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Docket No. 50-461

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Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Clinton Power Station Core Operating Limits Report
For Reload 7/Cycle 8, Revision 0

Dear Madam or Sir:

Attached is Revision 0 of the Clinton Power Station (CPS) Core Operating Limits Report (COLR) for Reload 7/Cycle 8. In accordance with CPS Technical Specification 5.6.5, the analytical methods used to determine the core operating limits were previously reviewed and approved by the Nuclear Regulatory Commission (NRC) and have been documented in General Electric Standard Application for Reactor Fuel (GESTAR), NEDE-24011-P-A-US, as amended, and the Maximum Extended Operating Domain and Feedwater Heater Out-of-Service Analysis for Clinton Power Station, NEDC-31546P, dated August 1988.

It should be noted that Cycle 8 will be the first operating cycle with the GE14 fuel type and that Cycle 8 will be first operating cycle for which the SAFER/GESTR-LOCA methodology is used to analyze the design basis accident. Determination of the core operating limits for Cycle 8 therefore included consideration of both the new GE14 fuel and the irradiated GE10 fuel contained in the CPS reactor core. The SAFER/GESTR-LOCA methodology involves analytical models that have been previously reviewed and approved by the NRC in a letter from C. O. Thomas (NRC) to J. F. Quirk (GE), *Acceptance for Referencing of Licensing Topical Report NEDE-23785, Revision 1, Volume III(P), "The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-of-Coolant Accident,"* dated June 1, 1984. The CPS specific results from the SAFER/GESTR-LOCA analysis are reported in a separate transmittal in accordance with 10 CFR 50.46.

Sincerely,

B. Elwood for

M. A. Reandeau
Director-Licensing

A001

RWC/blf

Attachment

cc: NRC Clinton Licensing Project Manager
NRC Resident Office, V-690
Regional Administrator, Region III, USNRC
Illinois Department of Nuclear Safety

AMERGEN

CLINTON POWER STATION

# CORE OPERATING LIMITS REPORT

FOR

RELOAD 7

CYCLE 8

REVISION 0

R. G. Heugel (Preparer) / 10/27/00
Fuel/PRA/RE — Date

A. Kahn (Reviewer) / 10/27/00
Fuel/PRA/RE — Date

FRG / 11/4/00 — Date

Manager-Clinton Power Station / 11/6/00 — Date

J. B. Elwood for M. A. Reandeau / 11/6/00
Director-Licensing — Date

M10480/359

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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, 2.1-2, and 2.1-3 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 2.1-4 through 2.1-9 (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 ($MAPFAC_p$) in either Figure 2.1-2 or Figure 2.1-3.

b. During single recirculation loop operation -

   the limits shown in Figures 2.1-4 through 2.1-9 multiplied by the smallest of $MAPFAC_f$, $MAPFAC_p$, or a factor of 0.75 for GE10 or 0.76 for GE14 fuel types (Reference 5).

