

CORE OPERATING LIMITS REPORT
FOR
LIMERICK GENERATING STATION UNIT 2
RELOAD 3, CYCLE 4

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LIST OF EFFECTIVE PAGES

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1,2,6,7,18-26,29-33,37	1

INTRODUCTION AND SUMMARY

This report 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) setpoints; MAPLHGR single loop operation (SLO) reduction factor; Linear Heat Generation Rate (LHGR); Turbine Bypass Valve parameters; Recirculation Pump Motor Generator (MG) Set Scoop Tube Stops; and Reactor Coolant System Recirculation Flow Upscale Trips for Limerick Generating Station Unit 2, Cycle 4. 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 Energy Company, Fuel & Services Division Procedure FM-105.

This report contains all thermal limit parameters related to the implementation of the ARTS Improvement Program and Maximum Extended Load Line Limit analyses (ARTS/MELLLA) for Limerick 2 Cycle 4. This is the first application of ARTS/MELLLA at Limerick Generating Station Unit 2.

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 10. These figures are used when hand calculations are required as specified in Technical Specification 3.2.1.

No reduction in MAPLHGR limits is required under ARTS during single loop operation (Table 2).

MCPR LIMITS

The MCPR value for use in Technical Specification 3.2.3 for each fuel type is given in Figures 11 through 19. Information regarding the validity of these MCPR limits in various operating domains and for SLO is also provided.

The MCPR values shown in these figures are the bounding values for all points on the power flow 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, Rated Core Flow (RCF, the area between the MELLL and ICF operating domains), Feedwater Temperature Reduction (FWTR) up to 105°F during Power Coastdown operation and Feedwater Heater Out of Service (FWHOOS) up to 60°F feedwater temperature reduction at any time during the cycle prior to Power Coastdown operation.

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

(EOOS) condition.

Note in these figures 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 multiplier MAPFAC(F) and flow-dependent adjustment MCPR(F) are sufficiently generic to apply to all fuel types and operating domains. However, there are two sets of power-dependent MAPLHGR multipliers for with- and without-EOOS conditions. Also, there are two sets of power-dependent MCPR adjustments and multipliers for with-and without-EOOS conditions.

These adjustments and multipliers are shown in Figures 20 through 25.

ROD BLOCK MONITOR SETPOINTS

The ARTS RBM provides for power-dependent RBM trips to replace the previous flow-dependent trips. The trip setpoints and applicable RBM signal filter time constant data are shown in Table 1.

LINEAR HEAT GENERATION RATES

The LHGR value for each fuel type for use in Technical Specification 3.2.4 is given in Table 3.

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 4. 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.

RECIRCULATION PUMP TRIP OPERABILITY

If the recirculation pump trip is inoperable, the MCPR, MCPR(P) and MAPFAC(P) limits for Recirculation Pump Trip Out Of Service (RPTOOS), must be used.

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

The electrical and mechanical stops are set to limit the reactor core coolant flow rate during an event in which the recirculation flow rate increases to its maximum value. Technical Specification Surveillance Requirement number 4.4.1.1.2 requires that each pump MG set scoop tube mechanical and electrical stop shall be demonstrated OPERABLE, with overspeed setpoints less than or equal to specified values, at least once per 24 months. These values are cycle specific and can be found in Table 5 of this COLR.

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 6 of this COLR. Table 6 lists the Nominal Trip Setpoint and Allowable Value.

QUALIFICATION FUEL BUNDLES

LGS Unit 2 Cycle 4 will be the third cycle of irradiation for the QFBs. The thermal limit basis for the ABB and SPC QFBs are specified in References 6 through 10. The limiting MAPLHGR values for the ABB and SPC QFBs (Figures 7 and 8) are based on the original MAPLHGR values for the 3E9B-P8CWB325-9GZ2-80M-150 bundle (Reference 5) and not the revised values (Reference 3). The MCPR values for the ABB and SPC QFBs are calculated based on the MCPR values of the GE9B-P8CWB325-9GZ2-80M-150 bundle (References 2 and 11). Specific values for all thermal limits are given for the GE11 QFBs (LUA304).

DEBRIS FILTER BUNDLES

Limerick Unit 2 Cycle 4 is the first PECO Energy Cycle in which a GE Fuel Bundle fitted with a debris-resistant lower tie plate (LTP) is used. Four of the Reload 3 GE11 fuel bundles will be equipped with these debris-resistant LTPs. The debris filter bundles will be modeled the same as the Reload 3 GE11 bundle (P9CUB399-14GZ). Therefore, they will have the same cycle specific parameter limits. The use of these debris-resistant LTP bundles is justified in References 15 and 16.

SAFETY LIMIT MINIMUM CRITICAL POWER RATIO (SLMCPR)

The Safety Limit Minimum Critical Power Ratio (SLMCPR) for Limerick 2 Cycle 4 has been recalculated by General Electric. The new analysis yields a SLMCPR of 1.10; 0.03 higher than previously reported. This change has been incorporated into the COLR as per the directions of Reference 17. A revision to the Supplemental Reload Licensing Report, Reference 18, has been issued to document the effect on Operating Limit Minimum Critical Power Ratio (OLMCPR) due to the change in SLMCPR. In addition, the Reference 19 letter documents the changes to the ARTS (power and flow) MCPR curves due to the increase in SLMCPR.

REFERENCES

- 1) "Technical Specifications and Bases for Limerick Generating Station Unit 2", Docket No. 50-353, License No. NPF-85.
- 2) "Supplemental Reload Licensing Report for Limerick Generating Station Unit 2 Reload 3 Cycle 4", General Electric Company Document No. 24A5168, Rev. 0, January 1995.
- 3) "Lattice Dependent MAPLHGR Report for Limerick Generating Station Unit 2 Reload 3 Cycle 4", General Electric Company Document No. 24A5168AA, Rev. 0, January 1995.
- 4) "Lattice-Dependent MAPLHGR Report for Limerick Generating Station Unit 2 Reload 2 Cycle 3", General Electric Company Document No. 23A7200AA, Rev. 3, July 1994.
- 5) "Basis of MAPLHGR Technical Specifications for Limerick Generating Station Unit 2", NEDC-31930P, April 1991.
- 6) "Supplemental Lead Fuel Licensing Report, SVEA-96 Lead Fuel Assemblies for Limerick-2, Summary", ABB Atom Report BR 91-042, January 1991.
- 7) "Limerick-2 9x9-9X+ Qualification Fuel Assembly Safety Analysis Report", ANF-90-193(P), Revision 1, September 1992.
- 8) Letter, W. R. Harris to A. M. Olson, "Revised LGS-2 SVEA-96 Lead Fuel Assembly (LFA) LOCA Limits", April 26, 1993.
- 9) Letter, H. G. Shaw to Manager Fuel Management Section, "Relaxation of LHGR and MAPLHGR limits for the 9x9-9X + Qualification Fuel Assemblies (QFAs) for Limerick", May 13, 1993.
- 10) "Supplemental Lead Fuel Assembly Licensing Report, SVEA-96 LFAs for Limerick 2", ABB Report UK 90-512, September 1991.
- 11) Calculation Sheet prepared by J. F. Buckley, "OLMCPR Limits for L2C4", DRF No. 4404, January 3, 1995.

REFERENCES (CONT.)

12) "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

13) Letter, G. V. Kumar to K. M. McGinnis, "Limerick ARTS Application with Equipment Out-of-Service(EOOS)", Dec. 10, 1993.

14) "Power Rerate Condition Setpoint Calculations for the Philadelphia Electric Company Limerick Generating Station Units 1 & 2", Document NO. GE-NE-208-20-0993-2, August 1994.

15) Letter, R. M. Butrovich to H. J. Diamond, "Safety Review of the Limerick 2 Cycle 4 Revised Loading Pattern" January 20, 1995.

16) ECR No. LG 94-11314 "DEC for Use of GE-11 Debris Resistant Lower Tie Plate"

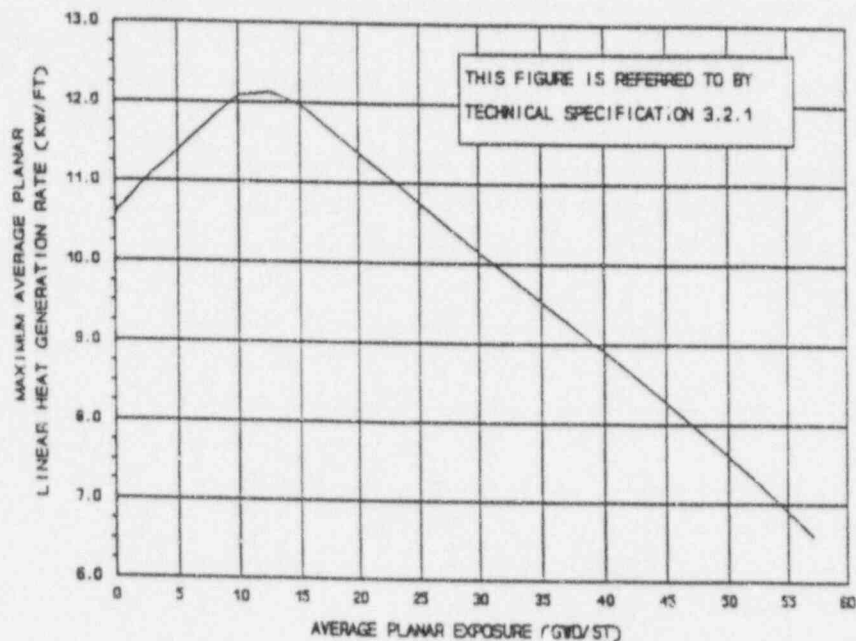
17) Letter, R. M. Butrovich to H. J. Diamond, "Limerick Unit 2 Safety Limit MCPR", May 21, 1996.

18) "Supplemental Reload Licensing Report for Limerick Generating Station Unit 2 Reload 3 Cycle 4", General Electric Company Document No. 24A5168, Rev. 1, June 1996.

19) Letter, R. M. Butrovich to H. J. Diamond, "Limerick 2 Reload 3 (Cycle 4) SRLR Revision 1", June 14, 1996.

