



PECO NUCLEAR

A Unit of PECO Energy

PECO Energy Company
200 Exelon Way
Kennett Square, PA 19348

August 10, 2000

Docket No. 50-352

License No. NPF-39

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

Subject: Limerick Generating Station, Unit 1
Issuance of the Core Operating Limits Report
for Reload 8, Cycle 9, Revision 1

Dear Sir/Madam:

Enclosed is a copy of the Core Operating Limits Report (COLR) Revision 1 for Limerick Generating Station (LGS) Unit 1, Reload 8, Cycle 9. This COLR provides the cycle-specific parameter limits for: Maximum Average Planar Linear Heat Generation Rate (MAPLHGR); Minimum Critical Power Ratio (MCPR); ARTS MCPR thermal limit adjustments and multipliers; ARTS MAPLHGR thermal limit multipliers; Rod Block Monitor (RBM) data; MAPLHGR single loop operation (SLO) reduction factor; Linear Heat Generation Rate (LHGR); Turbine Bypass Valve parameters; and Reactor Coolant System Recirculation Flow Upscale Trips. These values have been determined using NRC-approved methodology and are established such that all applicable limits of the plant safety analysis are met.

Technical Specifications (TS) Amendment number 142 to License No. NPF-39, issued on May 8, 2000, allowed the removal of the TS requirement to document the MG set scoop tube stop settings in the COLR. Therefore, Revision 1 of the COLR for LGS, Reload 8, Cycle 9 removes the paragraph "Recirculation Pump-Motor-Generator (MG) Set Scoop Tube Stops" and Table 6, which lists the values for the MG Set Scoop Tube Stops, from the COLR.

This COLR Revision was implemented on June 26, 2000, and is being provided to the NRC in accordance with LGS, Unit 1 Technical Specifications (TS) Section 6.9.1.12.

If you have any questions, please do not hesitate to contact us.

Very truly yours,

James A. Hutton
Director - Licensing

Enclosure

cc: (w/encl) H. J. Miller, Administrator, Region 1, USNRC
" A. L. Burritt, USNRC Senior Resident Inspector, LGS

A001

CORE OPERATING LIMITS REPORT
FOR
LIMERICK GENERATING STATION UNIT 1
RELOAD 8 CYCLE 9

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LIST OF EFFECTIVE PAGES

Page(s)

1 - 28

Revision

1

INTRODUCTION AND SUMMARY

This report provides the following cycle-specific parameter limits for Limerick Generating Station Unit 1 Cycle 9:

- Maximum Average Planar Linear Heat Generation Rate (MAPLHGR)
- Minimum Critical Power Ratio (MCPR)
- ARTS MCPR thermal limit adjustments and multipliers
- ARTS MAPLHGR thermal limit multipliers
- Rod Block Monitor (RBM) data
- MAPLHGR single loop operation (SLO) reduction factor
- Linear Heat Generation Rate (LHGR)
- Turbine Bypass Valve parameters
- Reactor Coolant System Recirculation Flow Upscale Trips

These values have been determined using NRC-approved methodology and are established such that all applicable limits of the plant safety analysis are met.

This report is submitted in accordance with Technical Specification 6.9.1.9 of Reference 1. Preparation of this report was performed in accordance with PECO Nuclear, Fuel & Services Division Procedure FM-300.

The data presented in this report is valid for all points and domains on the operating map, including:

- Maximum Extended Load Line Limit (MELLL) down to 81% of rated core flow during full power operation
- Increased Core Flow (ICF) up to 110% of rated core flow
- Feedwater Temperature Reduction (FWTR) up to 105°F during cycle extension operation
- Feedwater Heater Out of Service (FWHOOS) up to 60°F feedwater temperature reduction at any time during the cycle prior to cycle extension.

Further information on the cycle specific analyses for Limerick 1 Cycle 9 and their associated operating domains is available in Reference 2. Additional information on the inputs used in performing the Limerick 1 Cycle 9 specific analyses are available in References 3 and 4.

MAPLHGR LIMITS

The limiting MAPLHGR value for the most limiting lattice (excluding natural uranium) of each fuel type as a function of average planar exposure is given in Figures 1 through 9. These figures are used when hand calculations are required as specified in Technical Specification 3.2.1. The MAPLHGR limit curves of Figures 1 through 9 were generated from References 5 through 8.

For single loop operation, a reduction factor is used, which is shown in Table 3 and graphically depicted in Figure 13. This is documented in Reference 2.

MCPR LIMITS

The MCPR value for use in Technical Specification 3.2.3 is given in Table 1. This table is derived from the Reference 2 analysis and is valid for all Cycle 9 fuel types and operating domains. Information regarding the treatment of these MCPR limits for SLO is also provided.

Bounding MCPR values are also provided for inoperable Recirculation Pump Trip (RPTOOS) and/or inoperable Steam Bypass System (TBVOOS). These two options represent the Equipment Out of Service (EOOS) condition.

Note that in Table 1 the term "EOR" refers to the cycle exposure at which operation at "rated conditions" is no longer possible (i.e., the cycle exposure at which cycle extension begins). The cycle exposure which represents "EOR" is given in the latest verified and approved Cycle Management Report. This value can change during the cycle due to changes in operating strategy.

ARTS THERMAL LIMIT ADMINISTRATION

ARTS provides for power- and flow-dependent thermal limit adjustments and multipliers which allow for a more reliable administration of the MCPR and MAPLHGR thermal limits. The flow-dependent adjustment MCPR(F) is sufficiently generic to apply to all fuel types and operating domains (References 14 and 15). However, there are two sets of flow-dependent MAPFAC(F) multipliers for dual-loop and single-loop operation, References 15 and 11, respectively. Additionally, there are also two sets of power-dependent MAPLHGR multipliers for with- and without-EOOS conditions (References 9, 10 and 18). Finally, there are two sets of power-dependent MCPR adjustments and multipliers for with- and without-EOOS conditions (Reference 9, 10 and 18).

The ARTS adjustments and multipliers are shown in Figures 10 through 16. Thermal limit monitoring must be performed with the more limiting MCPR and MAPLHGR limits resulting from the power- and flow-biased calculation. The use of ARTS multipliers shown in Figures 10 through 16 is documented in References 9 through 11, 14, 15, and 18.

ROD BLOCK MONITOR SETPOINTS

The ARTS RBM provides for power-dependent RBM trips. The trip setpoints/allowable values and applicable RBM signal filter time constant data are shown in Table 2. These values are for use with Technical Specification 3.3.6. The use of the setpoints specified in Table 2 is documented in References 2, 9, and 12.

LINEAR HEAT GENERATION RATES

The maximum LHGR value for each fuel type for use in Technical Specification 3.2.4 is given in Table 4. The LHGR is an exposure dependent value. Due to the proprietary nature of these values, only the maximum LHGR for each fuel type is listed in Table 4. The LHGR data is listed in References 5 and 8 (GNF proprietary).

STEAM BYPASS SYSTEM OPERABILITY

The operability requirements for the steam bypass system for use in Technical Specifications 3.7.8 and 4.7.8.C are found in Table 5. If these requirements cannot be met, the MCPR, MCPR(P) and MAPFAC(P) limits for inoperable Steam Bypass System, known as Turbine Bypass Valve Out Of Service (TBVOOS), must be used. The turbine bypass valve parameters of Table 5 are documented in Reference 3.

RECIRCULATION PUMP TRIP OPERABILITY

If the recirculation pump trip is inoperable, then the MCPR, MCPR(P) and MAPFAC(P) limits for Recirculation Pump Trip Out Of Service (RPTOOS), must be used. Further information about the RPTOOS condition is available in Reference 10.

RECIRCULATION PUMP MOTOR-GENERATOR (MG) SET SCOOP TUBE STOPS

Deleted (Reference 19).

CONTROL ROD BLOCK INSTRUMENTATION REACTOR COOLANT SYSTEM RECIRCULATION FLOW UPSCALE TRIP

Technical Specification Limiting Condition for Operation number 3.3.6 requires control rod block instrumentation channels shall be OPERABLE with their trip setpoints consistent with the values shown in the Trip Setpoint column of Technical Specification Table 3.3.6-2. The Reactor Coolant System Recirculation Flow Upscale Trip is a cycle-specific value and as such is found in Table 7 of this COLR. Table 7 lists the Nominal Trip Setpoints and Allowable Values. These setpoints are set high enough to allow full utilization of the enhanced ICF domain up to 110% of rated core flow. Further details on these setpoints may be obtained from References 12 and 13.

HIGH EXPOSURE PROGRAM BUNDLES

Limerick Unit 1 Cycle 9 is the fourth cycle of irradiation for four Limerick Unit 1 Reload 4 GE11 fuel bundles. These bundles previously resided in Cycles 5 and 6 of Limerick Unit 1 and Cycle 5 of Limerick Unit 2. They have spent one year in the Limerick fuel pool and have been inspected prior to being inserted into this

cycle. These bundles are part of a joint Global Nuclear Fuel - Americas (GNF) and PECO Nuclear Lead Test Assembly (LTA) program. This LTA program was implemented in order to obtain fuel bundle data at exposures beyond the current GE11 licensed limit of 70 GWd/MT peak pellet exposure (Reference 17). A PECO Nuclear 10CFR50.59 Review was performed and PORC-approved for the use of these bundles (Reference 16). No Unreviewed Safety Questions were identified. The MAPLHGR and DESLIM values used for the HIE bundles in Limerick Unit 1 Cycle 9 can be found in Reference 8.

SAFETY LIMIT MINIMUM CRITICAL POWER RATIO (SLMCPR)

The Safety Limit Minimum Critical Power Ratio (SLMCPR) for Limerick 1 Cycle 9 is 1.12 for Dual Loop Operation and 1.14 for Single Loop Operation. These values are documented in Reference 2.

