BRUNSWICK UNIT 2, CYCLE 15

CORE OPERATING LIMITS REPORT

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CAUTION

References to COLR Figures or Tables should be made using titles only; figure and table numbers may change from cycle to cycle.

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Introduction and Summary

This report provides the values of the power distribution limits and control rod withdrawal block instrumentation setpoints for Brunswick Unit 2, Cycle 15 as required by TS 5.6.5.

OPERATING LIMIT	REQUIREMENT
Average Planar Linear Heat Generation Rate (APLHGR) limits (with associated core flow and core power adjustment factors)	TS 5.6.5.a.1
Minimum Critical Power Ratio (MCPR) limits (with associated core flow and core power adjustment factors)	TS 5.6.5.a.2
Allowable Values for Function 2.b of TS 3.3.1.1, APRM Flow Biased Simulated Thermal Power –High	TS 5.6.5.a.3
Allowable Values and power range setpoints for Rod Block Monitor Upscale Functions of TS 3.3.2.1	TS 5.6.5.a.4

Per TS 5.6.5.b and 5.6.5.c, these values have been determined using NRC approved methodology and are established such that all applicable limits of the plant safety analysis are met.

The limits specified in this report support single loop operation (SLO) as required by TS LCO 3.4.1 and inoperable Main Turbine Bypass System as required by TS 3.7.6.

In order to support the Thermal Hydraulic Instability (THI) E1A Stability Solution, the following is also included in this report:

OPERATING LIMIT	REQUIREMENT
Thermal Hydraulic Instability (THI) E1A Stability Solution Monitored Region and Restricted Region	TS 3.2.3 and 3.3.1.3, and TRMS 3.2
Thermal Hydraulic Instability (THI) E1A Stability Solution Exclusion Region	Implicit
"Setup" and "Non-Setup" scram values of the APRM Flow Biased Simulated Thermal Power-High Allowable Value ("Flow Biased Scram")	TS 3.2.3 and 3.3.1.1
"Setup" and "Non-Setup" control rod block values of the APRM Flow Biased - Upscale Allowable Value ("Flow Biased Rod Block")	TRMS 3.3

Four Siemens ATRIUM-10 (A10) Lead Qualification Assemblies will be loaded in the B2C15 core. **Reference 4 concludes the A10 is bounded by the GE13 operating limits and licensing analyses, provided** additional operating and design constraints are imposed on the GE13 fuel type used to monitor the A10. The additional operating requirements have been incorporated herein as applicable.

Preparation of this report was performed in accordance with Quality Assurance requirements as specified in Reference 1.

Single Loop Operation

Brunswick Unit 2, Cycle 15 may operate at any point in the cycle over the entire MEOD range with Single Recirculation Loop Operation (SLO) as permitted by TS 3.4.1 with applicable limits specified in the COLR for TS LCO's 3.2.1, 3.2.2 and 3.3.1.1:

LCO 3.2.1, Average Planar Linear Heat Generation Rate (APLHGR) Limits: per Reference 1 and Figures 9, 10 and 10a, the APLHGR Limits include a SLO limitation of 0.8 on the MAPLHGR(F) and MAPLHGR(P) multipliers.

LCO 3.2.2, Minimum Critical Power Ratio (MCPR) Limits: per Reference 1, Table 1 and Figures 11, 11a, 12 and 12a, the MCPR limits presented apply to SLO without modification.

LCO 3.3.1.1, Reactor Protection System Instrumentation Function 2.b (Average Power Range Monitors Flow Biased Simulated Thermal Power - High) Allowable Value: per Reference 1 and the THI E1A STABILITY SOLUTION, these limits apply to SLO without modification.

Inoperable Main Turbine Bypass System

Brunswick Unit 2, Cycle 15 may operate with an inoperable Main Turbine Bypass System in accordance with TS 3.7.6 with applicable limits specified in the COLR for TS LCO 3.2.1 and 3.2.2. Three or more bypass valves inoperable renders the System inoperable, although the Turbine Bypass Out-of-Service (TBPOOS) analysis supports operation with all bypass valves inoperable for the entire MEOD range and up to 110°F rated equivalent feedwater temperature reduction. The system response time assumed by the safety analyses from event initiation to start of bypass valve opening is 0.10 seconds, with at least 64% bypass flow achieved in 0.30 seconds. The applicable limits are as follows:

LCO 3.2.1, Average Planar Linear Heat Generation Rate (APLHGR) Limits: in accordance with Reference 1 as shown in Figure 10, TBPOOS requires a reduction in the MAPLGHR(P) limits between 25% and 30% power. The limits in Figure 10a between 25% and 30% power are valid for TBP operable or inoperable.

LCO 3.2.2, Minimum Critical Power Ratio (MCPR) Limits: in accordance with Reference 1, TBPOOS requires an increase in the MCPR(P) multiplier between 25% and 30% power, as shown in Figures 12. This increase is already identified in Figure 12a. TBPOOS also requires increased MCPR limits, included in Table 1.

APLHGR Limits

The limiting APLHGR value for the most limiting lattice (excluding natural uranium) of each fuel type as a function of planar average exposure is given in Figures 1 through 7. These values were determined with the SAFER/GESTR LOCA methodology described in GESTAR-II (Reference 2). Figures 1 through 7 are to be used only when hand calculations are required as specified in the bases for TS 3.2.1. Hand calculated results may not match a POWERPLEX calculation since normal monitoring of the APLHGR limits with POWERPLEX uses the complete set of lattices for each fuel type provided in Reference 3.

The core flow and core power adjustment factors for use in TS 3.2.1 are presented in Figures 9, 10 and 10a. For any given flow/power state, the minimum of MAPLHGR(F) determined from Figure 9 and MAPLHGR(P) determined from Figures 10 and 10a is used to determine the governing limit.

MCPR Limits

The ODYN OPTION A, ODYN OPTION B and non-pressurization transient MCPR limits for use in TS 3.2.2 for each fuel type as a function of cycle average exposure are given in Table 1. These values were determined with the GEMINI methodology and GEXL-PLUS critical power correlation described in GESTAR-II (Reference 2) and are consistent with a Safety Limit MCPR of 1.09 specified by TS2.1.1.2.

The core flow and core power adjustment factors for use in TS 3.2.2 are presented in Figures 11, 11a, 12 and 12a. For any given power/flow state, the maximum of MCPR(F) determined from Figure 11 or 11a and MCPR(P) determined from Figure 12 or 12a is used to determine the governing limit.

All MCPR limits presented in Table 1, Figure 11, Figure 11a, Figure 12 and Figure 12a were determined without EOC-RPT operable and apply to two recirculation pump operation and SLO without modification.

RBM Rod Block Instrumentation Setpoints

The nominal trip setpoints and allowable values of the control rod withdrawal block instrumentation for use in TS 3.3.2.1 (Table 3.3.2.1-1) are presented in Table 2. These values were determined consistent with the bases of the ARTS program and the determination of MCPR limits with the GEMINI methodology and GEXL-PLUS critical power correlation described in GESTAR-II (Reference 2).

THI E1A Stability Solution

The Enhanced Option 1A methodology was used to develop the THI E1A Stability Solution, which involves exclusion from certain areas of the power/flow map and specific restrictions for operating in other areas.

The COLR provides the Stability Regions on the power/(core) flow map in Figures 13-16. These Figures define the Monitored and Restricted Regions for compliance with TS 3.2.3, TS 3.3.1.3 and TRMS 3.2 (and indirectly TS 3.3.1.1 and TRMS 3.3), and include the Exclusion Region (for which definition in the COLR is not a TS requirement). Core flow nominal trip setpoint values on Figures 13-16 correspond to the nominal trip setpoint values translated into drive flow and installed in the Flow Control Trip Reference (FCTR) cards.

Automatic features of the THI E1A Stability Solution implementation use digital FCTR cards that incorporate Trip Reference setpoints which are equivalent or more restrictive than the pre-Stability Solution APRM flow-biased and clamped limits. The FCTR cards support TS 3.3.1.1 (automatic APRM Flow-biased Scram) and TRMS 3.2 (Restricted Region Entry Alarm, which uses the TRMS 3.3 Flow-biased Rod Block setpoint). Figures 17-20, E1A Setpoint Allowable Values Versus Aligned Drive Flow, are based on drive flow and not core flow to support the flow signal used for the FCTR cards. Also, Figures 17-20 allow quantification of Technical Specification compliance once the drive flow input is aligned in accordance with Table 3.

"Non-Setup" setpoints (Figures 13, 15, 17, 19) enforce the normal Exclusion and Restricted Regions described above. Setup setpoints (Figures 14, 16, 18, 20) are to be used only when FCBB $\leq$ 1.0 and allow operation in the Restricted Region. When operating in Setup, the Flow-biased Rod Block setpoints generally increase in power to the Flow-biased Scram or power/flow map boundaries. The Flow-biased Scram setpoint generally increases by an equivalent amount (within the power/flow map boundaries) to avoid spurious scrams from power spikes. The inherent stability from maintaining FCBB less than one justifies continued operation in the Restricted Region, but not in that portion of the power/flow map which, in Setup, becomes unprotected by the Flow-biased Scram. The alarm associated with the Rod Block ceases to be a RREA when in Setup, but signals to Operations a similar need to immediately move to a more stable region of the power/flow map.

For BNP the two loop operation (TLO) Flow-biased Scram and Rod Block setpoints, and TLO Stability Regions, are equivalent to the SLO counterparts over all applicable portions of the operating domain.

The E1A Stability Solution provides for distinct Flow-biased Scram and Rod Block setpoints for normal and reduced feedwater temperature conditions ("normal" and "alternate" setpoints) because the core is more susceptible to instabilities with decreasing feedwater temperature. Normal setpoints (Figures 13, 14, 17, 18) are to be used below 30% power or when feedwater temperature is within 50°F rated equivalent of nominal. Alternate setpoints (Figures 15, 16 19, 20) are to be used above 30% power when feedwater is reduced by more than 50°F rated equivalent (50°F * (% power/100)$^{0.385}$) in accordance with 2OP-32.

References

1) BNP Design Calculation 2B21-0585; "Preparation of the B2C15 Core Operating Limits Report," Revision 0, February 2001.

2) NEDE-24011-P-A; "General Electric Standard Application for Reactor Fuel," (latest approved version).

3) NEDC-31624P, "Loss-of-Coolant Accident Analysis Report for Brunswick Steam Electric Plant Unit 2 Reload 14 Cycle 15," Supplement 2, Revision 7, February 2001.

4) EMF-2168(P), "Brunswick ATRIUM-10 Lead Qualification Assemblies Safety Analysis," Revision 0, March 1999.

Table 1

MCPR Limits

(EOC-RPT Not Required)

Steady State, Non-pressurization Transient MCPR Limits	
Fuel Type	Exposure Range: BOC - EOC
GE13 and GE14	1.22
A10	1.36

Pressurization Transient MCPR Limits, OLMCPR (100%P): Turbine Bypass System Operable			
		Normal and Reduced Feedwater Temperature	
MCPR Option	**Fuel Type**	Exposure Range: BOC to EOFPC-2101 MWd/MT	Exposure Range: EOFPC-2101 MWd/MT to EOC
A	GE13	1.40	1.46
	GE14	1.52	1.66
	A10	1.56	1.62
B	GE13	1.35	1.38
	GE14	1.41	1.49
	A10	1.50	1.53

Pressurization Transient MCPR Limits, OLMCPR (100%P): Turbine Bypass System Inoperable		
		Normal and Reduced Feedwater Temperature
MCPR Option	**Fuel Type**	BOC to EOC
A	GE13	1.47
	GE14	1.68
	A10	1.63
B	GE13	1.39
	GE14	1.51
	A10	1.55

This Table is referred to by Technical Specifications 3.2.2, 3.4.1 and 3.7.6.

Table 2

RBM System Setpoints

Setpoint	Trip Setpoint	Allowable Value
Lower Power Setpoint (LPSP[a])	27.0	≤ 29.0
Intermediate Power Setpoint (IPSP[a])	62.0	≤ 64.0
High Power Setpoint (HPSP[a])	82.0	≤ 84.0
Low Trip Setpoint (LTSP[b])	≤ 115.1	≤ 115.5
Intermediate Trip Setpoint (ITSP[b])	≤ 109.3	≤ 109.7
High Trip Setpoint (HTSP[b])	≤ 105.5	≤ 105.9
t_{d2}	≤ 2.0 seconds	≤ 2.0 seconds

[a] Setpoints in percent of Rated Thermal Power.

[b] Setpoints relative to a full scale reading of 125. For example, ≤ 115.1 means ≤ 115.1/125.0 of full scale.

This Table is referred to by Technical Specification 3.3.2.1 (Table 3.3.2.1-1).