Figure 1

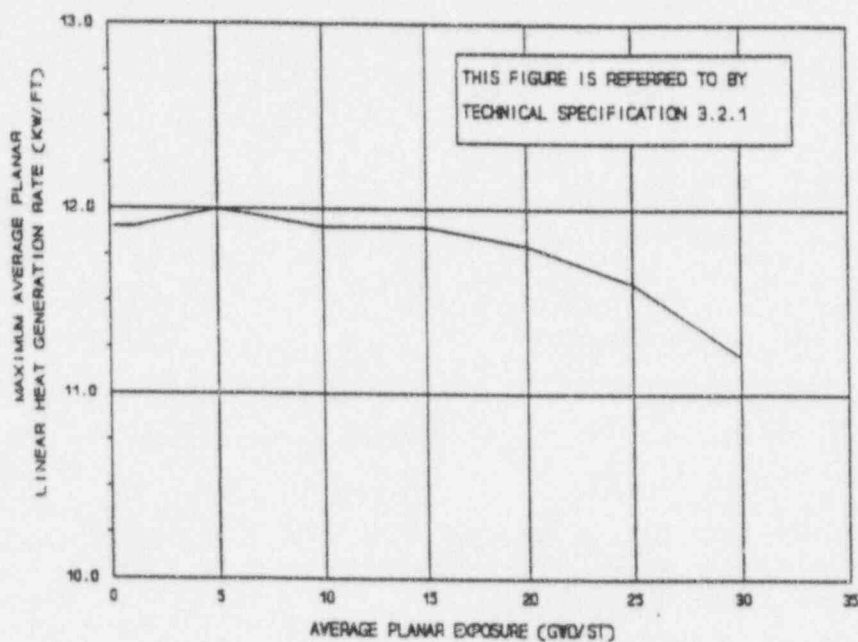
MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE P9CUB399-14GZ (GE11)



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	10.57	7.0	11.67	25.0	10.75
0.2	10.63	8.0	11.82	30.0	10.14
1.0	10.76	9.0	11.95	35.0	9.53
2.0	10.95	10.0	12.09	40.0	8.91
3.0	11.10	12.5	12.13	45.0	8.27
4.0	11.24	15.0	11.97	50.0	7.60
5.0	11.38	17.5	11.68	55.0	6.90
6.0	11.53	20.0	11.37	57.1	6.59

Figure 2

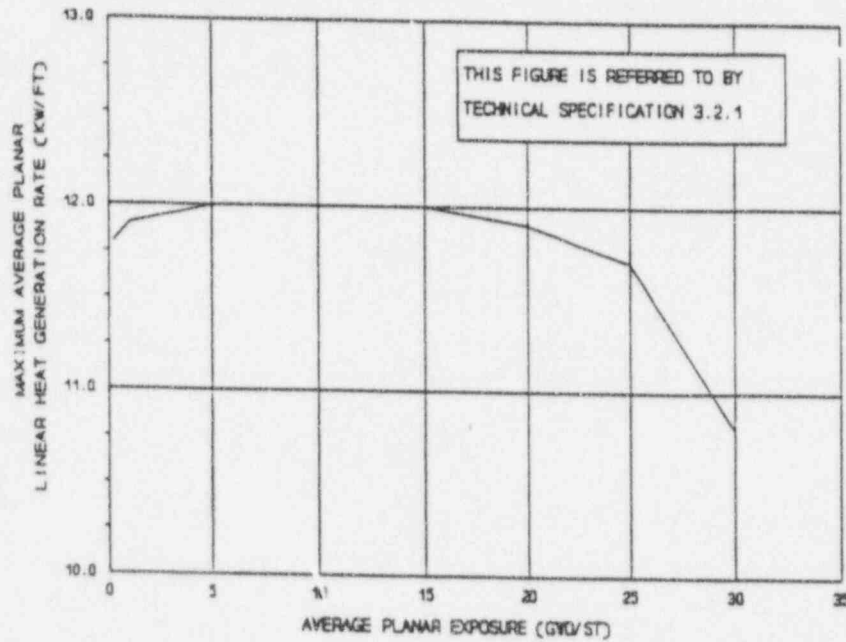
MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE P8CIB219-4GZ (GE6)



<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>
0.2	11.90	10.0	11.90	25.0	11.60
1.0	11.90	15.0	11.90	30.0	11.20
5.0	12.00	20.0	11.80		

Figure 3

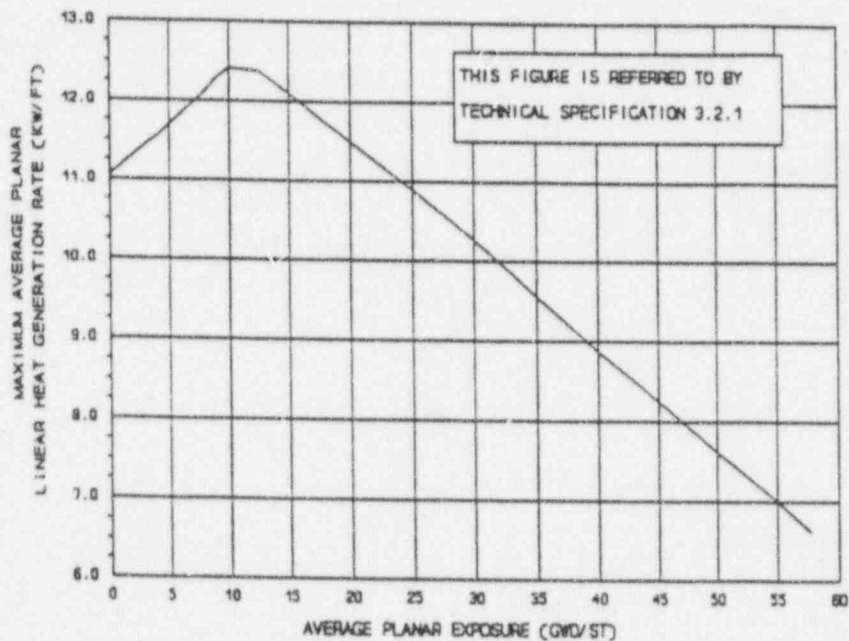
MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE P8CIB176-4GZ (GE6)



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

Figure 4

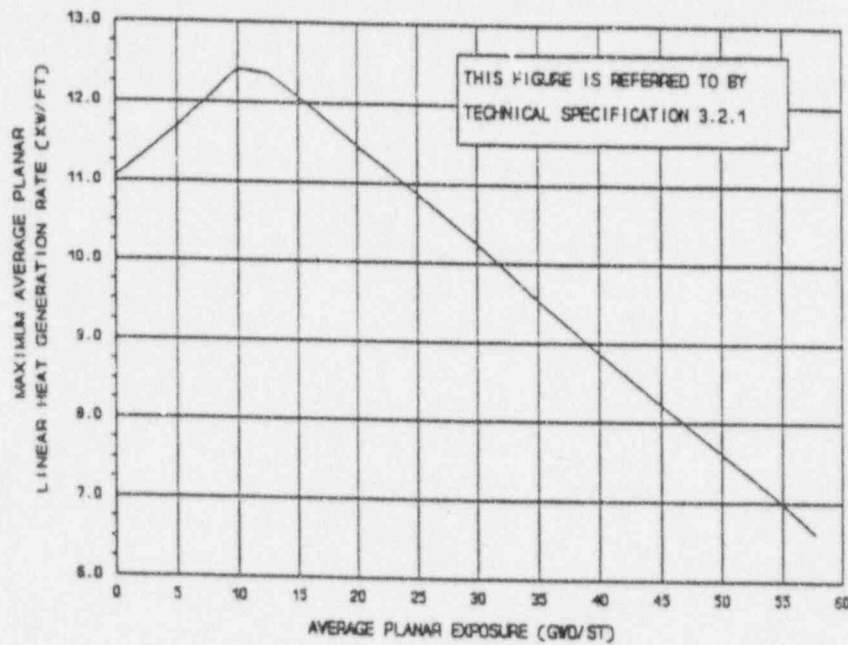
MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE P9CUB354-12GZ2 (GE11)



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	11.05	7.0	11.98	25.0	10.89
0.2	11.09	8.0	12.13	30.0	10.27
1.0	11.19	9.0	12.30	35.0	9.55
2.0	11.31	10.0	12.42	40.0	8.87
3.0	11.44	12.5	12.38	45.0	8.24
4.0	11.56	15.0	12.10	50.0	7.62
5.0	11.70	17.5	11.79	55.0	7.00
6.0	11.84	20.0	11.49	57.7	6.62

Figure 5

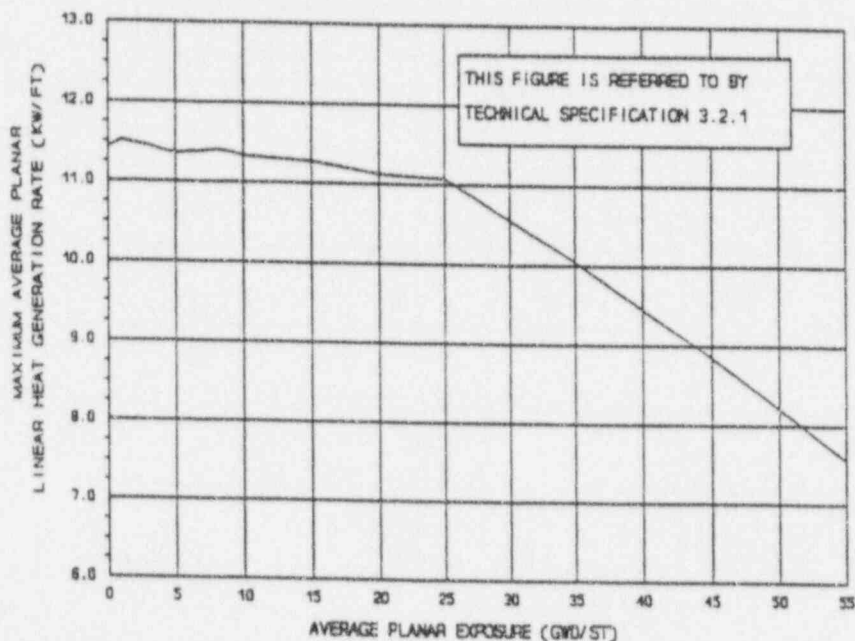
MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE P9CUB354-13GZ2 (GE11)



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	11.04	7.0	11.97	25.0	10.87
0.2	11.08	8.0	12.12	30.0	10.25
1.0	11.18	9.0	12.28	35.0	9.54
2.0	11.30	10.0	12.42	40.0	8.86
3.0	11.43	12.5	12.36	45.0	8.22
4.0	11.56	15.0	12.08	50.0	7.60
5.0	11.69	17.5	11.78	55.0	6.99
6.0	11.83	20.0	11.47	57.7	6.61

Figure 6

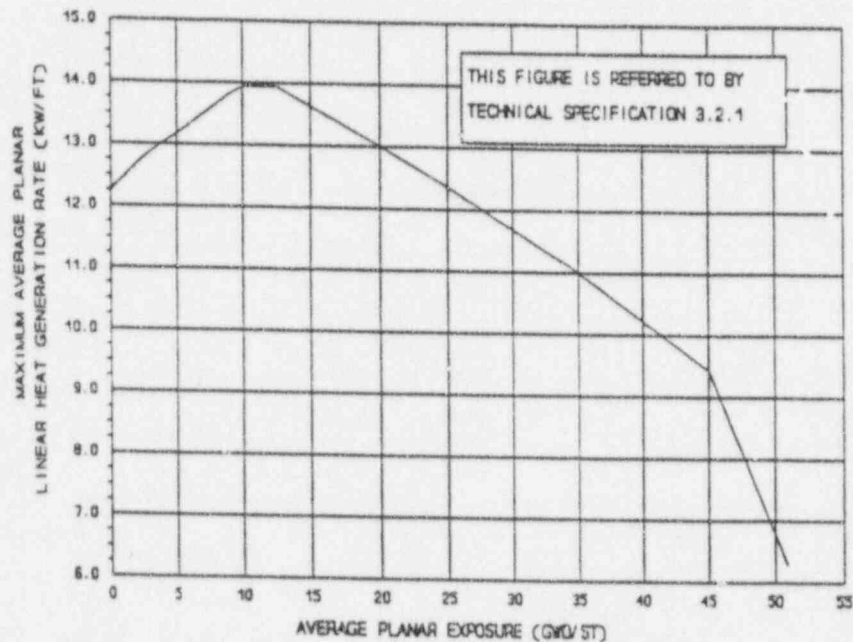
MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE P9CUB304-LUA (GE11)



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	11.42	7.0	11.38	25.0	11.07
0.2	11.44	8.0	11.40	30.0	10.56
1.0	11.52	9.0	11.37	35.0	10.05
2.0	11.48	10.0	11.33	40.0	9.45
3.0	11.44	12.5	11.30	45.0	8.85
4.0	11.39	15.0	11.27	50.0	8.21
5.0	11.35	17.5	11.20	55.0	7.56
6.0	11.37	20.0	11.12		