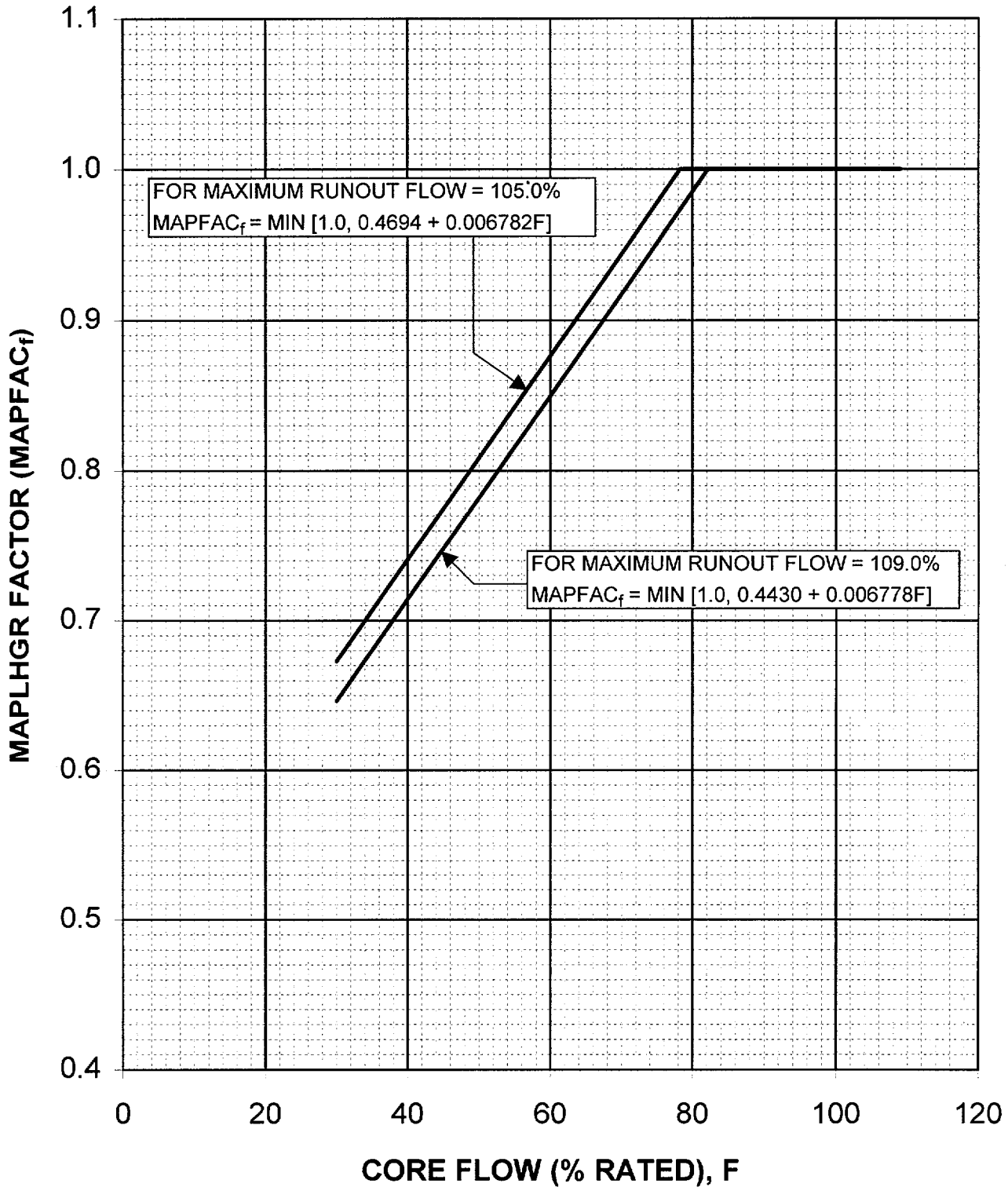


**Figure 2.1-1, Flow - Dependent MAPLHGR Factors (MAPFAC$_f$)**

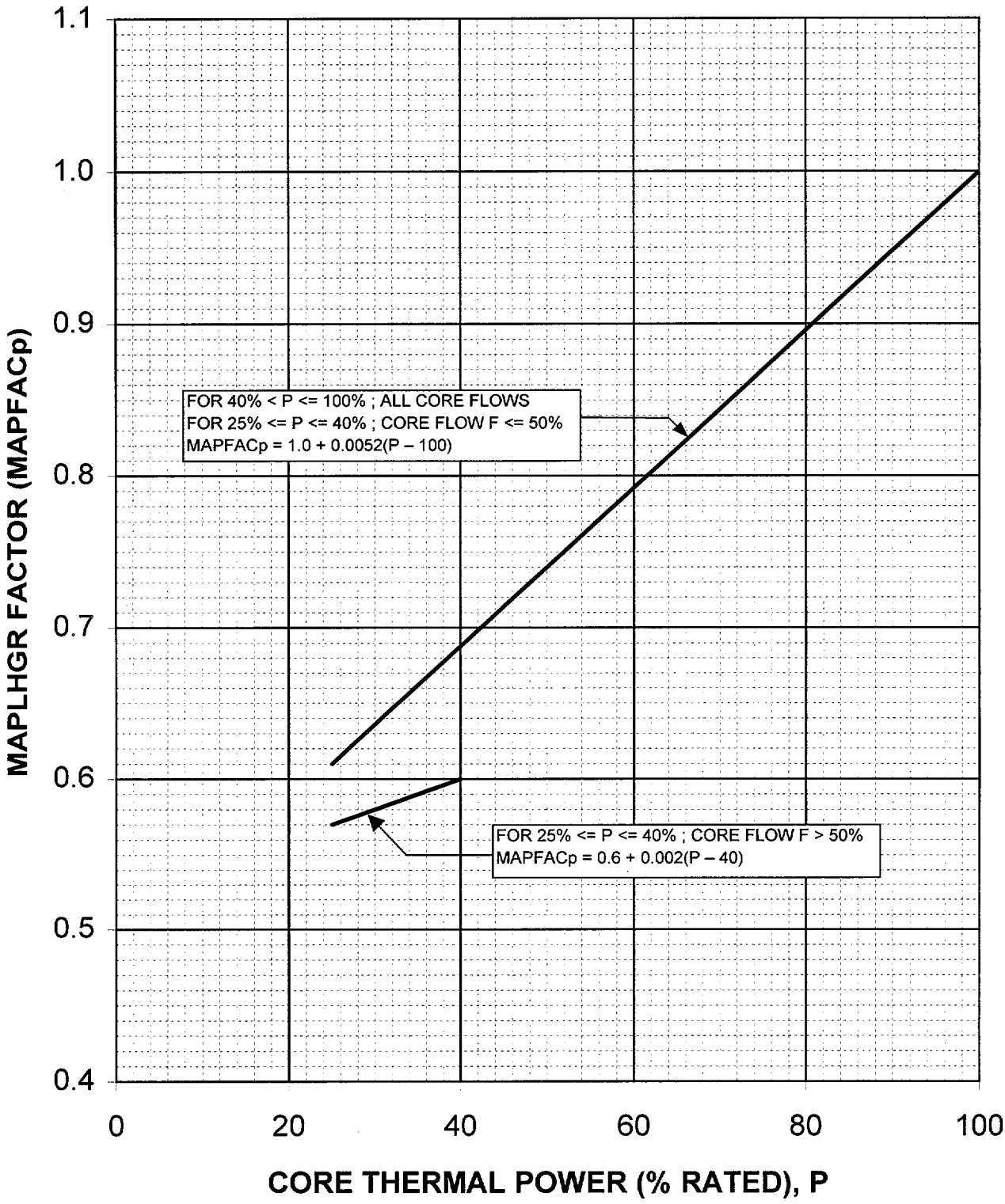


**Figure 2.1-2, Power - Dependent MAPLHGR Factors (MAPFACp)**

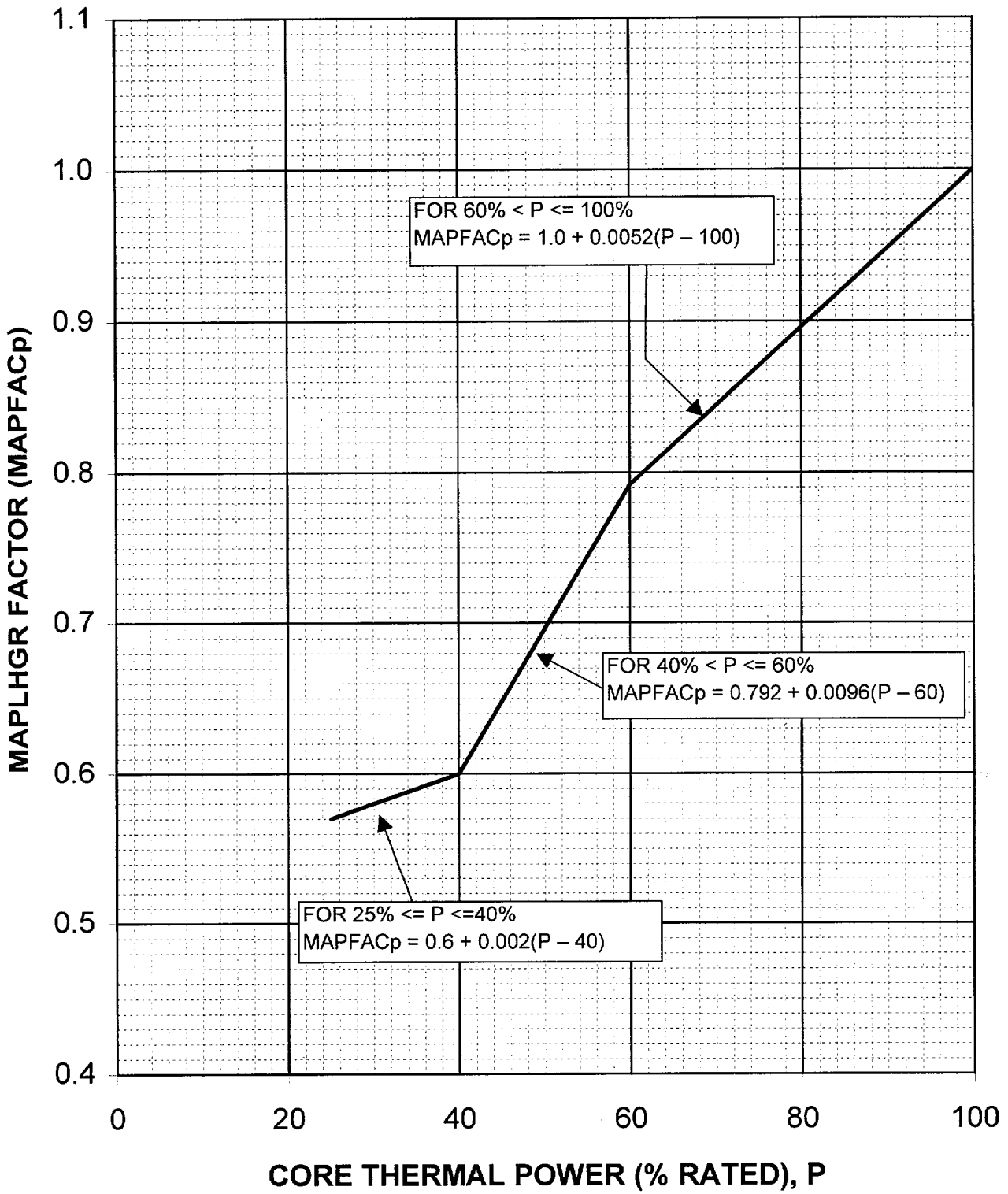


**Figure 2.1-3, Power - Dependent MAPLHGR Factors (MAPFACp) with Pressure Regulator Out of Service**

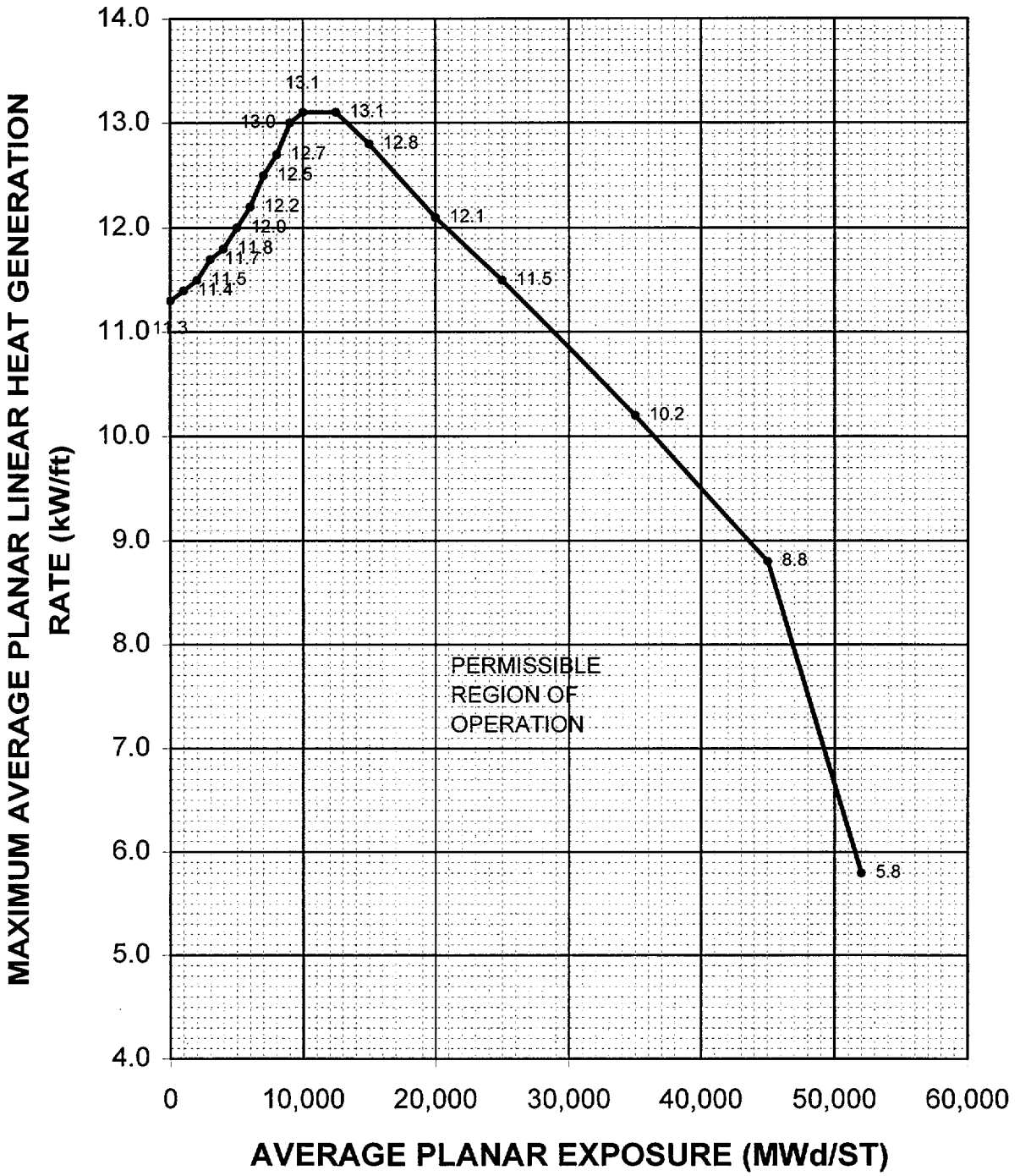


**Figure 2.1-4, Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) Versus Average Planar Exposure, Reload 4**

**Fuel