Table 3

Aligned Drive Flow

The Scram and Rod Block trip setpoints are provided by Flow Control Trip Reference (FCTR) cards. The FCTR cards have their drive flows calibrated each cycle by 0PT-50.10, "APRM FCTR Card Drive Flow Alignment". The calibration "aligns" the current cycle drive flow to the drive flow used when the E1A flow mapping solution was developed for BNP. The COLR presents the Scram and Rod Block trip setpoints as a function of aligned drive flow. This table provides an equation for deriving the aligned drive flow from the FCTR card input drive flow signal:

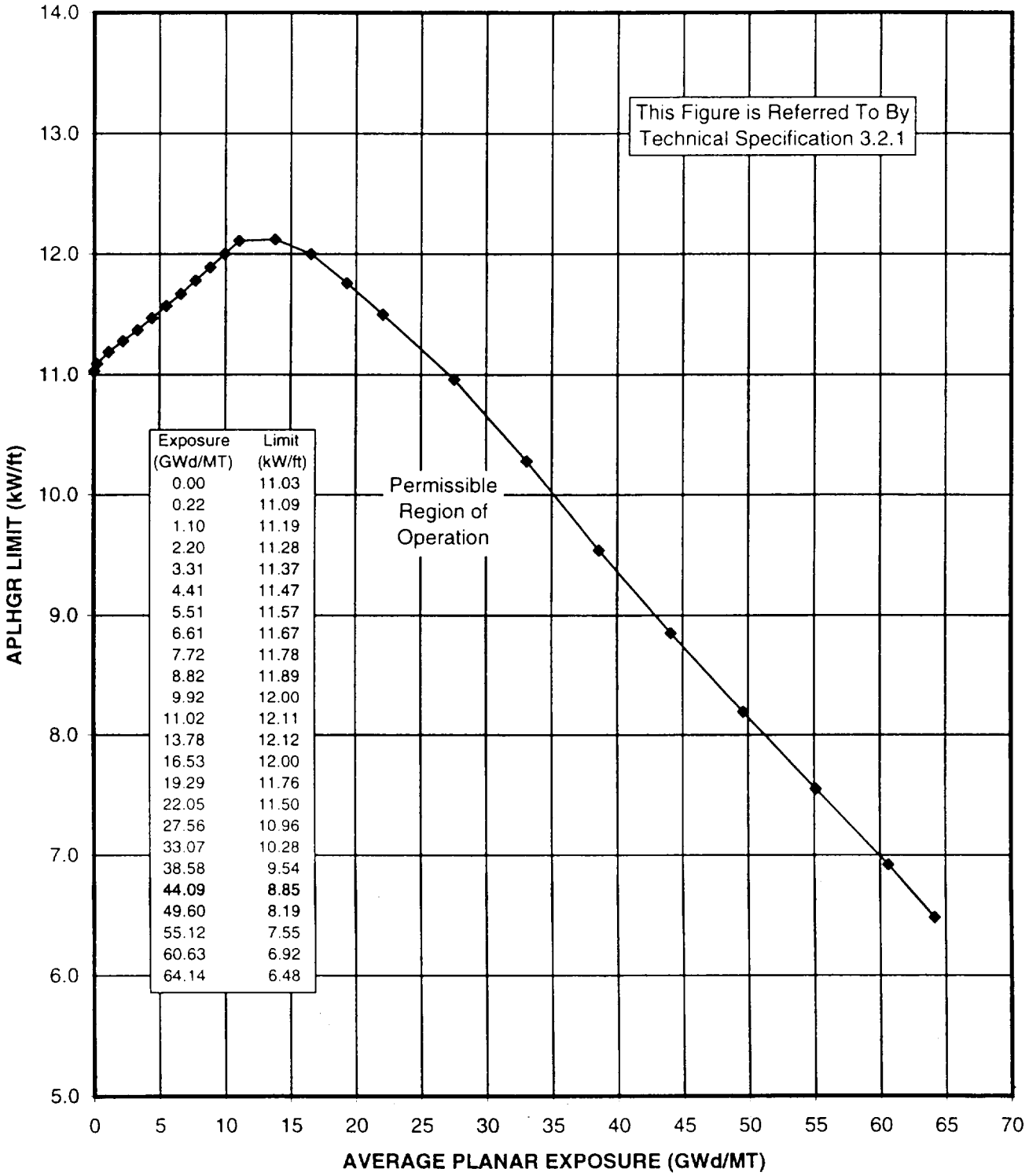
$$W_D = \frac{100.005 \cdot \Delta^{40} - 30.294 \cdot \Delta^{100} + 69.711 \cdot W_{\tilde{D}}}{69.711 - (\Delta^{100} - \Delta^{40})}$$

where: W_D is the aligned drive flow to be used for Figures 17 through 20
Δ^{40} and Δ^{100} are the current values for the FCTR card alignment
$W_{\tilde{D}}$ is the input drive flow signal

This Table supports Technical Specifications 3.2.3 and 3.3.1.1 and Technical Requirements Manual Specifications 3.2 and 3.3.

Figure 1

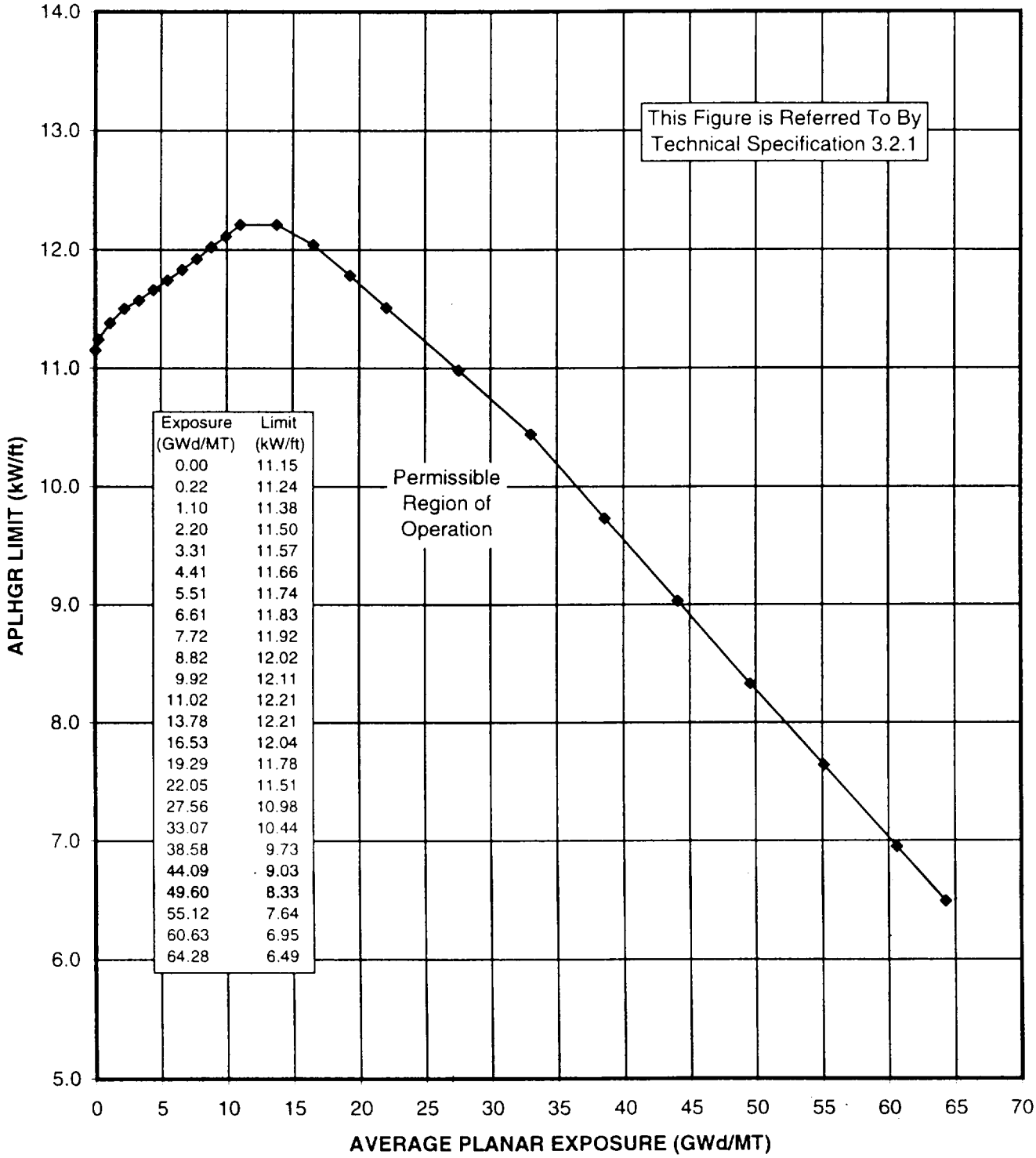
Fuel Type GE13-P9DTB393-4G6.0/9G5.0-100T-146-T (GE13)
Average Planar Linear Heat Generation Rate (APLHGR) Limit
Versus Average Planar Exposure



Exposure (GWd/MT)	Limit (kW/ft)
0.00	11.03
0.22	11.09
1.10	11.19
2.20	11.28
3.31	11.37
4.41	11.47
5.51	11.57
6.61	11.67
7.72	11.78
8.82	11.89
9.92	12.00
11.02	12.11
13.78	12.12
16.53	12.00
19.29	11.76
22.05	11.50
27.56	10.96
33.07	10.28
38.58	9.54
44.09	**8.85**
49.60	8.19
55.12	7.55
60.63	6.92
64.14	6.48

Figure 2

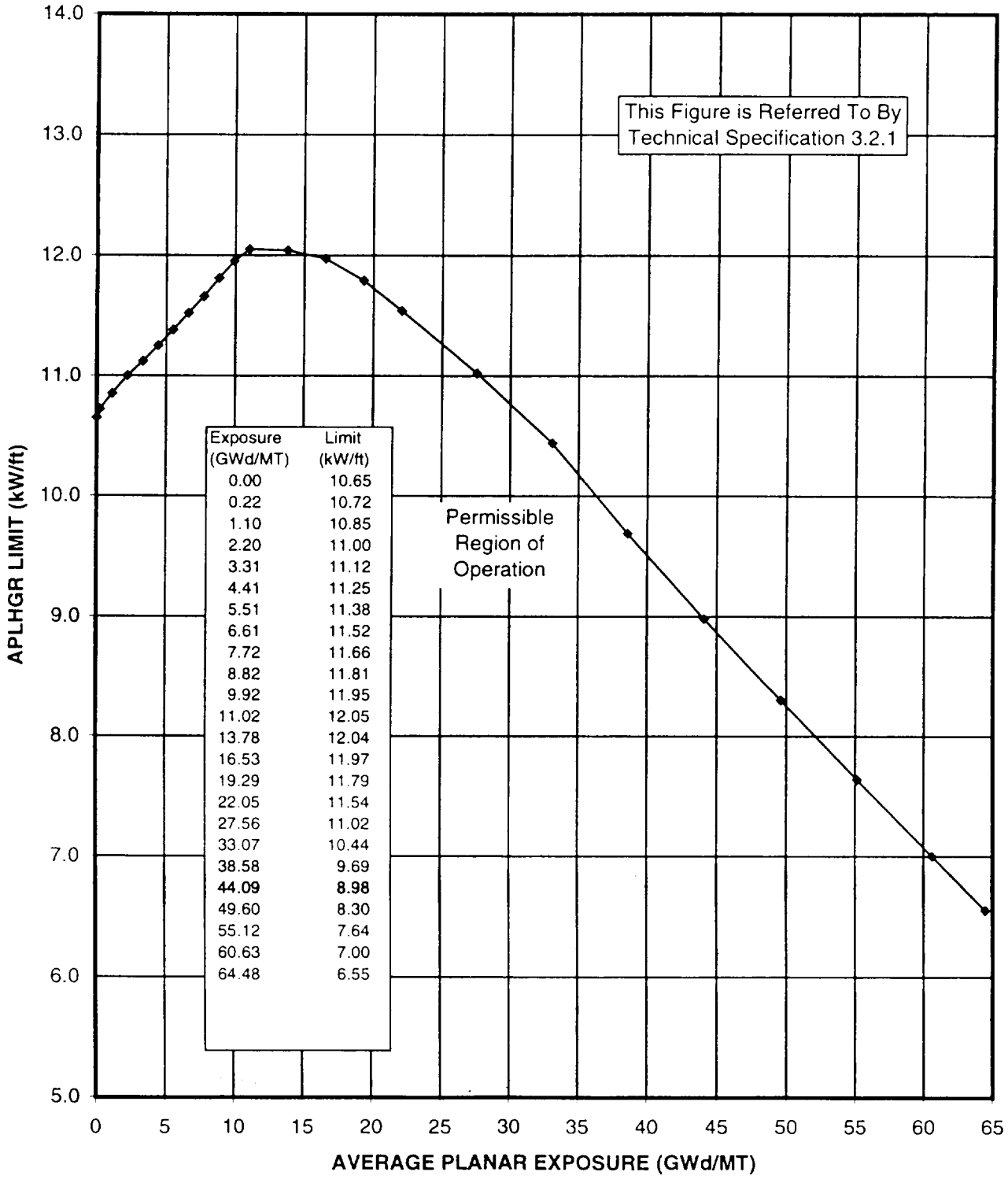
Fuel Type GE13-P9DTB395-12G5.0-100T-146-T (GE13) Average Planar Linear Heat Generation Rate (APLHGR) Limit Versus Average Planar Exposure