Figure 7

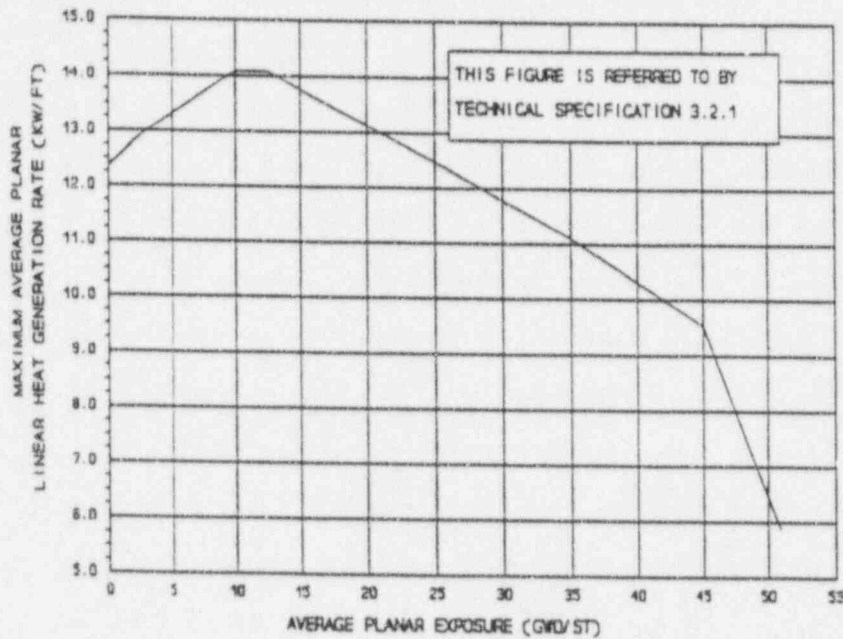
MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE ABB SVEA-96 (QFR)



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	12.23	6.0	13.33	20.0	13.01
0.2	12.31	7.0	13.49	25.0	12.36
1.0	12.47	8.0	13.65	35.0	11.01
2.0	12.70	9.0	13.81	45.0	9.44
3.0	12.89	10.0	13.95	50.9	6.29
4.0	13.03	12.5	13.95		
5.0	13.18	15.0	13.64		

Figure 8

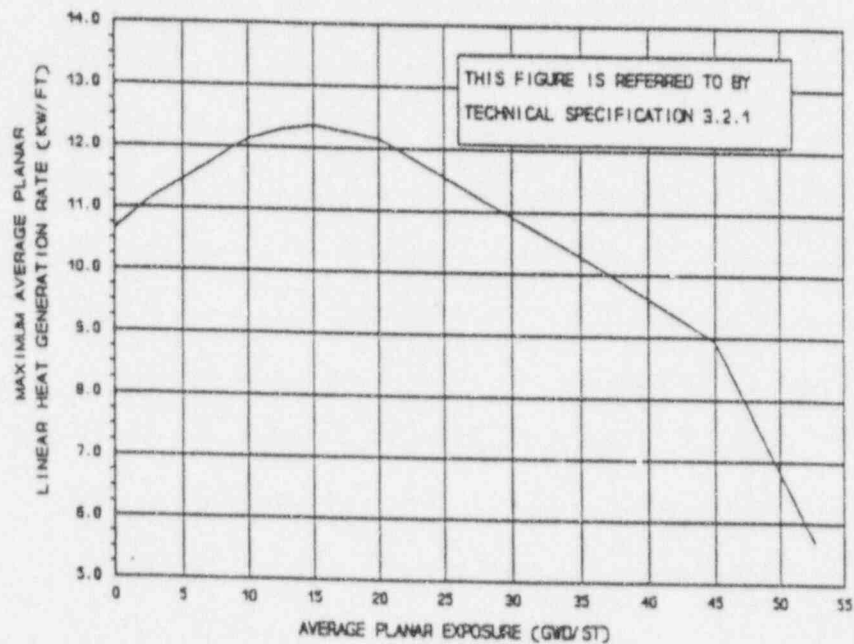
MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE SPC 9x9-9X + (QFB)



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	12.34	6.0	13.46	20.0	13.13
0.2	12.42	7.0	13.62	25.0	12.47
1.0	12.58	8.0	13.78	35.0	11.11
2.0	12.82	9.0	13.94	45.0	9.53
3.0	13.01	10.0	14.08	50.9	5.88
4.0	13.15	12.5	14.08		
5.0	13.31	15.0	13.77		

Figure 9

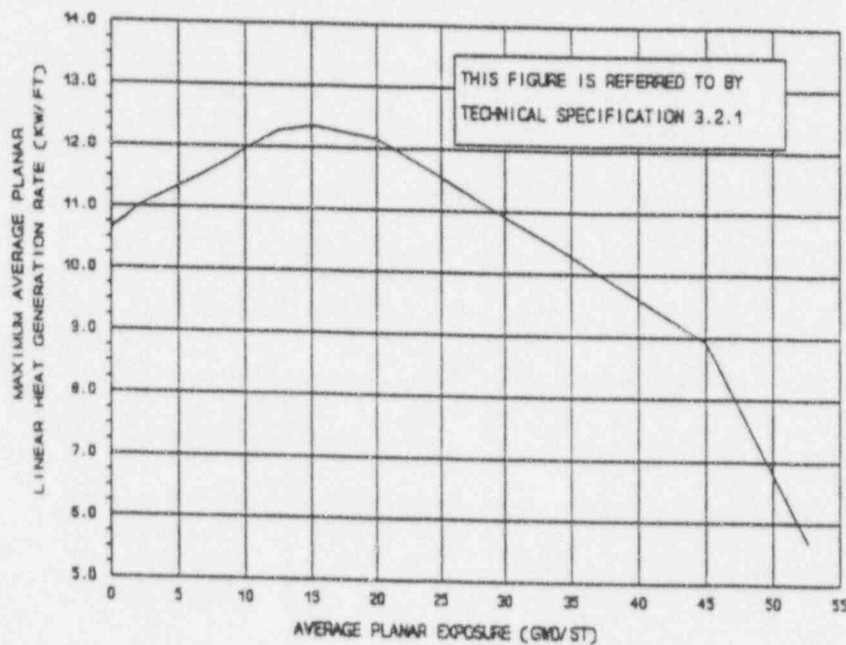
MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE P8CWB325-9GZ2 (GE9B, GE8x8NE)



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	10.64	6.0	11.60	20.0	12.16
0.2	10.70	7.0	11.73	25.0	11.55
1.0	10.84	8.0	11.87	35.0	10.29
2.0	11.04	9.0	12.01	45.0	8.94
3.0	11.21	10.0	12.13	52.7	5.69
4.0	11.34	12.5	12.29		
5.0	11.47	15.0	12.37		

Figure 10

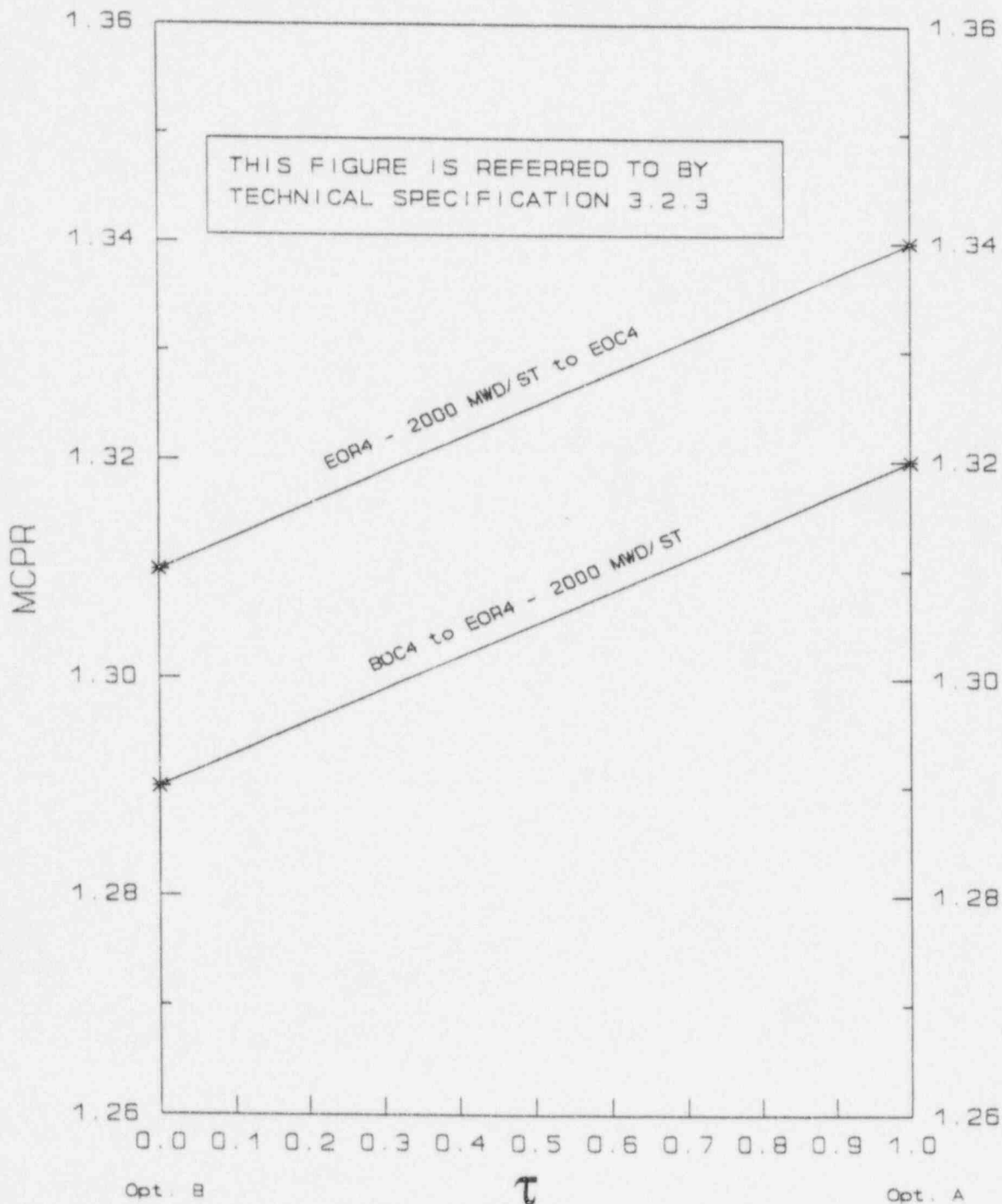
MAXIMUM AVERAGE PLANAR LINEAR HEAT
GENERATION RATE (MAPLHGR) VERSUS
AVERAGE PLANAR EXPOSURE
FUEL TYPE P8CWB325-9GZ1 (GE9B, GE8x8NB)



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	10.63	6.0	11.46	20.0	12.16
0.2	10.69	7.0	11.57	25.0	11.54
1.0	10.82	8.0	11.69	35.0	10.29
2.0	11.01	9.0	11.82	45.0	8.93
3.0	11.12	10.0	11.97	52.6	5.69
4.0	11.23	12.5	12.27		
5.0	11.34	15.0	12.36		

MCPR vs. TAU

This figure is valid for two-loop operation. For single-loop operation, increase any value obtained from the figure by 0.02.



MCPR vs. TAU

This figure is valid for two-loop operation. For single-loop operation, increase any value obtained from the figure by 0.02.