Type - GE10-P8SXB322-10GZ-120M-150-T**

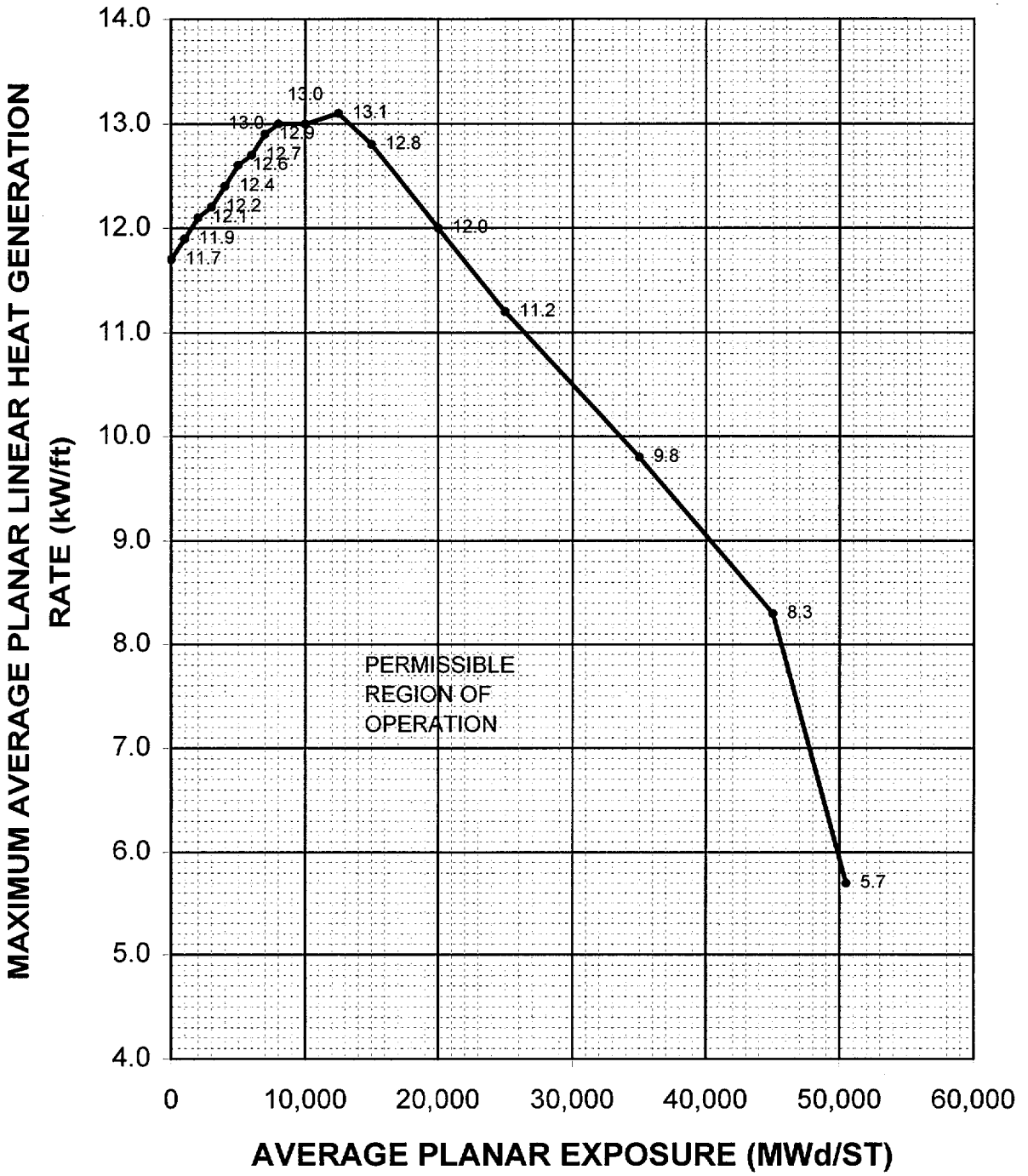


**Figure 2.1-5, Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) Versus Average Planar Exposure, Reload 5**

**Fuel Type - GE10-P8SXB346-10GZ-120M-150-T**

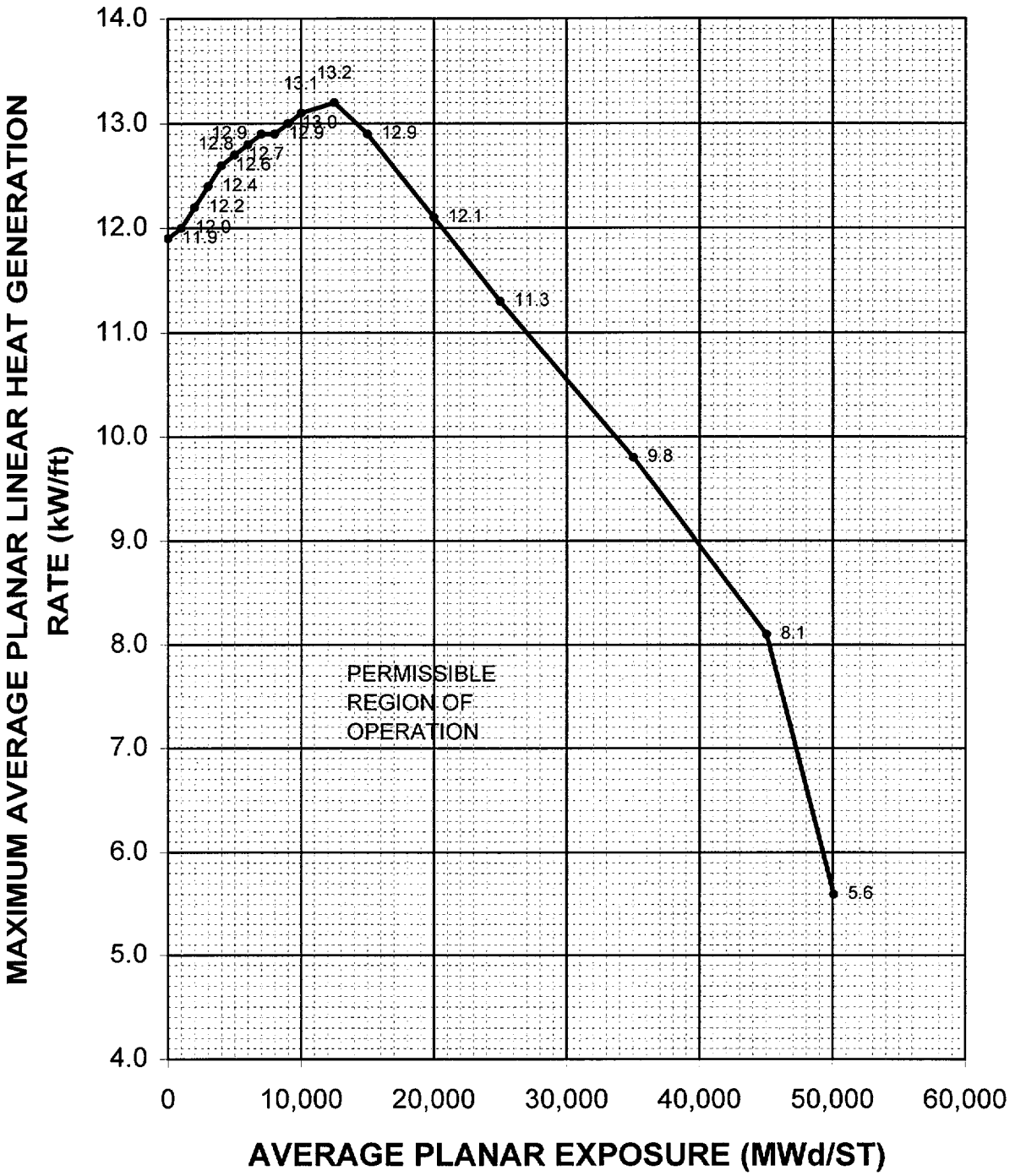


**Figure 2.1-6, Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) Versus Average Planar Exposure, Reload 5**

**Fuel Type - GE10-P8SXB348-10GZ-120M-150-T**

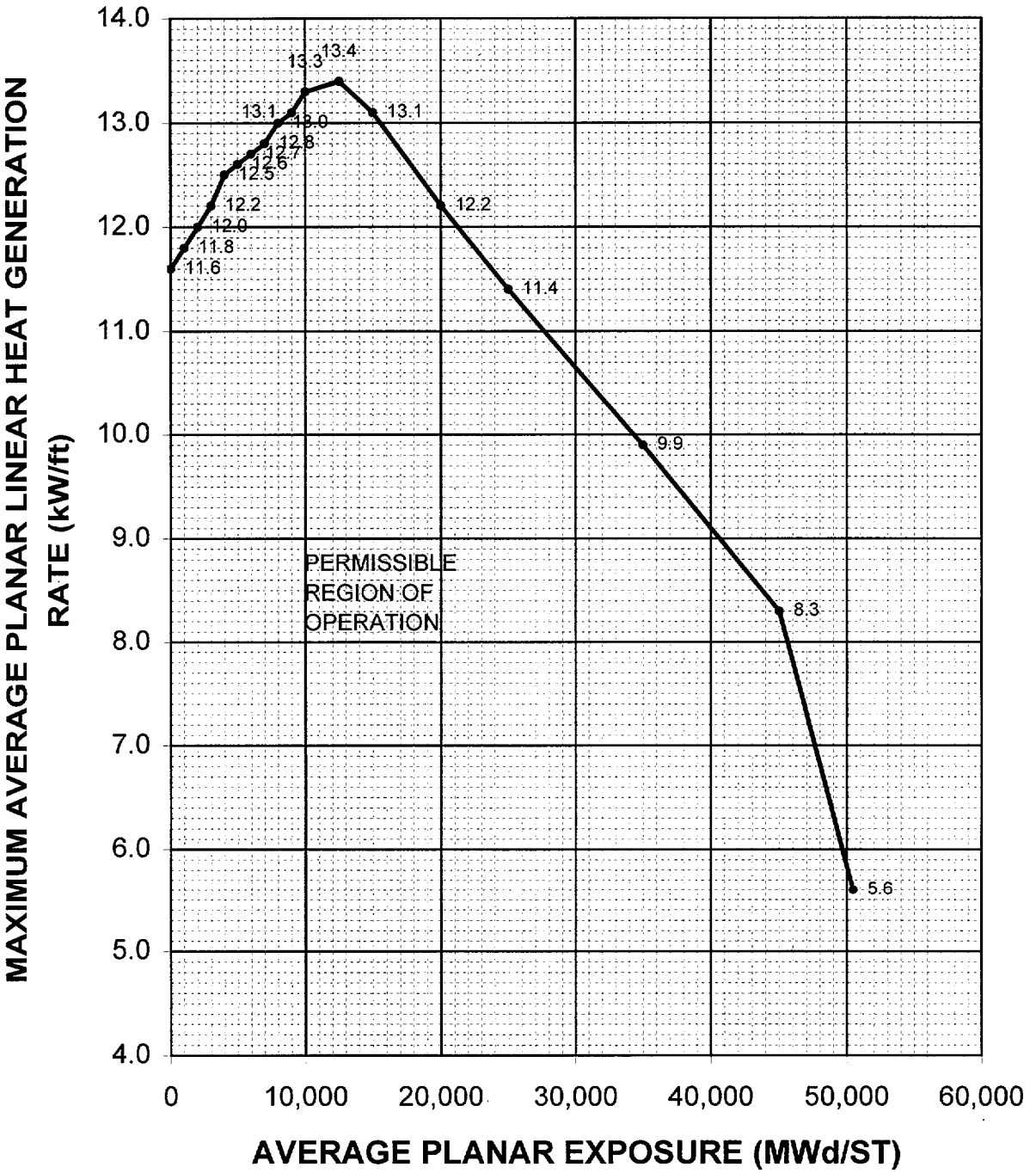