REFERENCES

1. "Technical Specifications and Bases for Limerick Generating Station Unit 1", Docket No. 50-352, License No. NPF-39.
2. "Supplemental Reload Licensing Report for Limerick Generating Station Unit 1 Reload 8 Cycle 9", Global Nuclear Fuel Document No. J11-03646SRLR, Rev. 0, March 2000.
3. Letter, J. A. Baumgartner to K. W. Hunt, "Resolved OPL-3 for Limerick 1 Reload 8 (Cycle 9) Reload Licensing Analysis", November 4, 1999.
4. Letter, J. A. Baumgartner to K. W. Hunt, "Resolved FRED for Limerick 1 Reload 8 (Cycle 9) Reload Licensing Analysis", October 22, 1999.
5. "Lattice Dependent MAPLHGR Report for Limerick Generating Station Unit 1 Reload 7 Cycle 8", General Electric Company Document No. J11-03191MAPL, Rev. 0, March 1998.
6. "Lattice Dependent MAPLHGR Report for Limerick Generating Station Unit 1 Reload 6 Cycle 7", General Electric Company Document No. 24A5185AA, Rev. 0, January 1996.
7. "Lattice Dependent MAPLHGR Report for Limerick Generating Station Unit 1 Reload 5 Cycle 6", General Electric Company Document No. 23A7232AA, Rev. 1, July 1995.
8. "Lattice Dependent MAPLHGR Report for Limerick Generating Station Unit 1 Reload 8 Cycle 9", Global Nuclear Fuel Document No. J11-03646MAPL, Rev. 0, March 2000.
9. "Maximum Extended Load Line Limit and ARTS Improvement Program Analyses for Limerick Generating Station Units 1 and 2", GE Nuclear Energy Document No. NEDC-32193P, Rev.2, October 1993.

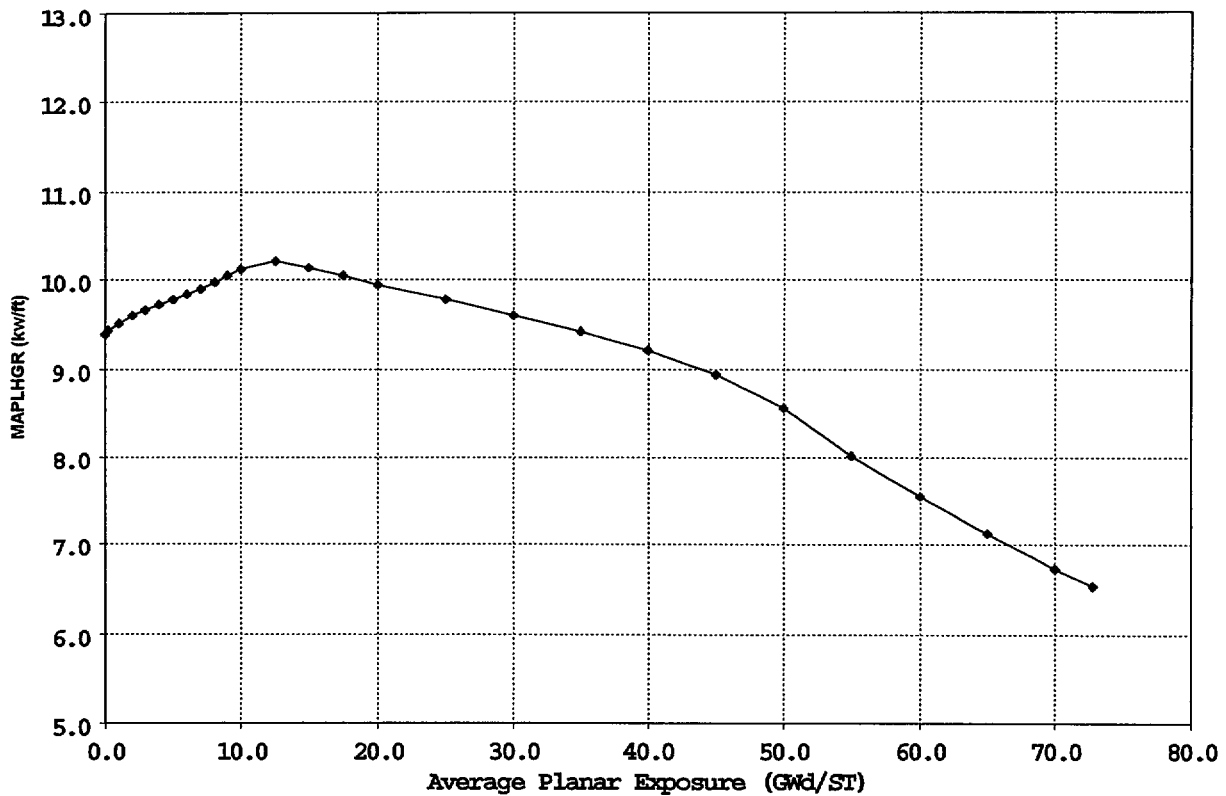
REFERENCES (cont'd)

10. Letter, G. V. Kumar to K. M. McGinnis, "Limerick ARTS Application with Equipment Out-of-Service (EOOS)", Dec. 10, 1993.
11. Letter, J. A. Baumgartner to K. W. Hunt, "OPL-7 Data for the Limerick 1 Cycle 9 Process Computer Data Bank", March 1, 2000.
12. "Power Range Neutron Monitor System Setpoint Calculation", Global Nuclear Fuel Calculation No. LE-0107, Rev. 2, March 2000.
13. "Safety Review for Limerick Generating Station Units 1 and 2, 110% Increased Core Flow Operation and Final Feedwater Temperature Reduction", GE Nuclear Energy Document NEDC-32224P, Rev. 1, October 1994.
14. Letter, J. L. Casillas to G. C. Storey, "Applicability of Flow MCPR Limit to Single Loop Operation", May 5, 1998.
15. "ARTS Flow-Dependent Limits with TBVOOS for Peach Bottom Atomic Power Station and Limerick Generating Station", NEDC-32847P, June 1998.
16. PECO Nuclear 50.59 Review, "Continued Irradiation of Limerick 1 Reload 4 GE11 Assemblies in Limerick 1 Cycle 9", DRF #2109, March 2000.
17. General Electric Report No. NEDE-31917P, "GE11 Compliance with Amendment 22 of NEDE-24011-P-A (GESTAR II), April 1991.
18. General Electric Report No. NEDE-32198P, "GE13 Compliance with Amendment 22 of NEDE-24011-P-A (GESTAR II), December 1993.
19. Amendment to Facility Operating License for Limerick Generating Station Unit 1, Amendment No. 142, Docket No. 50-352, License No. NPF-39.

FIGURE 1

MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE P9CUB331-9G5.0-100T-146-T-HIE (GE11)
(Reference 8)

THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.1

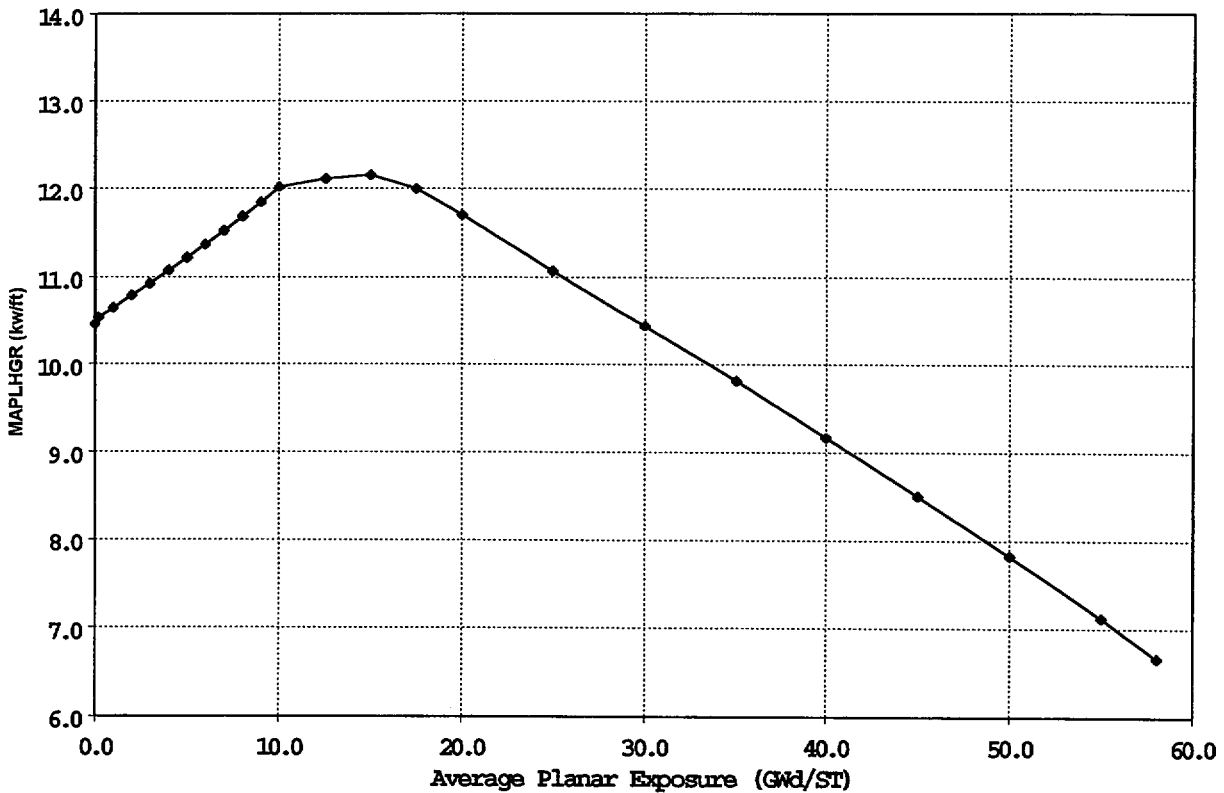


| Avg. Plan Exposure (GWd/ST) | MAPLHGR (kW/ft) | Avg. Plan Exposure (GWd/ST) | MAPLHGR (kW/ft) | Avg. Plan Exposure (GWd/ST) | MAPLHGR (kW/ft) |
|-----------------------------|-----------------|-----------------------------|-----------------|-----------------------------|-----------------|
| 0.0 | 9.39 | 8.0 | 9.97 | 35.0 | 9.41 |
| 0.2 | 9.43 | 9.0 | 10.04 | 40.0 | 9.20 |
| 1.0 | 9.50 | 10.0 | 10.12 | 45.0 | 8.93 |
| 2.0 | 9.59 | 12.5 | 10.22 | 50.0 | 8.55 |
| 3.0 | 9.65 | 15.0 | 10.13 | 55.0 | 8.02 |
| 4.0 | 9.71 | 17.5 | 10.04 | 60.0 | 7.55 |
| 5.0 | 9.77 | 20.0 | 9.94 | 65.0 | 7.12 |
| 6.0 | 9.84 | 25.0 | 9.77 | 70.0 | 6.74 |
| 7.0 | 9.90 | 30.0 | 9.59 | 72.82 | 6.54 |