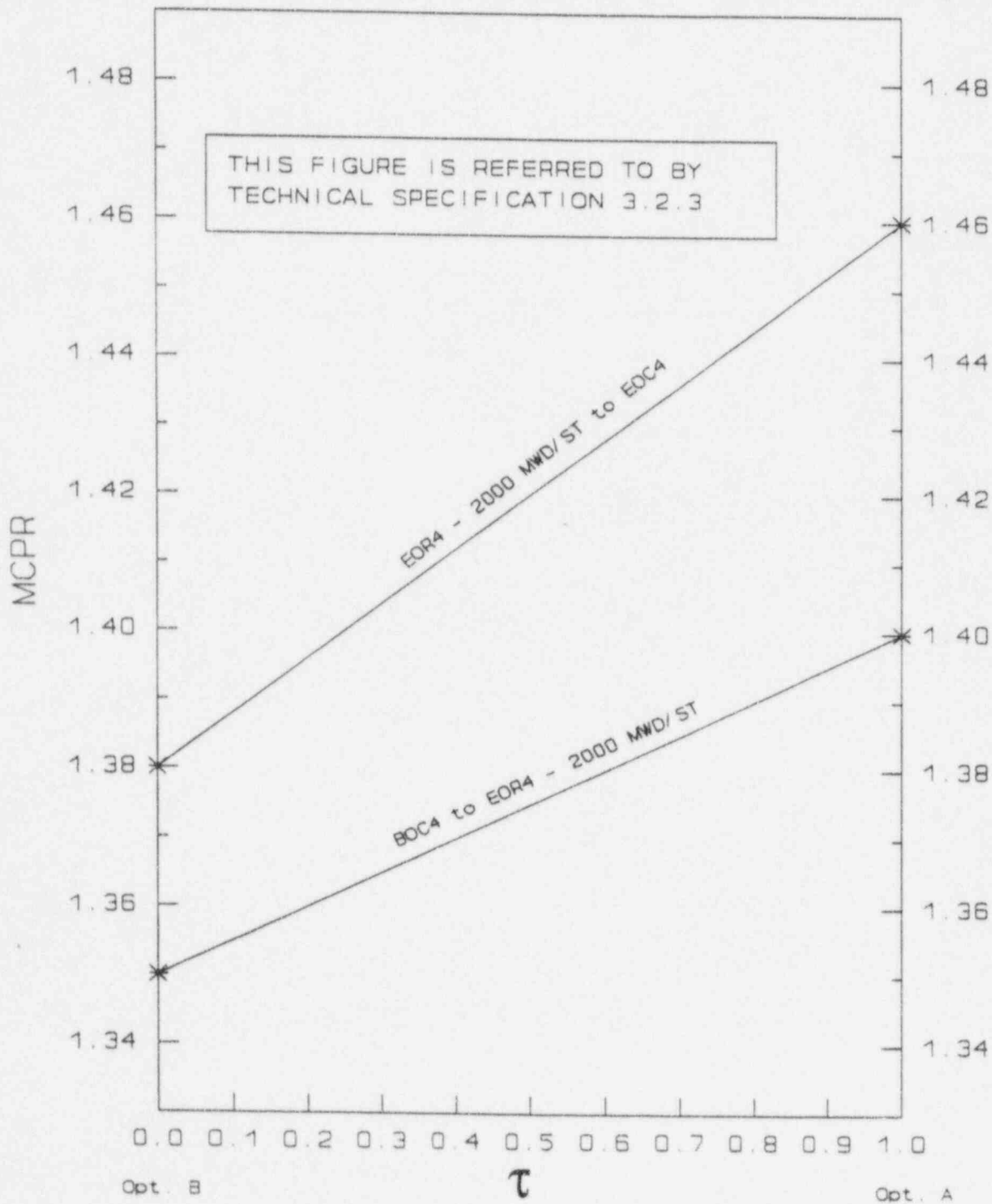


FIGURE 13

MCPR vs. TAU

THIS FIGURE IS VALID FOR ALL GE FUEL TYPES
(TBVOOS)

This figure is valid for two-loop operation. For single-loop operation, increase any value obtained from the figure by 0.02

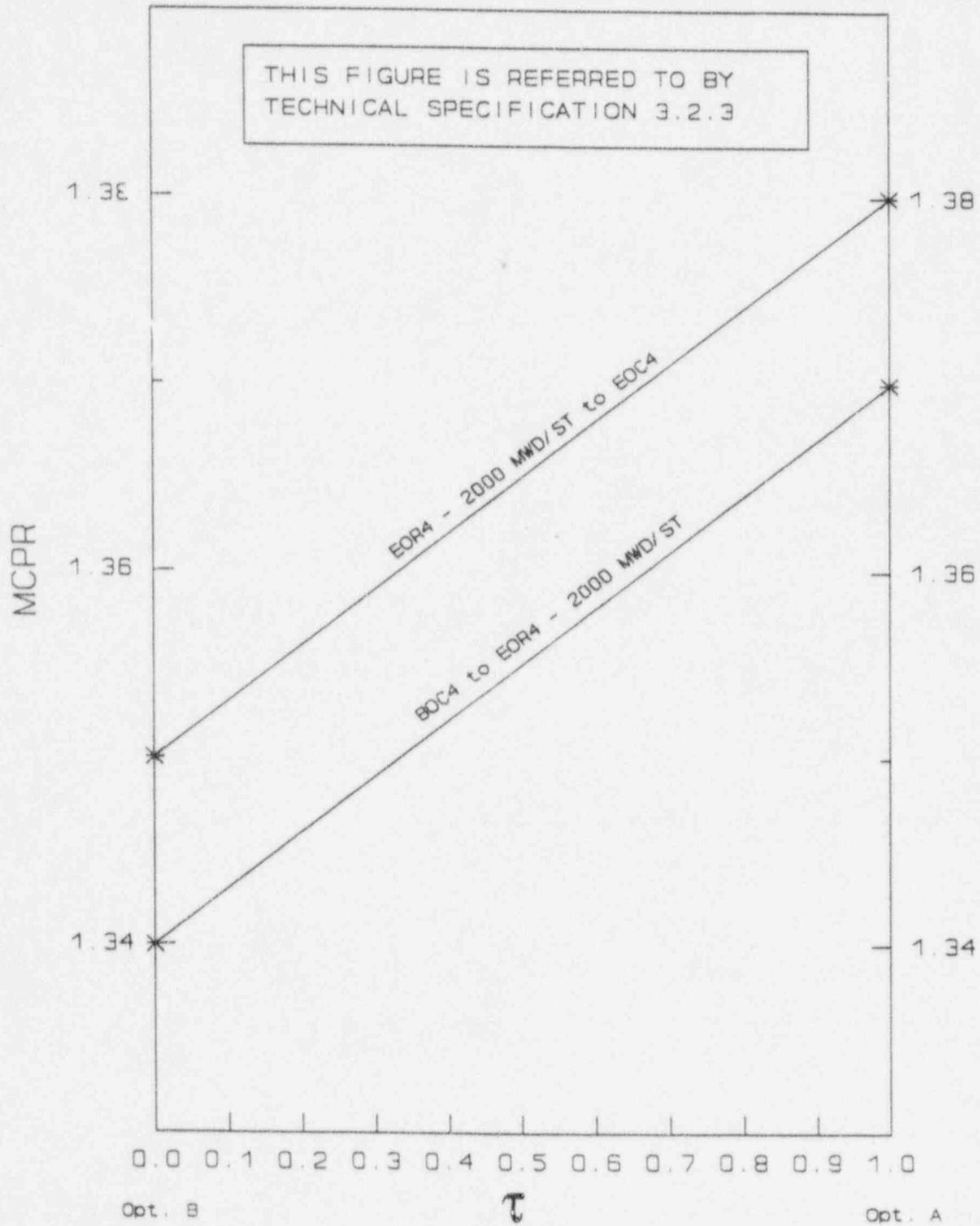


FIGURE 14

MCPR vs. τ

THIS FIGURE IS VALID FOR THE ABB SVEA-96 QFB
(RCF, MELL, ICF, FWTR, AND FWHOOS)

This figure is valid for two-loop operation. For single-loop operation, increase any value obtained from the figure by 0.02.

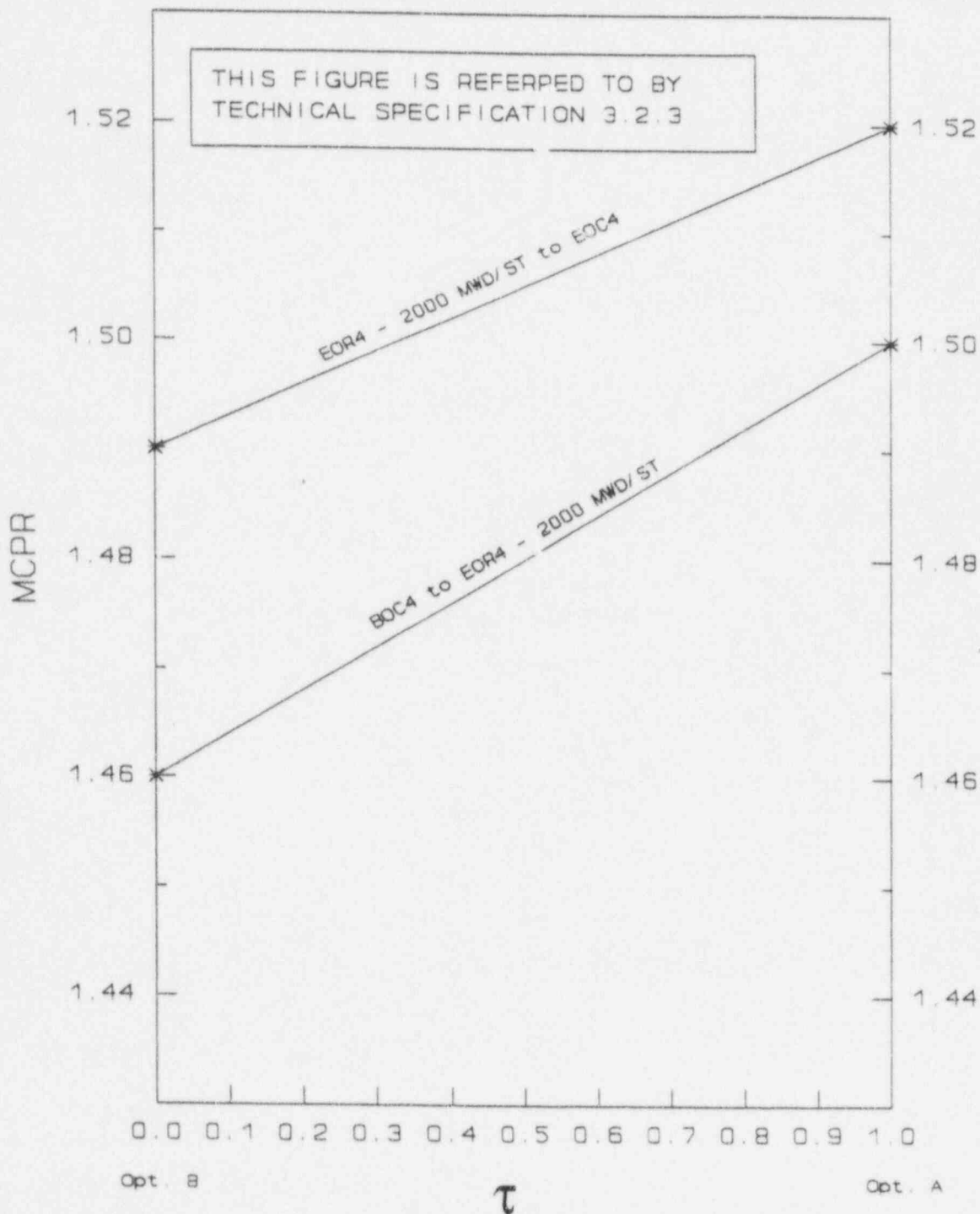


FIGURE 15

MCPR vs. τ

THIS FIGURE IS VALID FOR THE ABB SVEA-96 QFB
(RPTOOS)

This figure is valid for two-loop operation. For single-loop operation, increase any value obtained from the figure by 0.02.