**Figure 2.1-7, Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) Versus Average Planar Exposure, Reload 6**

**Fuel Type - GE10-P8SXB353-12GZ-120T-150-T**

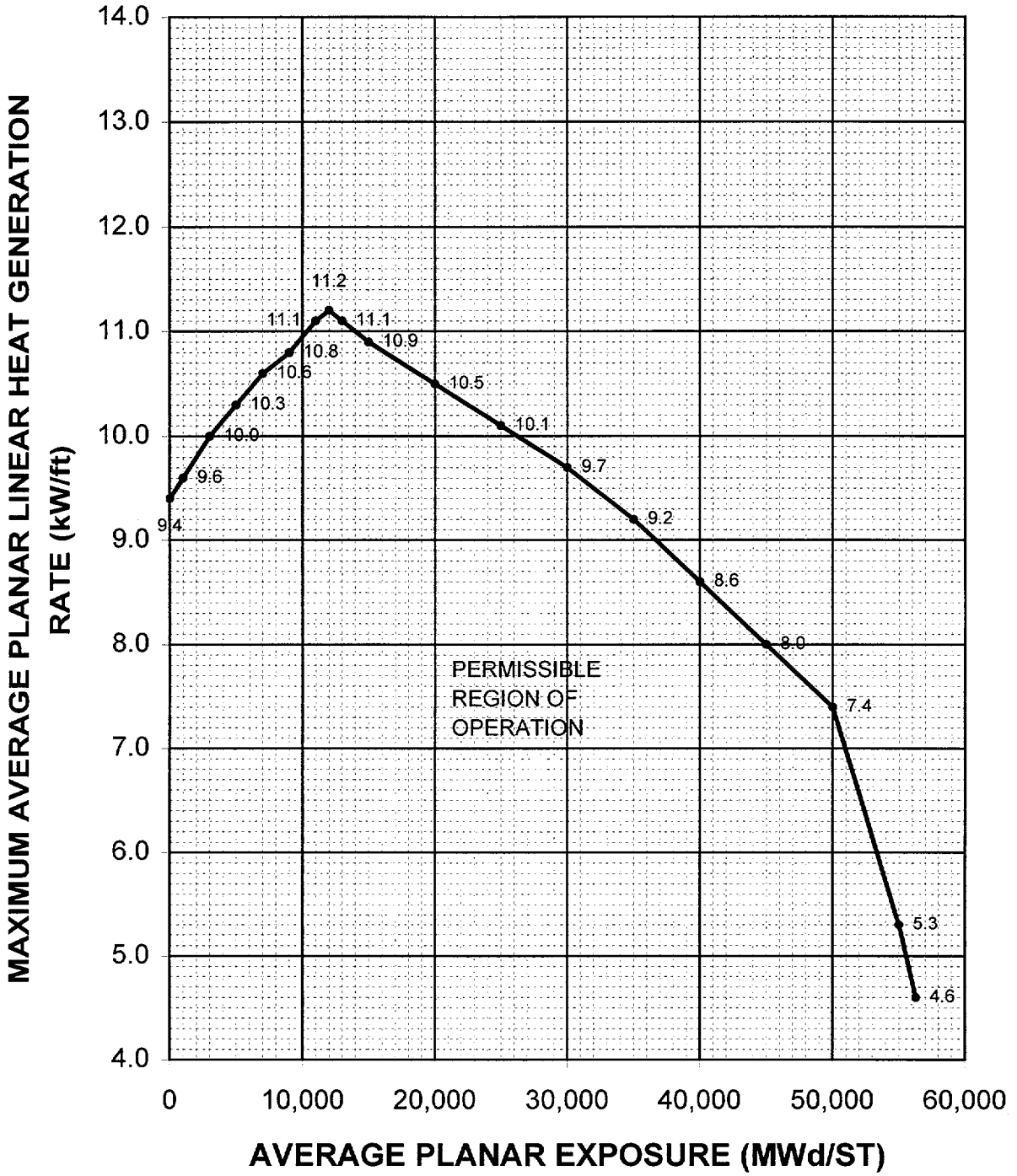


**Figure 2.1-8, Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) Versus Average Planar Exposure, Reload 7**

**Fuel Type - GE14-P10SNAB353-13GZ-120T-150-T-2412**

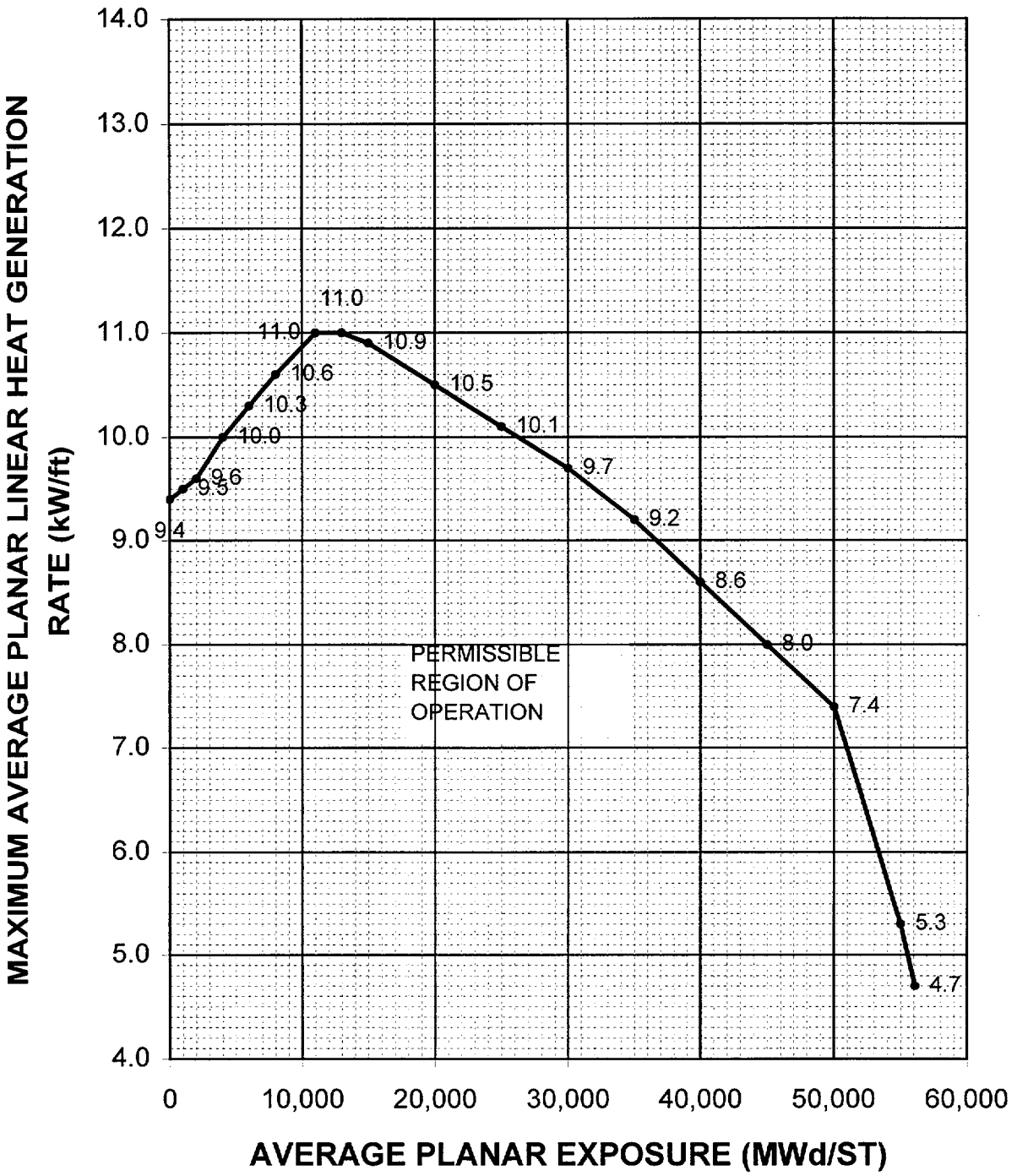


**Figure 2.1-9, Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) Versus Average Planar Exposure, Reload 7**

**Fuel Type - GE14-P10SNAB354-15GZ-120T-150-T-2413**

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 and the MCPRp limits at indicated core flow and core THERMAL POWER for each fuel bundle type. These MCPR limits are consistent with Reference 5.

a. During two-recirculation loop operation –

   the $MCPR_f$ limits are in figures 2.2-1a through 2.2-1b, and

   the MCPRp limits are in figures 2.2-2a through 2.2-2d.

b. During single-recirculation loop operation the MCPR operating limit is 0.03 greater than the two-recirculation loop value.