Exposure (GWd/MT)	Limit (kW/ft)
0.00	11.15
0.22	11.24
1.10	11.38
2.20	11.50
3.31	11.57
4.41	11.66
5.51	11.74
6.61	11.83
7.72	11.92
8.82	12.02
9.92	12.11
11.02	12.21
13.78	12.21
16.53	12.04
19.29	11.78
22.05	11.51
27.56	10.98
33.07	10.44
38.58	9.73
44.09	9.03
49.60	8.33
55.12	7.64
60.63	6.95
64.28	6.49

Figure 3

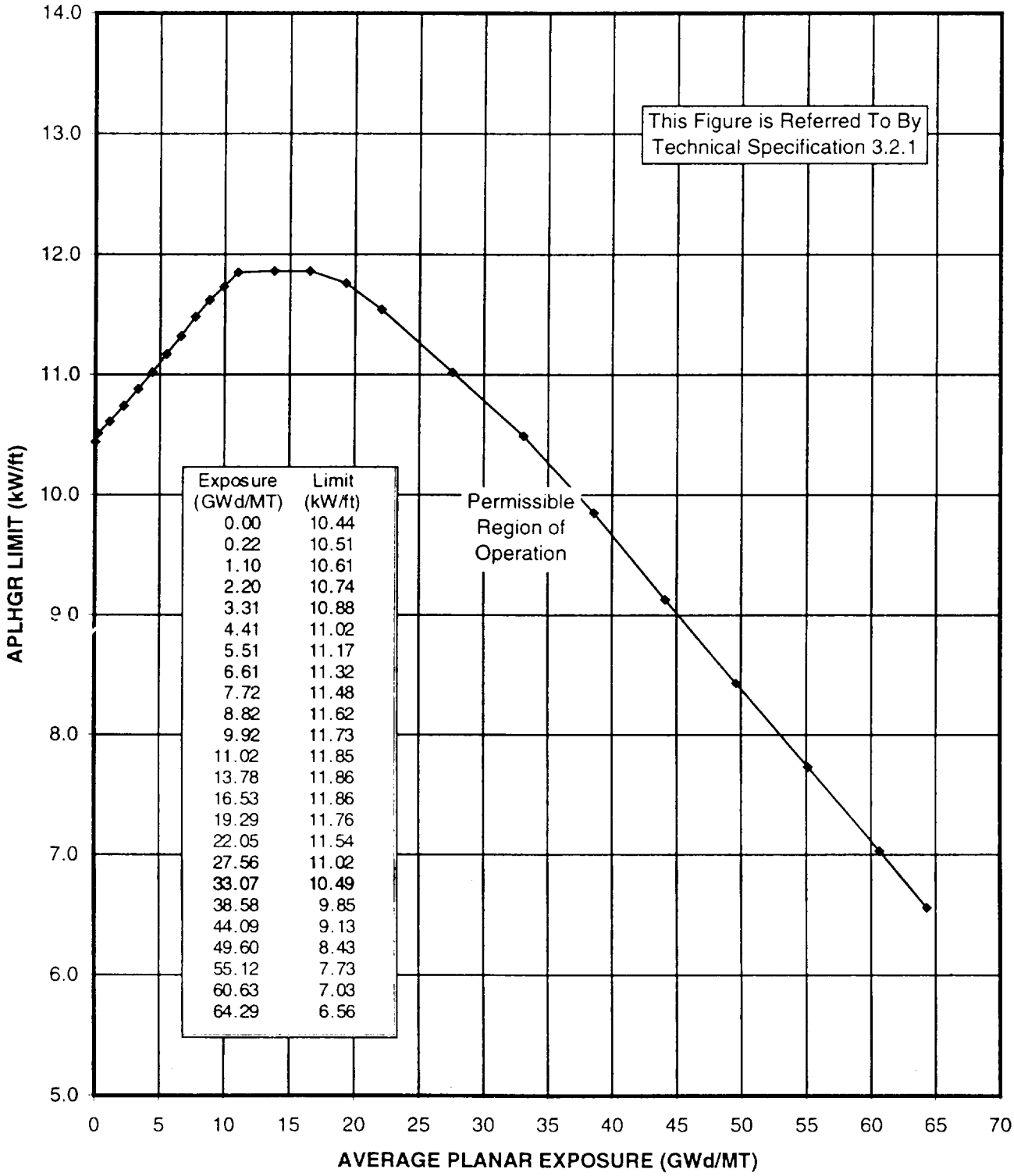
Fuel Type GE13-P9DTB403-5G6.0/7G5.0-100T-146-T (GE13) Average Planar Linear Heat Generation Rate (APLHGR) Limit Versus Average Planar Exposure



Exposure (GWd/MT)	Limit (kW/ft)
0.00	10.65
0.22	10.72
1.10	10.85
2.20	11.00
3.31	11.12
4.41	11.25
5.51	11.38
6.61	11.52
7.72	11.66
8.82	11.81
9.92	11.95
11.02	12.05
13.78	12.04
16.53	11.97
19.29	11.79
22.05	11.54
27.56	11.02
33.07	10.44
38.58	9.69
44.09	**8.98**
49.60	8.30
55.12	7.64
60.63	7.00
64.48	6.55

Figure 4

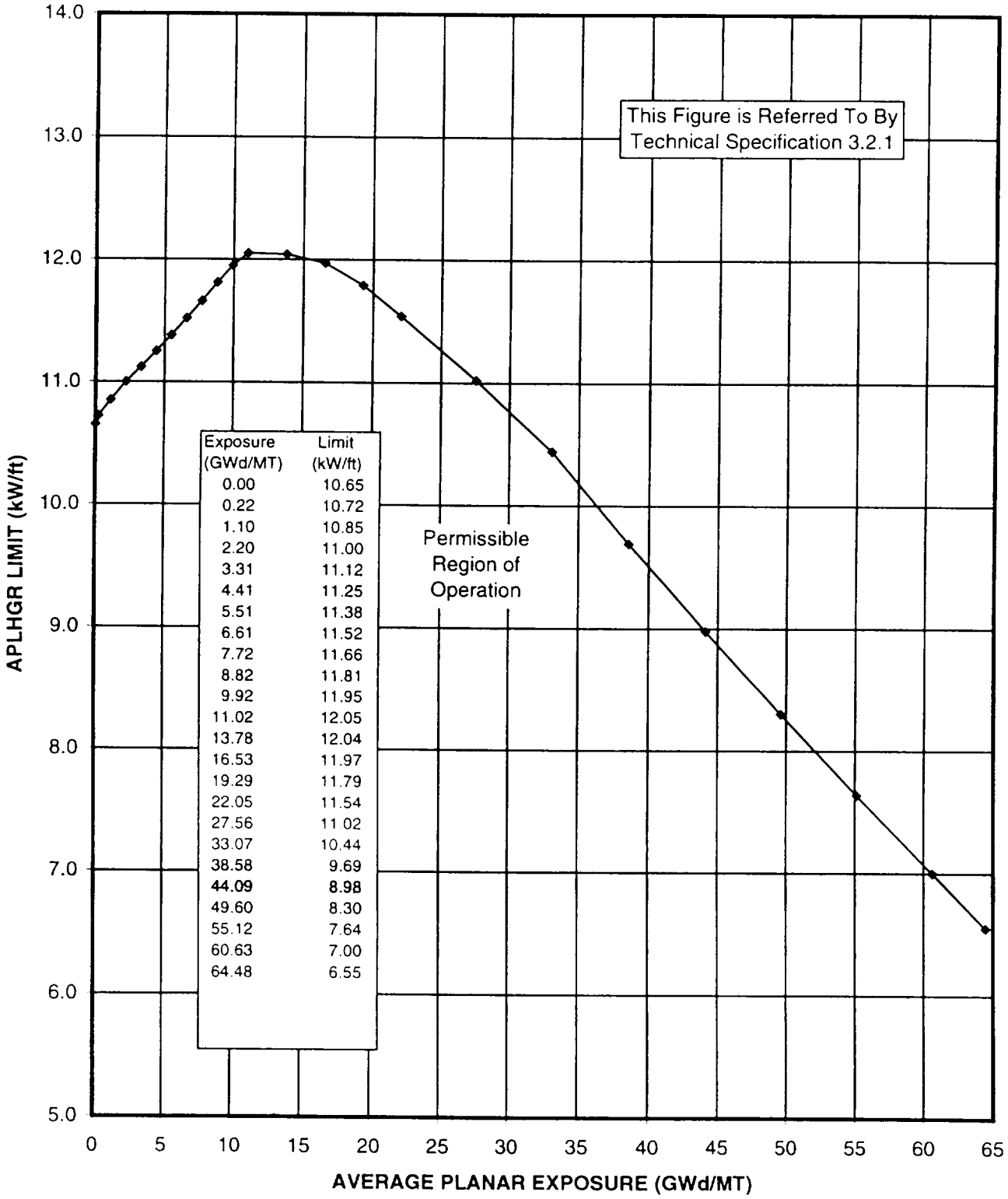
Fuel Type GE13-P9DTB403-7G6.0/7G5.0-100T-146-T (GE13) Average Planar Linear Heat Generation Rate (APLHGR) Limit Versus Average Planar Exposure



Exposure (GWd/MT)	Limit (kW/ft)
0.00	10.44
0.22	10.51
1.10	10.61
2.20	10.74
3.31	10.88
4.41	11.02
5.51	11.17
6.61	11.32
7.72	11.48
8.82	11.62
9.92	11.73
11.02	11.85
13.78	11.86
16.53	11.86
19.29	11.76
22.05	11.54
27.56	11.02
33.07	10.49
38.58	9.85
44.09	9.13
49.60	8.43
55.12	7.73
60.63	7.03
64.29	6.56

Figure 5

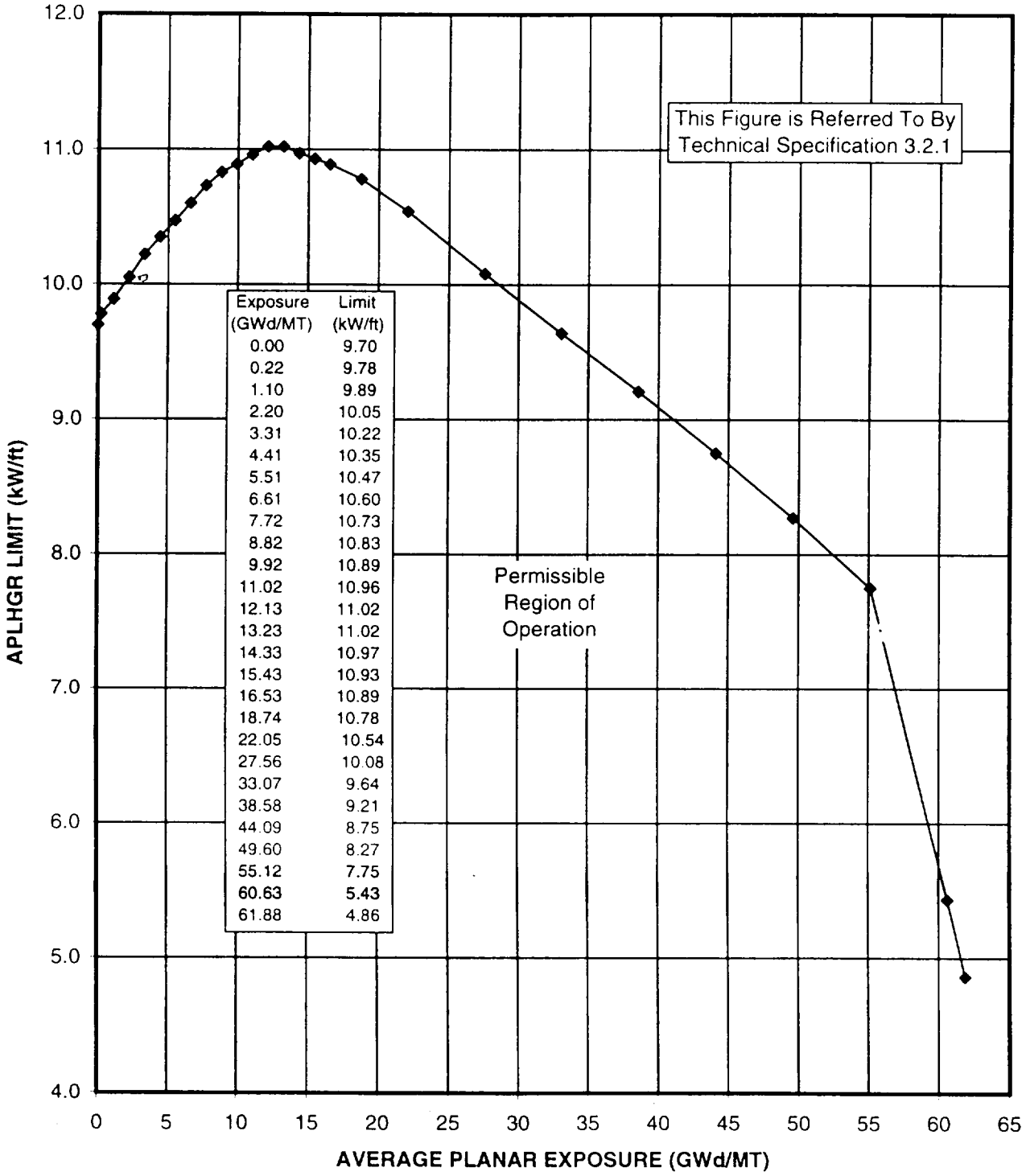
Fuel Type Atrium-10
Average Planar Linear Heat Generation Rate (APLHGR) Limit Versus Average Planar Exposure