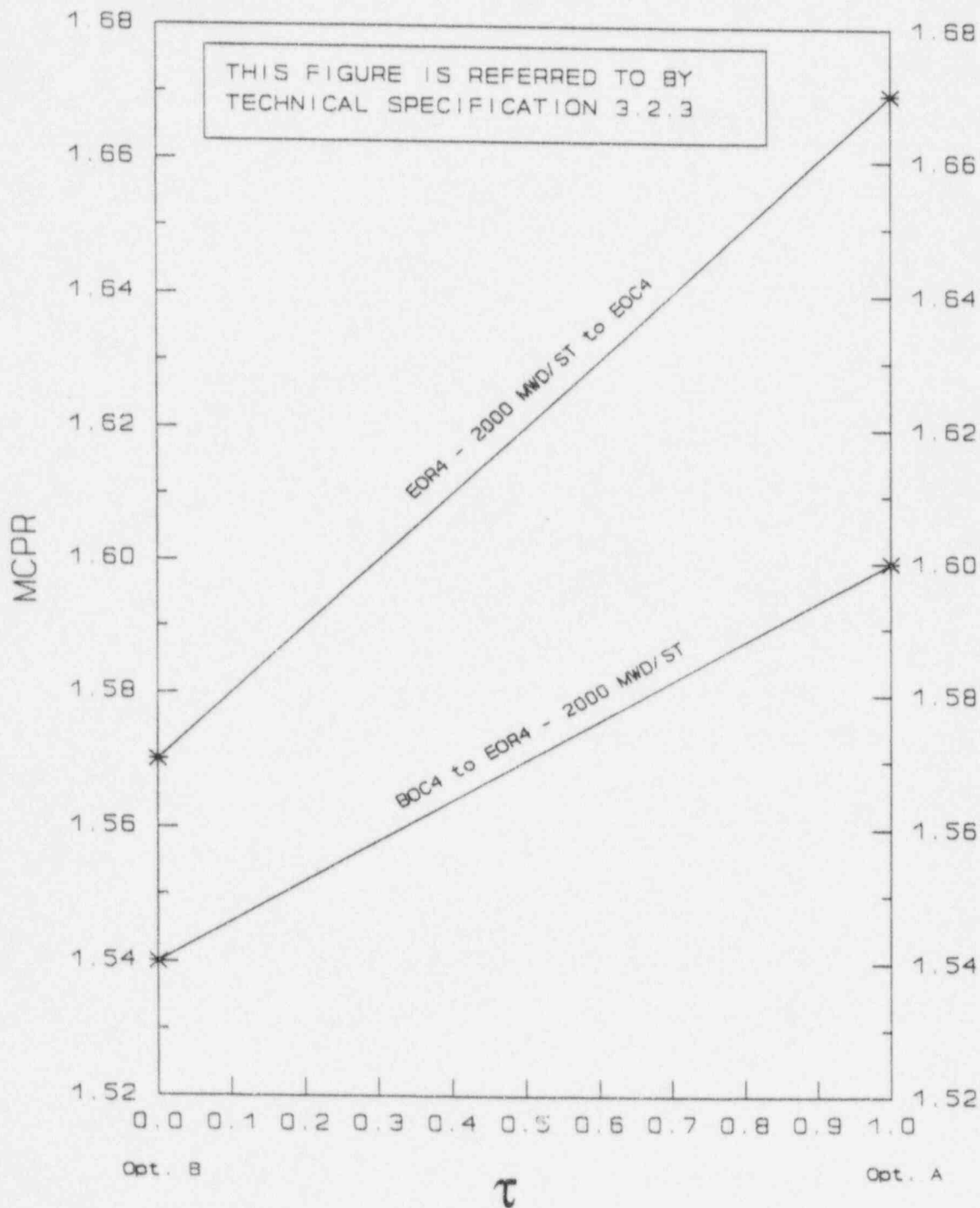


FIGURE 16

MCPR vs. τ

THIS FIGURE IS VALID FOR THE ABB SVRA-96 QFB
(TBVOOS)

This figure is valid for two-loop operation. For single-loop operation, increase any value obtained from the figure by 0.02

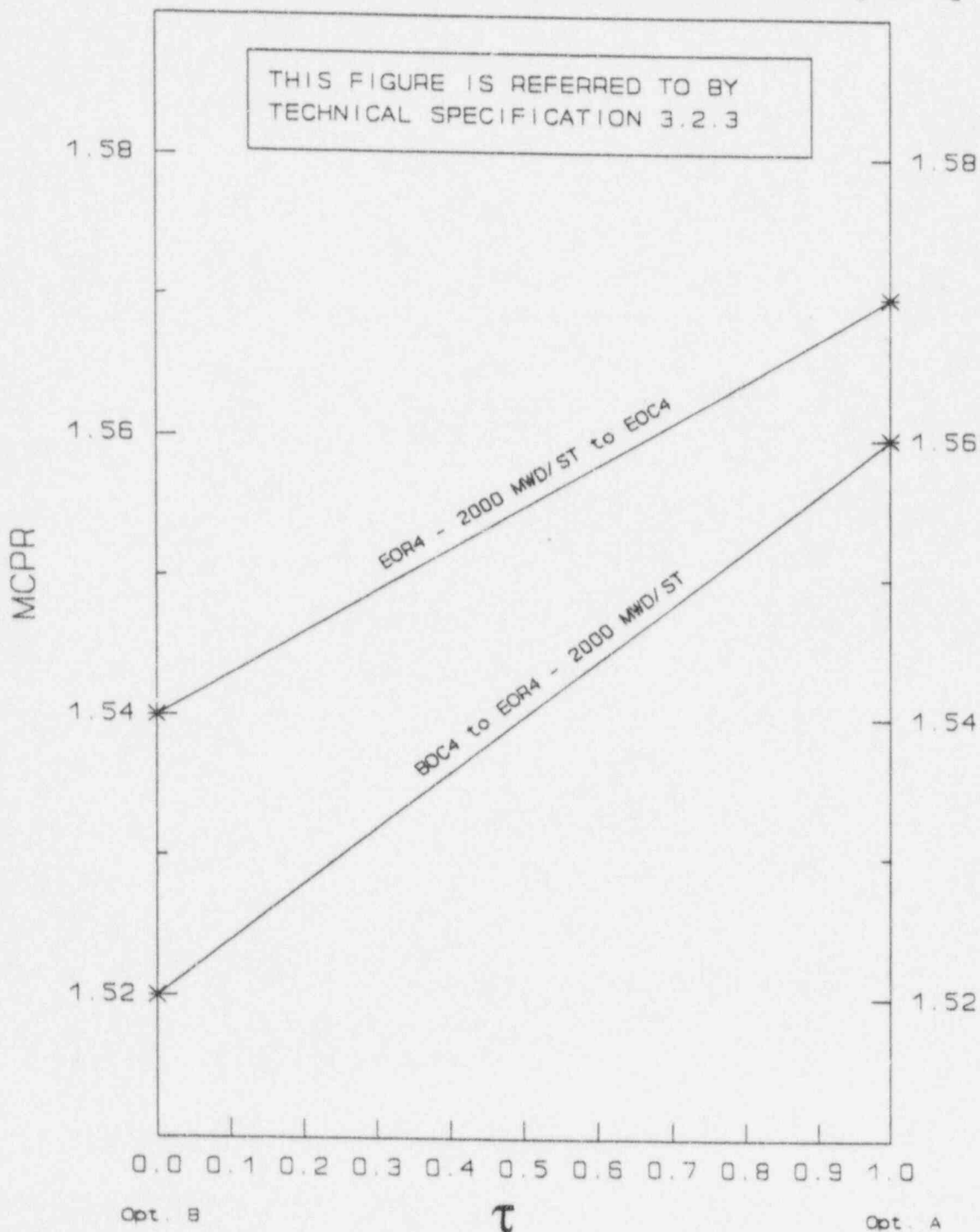


FIGURE 17

MCPR vs. TAU

THIS FIGURE IS VALID FOR THE SPC 9x9-9X+ QFB
(RCF, MELL, ICF, FWTR, AND FWHOOS)

This figure is valid for two-loop operation. For single-loop operation, increase any value obtained from the figure by 0.02.

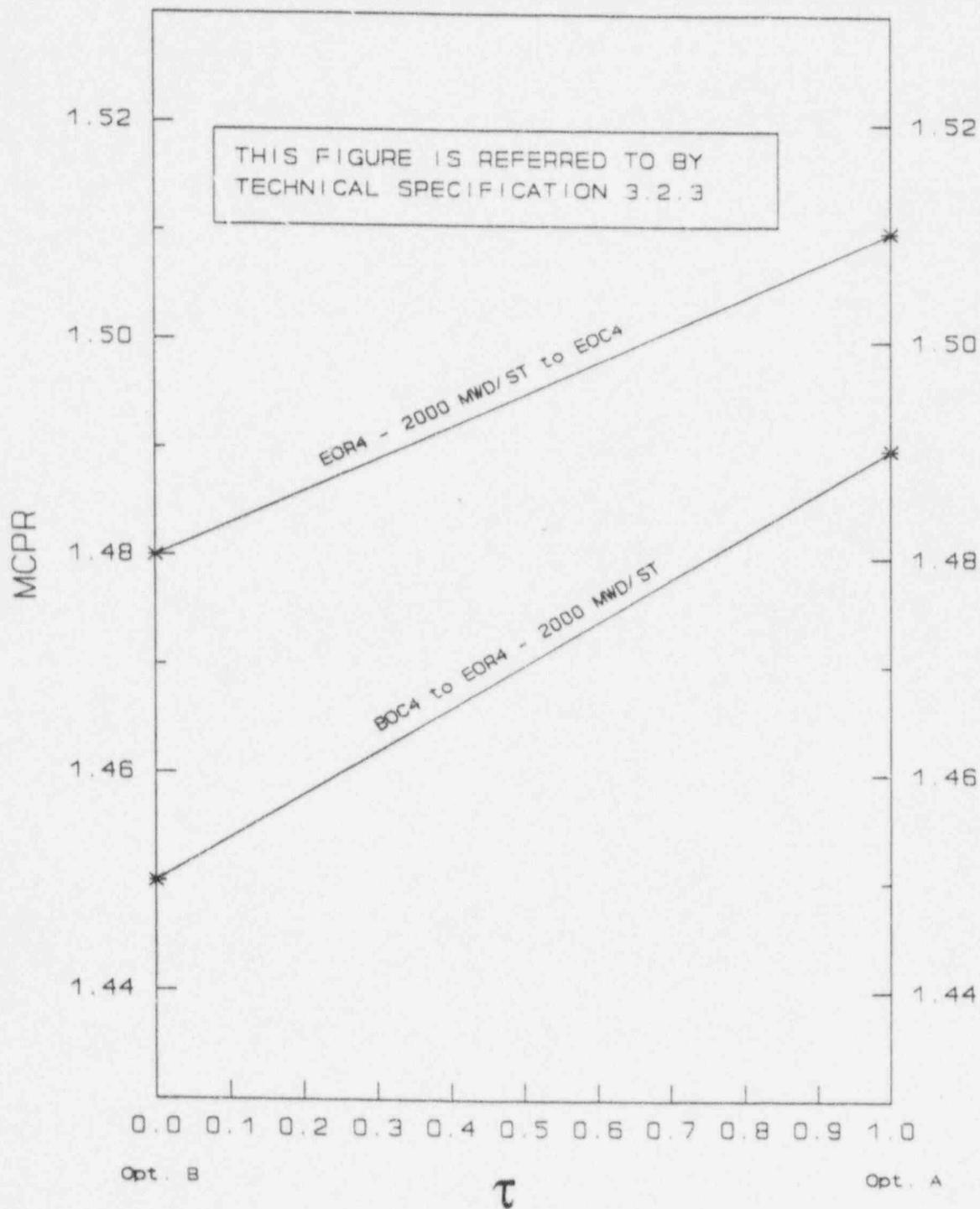


FIGURE 18

MCPR vs. τ

THIS FIGURE IS VALID FOR THE SPC 9x9-9X+ QFB
(RPTOOS)

This figure is valid for two-loop operation. For single-loop operation, increase any value obtained from the figure by 0.02.

