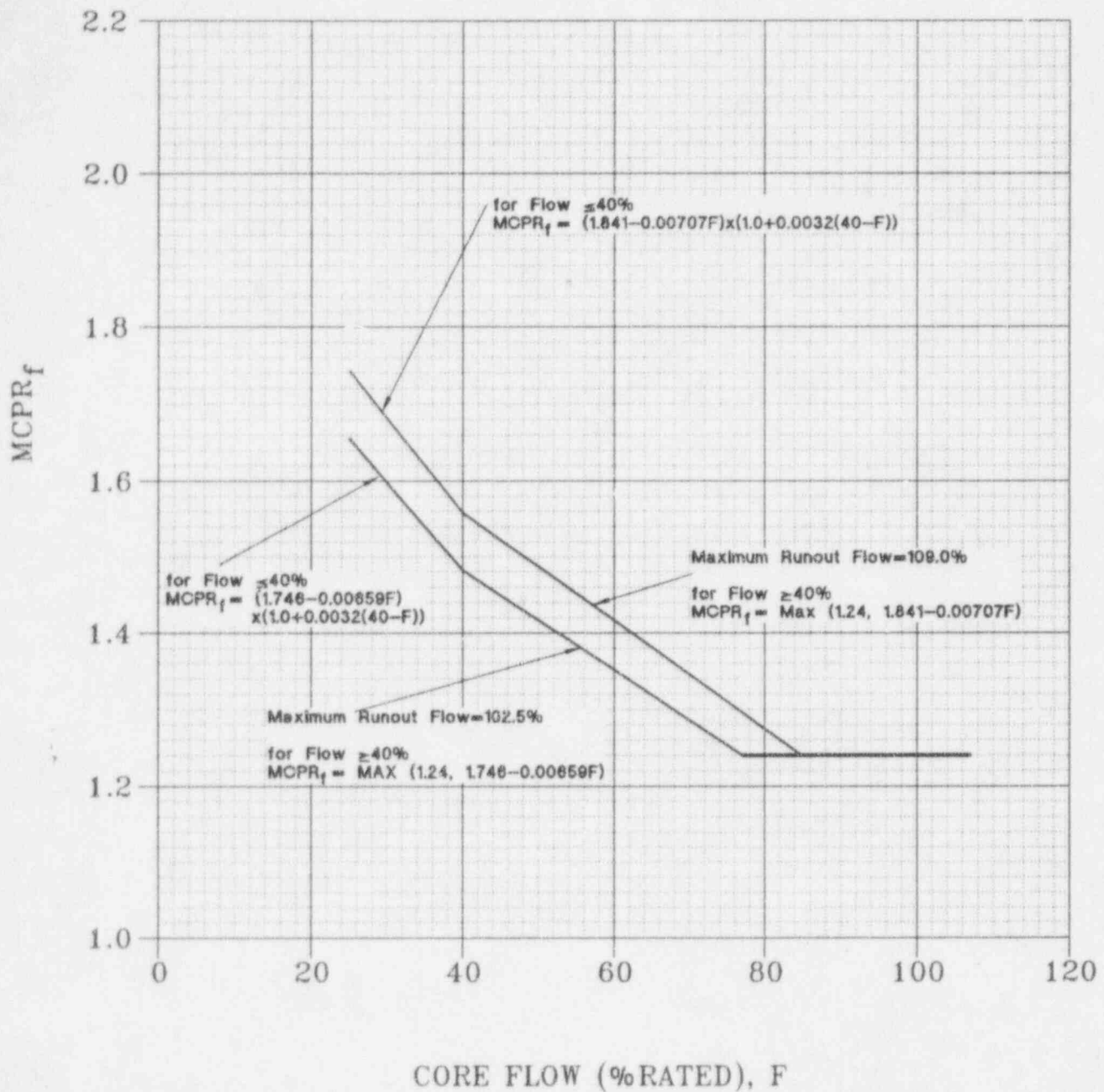


Figure 2.2-1b CLINTON MCPR_f VERSUS CORE FLOW,
RELOAD FUEL TYPE GE10

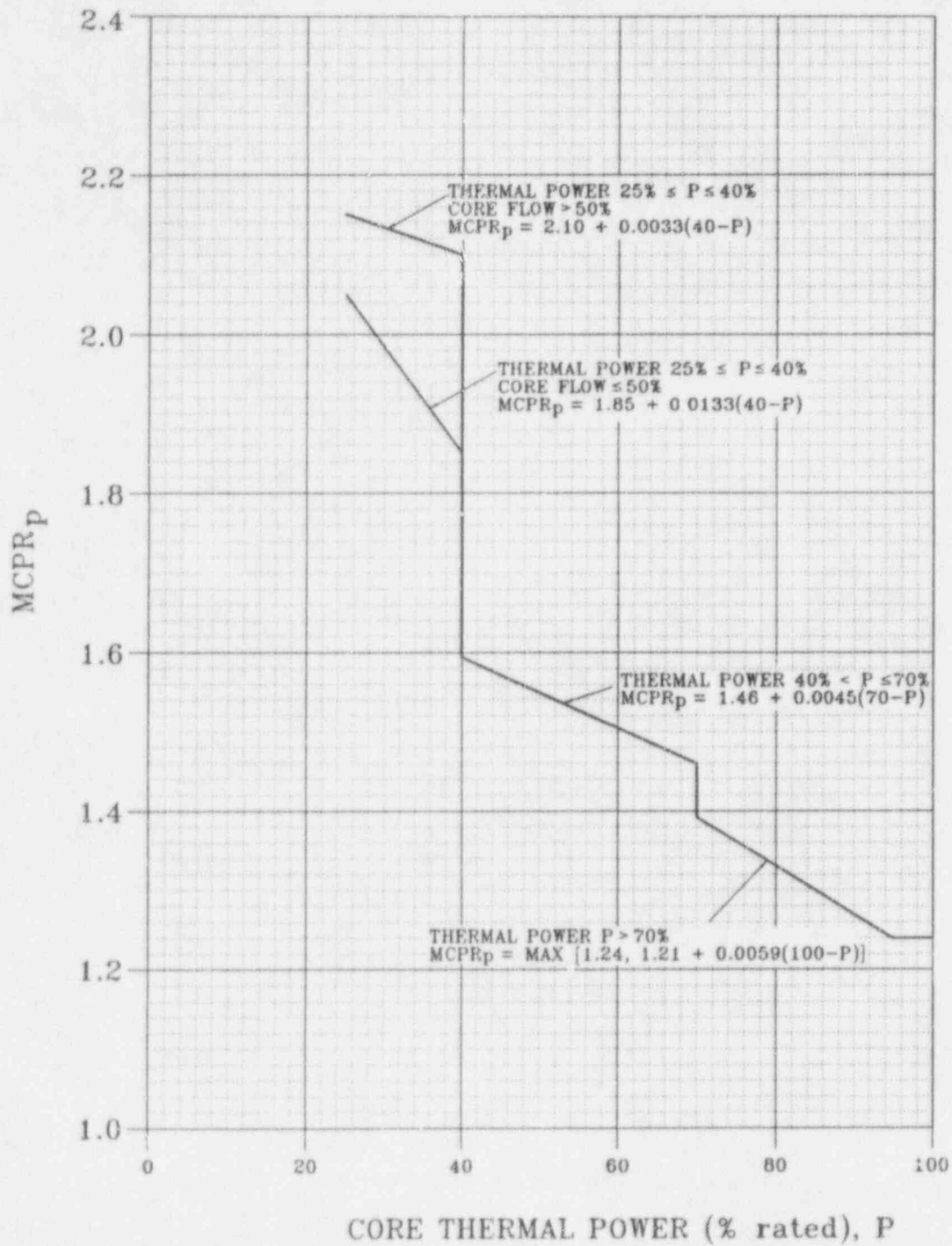


Figure 2.2-2 Clinton MCPR_p Versus Power for ΔT ≤ 50°F and Core Flow ≤ 107%

LIMITS APPLICABLE TO TECHNICAL SPECIFICATION LCO 3.2.3

POWER DISTRIBUTION LIMITS

LINEAR HEAT GENERATION RATE

The LINEAR HEAT GENERATION RATE (LHGR) for each fuel bundle type (References 6, 7) shall not exceed the limits specified below:

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

BP8SRB299LA (BP8x8R)

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

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

GE10-P8SXB322-10GZ-120M-150-T

GE10-P8SXB346-10GZ-120M-150-T

GE10-P8SXB348-10GZ-120M-150-T

LIMITS APPLICABLE TO TECHNICAL SPECIFICATION LCO 3.3.1.1

SIMULATED THERMAL POWER TIME CONSTANT

The Average Power Range Monitor (APRM) simulated thermal power time constant (References 8, 9) shall be between 5.4 seconds and 6.6 seconds (Reference 10).

REFERENCES

1. CPS Technical Specification 5.6.5, CORE OPERATING LIMITS REPORT (COLR).
2. "General Electric Standard Application for Reactor Fuel" (GESTAR II), GE Licensing Topical Report NEDE-24011-P-A, as amended (latest approved version).
3. "Maximum Extended Operating Domain and Feedwater Heater Out-of-Service Analysis for Clinton Power Station," GE Report NEDC-31546P, August 1988.
- 4.A. "Supplemental Reload Licensing Submittal for Clinton Power Station Unit 1 Reload 2, Cycle 3," GE Document 23A5976, Revision 0, July 1990.
- 4.B. "Supplemental Reload Licensing Report for Clinton Power Station Unit 1 Reload 3, Cycle 4," GE Document 23A7144AA, Revision 0, Supplement 1, January 1992.
- 4.C. "Lattice-Dependent MAPLHGR Report for Clinton Power Station Unit 1 Reload 4, Cycle 5," GE Document 23A7213AA, Revision 0, October 1993.
- 4.D. "Lattice Dependent MAPLHGR Report for Clinton Power Station Unit 1 Reload 5, Cycle 6," GE Document DRF J11-02425MAP, Revision 0, February 1995.
- 5.A. "Supplemental Reload Licensing Submittal for Clinton Power Station Unit 1 Reload 2, Cycle 3," GE Document 23A5976, Revision 0, July 1990.
- 5.B. "Supplemental Reload Licensing Report for Clinton Power Station Unit 1 Reload 3 Cycle 4," GE Document 23A7144, Revision 0, January 1992.
- 5.C. "Supplemental Reload Licensing Report for Clinton Power Station Unit 1 Reload 4 Cycle 5," GE Document 23A7213, Revision 0, October 1993.
- 5.D. "Supplemental Reload Licensing Report for Clinton Power Station Unit 1, Reload 5 Cycle 6," GE Document DRF J11-02425SRLR, Revision 0, February 1995.
6. Letter to J. S. Charnley (GE) from C. O. Thomas (NRC), "Acceptance for Referencing of Licensing Topical Report NEDE-24011-P-A-6, Amendment 10, 'General Electric Standard Application for Reactor Fuel'," MFN-082-85, May 28, 1985.
7. Letter to J. S. Charnley (GE) from A. C. Thadani (NRC), "Acceptance for Referencing of Amendment 18 to General Electric Licensing Topical Report NEDE-24011-P-1, 'General Electric Standard Application for Reactor Fuel'," May 12, 1988.

8. Letter to Nuclear Regulatory Commission from J. S. Perry (IP), "Clinton Power Station Proposed Amendment of Facility Operating License No. NPF-62," U-602085 [LS-92-004], February 11, 1993.
9. Letter to F. A. Spangenberg (IP) from D. V. Pickett (NRC) , "Issuance of Amendment [No. 75] (TAC No. M85816)," May 25, 1993.
10. Letter to J. A. Miller (IP) from J. T. Worthington (GE), "Time Constant for Simulated Thermal Power Monitor," JTW.93-128, September 1, 1993.