Exposure (GWd/MT)	Limit (kW/ft)
0.00	10.65
0.22	10.72
1.10	10.85
2.20	11.00
3.31	11.12
4.41	11.25
5.51	11.38
6.61	11.52
7.72	11.66
8.82	11.81
9.92	11.95
11.02	12.05
13.78	12.04
16.53	11.97
19.29	11.79
22.05	11.54
27.56	11.02
33.07	10.44
38.58	9.69
44.09	8.98
49.60	8.30
55.12	7.64
60.63	7.00
64.48	6.55

Figure 6

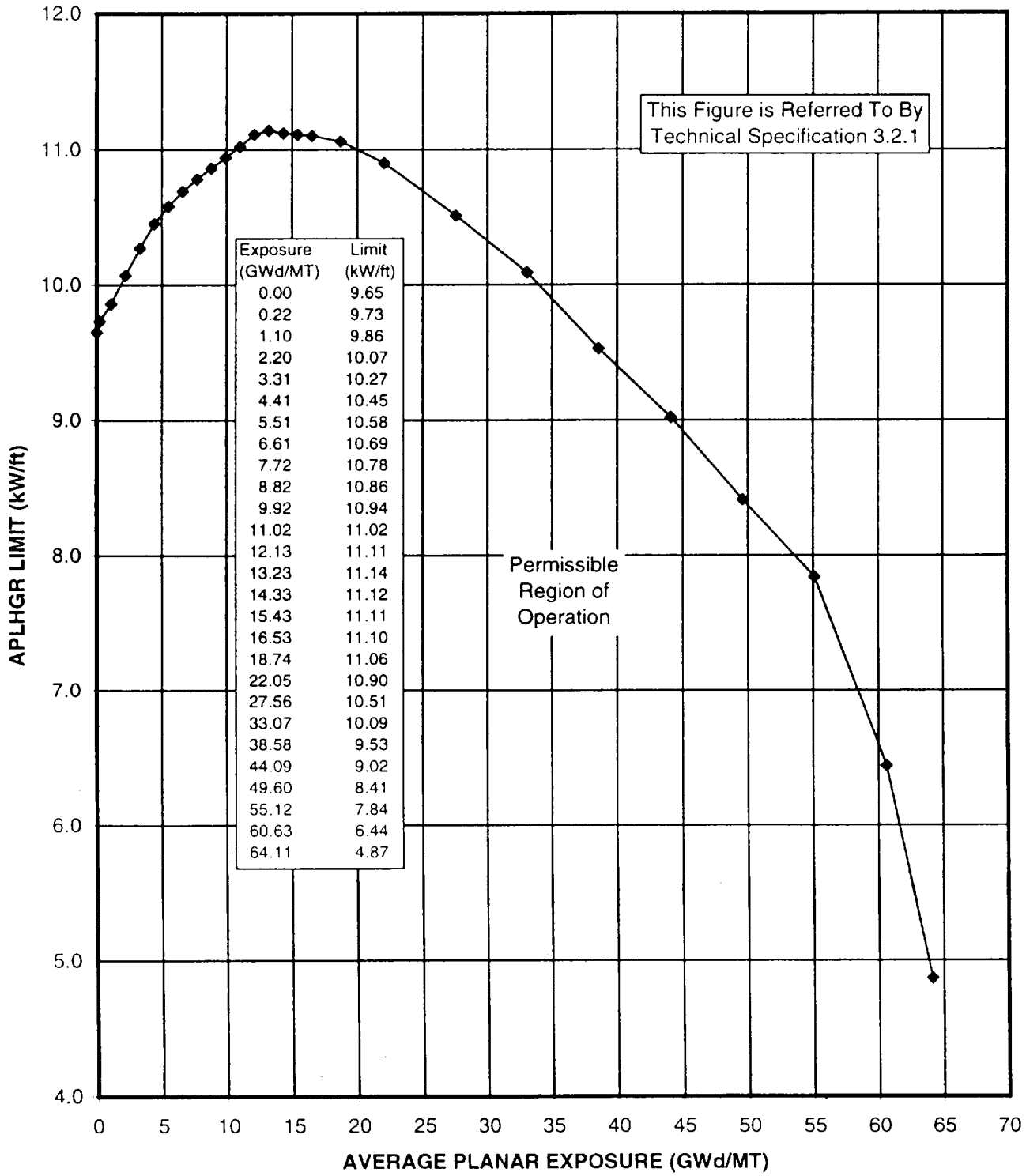
Fuel Type GE14-P10DNAB398-13GZ-100T-150-T (GE14) Average Planar Linear Heat Generation Rate (APLHGR) Limit Versus Average Planar Exposure



Exposure (GWd/MT)	Limit (kW/ft)
0.00	9.70
0.22	9.78
1.10	9.89
2.20	10.05
3.31	10.22
4.41	10.35
5.51	10.47
6.61	10.60
7.72	10.73
8.82	10.83
9.92	10.89
11.02	10.96
12.13	11.02
13.23	11.02
14.33	10.97
15.43	10.93
16.53	10.89
18.74	10.78
22.05	10.54
27.56	10.08
33.07	9.64
38.58	9.21
44.09	8.75
49.60	8.27
55.12	7.75
60.63	5.43
61.88	4.86

Figure 7

Fuel Type GE14-P10DNAB399-16GZ-100T-150-T (GE14) Average Planar Linear Heat Generation Rate (APLHGR) Limit Versus Average Planar Exposure



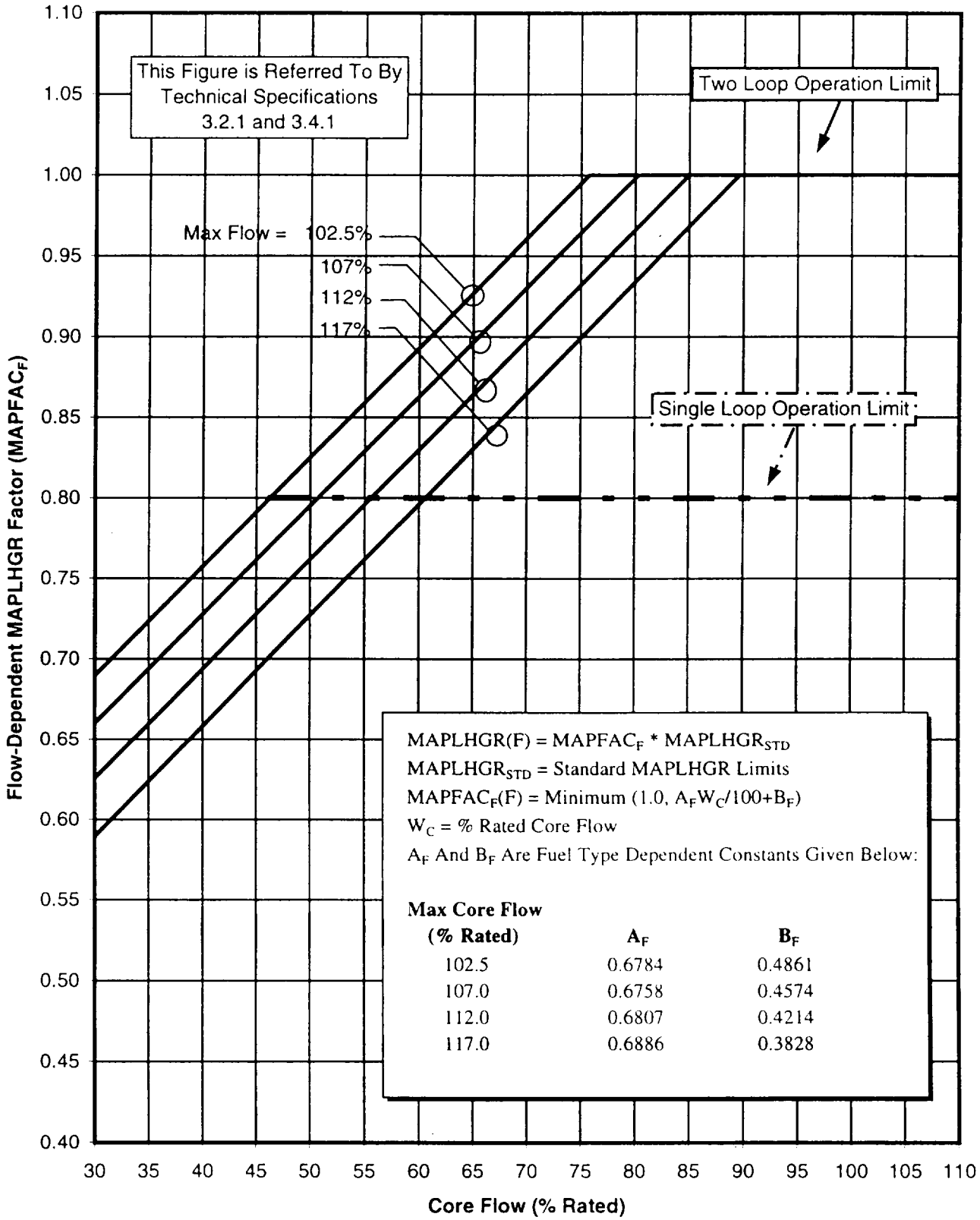
Exposure (GWd/MT)	Limit (kW/ft)
0.00	9.65
0.22	9.73
1.10	9.86
2.20	10.07
3.31	10.27
4.41	10.45
5.51	10.58
6.61	10.69
7.72	10.78
8.82	10.86
9.92	10.94
11.02	11.02
12.13	11.11
13.23	11.14
14.33	11.12
15.43	11.11
16.53	11.10
18.74	11.06
22.05	10.90
27.56	10.51
33.07	10.09
38.58	9.53
44.09	9.02
49.60	8.41
55.12	7.84
60.63	6.44
64.11	4.87

Figure 8

Not Used

Figure 9

Flow-Dependent MAPLHGR Limit, MAPLHGR(F)



$MAPLHGR(F) = MAPFAC_F * MAPLHGR_{STD}$

$MAPLHGR_{STD}$ = Standard MAPLHGR Limits

$MAPFAC_F(F) = \text{Minimum}\ (1.0,\ A_F W_C/100 + B_F)$

W_C = % Rated Core Flow

A_F And B_F Are Fuel Type Dependent Constants Given Below:

Max Core Flow (% Rated)	A_F	B_F
102.5	0.6784	0.4861
107.0	0.6758	0.4574
112.0	0.6807	0.4214
117.0	0.6886	0.3828

Figure 10

GE13 and A10 Power-Dependent MAPLHGR Limit, MAPLHGR (P)