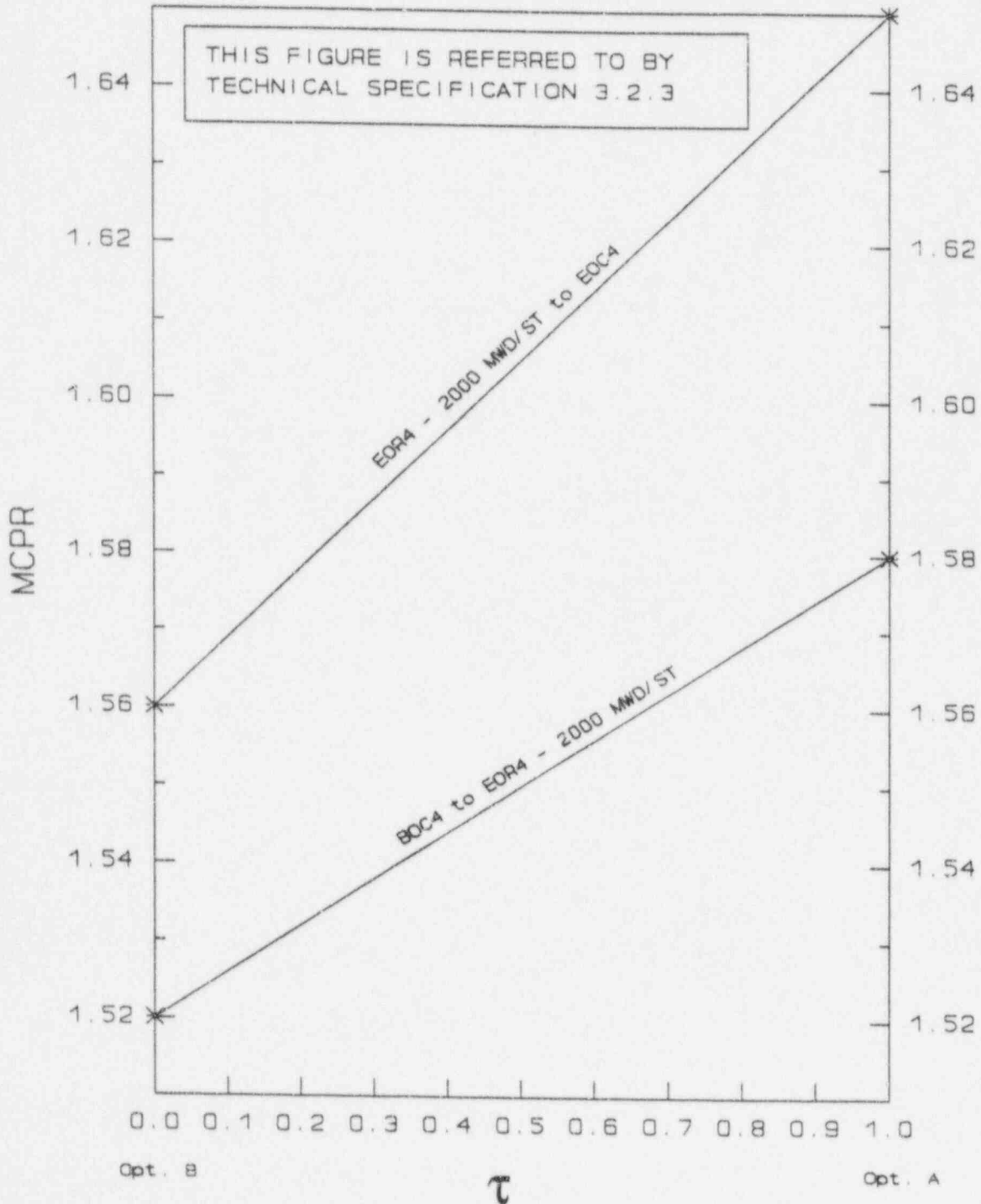


FIGURE 19

MCPR vs. τ

THIS FIGURE IS VALID FOR THE SPC 9x9-9X+ QFB
(TBVOOS)

This figure is valid for two-loop operation. For single-loop operation, increase any value obtained from the figure by 0.02

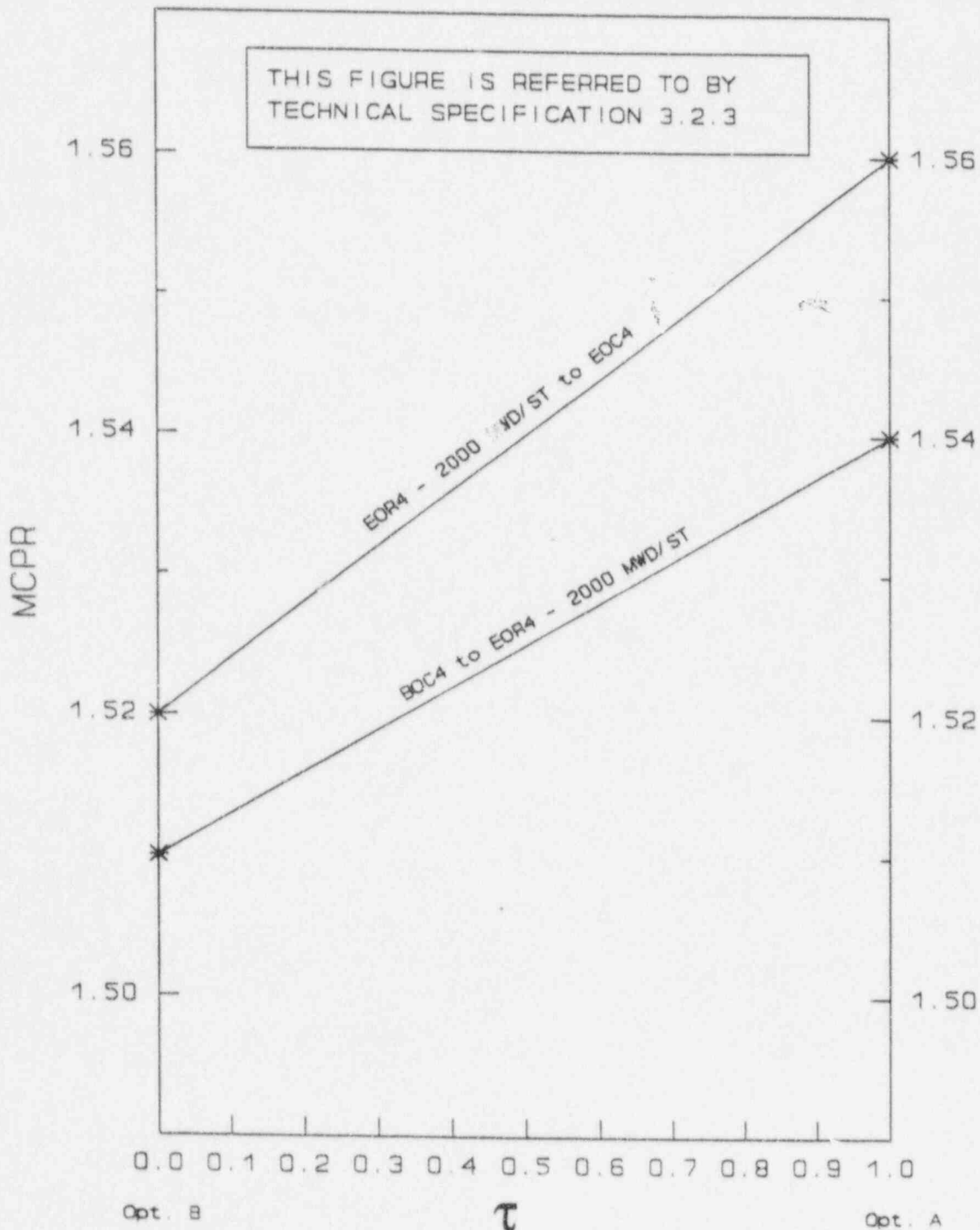


FIGURE 20

POWER DEPENDENT MAPLHGR MULTIPLIER MAPFAC(P)
THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.1
THIS FIGURE IS VALID FOR THE RCF, ICF, MELL, FMHOS AND
FWTR OPERATING DOMAINS

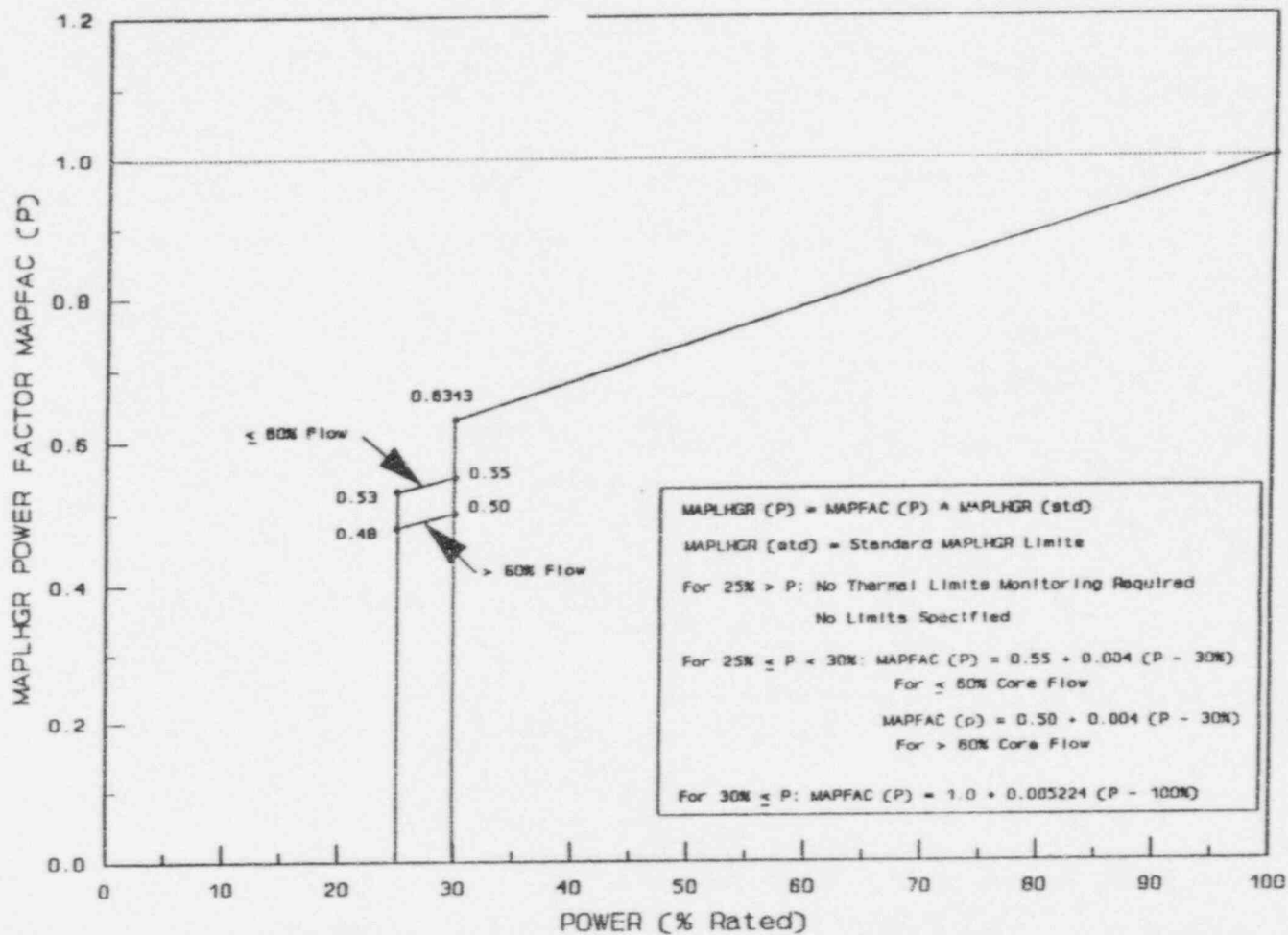


FIGURE 21

POWER DEPENDENT MAPLHGR MULTIPLIER MAPFAC(P)
THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.1
THIS FIGURE IS VALID FOR THE RPTOOS AND/OR TBVOOS
OPERATING DOMAINS