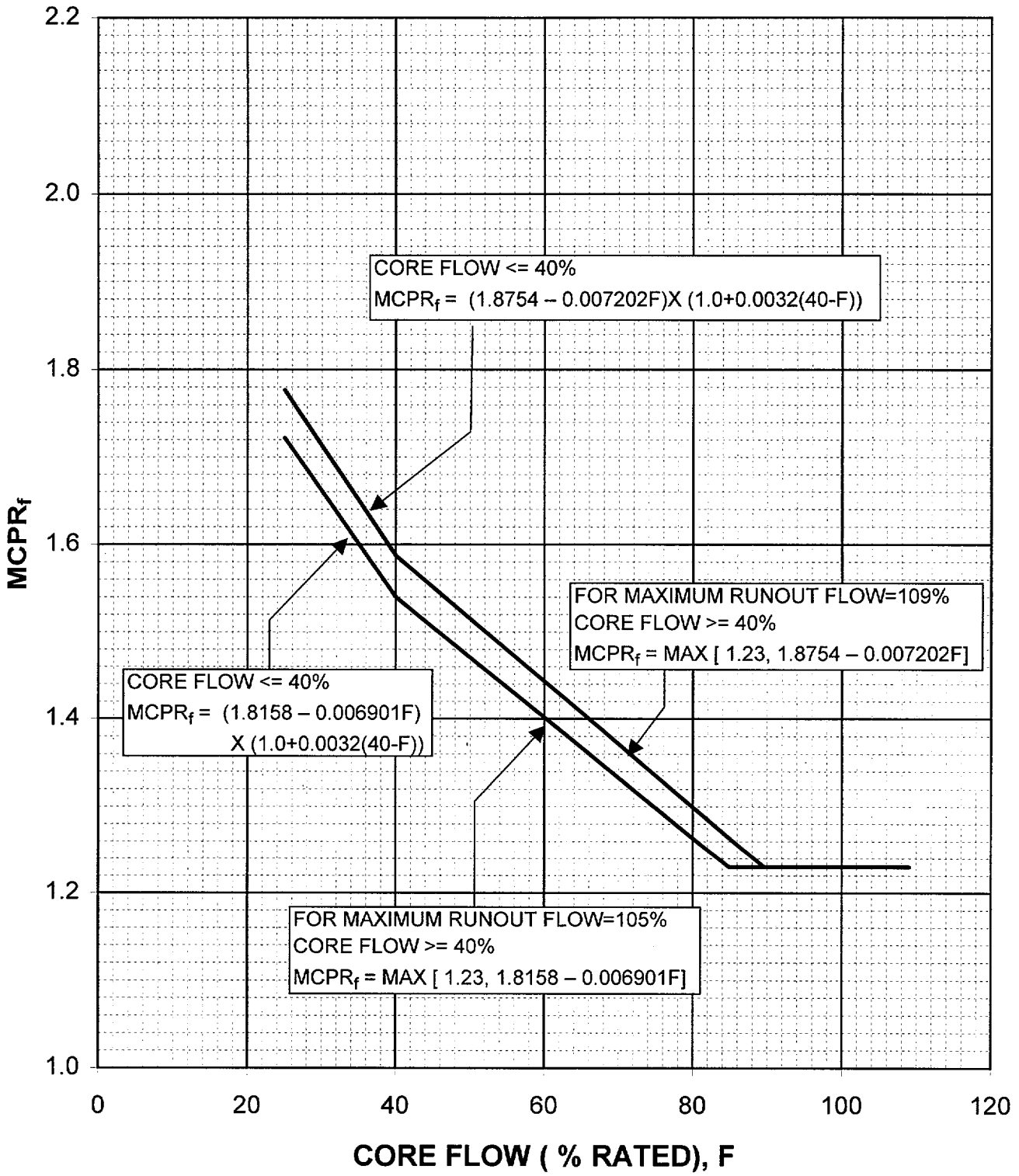


**Figure 2.2-1a, Flow Dependent MCPR Limits, Reload Fuel Type GE10**

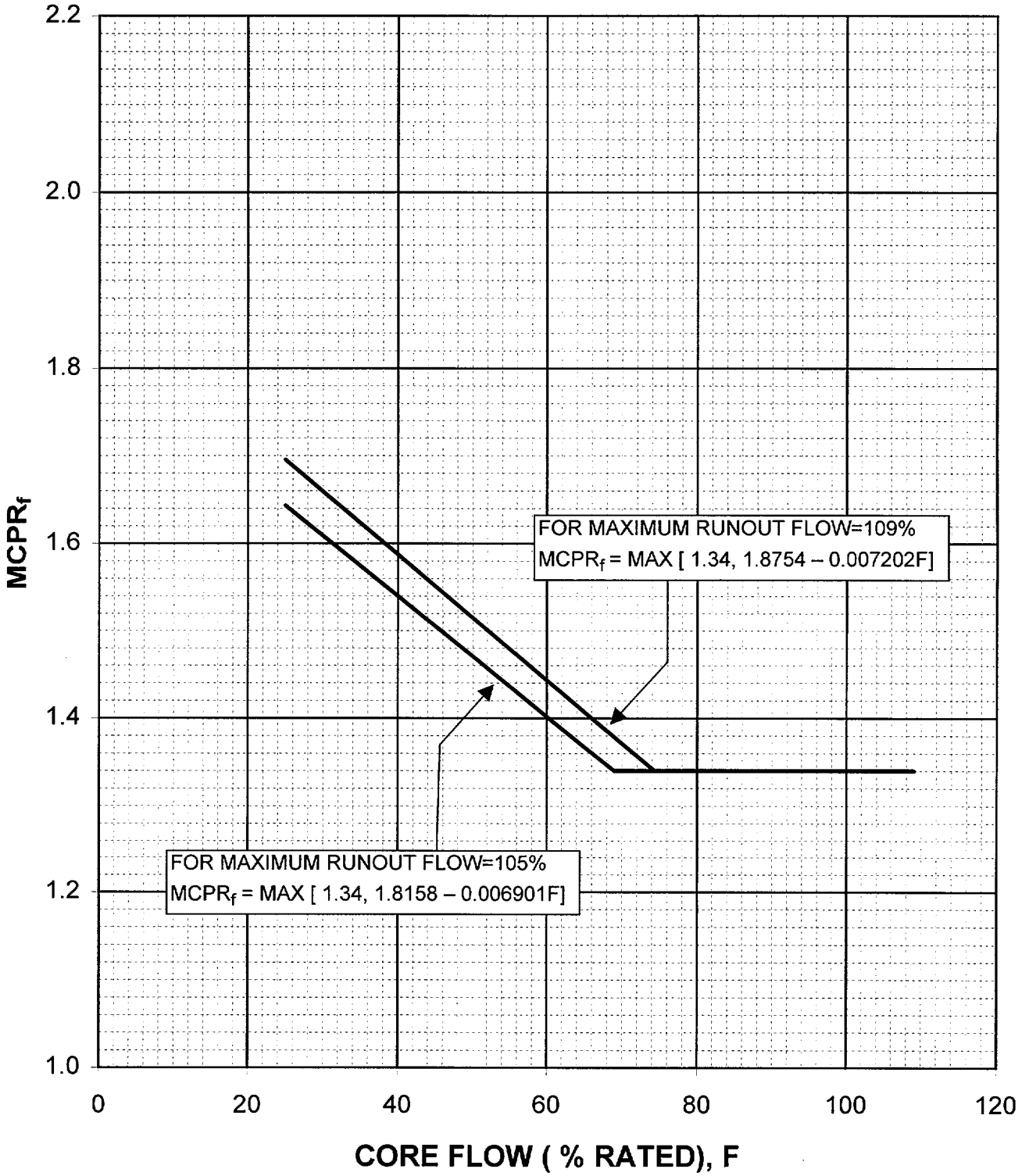


**Figure 2.2-1b, Flow Dependent MCPR Limits, Reload Fuel Type GE14**

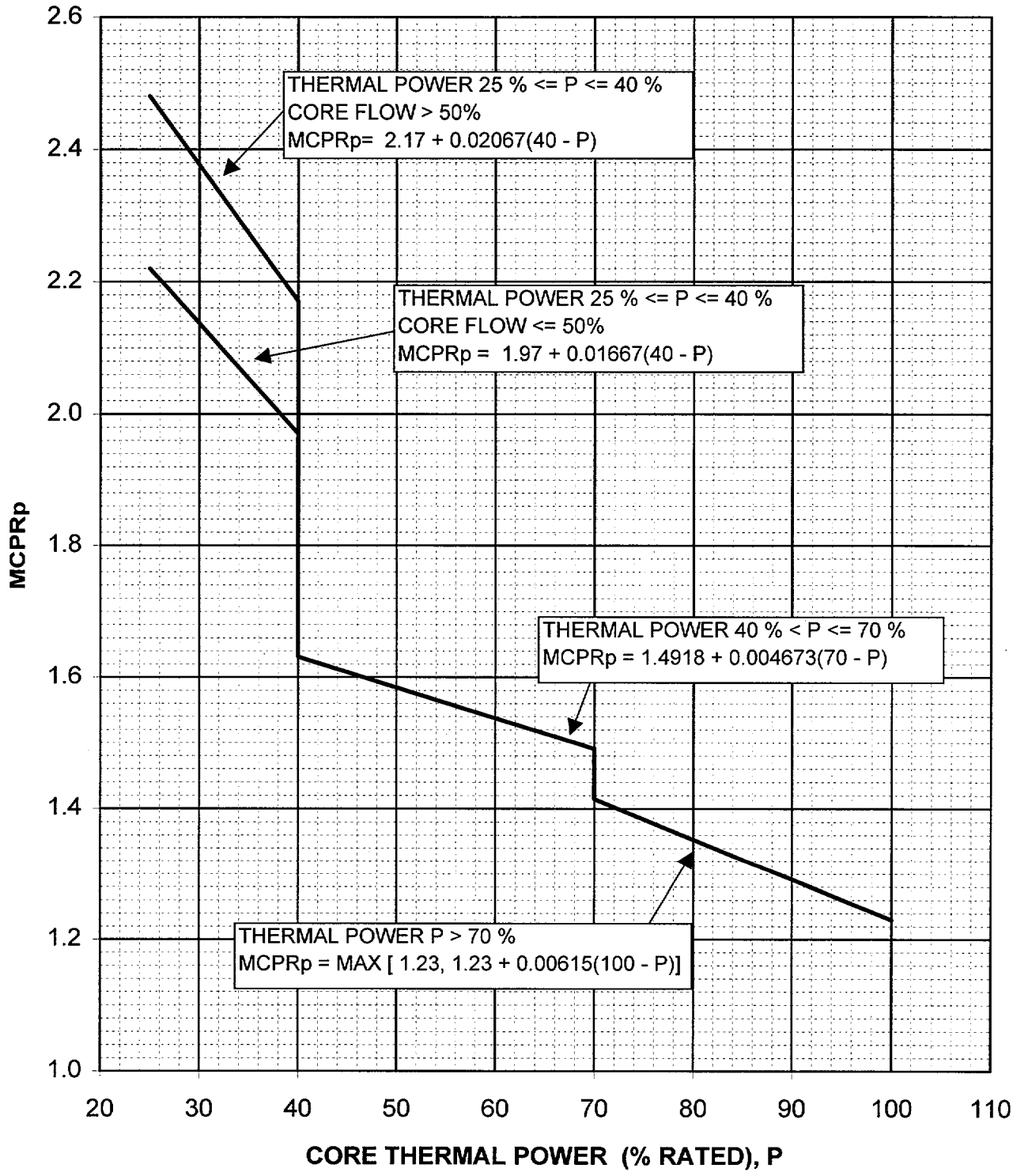


**Figure 2.2-2a, Power Dependent MCPR Limits,**

**Reload Fuel Type GE10**

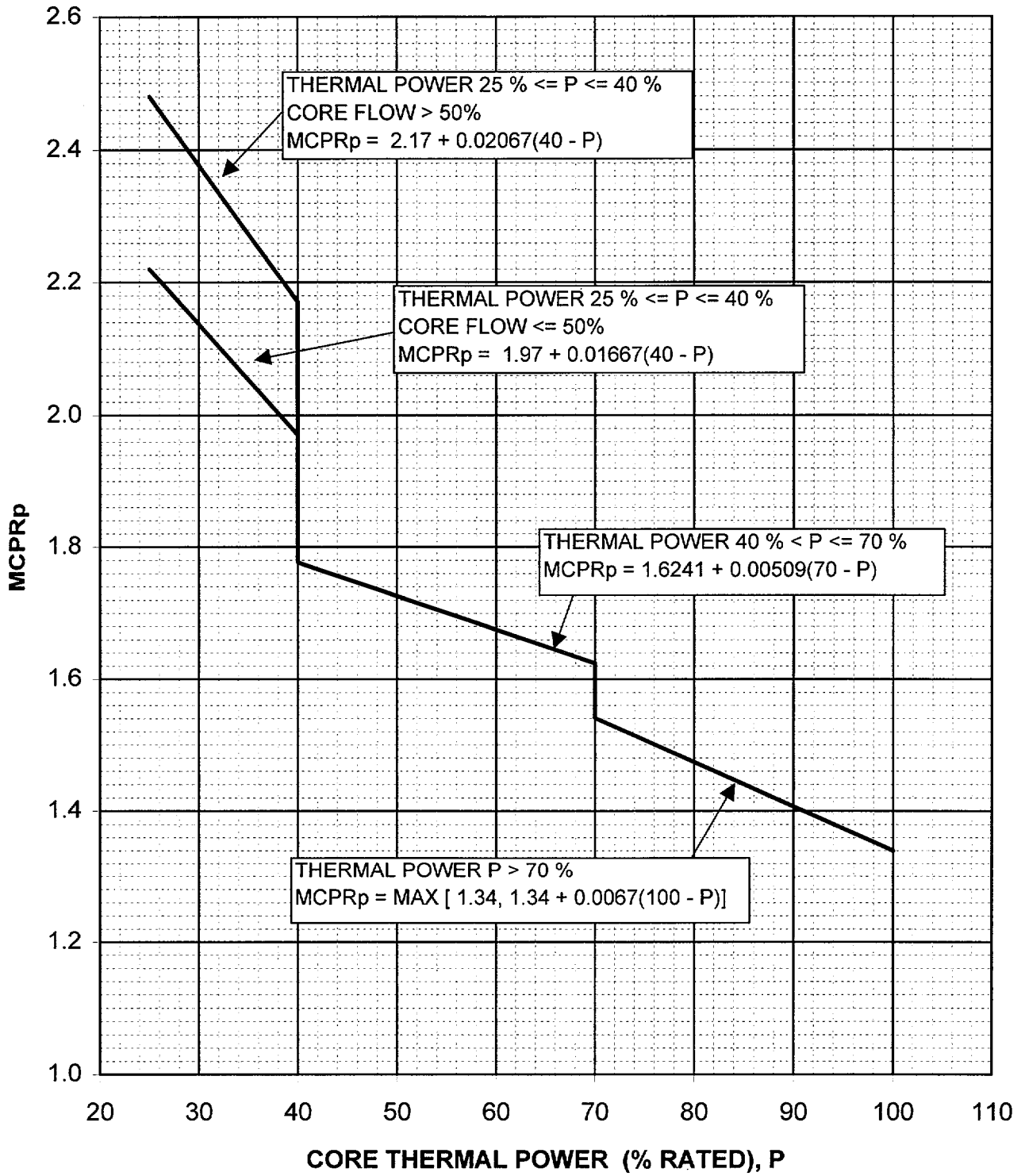


**Figure 2.2-2b, Power Dependent MCPR Limits,**

**Reload Fuel Type GE14**

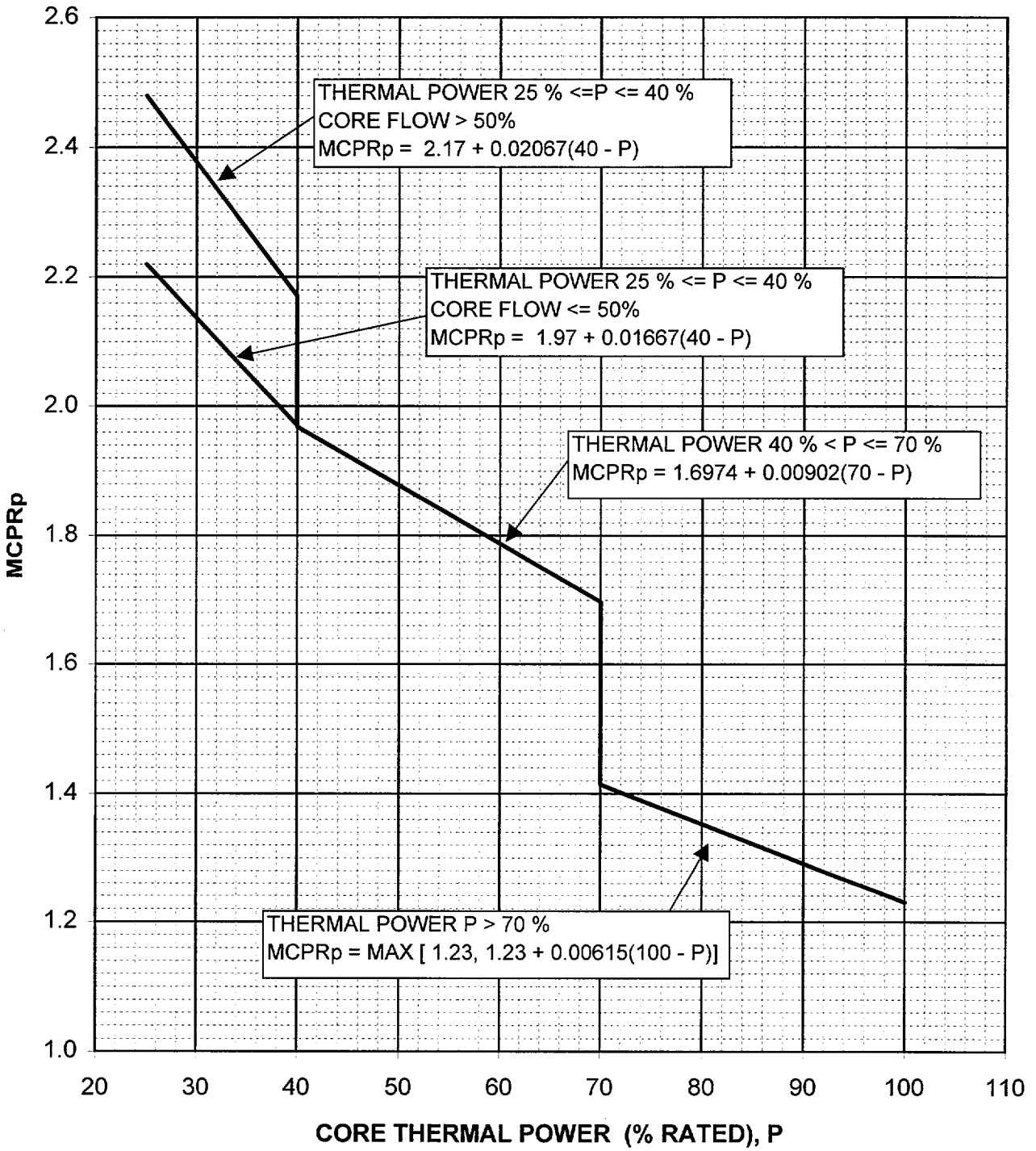


**Figure 2.2-2c, Power Dependent MCPR Limits,**

**Reload Fuel Type GE10 with Pressure Regulator Out of Service**

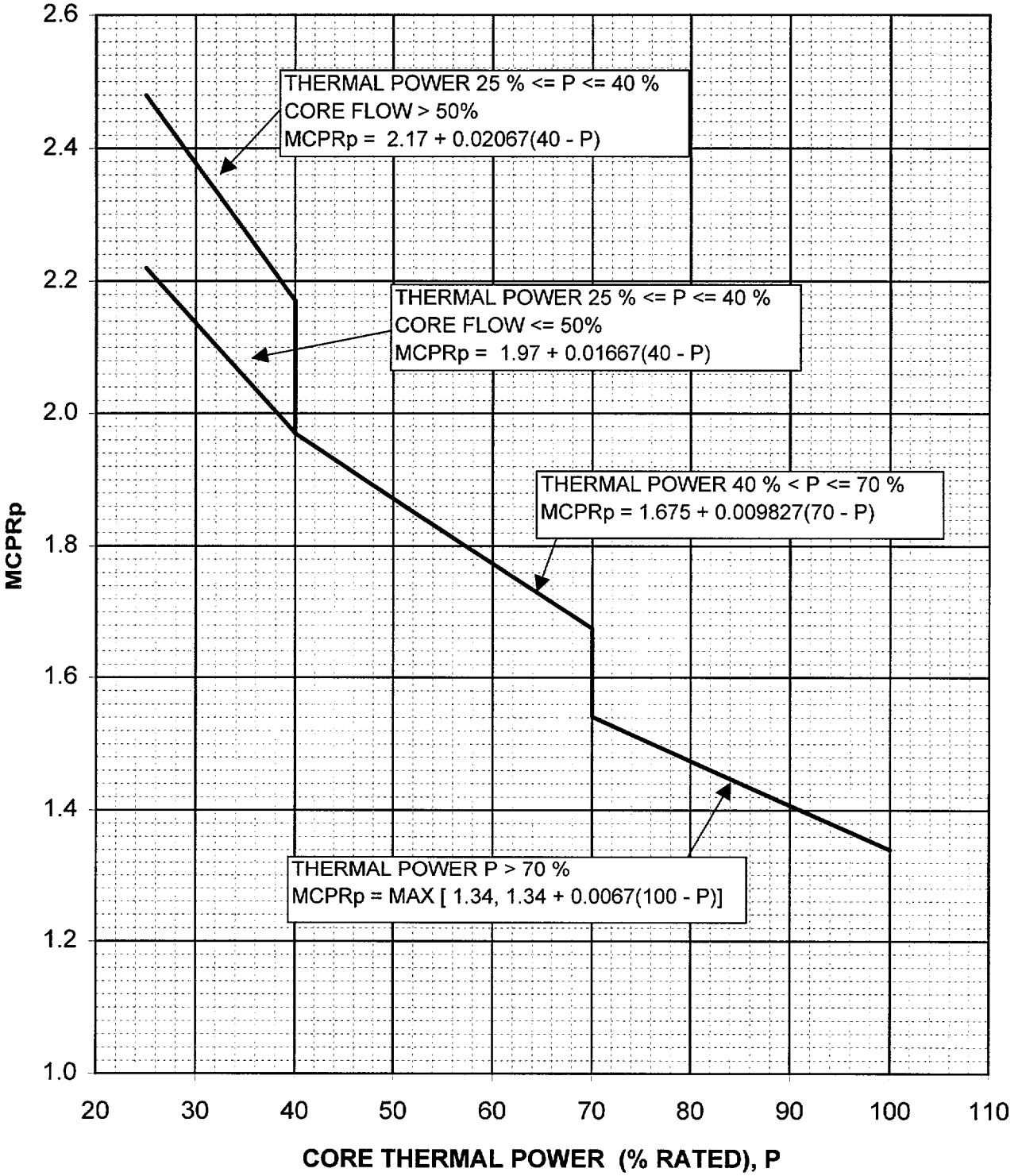


**Figure 2.2-2d, Power Dependent MCPR Limits,**

**Reload Fuel Type GE14 with Pressure Regulator Out of Service**

LIMITS APPLICABLE TO TECHNICAL SPECIFICATION LCO 3.2.3

POWER DISTRIBUTION LIMITS

LINEAR HEAT GENERATION RATE