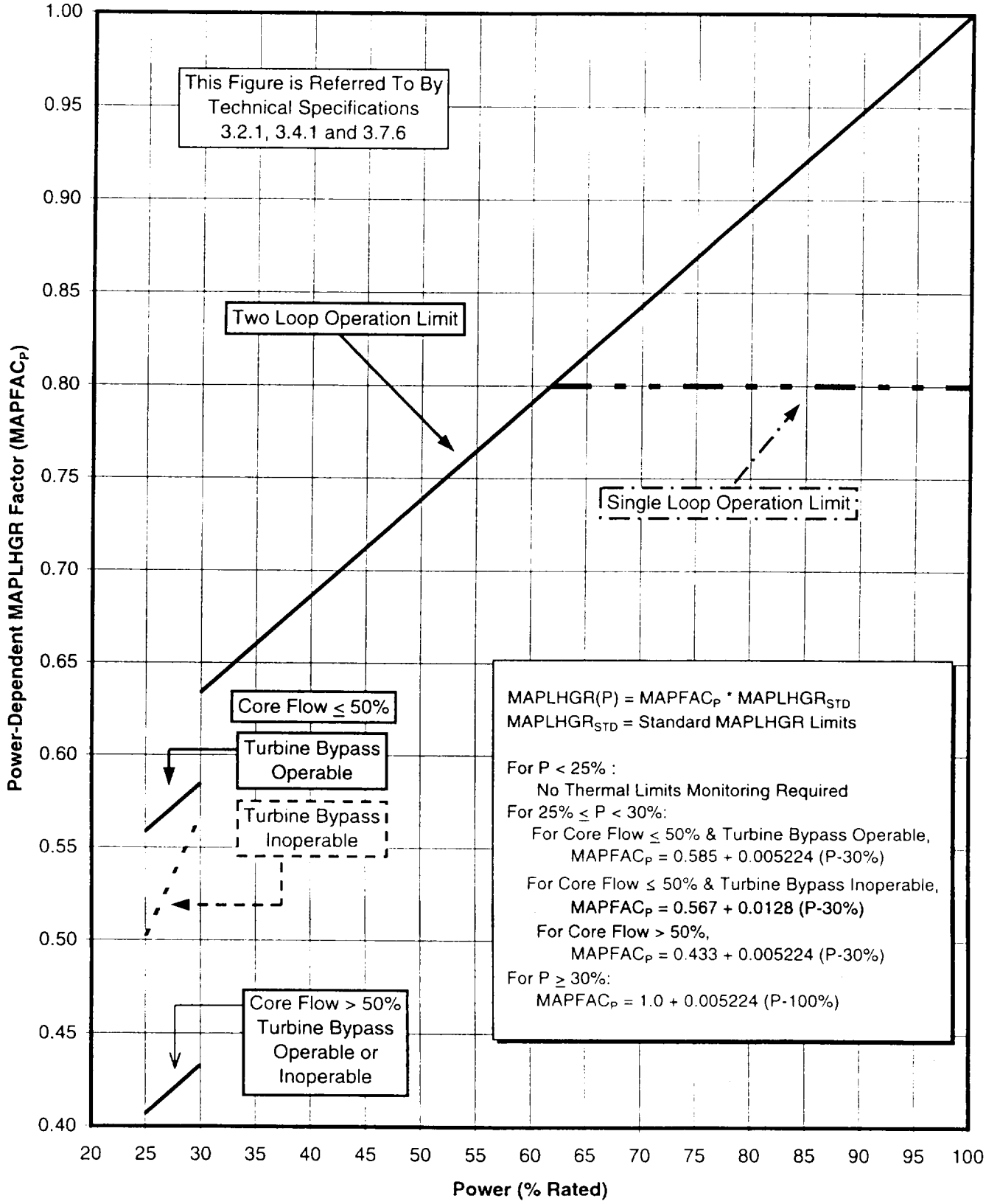


Figure 10a

GE14 Power-Dependent MAPLHGR Limit, MAPLHGR (P)

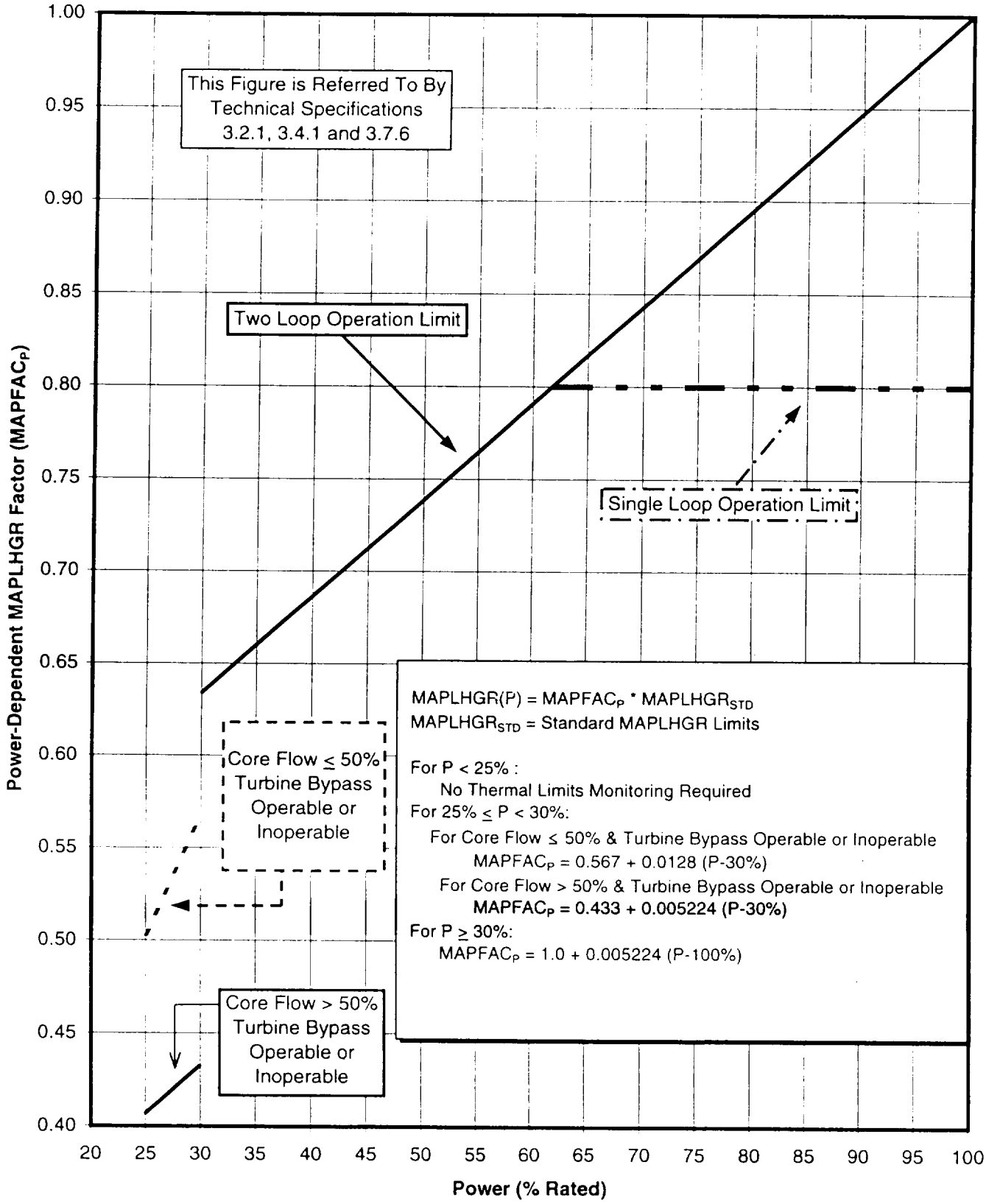


Figure 11

GE13 and GE14 Flow-Dependent MCPR Limit, MCPR(F)

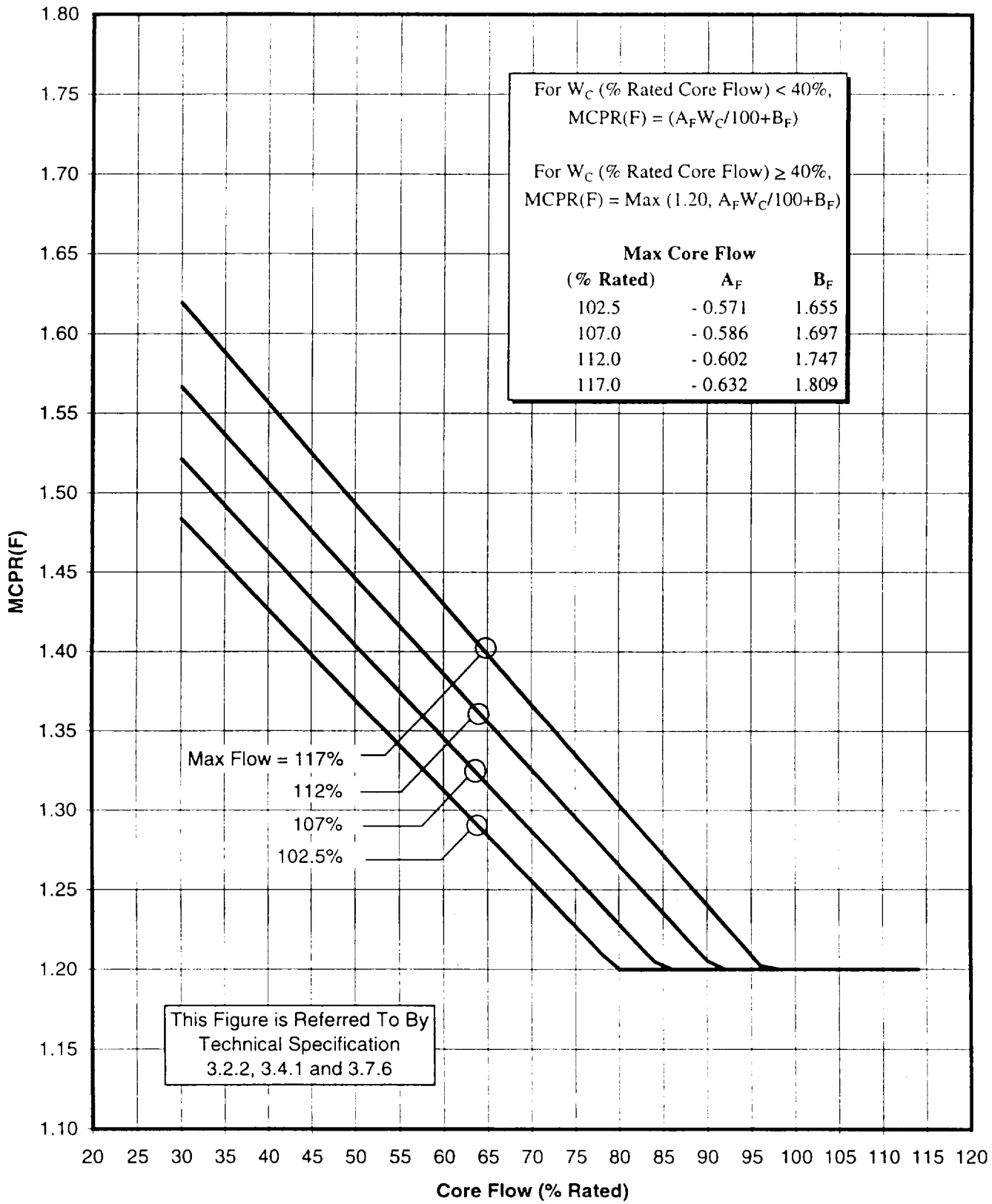


Figure 11a

A10 Flow-Dependent MCPR Limit, MCPR(F)

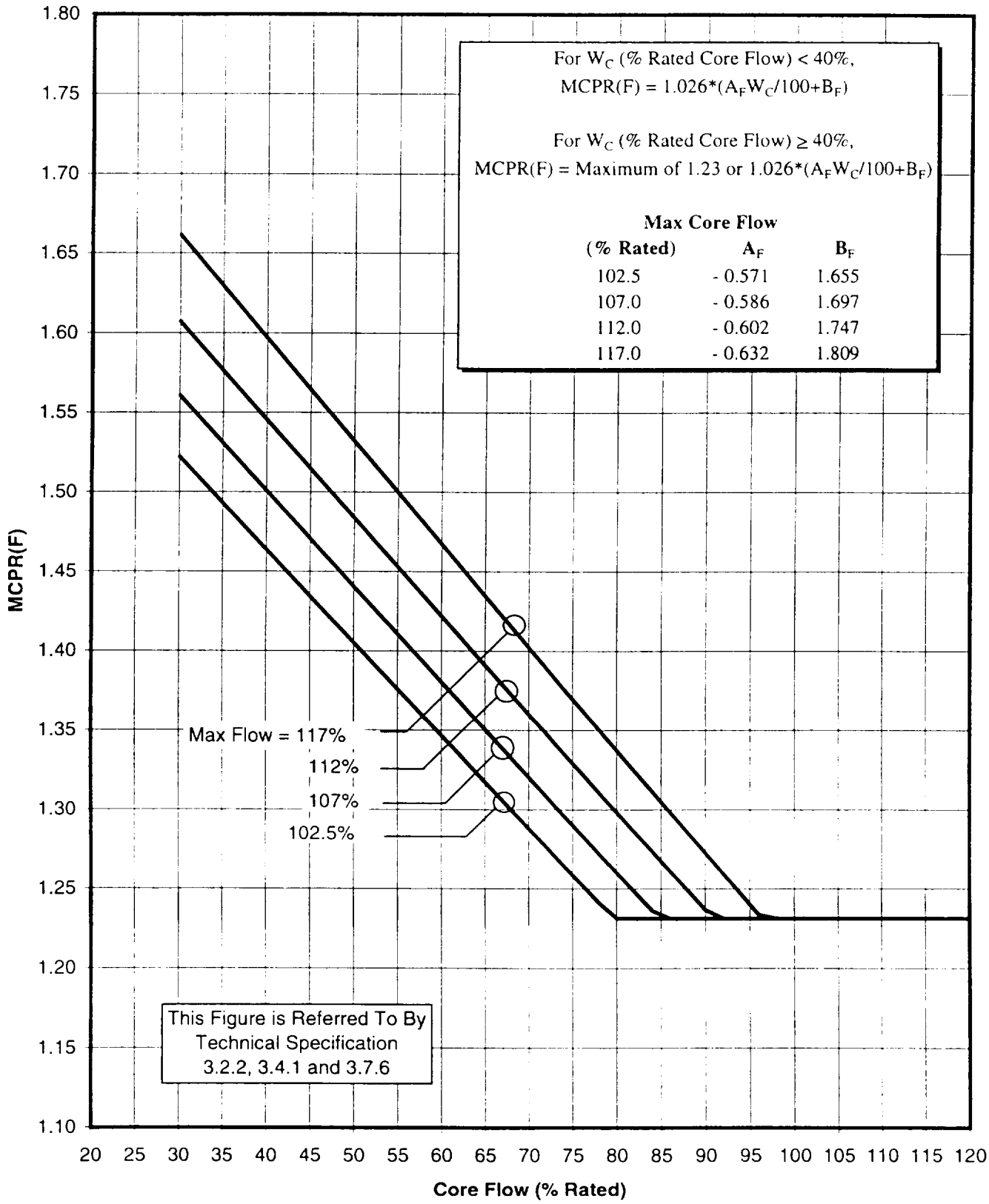


Figure 12

GE13 and Atrium-10 Power - Dependent MCPR Limit, MCPR (P)