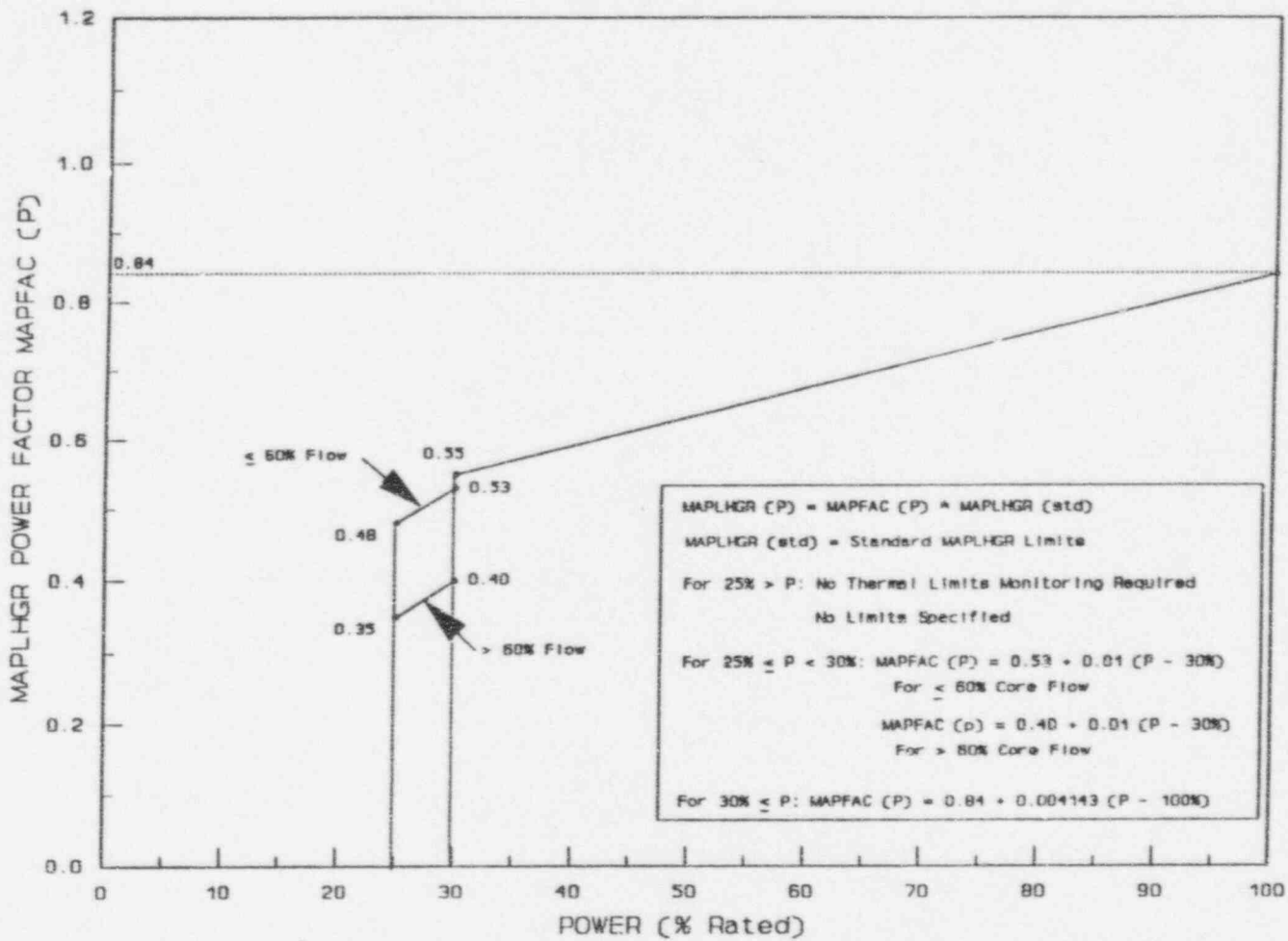


FIGURE 22

FLOW DEPENDENT MAPLHGR MULTIPLIER MAPFAC(F)
THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.1
THIS FIGURE IS VALID FOR ALL OPERATING DOMAINS

THIS FIGURE IS VALID ONLY FOR A MAXIMUM FLOW SETTING
OF 114% OF RATED

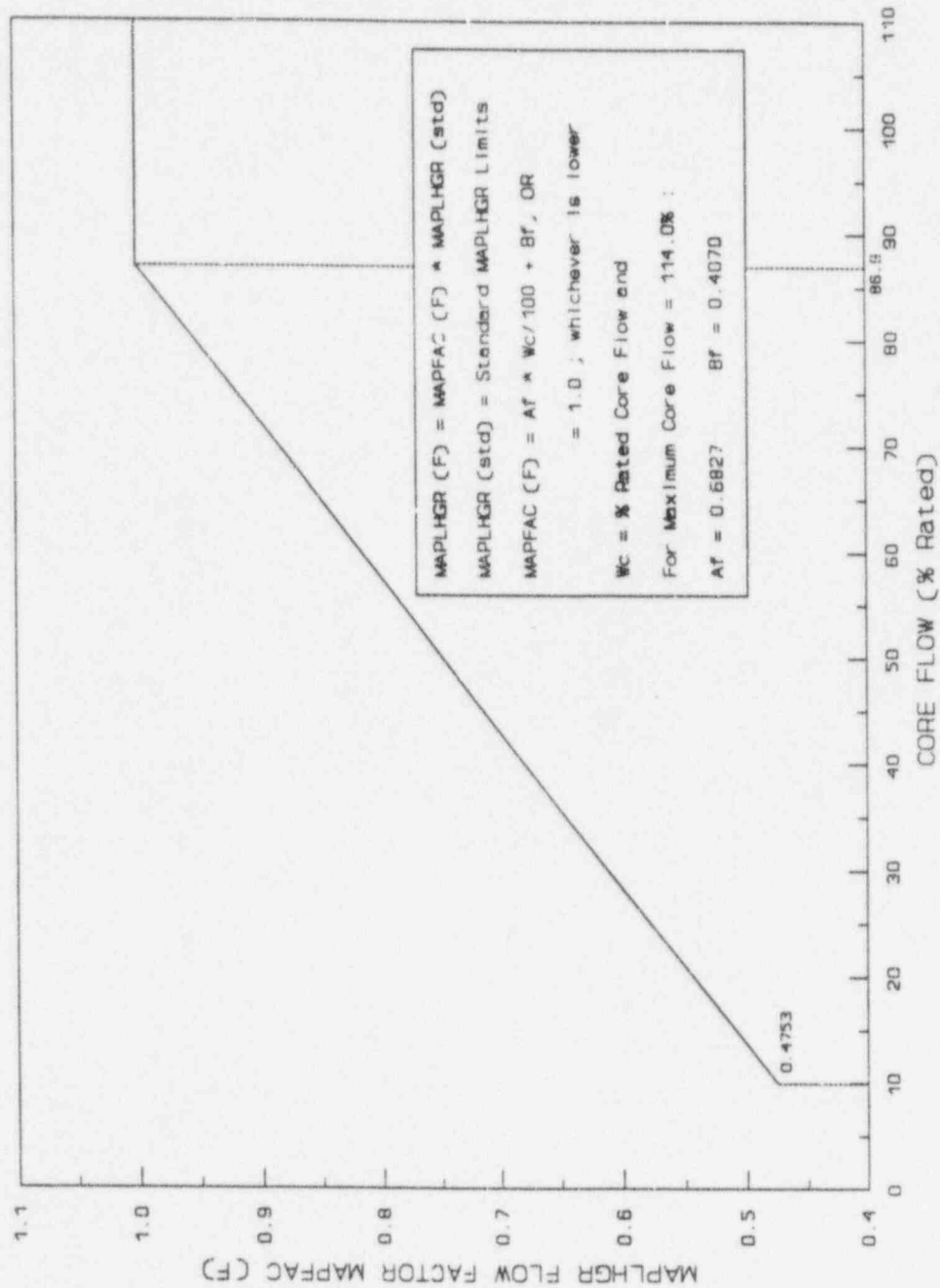


FIGURE 23

POWER DEPENDENT MCPR LIMIT ADJUSTMENTS AND MULTIPLIERS
THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.3
THIS FIGURE IS VALID FOR THE RCF, ICF, MELL, FWHOS
AND FWTR OPERATING DOMAINS

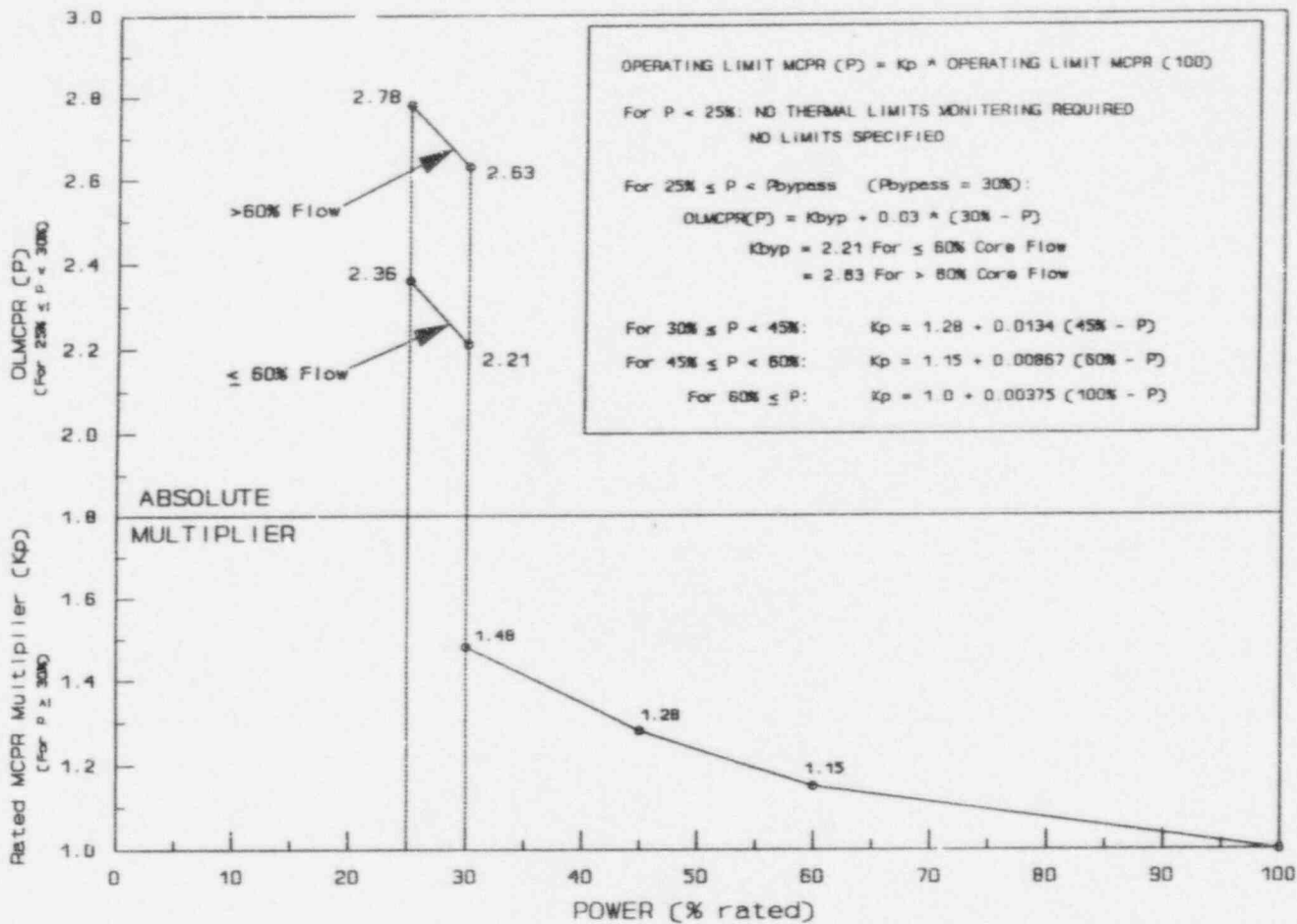


FIGURE 24

POWER DEPENDENT MCPR LIMIT ADJUSTMENTS AND MULTIPLIERS
THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.3
THIS FIGURE IS VALID FOR THE RPTOOS AND/OR TBOOS
OPERATING DOMAINS