FIGURE 2

MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE P9CTB417-13GZ-100T-146-T (GE13)
(Reference 8)

THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.1

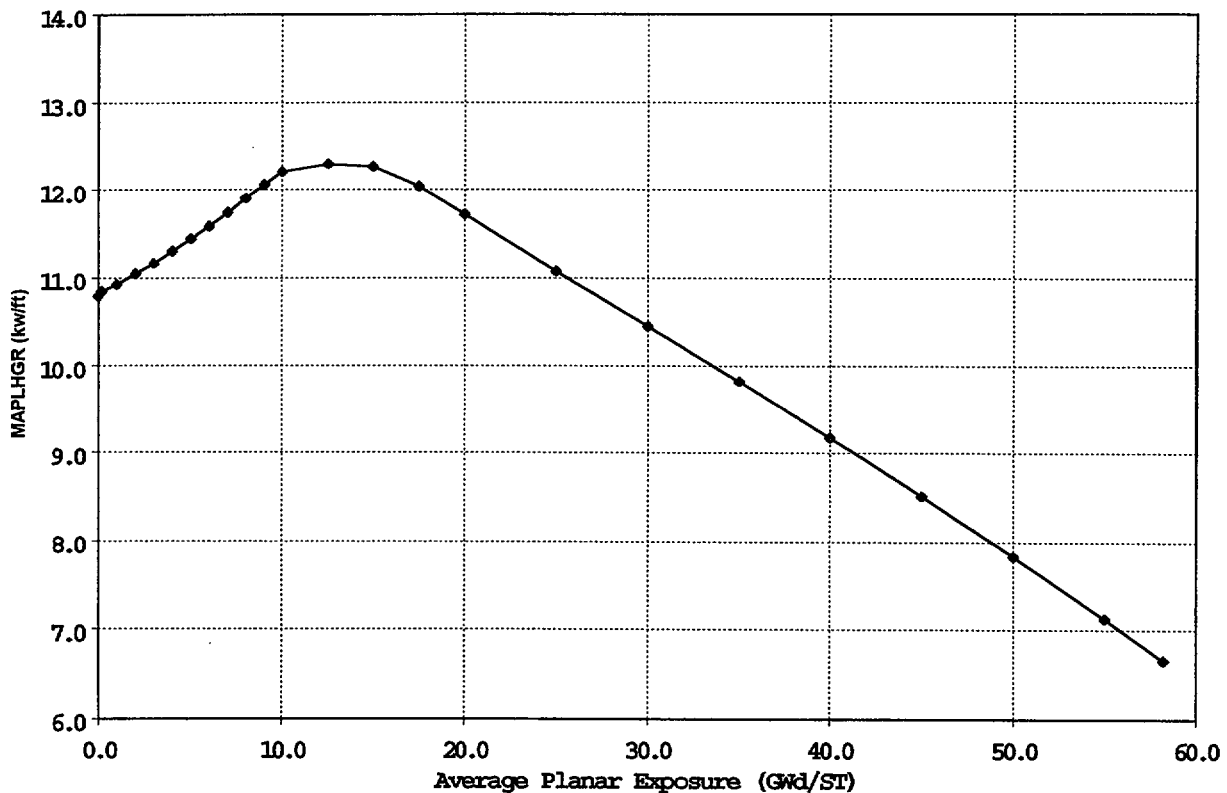


| Avg. Plan Exposure (GWd/ST) | MAPLHGR (kW/ft) | Avg. Plan Exposure (GWd/ST) | MAPLHGR (kW/ft) | Avg. Plan Exposure (GWd/ST) | MAPLHGR (kW/ft) |
|-----------------------------|-----------------|-----------------------------|-----------------|-----------------------------|-----------------|
| 0.0 | 10.46 | 8.0 | 11.69 | 35.0 | 9.81 |
| 0.2 | 10.54 | 9.0 | 11.85 | 40.0 | 9.17 |
| 1.0 | 10.65 | 10.0 | 12.02 | 45.0 | 8.51 |
| 2.0 | 10.79 | 12.5 | 12.11 | 50.0 | 7.83 |
| 3.0 | 10.93 | 15.0 | 12.15 | 55.0 | 7.12 |
| 4.0 | 11.08 | 17.5 | 12.00 | 58.03 | 6.67 |
| 5.0 | 11.22 | 20.0 | 11.71 | | |
| 6.0 | 11.37 | 25.0 | 11.07 | | |
| 7.0 | 11.53 | 30.0 | 10.44 | | |

FIGURE 3

MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE P9CTB417-11GZ-100T-146-T (GE13)
(Reference 8)

THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.1

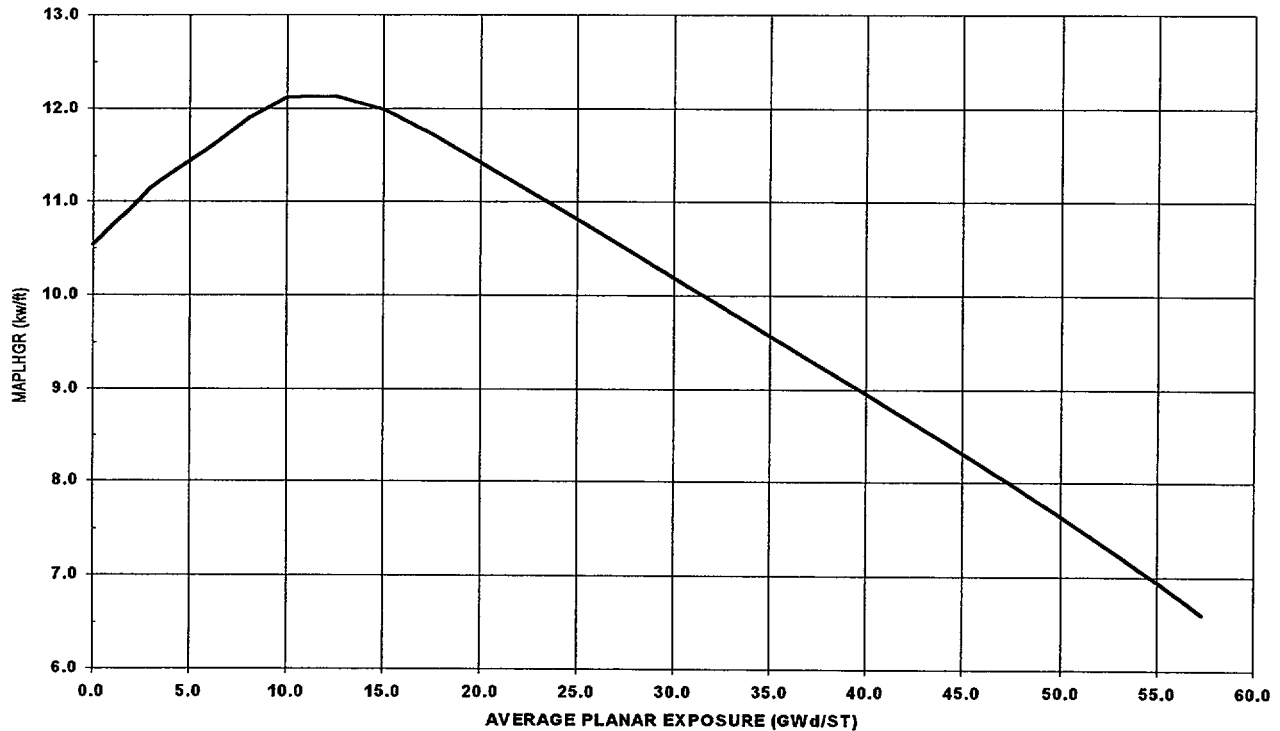


| <u>Avg. Plan Exposure (GWd/ST)</u> | <u>MAPLHGR (kW/ft)</u> | <u>Avg. Plan Exposure (GWd/ST)</u> | <u>MAPLHGR (kW/ft)</u> | <u>Avg. Plan Exposure (GWd/ST)</u> | <u>MAPLHGR (kW/ft)</u> |
|------------------------------------|------------------------|------------------------------------|------------------------|------------------------------------|------------------------|
| 0.0 | 10.79 | 8.0 | 11.91 | 35.0 | 9.82 |
| 0.2 | 10.85 | 9.0 | 12.06 | 40.0 | 9.18 |
| 1.0 | 10.93 | 10.0 | 12.21 | 45.0 | 8.52 |
| 2.0 | 11.05 | 12.5 | 12.30 | 50.0 | 7.84 |
| 3.0 | 11.17 | 15.0 | 12.27 | 55.0 | 7.13 |
| 4.0 | 11.31 | 17.5 | 12.04 | 58.2 | 6.66 |
| 5.0 | 11.45 | 20.0 | 11.73 | | |
| 6.0 | 11.59 | 25.0 | 11.08 | | |
| 7.0 | 11.75 | 30.0 | 10.45 | | |

FIGURE 4

MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE P9CTB404-14GZ (GE13)
(Reference 6)

THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.1

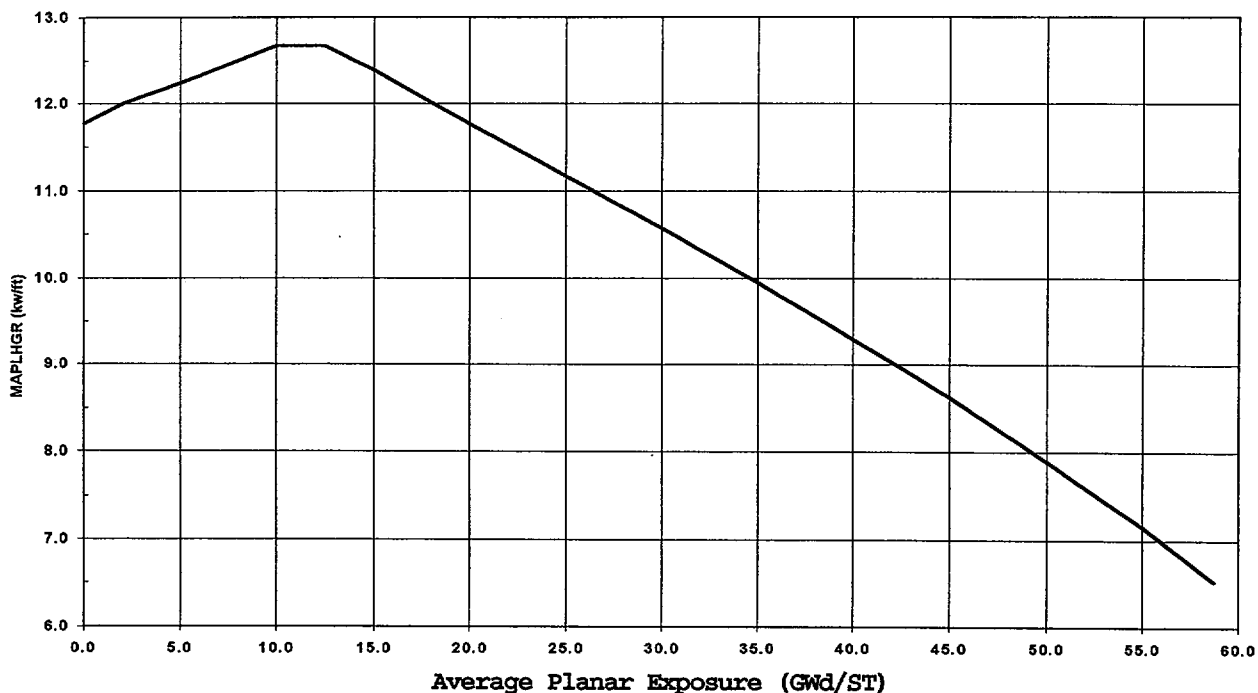


| Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) | Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) | Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) |
|----------------------------|-----------------|----------------------------|-----------------|----------------------------|-----------------|
| 0.0 | 10.53 | 10.0 | 12.12 | 40.0 | 8.96 |
| 1.0 | 10.74 | 12.5 | 12.13 | 45.0 | 8.31 |
| 2.0 | 10.93 | 15.0 | 11.99 | 50.0 | 7.64 |
| 3.0 | 11.14 | 17.5 | 11.74 | 55.0 | 6.94 |
| 4.0 | 11.30 | 20.0 | 11.43 | 57.35 | 6.60 |
| 5.0 | 11.44 | 25.0 | 10.81 | | |
| 6.0 | 11.59 | 30.0 | 10.19 | | |
| 8.0 | 11.90 | 35.0 | 9.58 | | |

FIGURE 5

MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE P9CUB331-9G5.0 (GE11-LGS1 Reinsert)
(Reference 7)

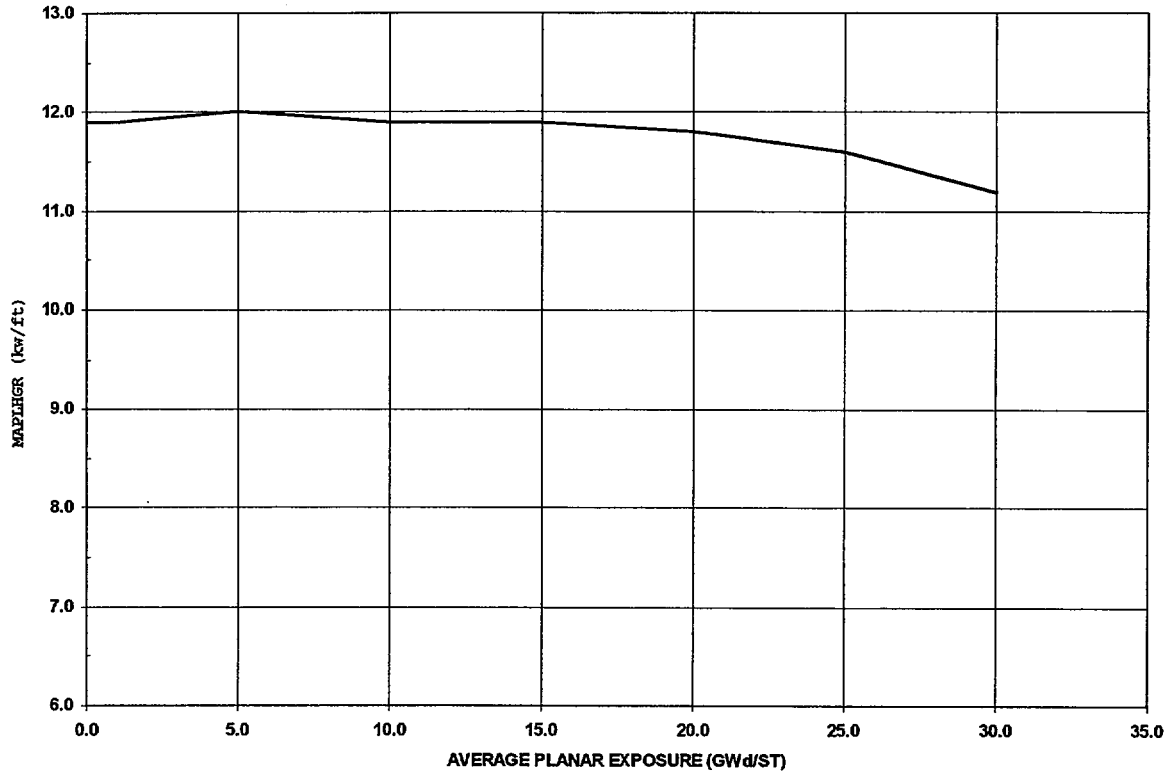
THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.1



| Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) | Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) | Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) |
|----------------------------|-----------------|----------------------------|-----------------|----------------------------|-----------------|
| 0.0 | 11.76 | 12.5 | 12.67 | 35.0 | 9.95 |
| 2.0 | 12.01 | 15.0 | 12.39 | 40.0 | 9.30 |
| 4.0 | 12.16 | 17.5 | 12.08 | 45.0 | 8.62 |
| 6.0 | 12.32 | 20.0 | 11.77 | 50.0 | 7.90 |
| 8.0 | 12.49 | 25.0 | 11.17 | 55.0 | 7.16 |
| 10.0 | 12.67 | 30.0 | 10.57 | 58.7 | 6.52 |
| | | | | | |
| | | | | | |

FIGURE 6

MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPES: P8CIB219-4GZ-100M and P8CIB219-4GZ-80M (GE6)
(References 5 and 7)
THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.1

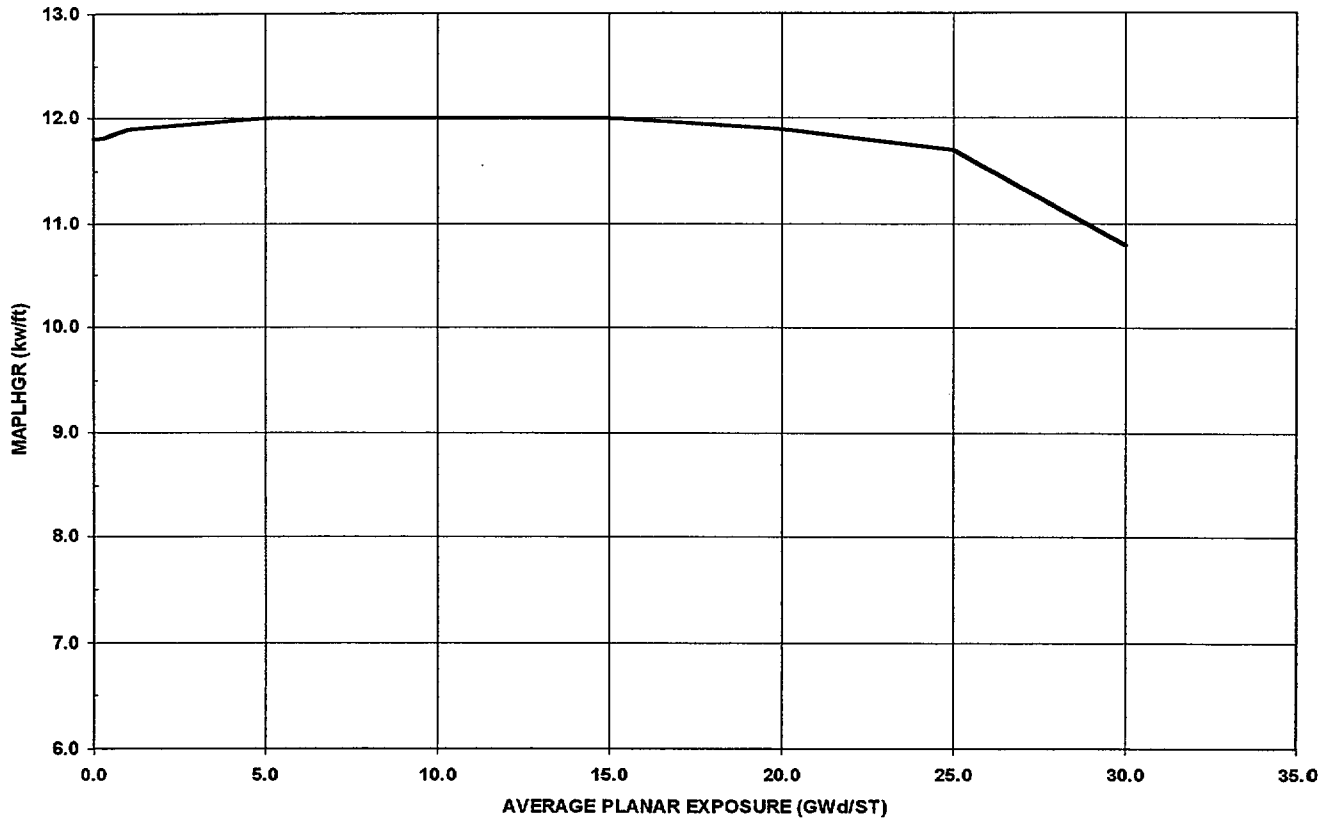


| Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) | Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) | Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) |
|----------------------------|-----------------|----------------------------|-----------------|----------------------------|-----------------|
| 0.0 | 11.90 | 5.0 | 12.00 | 20.0 | 11.80 |
| 0.2 | 11.90 | 10.0 | 11.90 | 25.0 | 11.60 |
| 1.0 | 11.90 | 15.0 | 11.90 | 30.0 | 11.20 |