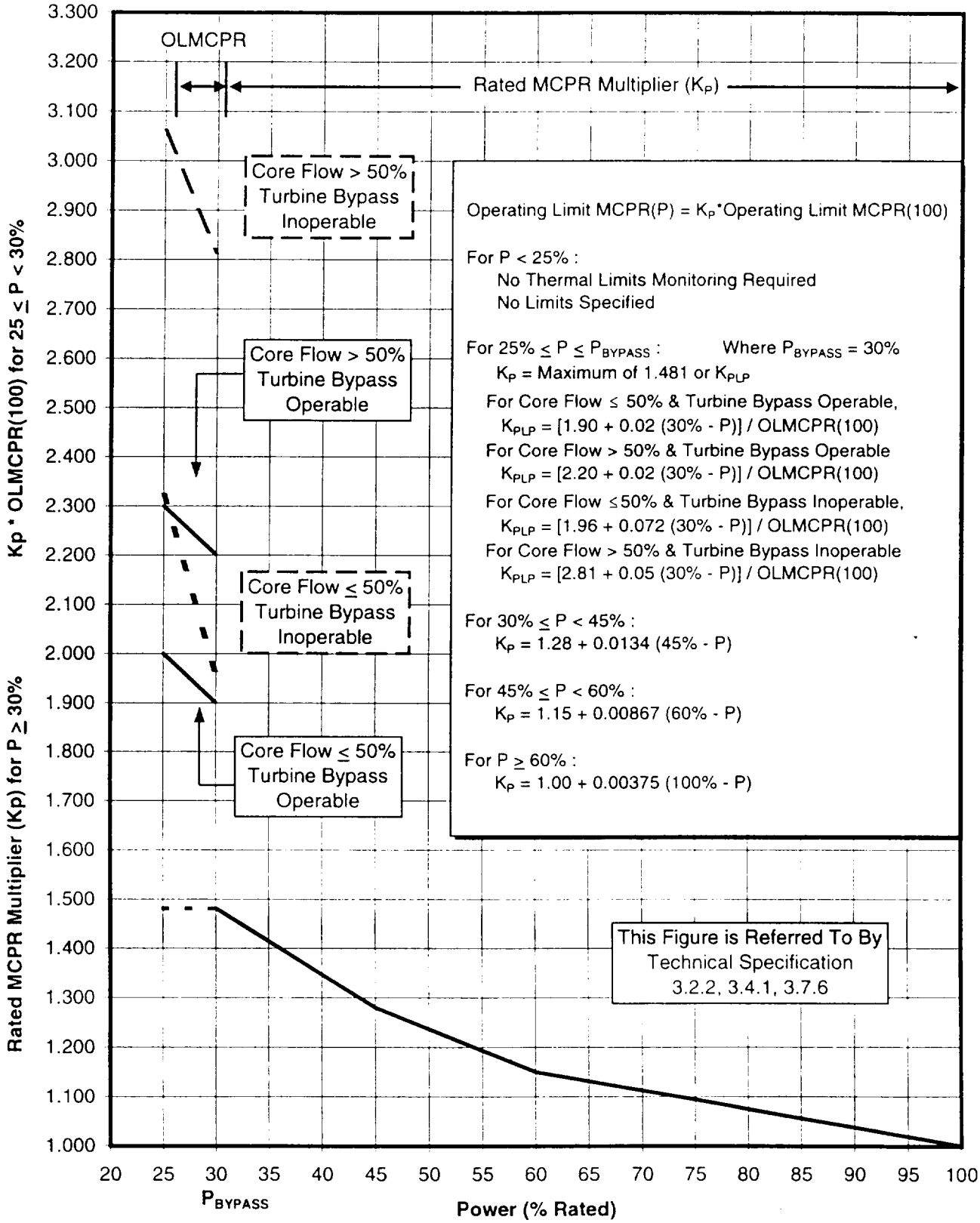


Figure 12a

GE14 Power - Dependent MCPR Limit, MCPR (P)

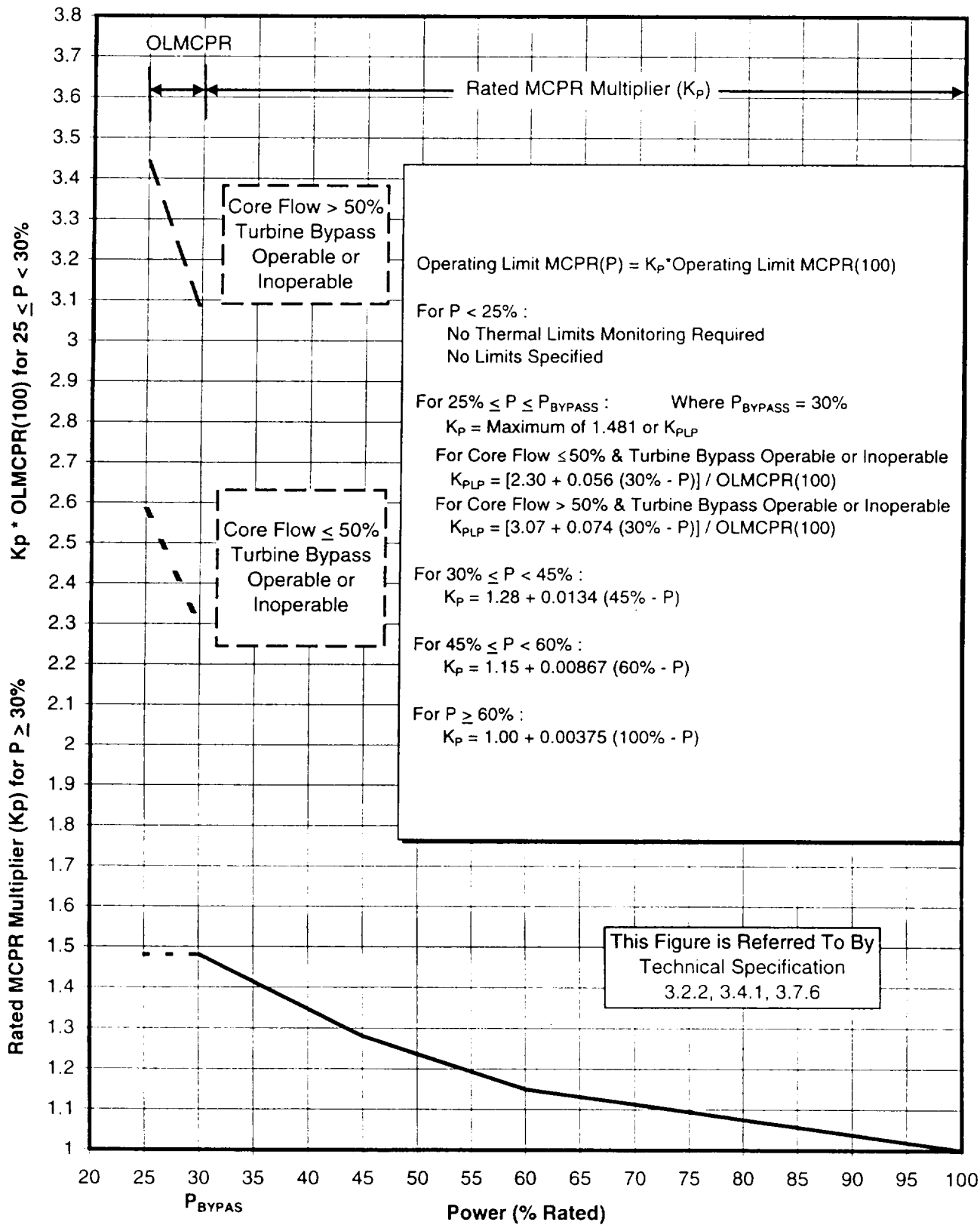
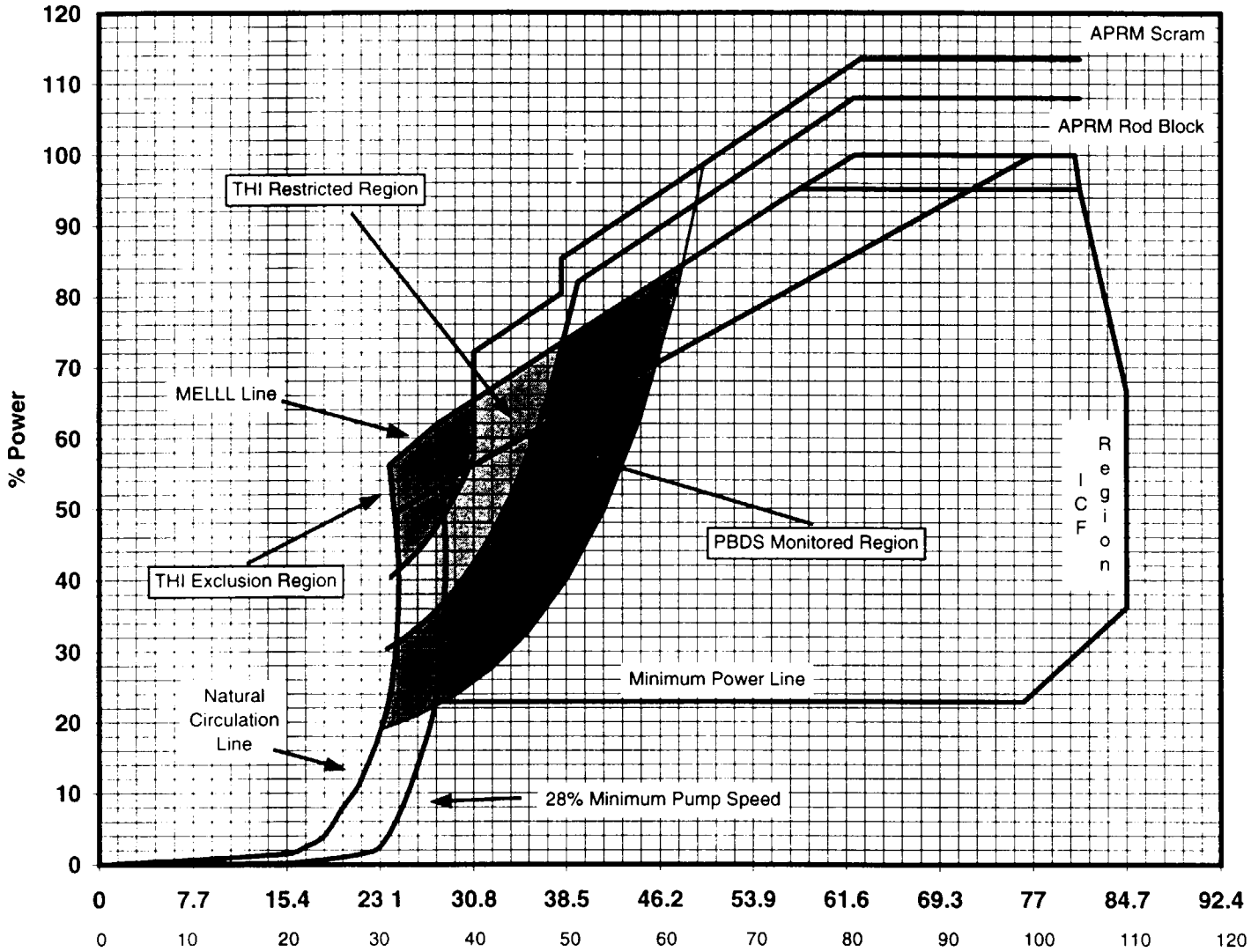