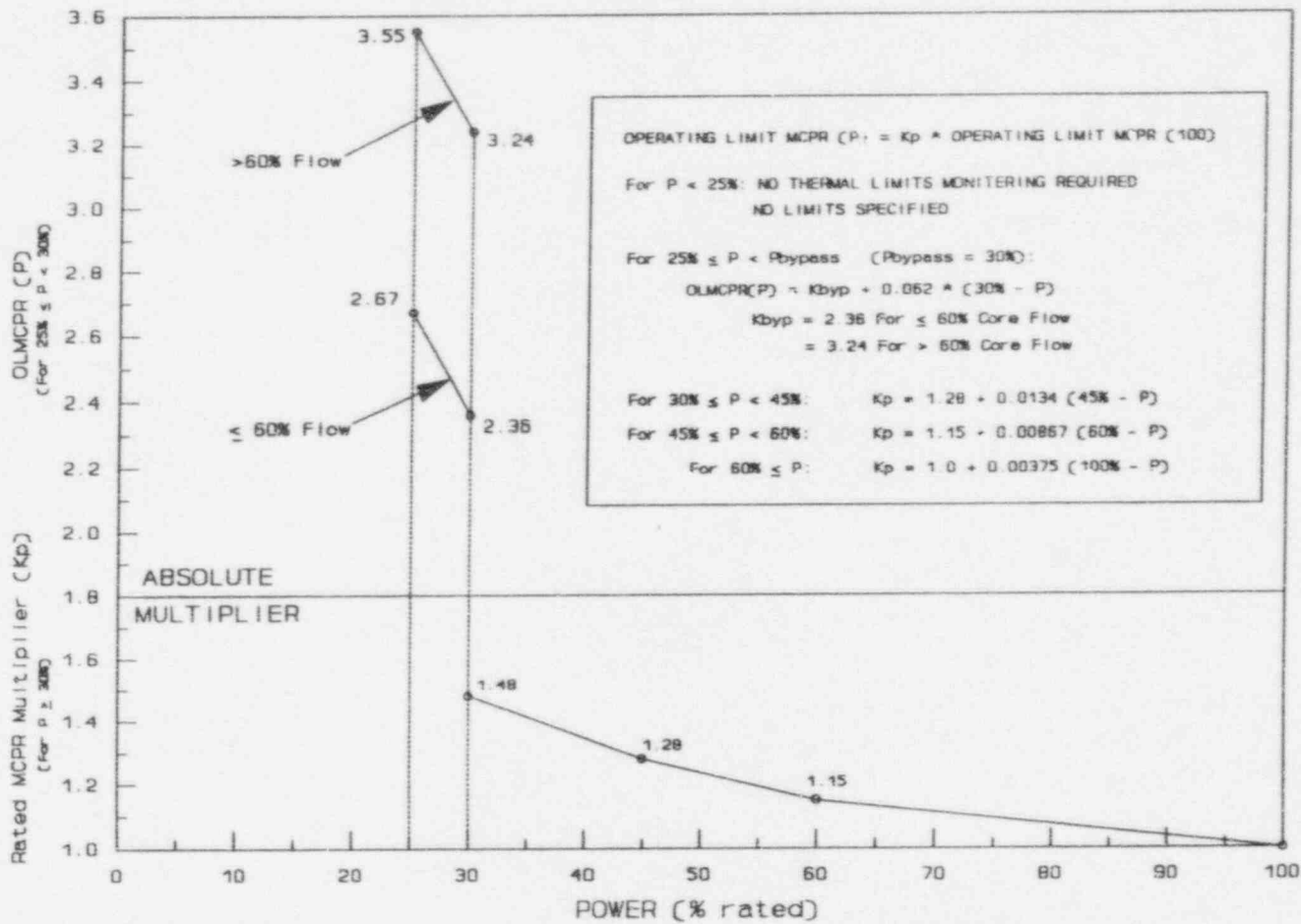


FIGURE 25

FLOW DEPENDENT MCPR LIMITS MCPR(F)

THIS FIGURE IS REFERRED TO BY TECHNICAL SPECIFICATION 3.2.3

THIS FIGURE IS VALID FOR ALL OPERATING DOMAINS

THIS FIGURE IS VALID ONLY FOR A MAXIMUM FLOW SETTING
OF 114% OF RATED

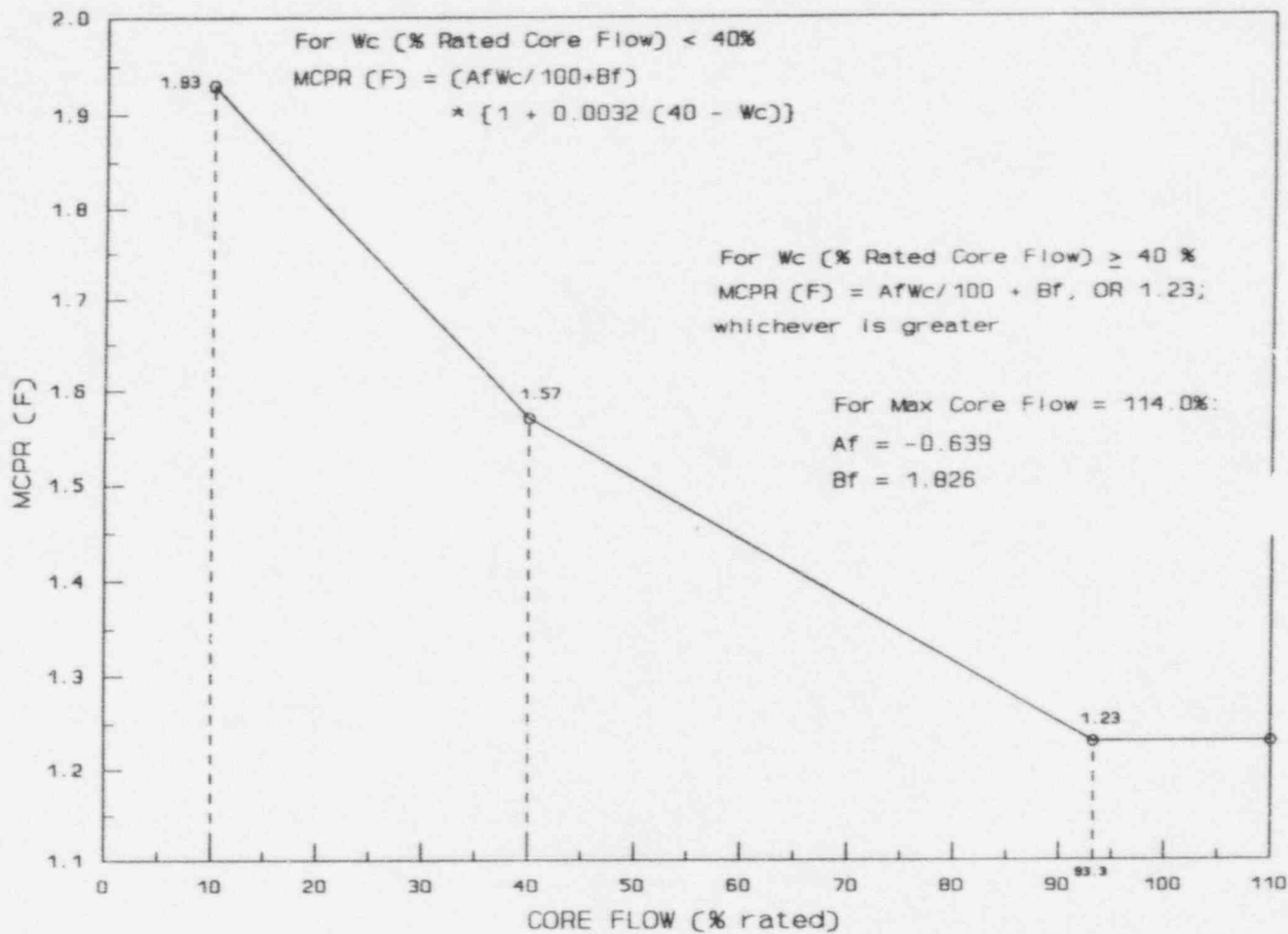


TABLE 1

ROD BLOCK MONITOR SETPOINTS

	Nominal Trip Setpoint	Allowable Value
LTSP	117.1%	118.3%
ITSP	112.3%	113.5%
HTSP	107.3%	108.5%
DTSP	92%	89%

These setpoints are based on a MCPR limit of 1.28 and are consistent with a RBM filter time constant between 0.1 seconds and 0.55 seconds.

TABLE 2

MAPLHGR SINGLE LOOP OPERATION (SLO) REDUCTION FACTOR

SLO reduction factor = 1.00 for all cycle 4 fuel types.

TABLE 3

LINEAR HEAT GENERATION RATE LIMITS

<u>FUEL TYPE</u>	<u>MAXIMUM VALUE</u>
GE6	13.4 kW/ft
GE9B	14.4 kW/ft
GE11	14.4 kW/ft
ABB SVEA-96 (QFB)	17.7 kW/ft
SPC 9x9-9X + (QFB)	15.8 kW/ft

TABLE 4

TURBINE BYPASS VALVE PARAMETERS

TURBINE BYPASS SYSTEM RESPONSE TIME

Maximum delay time before start of bypass valve opening following generation of the turbine bypass valve flow signal	0.10 sec
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Maximum time after generation of a turbine bypass valve flow signal for bypass valve position to reach 80% of full stroke (includes the above delay time)	0.30 sec
--	----------

MINIMUM REQUIRED BYPASS VALVES TO MAINTAIN SYSTEM OPERABILITY

Number of valves = 7

TABLE 5

Recirculation Pump Motor-Generator (MG) Set Scoop Tube Stops

Mechanical $\leq 114\%$
Electrical $\leq 112\%$

TABLE 6

Control Rod Block Instrumentation
Reactor Coolant System Recirculation Flow Upscale Trip

Nominal Trip Setpoint $\leq 113.4\%$
Allowable Value $\leq 115.6\%$