FIGURE 7

MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE P8CIB176-4GZ-80M (GE6)
(Reference 6)

THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.1

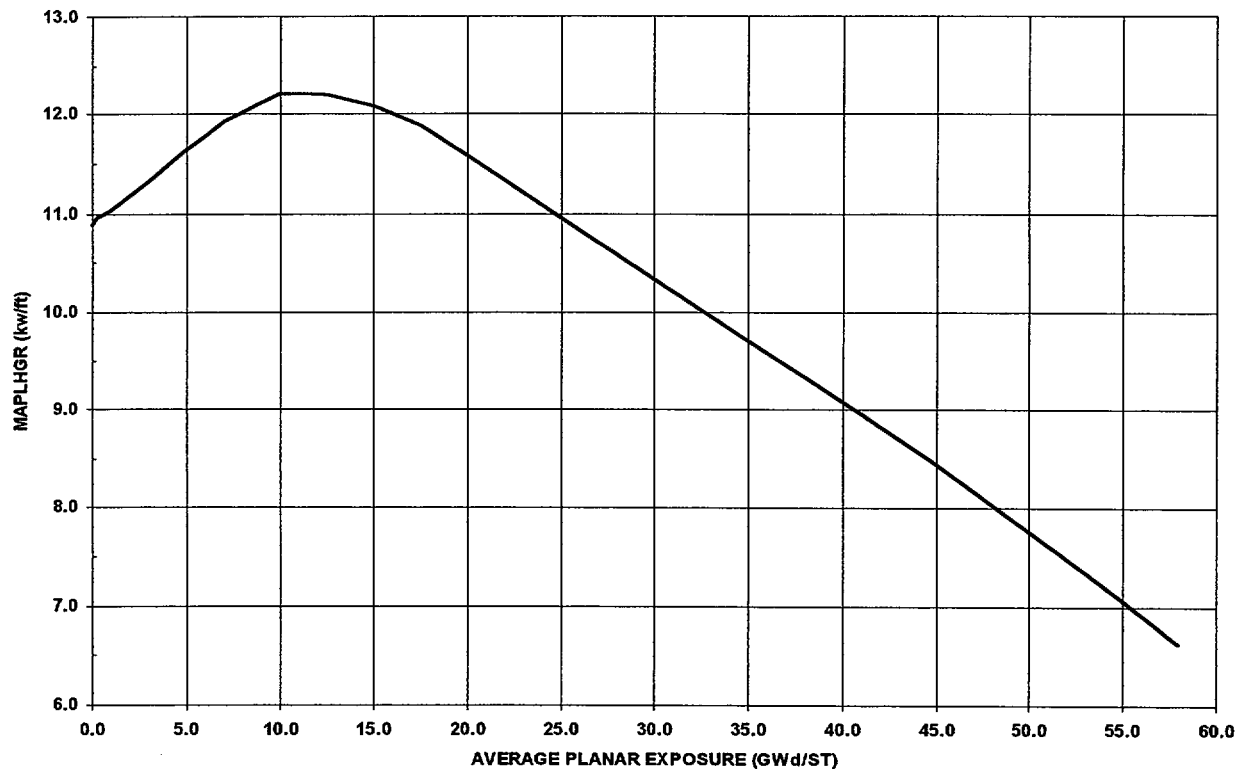


| Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) | Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) | Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) |
|----------------------------|-----------------|----------------------------|-----------------|----------------------------|-----------------|
| 0.0 | 11.80 | 5.0 | 12.00 | 20.0 | 11.90 |
| 0.2 | 11.80 | 10.0 | 12.00 | 25.0 | 11.70 |
| 1.0 | 11.90 | 15.0 | 12.00 | 30.0 | 10.80 |

FIGURE 8

MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE P9CTB412-13GZ (GE13)
(Reference 5)

THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.1

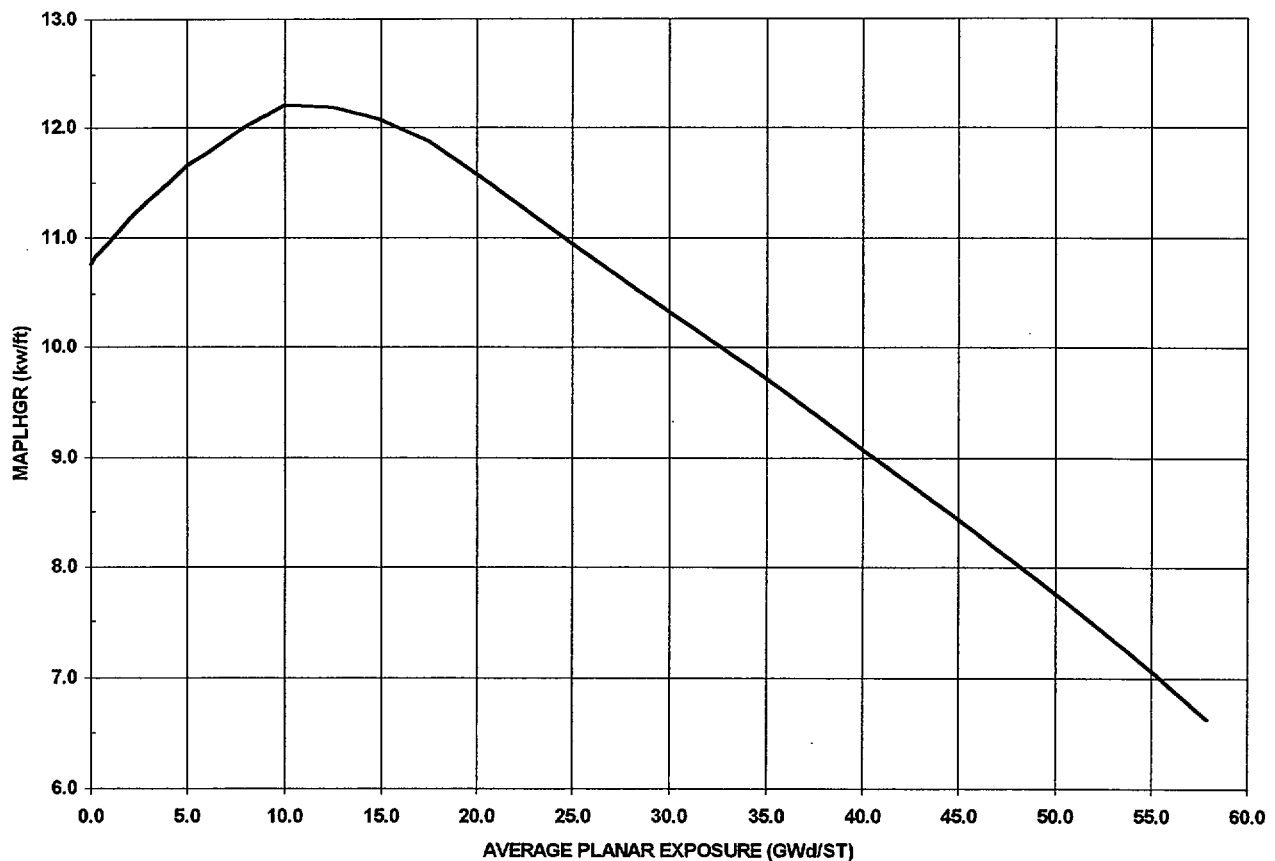


| Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) | Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) | Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) |
|----------------------------|-----------------|----------------------------|-----------------|----------------------------|-----------------|
| 0.0 | 10.89 | 7.0 | 11.92 | 25.0 | 10.95 |
| 0.2 | 10.95 | 8.0 | 12.02 | 30.0 | 10.33 |
| 1.0 | 11.04 | 9.0 | 12.12 | 35.0 | 9.71 |
| 2.0 | 11.18 | 10.0 | 12.21 | 40.0 | 9.08 |
| 3.0 | 11.33 | 12.5 | 12.20 | 45.0 | 8.44 |
| 4.0 | 11.49 | 15.0 | 12.08 | 50.0 | 7.76 |
| 5.0 | 11.65 | 17.5 | 11.88 | 55.0 | 7.06 |
| 6.0 | 11.78 | 20.0 | 11.58 | 57.9 | 6.63 |

FIGURE 9

MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE P9CTB413-14GZ (GE13)
(Reference 5)

THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.1



| Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) | Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) | Avg Plan Exposure (GWd/ST) | MAPLHGR (kw/ft) |
|----------------------------|-----------------|----------------------------|-----------------|----------------------------|-----------------|
| 0.0 | 10.76 | 7.0 | 11.90 | 25.0 | 10.95 |
| 0.2 | 10.83 | 8.0 | 12.01 | 30.0 | 10.33 |
| 1.0 | 10.97 | 9.0 | 12.11 | 35.0 | 9.71 |
| 2.0 | 11.18 | 10.0 | 12.21 | 40.0 | 9.08 |
| 3.0 | 11.34 | 12.5 | 12.19 | 45.0 | 8.44 |
| 4.0 | 11.50 | 15.0 | 12.07 | 50.0 | 7.76 |
| 5.0 | 11.66 | 17.5 | 11.87 | 55.0 | 7.06 |
| 6.0 | 11.78 | 20.0 | 11.58 | 57.9 | 6.63 |

FIGURE 10

POWER DEPENDENT MAPLHGR MULTIPLIER MAPFAC(P)

THIS FIGURE IS VALID FOR THE RCF, ICF, MELL, FWHOS AND FWTR
OPERATING DOMAINS
(References 9 and 18)

THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.1

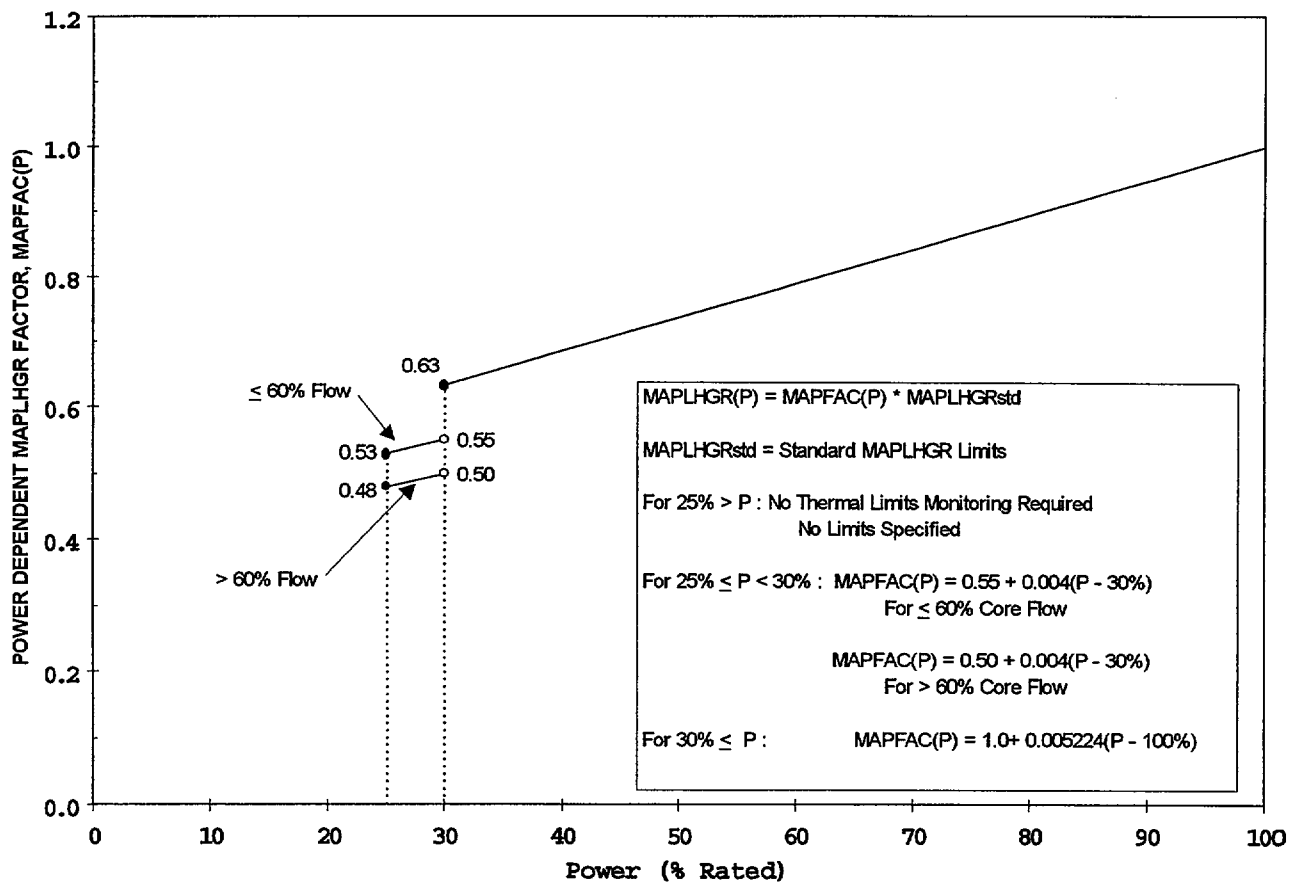


FIGURE 11

POWER DEPENDENT MAPLHGR MULTIPLIER MAPFAC(P)

THIS FIGURE IS VALID FOR RPTOOS AND/OR TBVOOS
OPERATING DOMAINS
(Reference 10)

THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.1

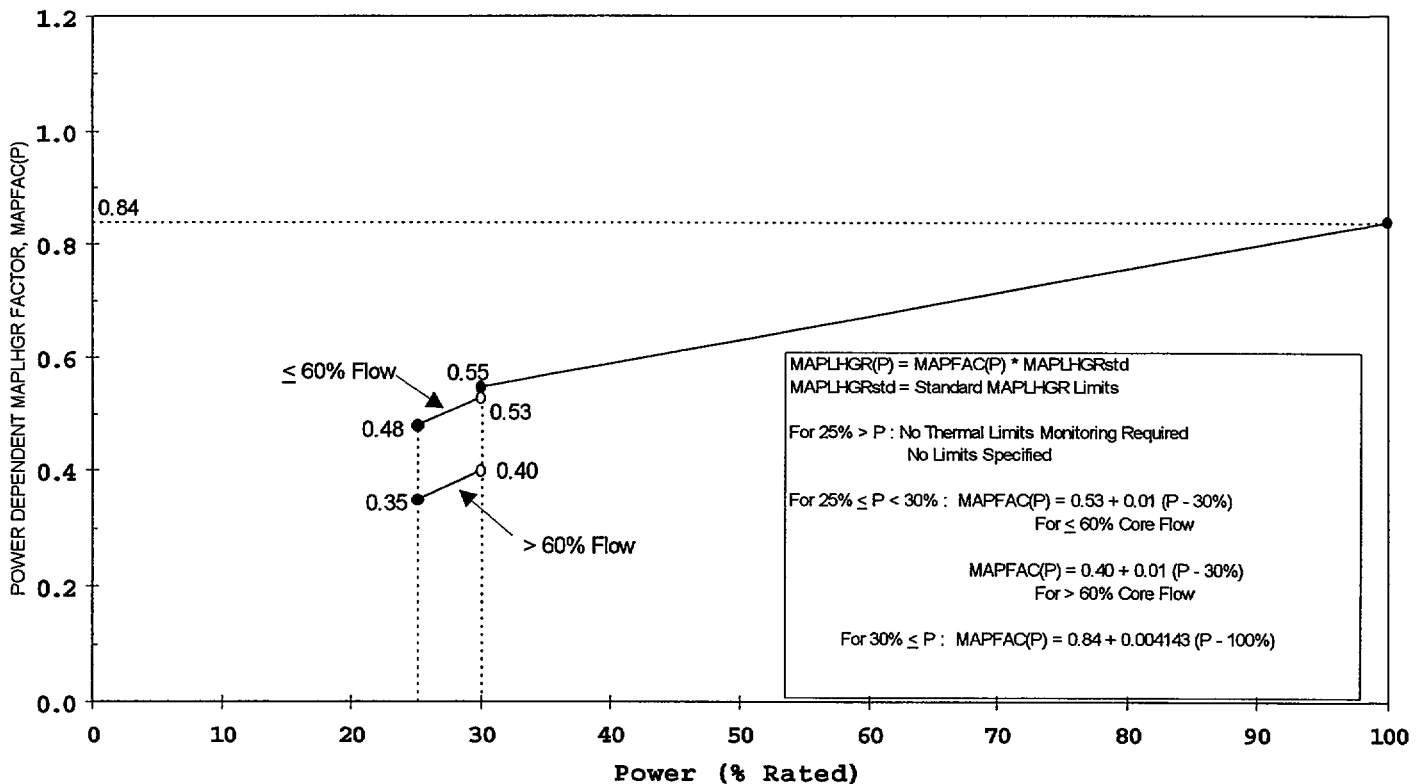


FIGURE 12

FLOW DEPENDENT MAPLHGR MULTIPLIER MAPFAC(F)

THIS FIGURE IS VALID FOR ALL OPERATING DOMAINS
(Reference 15)

THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.1

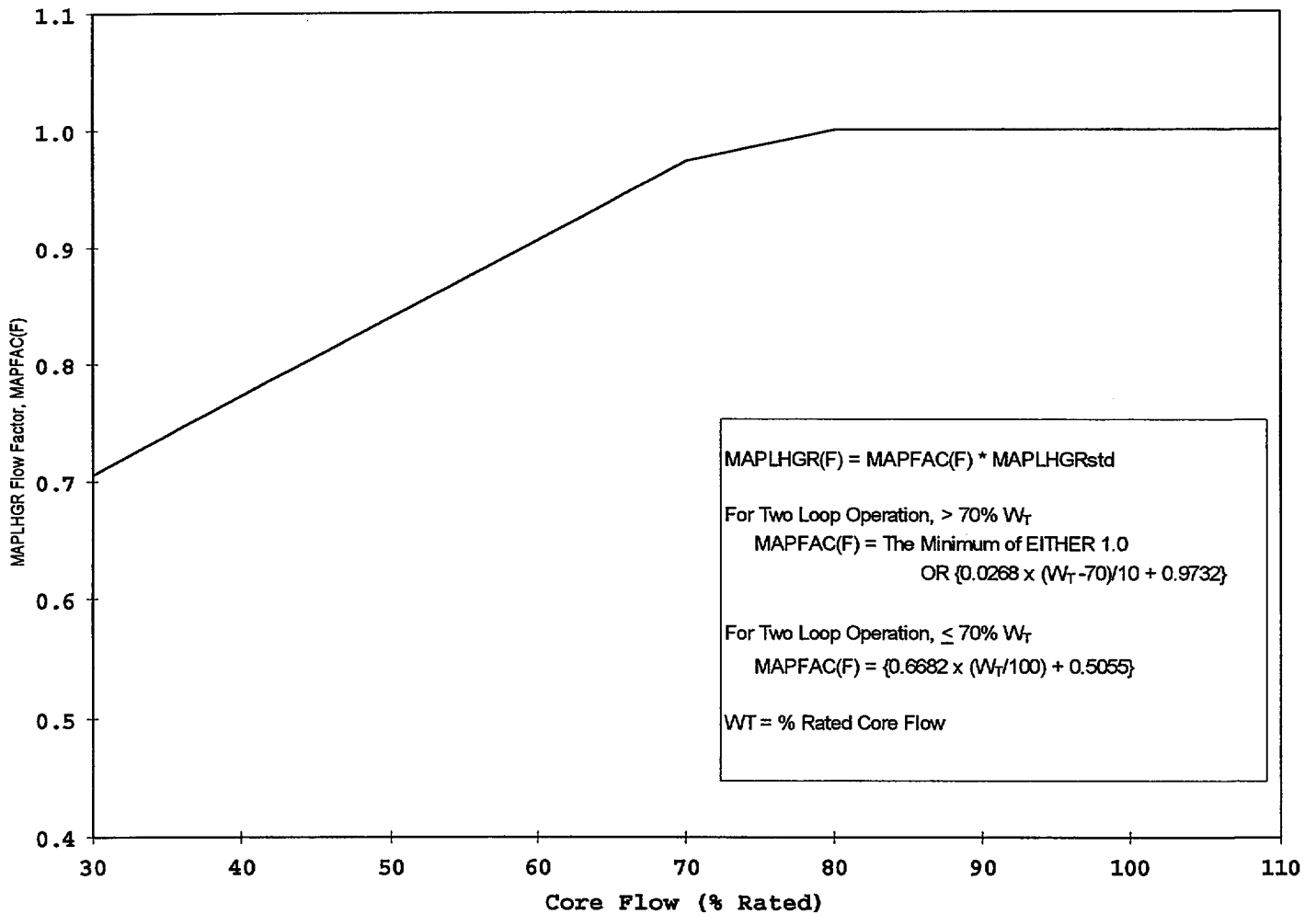


FIGURE 13

FLOW DEPENDENT MAPLHGR MULTIPLIER MAPFAC(F)