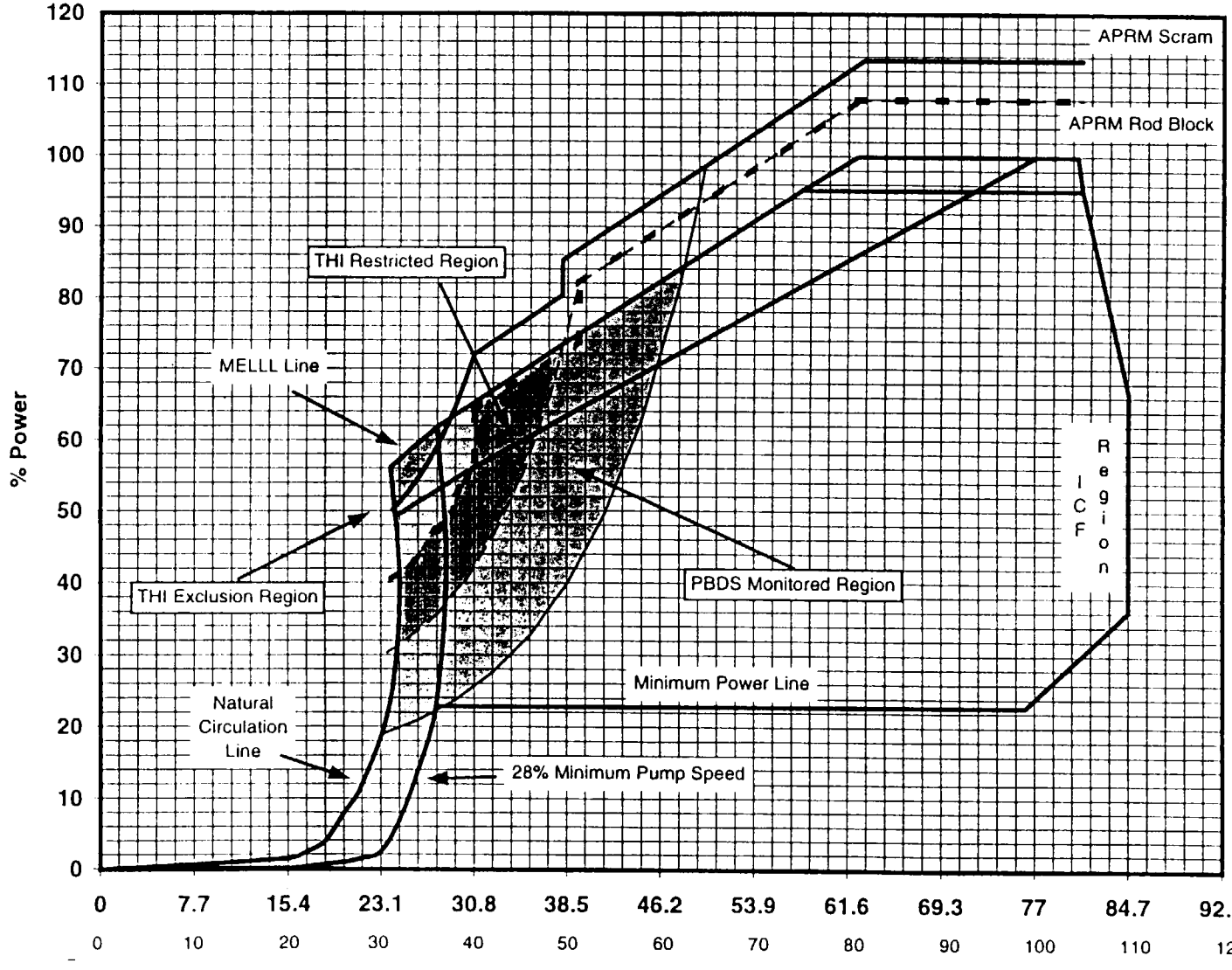
Figure 13
Power/Flow Map Stability Regions:
Normal TFW, Non-Setup



Power %	Core Flow, Mlbs/hr
100	80.31
99	80.42
98	80.54
97	80.65
96	80.76
95	80.87
94	81.01
93	81.15
92	81.28
91	81.42
90	81.55
89	81.69
88	81.82
87	81.96
86	82.09
85	82.23
84	82.36
83	82.50
82	82.63
81	82.77
80	82.90
79	83.04
78	83.17
77	83.31
76	83.44
75	83.58
74	83.71
73	83.85
72	83.98
71	84.12
70	84.25
69	84.39
68	84.53
67	84.66
66	84.70

This Figure supports Technical Specifications 3.2.3, 3.3.1.1 and 3.3.1.3 and the Technical Requirements Manual Specifications 3.2 and 3.3

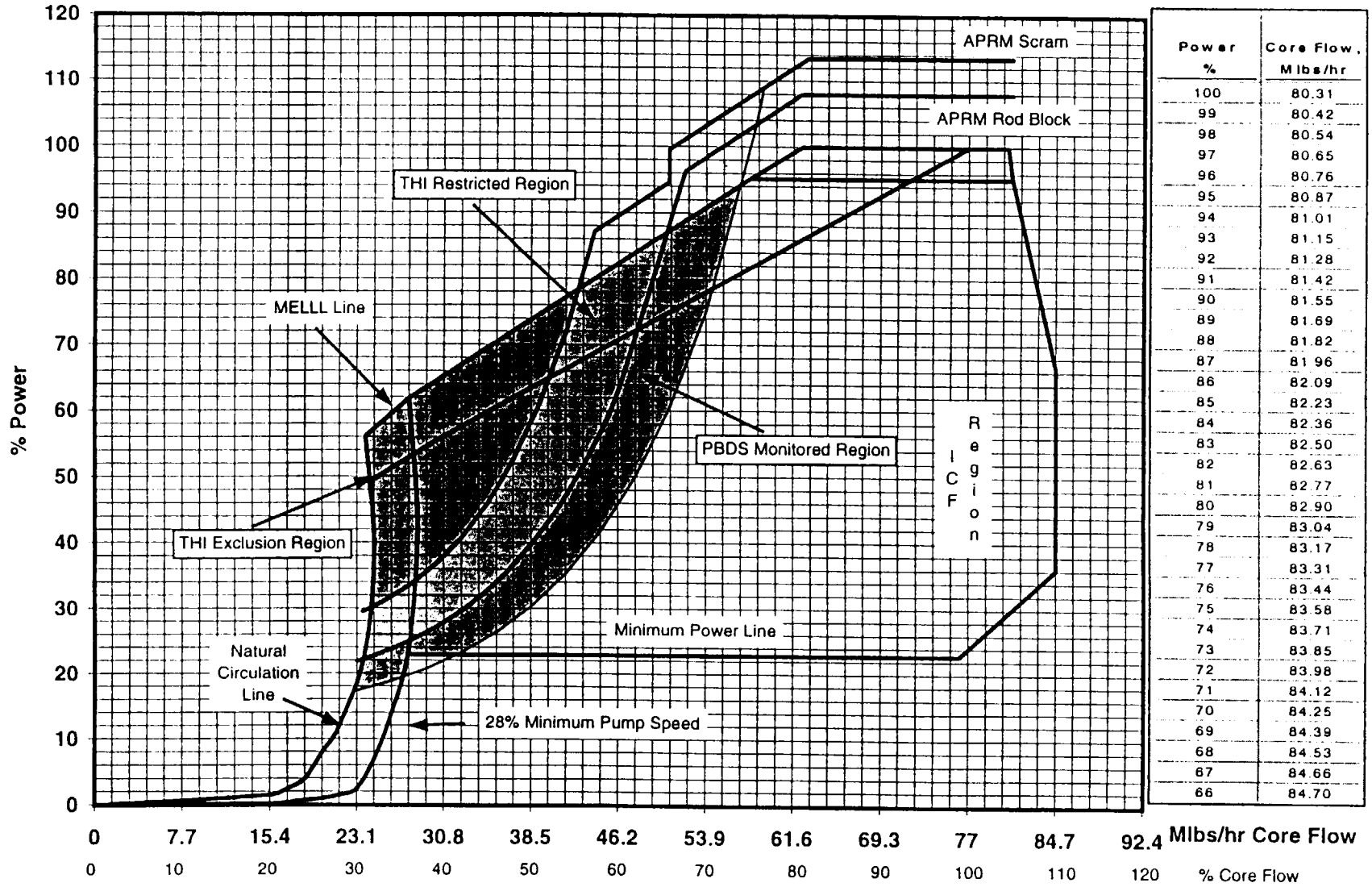
Figure 14
Power/Flow Map Stability Regions: Normal TFW, Setup



Power %	Core Flow, Mlbs/hr
100	80.31
99	80.42
98	80.54
97	80.65
96	80.76
95	80.87
94	81.01
93	81.15
92	81.28
91	81.42
90	81.55
89	81.69
88	81.82
87	81.96
86	82.09
85	82.23
84	82.36
83	82.50
82	82.63
81	82.77
80	82.90
79	83.04
78	83.17
77	83.31
76	83.44
75	83.58
74	83.71
73	83.85
72	83.98
71	84.12
70	84.25
69	84.39
68	84.53
67	84.66
66	84.70

This Figure supports Technical Specifications 3.2.3, 3.3.1.1 and 3.3.1.3 and the Technical Requirements Manual Specifications 3.2 and 3.3

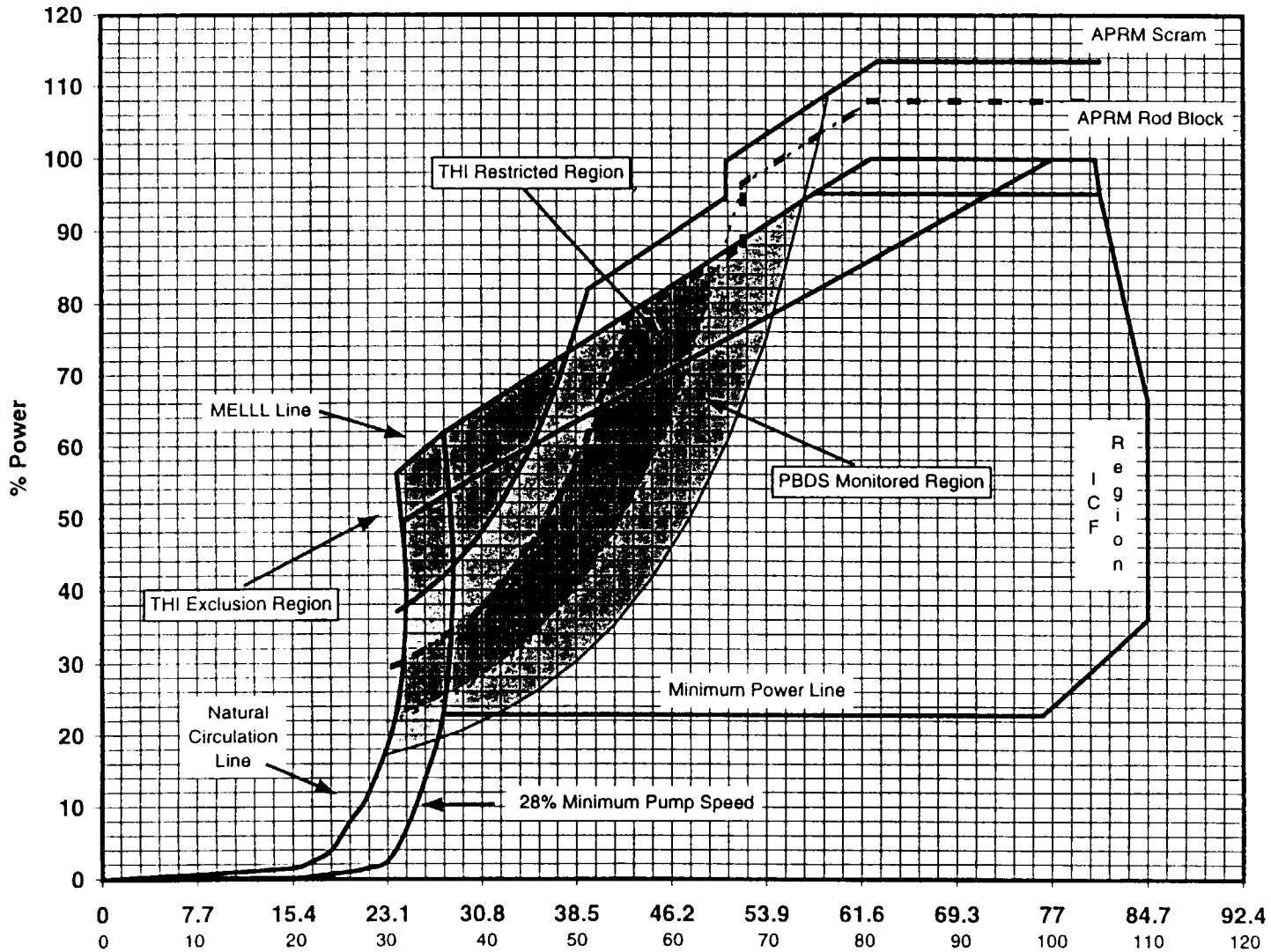
Figure 15
Power/Flow Map Stability Regions: Reduced TFW, Non-Setup



Power %	Core Flow, Mlbs/hr
100	80.31
99	80.42
98	80.54
97	80.65
96	80.76
95	80.87
94	81.01
93	81.15
92	81.28
91	81.42
90	81.55
89	81.69
88	81.82
87	81.96
86	82.09
85	82.23
84	82.36
83	82.50
82	82.63
81	82.77
80	82.90
79	83.04
78	83.17
77	83.31
76	83.44
75	83.58
74	83.71
73	83.85
72	83.98
71	84.12
70	84.25
69	84.39
68	84.53
67	84.66
66	84.70