The LINEAR HEAT GENERATION RATE (LHGR) shall not exceed the limit of 14.4 kW/ft for the following fuel bundle types (References 6, 7):

GE10-P8SXB322-10GZ-120M-150-T
GE10-P8SXB346-10GZ-120M-150-T
GE10-P8SXB348-10GZ-120M-150-T
GE10-P8SXB353-12GZ-120T-150-T

The LINEAR HEAT GENERATION RATE (LHGR) shall not exceed the limit of 13.4 kW/ft for the following fuel bundle types:

GE14-P10SNAB353-13GZ-120T-150-T-2412
GE14-P10SNAB354-15GZ-120T-150-T-2413

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. "Lattice-Dependent MAPLHGR Report for Clinton Power Station Unit 1 Reload 4, Cycle 5," GE Document 23A7213AA, Revision 0, October 1993.

4.B. "Lattice Dependent MAPLHGR Report for Clinton Power Station Unit 1 Reload 5, Cycle 6," GE Document DRF J11-02425MAP, Revision 0, February 1995.

4.C. "Lattice Dependent MAPLHGR Report for Clinton Power Station Unit 1 Reload 6, Cycle 7," GE Document DRF J11-02920MAP, Revision 1, November 1998.

4.D. "Lattice Dependent MAPLHGR Report for Clinton Power Station Unit 1 Reload 7, Cycle 8," GE Document DRF J11-03753MAPL, Revision 0, September 2000.

5.A. "Supplemental Reload Licensing Report for Clinton Power Station Unit 1 Reload 4 Cycle 5," GE Document 23A7213, Revision 0, October 1993.

5.B. "Supplemental Reload Licensing Report for Clinton Power Station Unit 1, Reload 5 Cycle 6," GE Document DRF J11-02425SRLR, Revision 0, February 1995.

5.C. "Supplemental Reload Licensing Report for Clinton Power Station Unit 1 Reload 6, Cycle 7," GE Document DRF J11-02920SRLR, Revision 2, November 1998.

5.D. "Supplemental Reload Licensing Report for Clinton Power Station Unit 1 Reload 7, Cycle 8," GE Document DRF J11-03753SRLR, Revision 0, September 2000.

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.