THIS FIGURE IS VALID FOR SINGLE LOOP OPERATION
(Reference 11)

THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.1

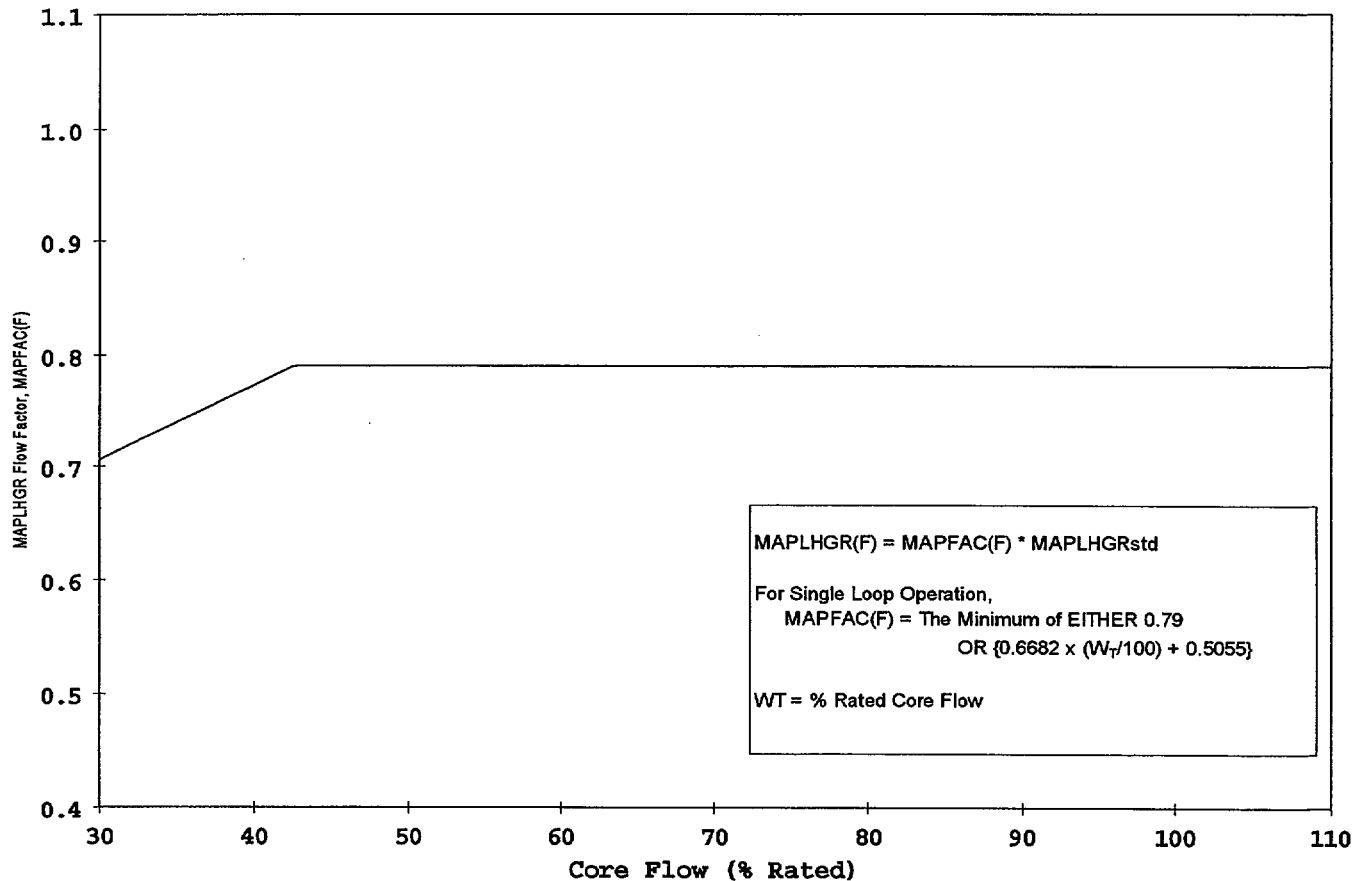


TABLE 1

OPERATING LIMIT MINIMUM CRITICAL POWER RATIO (OLMCPR)
Use in conjunction with Figures 14, 15, and 16.
(Reference 2)

- This table is valid for two-loop operation.
- Add 0.02 to the OLMCPR when in Single Loop Operation.
- This table is valid for all Cycle 9 fuel types.
- This table is referred to by Technical Specification 3.2.3.

| | TBV In Service and RPT In Service | | TBV Out of Service | | RPT Out of Service | |
|-----------------------------------|---|-------------------|-----------------------|-------------------|--------------------|-------------------|
| | Opt. B (Tau=0) | Opt. A (Tau=1) | Opt. B (Tau=0) | Opt. A (Tau=1) | Opt. B (Tau=0) | Opt. A (Tau=1) |
| BOC TO EOR - 2000 MWd/ST | 1.33 | 1.35 | 1.35 | 1.38 | 1.38 | 1.43 |
| EOR - 2000 MWd/ST to EOC | 1.34 | 1.37 | 1.39 | 1.42 | 1.42 | 1.50 |

Notes:

1. When Tau does not equal 0 or 1, determine OLMCPR via linear interpolation.
2. Applicable domains for this table are: RCF, ICF, MELL, FWHOS, FWTR, RPTOS, TBVOS, and SLO (with corrections as discussed above).

FIGURE 14

POWER DEPENDENT MCPR LIMIT ADJUSTMENTS AND MULTIPLIERS

THIS FIGURE IS VALID FOR THE RCF, ICF, MELLL, FWHOOS, AND FWTR
OPERATING DOMAINS
(References 9 and 18)

THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.3

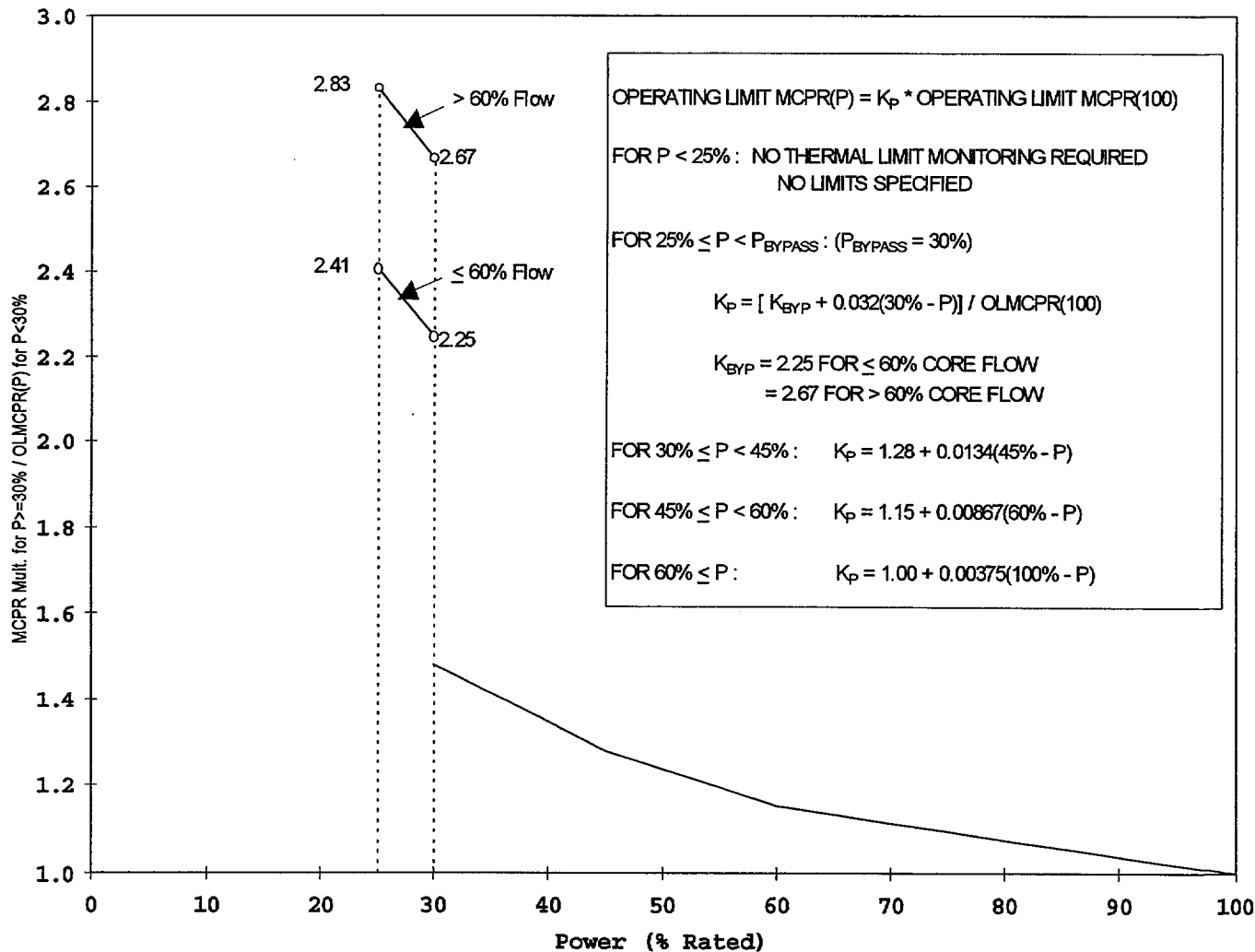


FIGURE 15

POWER DEPENDENT MCPR LIMIT ADJUSTMENTS AND MULTIPLIERS

THIS FIGURE IS VALID FOR RPTOOS AND/OR TBVOOS
OPERATING DOMAINS
(References 10 and 18)

THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.3

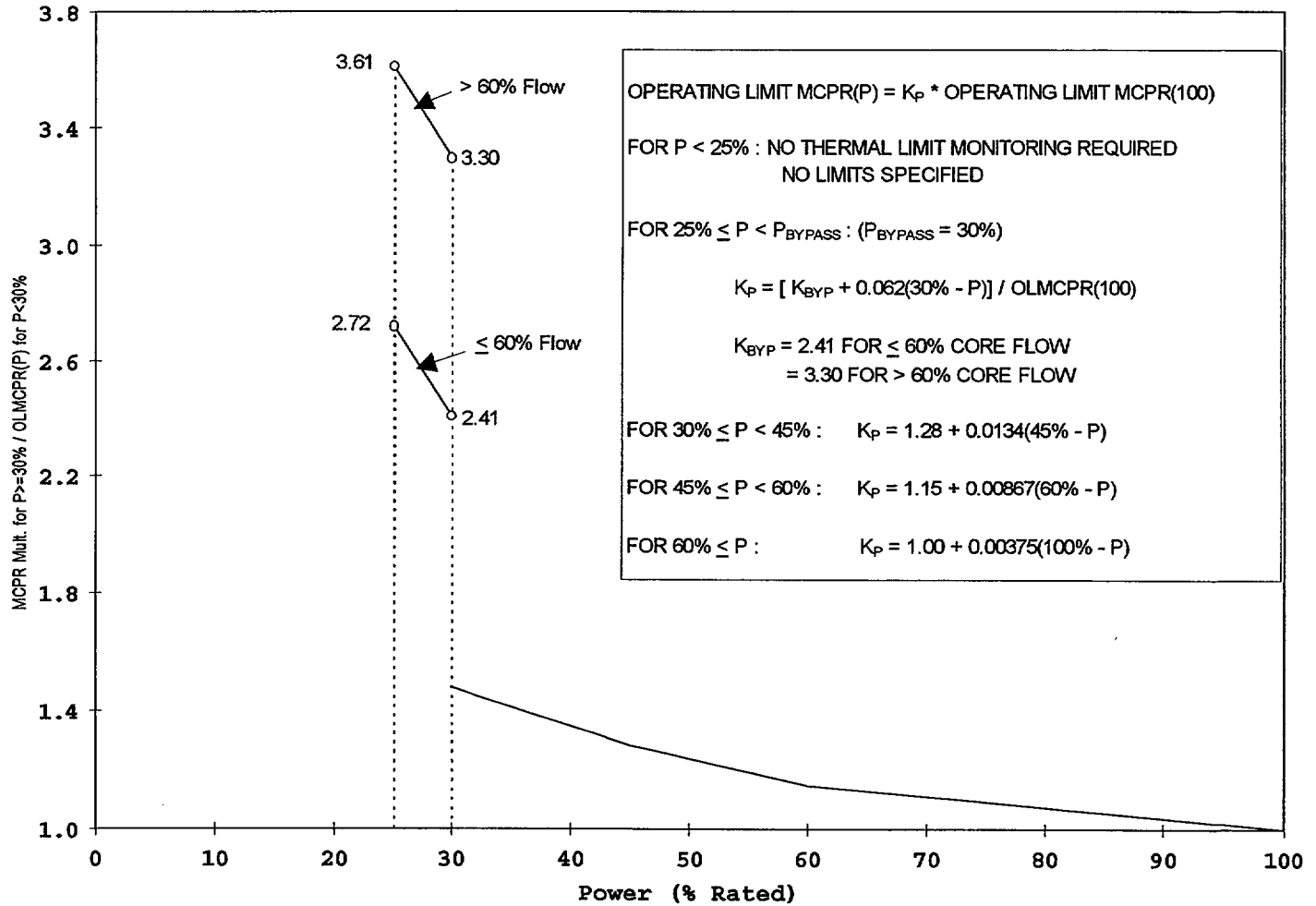


FIGURE 16

FLOW DEPENDENT MCPR LIMITS MCPR(F)

THIS FIGURE IS VALID FOR ALL OPERATING DOMAINS
(INCLUDING SLO AND TWO RECIRCULATION LOOP OPERATION)
(Reference 15)

THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.3

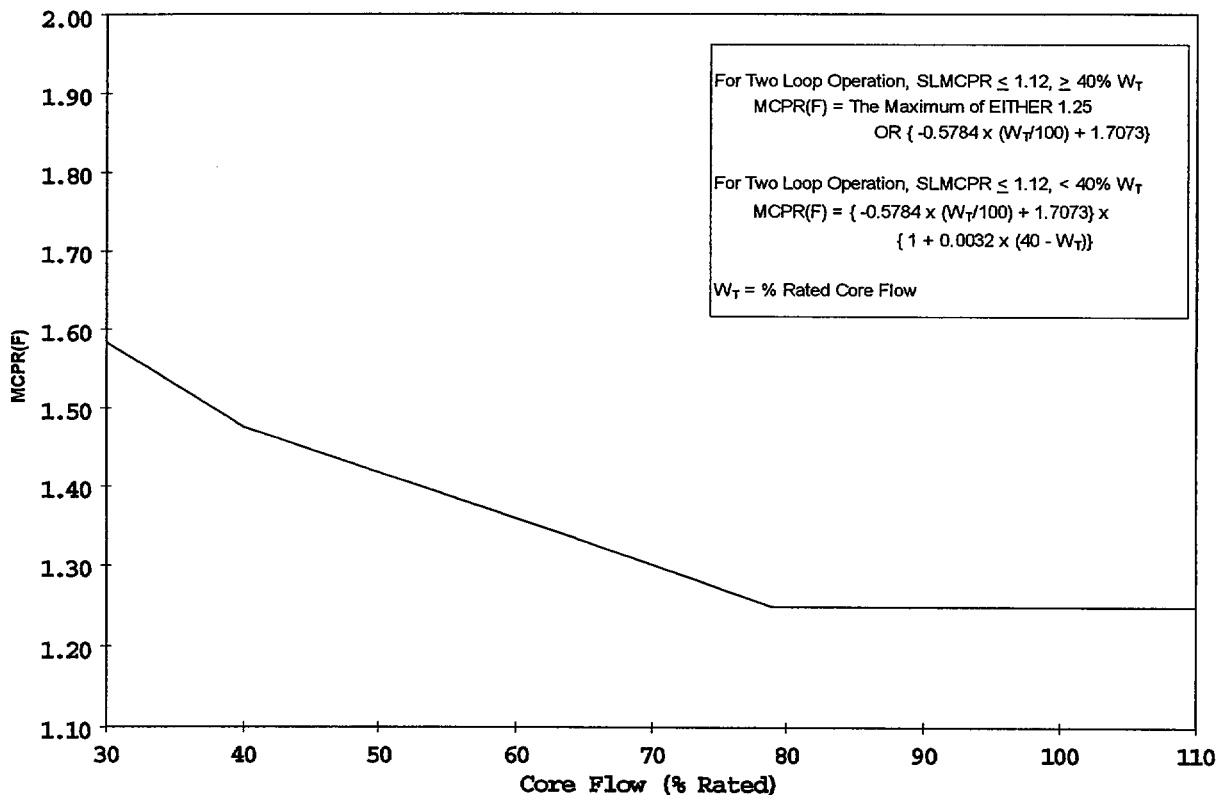


TABLE 2

ROD BLOCK MONITOR DATA
(Reference 13)

| | Nominal Trip Setpoint | Allowable Value |
|------|--------------------------|-----------------|
| LTSP | 118.5% | 118.5% |
| ITSP | 113.7% | 113.7% |
| HTSP | 108.7% | 108.7% |
| DTSP | 92% | 89% |

These setpoints are based on the Cycle 9 RWE Rated MCPR limit of 1.31* and are consistent with an RBM signal filter time constant between 0.1 and 0.55 seconds.

LTSP - Low trip setpoint
ITSP - Intermediate trip setpoint
HTSP - High trip setpoint
DTSP - Downscale trip setpoint

* The Cycle 9 RWE Rated MCPR limit is calculated by multiplying the "Original" Rated MCPR limit of 1.25 found in Reference 9 by the ratio of SLMCPR values (1.12/1.07).

TABLE 3

MAPLHGR SINGLE LOOP OPERATION (SLO) REDUCTION FACTOR
(Reference 2)

SLO reduction factor = 0.79 for all Cycle 9 fuel types.

TABLE 4

Linear Heat Generation Rate Limits

| <u>Fuel Type</u> | <u>Maximum LHGR (kw/ft)</u> |
|--------------------------|-----------------------------|
| GE13 | 14.4 |
| GE11 | 14.4 |
| GE11 (High Exposure LTA) | 11.5 |
| GE6 | 13.4 |

NOTE: The LHGR is an exposure dependent value. Due to the proprietary nature of these values, only the maximum LHGR for each fuel type is provided in Table 4. The LHGR data is provided in References 5 and 8 (GNF proprietary).

TABLE 5

TURBINE BYPASS VALVE PARAMETERS
(Reference 3)

TURBINE BYPASS SYSTEM RESPONSE TIME

| | |
|--|----------|
| Maximum delay time before start of bypass valve opening following start of turbine stop valve motion | 0.11 sec |
|--|----------|

| | |
|---|----------|
| Maximum time after start of turbine stop valve motion until bypass valve position reaches 80% of full flow (includes the above delay time) | 0.31 sec |
|---|----------|

MINIMUM REQUIRED BYPASS VALVES TO MAINTAIN SYSTEM OPERABILITY

Number of valves = 7

TABLE 6

(Reference 19)

DELETED

TABLE 7

Control Rod Block Instrumentation
Reactor Coolant System Recirculation Flow Upscale Trip
(References 12 and 13)

Nominal Trip Setpoint $\leq 113.4\%$

Allowable Value $\leq 115.6\%$