This Figure supports Technical Specifications 3.2.3, 3.3.1.1 and 3.3.1.3 and the Technical Requirements Manual Specifications 3.2 and 3.3

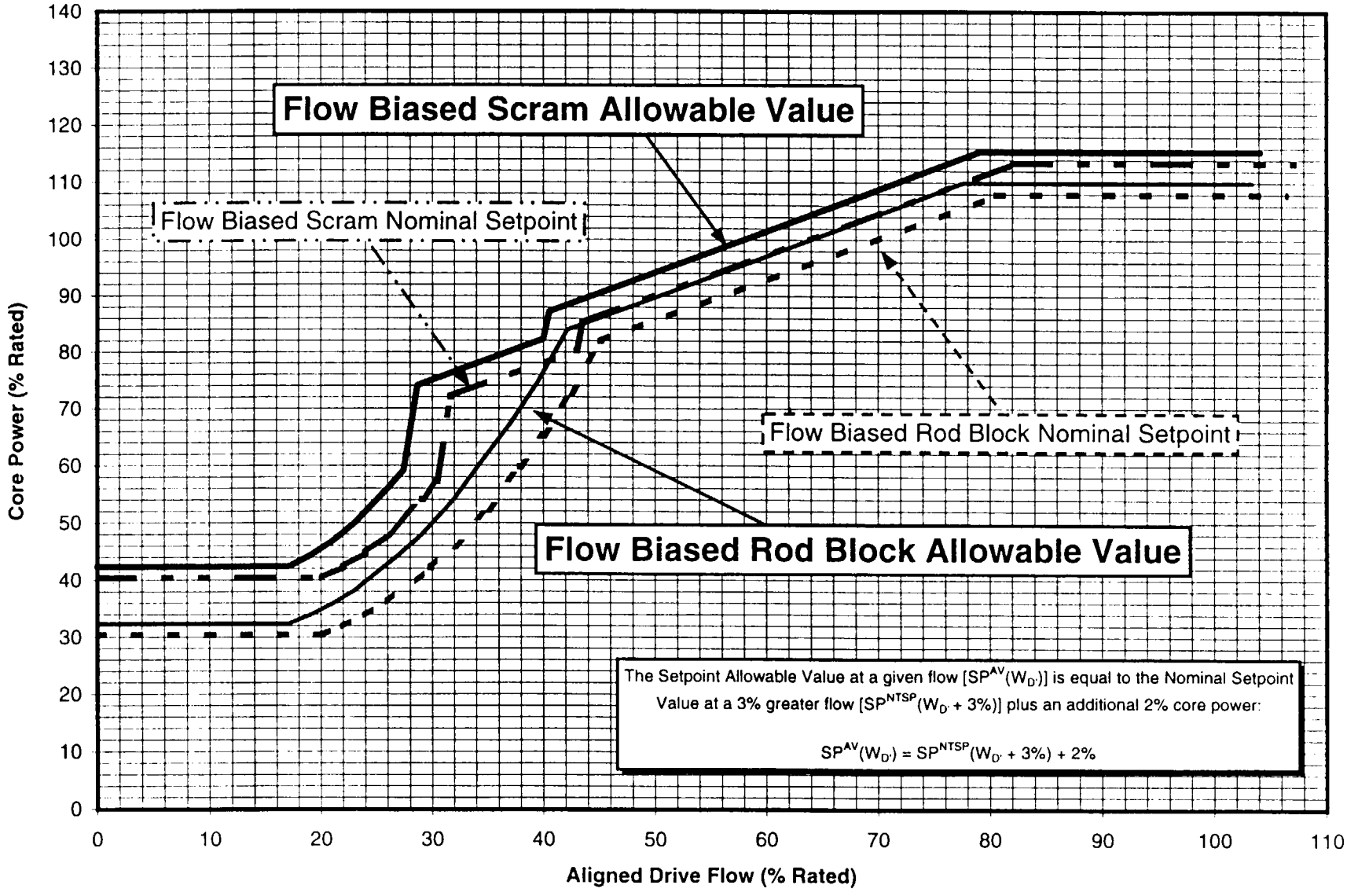
Figure 16
Power/Flow Map Stability Regions: Reduced TFW, Setup



Power %	Core Flow, Mlbs/hr
100	80.31
99	80.42
98	80.54
97	80.65
96	80.76
95	80.87
94	81.01
93	81.15
92	81.28
91	81.42
90	81.55
89	81.69
88	81.82
87	81.96
86	82.09
85	82.23
84	82.36
83	82.50
82	82.63
81	82.77
80	82.90
79	83.04
78	83.17
77	83.31
76	83.44
75	83.58
74	83.71
73	83.85
72	83.98
71	84.12
70	84.25
69	84.39
68	84.53
67	84.66
66	84.70

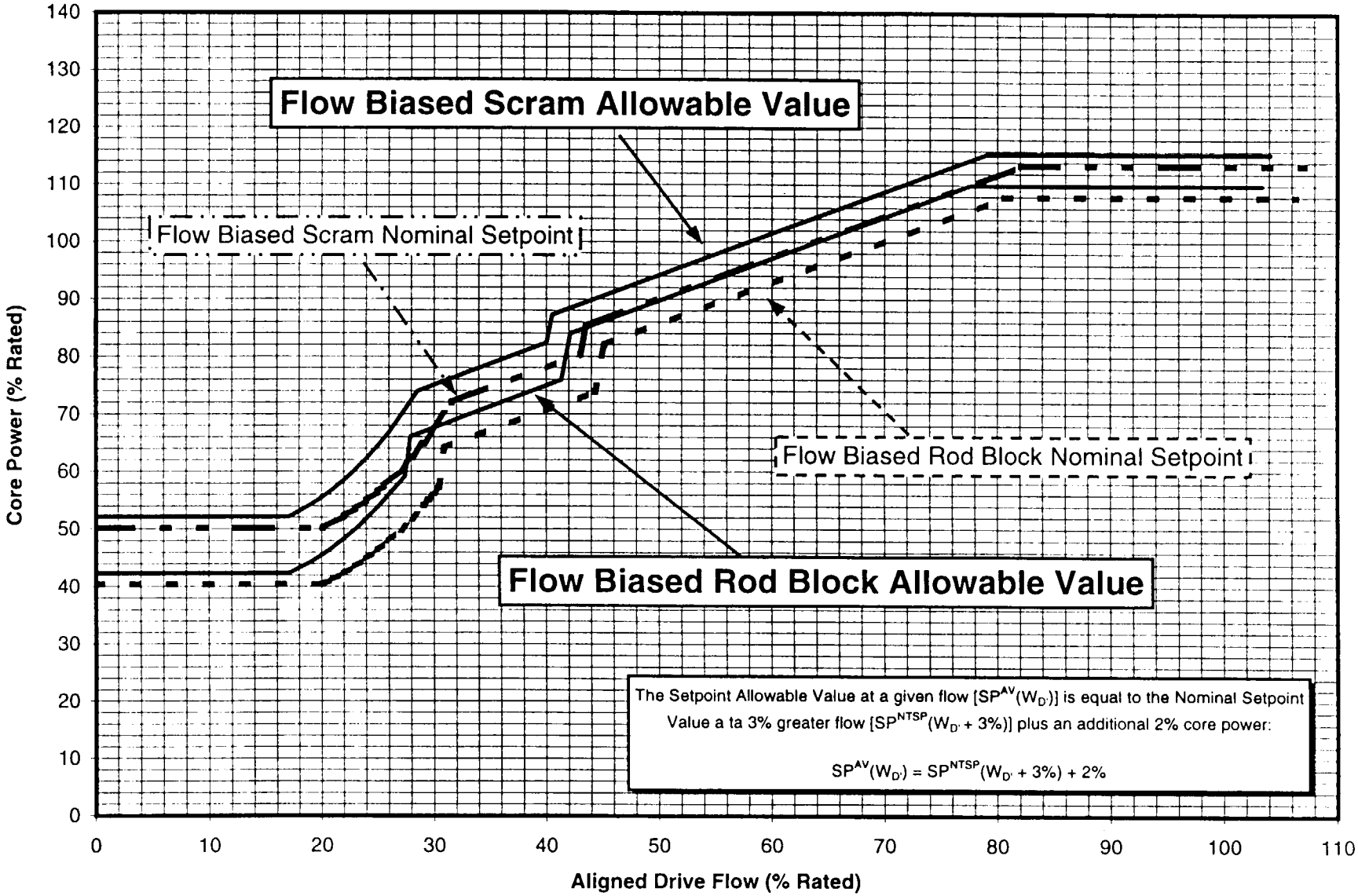
This Figure supports Technical Specifications 3.2.3, 3.3.1.1 and 3.3.1.3 and the Technical Requirements Manual Specifications 3.2 and 3.3

Figure 17
E1A Setpoint Allowable Values versus Aligned Drive Flow:
Normal TFW, Non-Setup



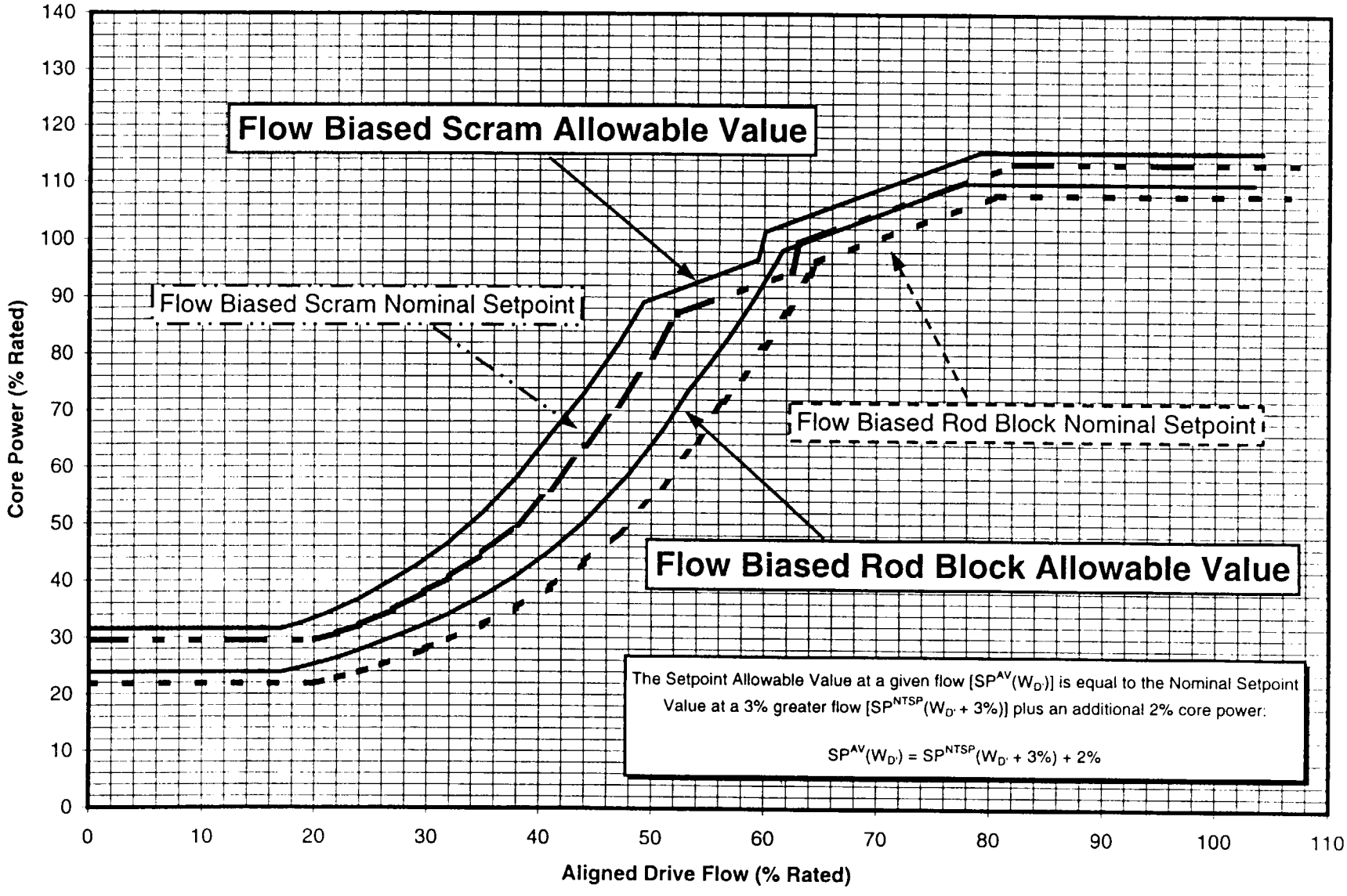
This Figure supports Technical Specification 3.3.1.1 and the Technical Requirements Manual Specifications 3.2 and 3.3

Figure 18
E1A Setpoint Allowable Values versus Aligned Drive Flow:
Normal TFW, Setup



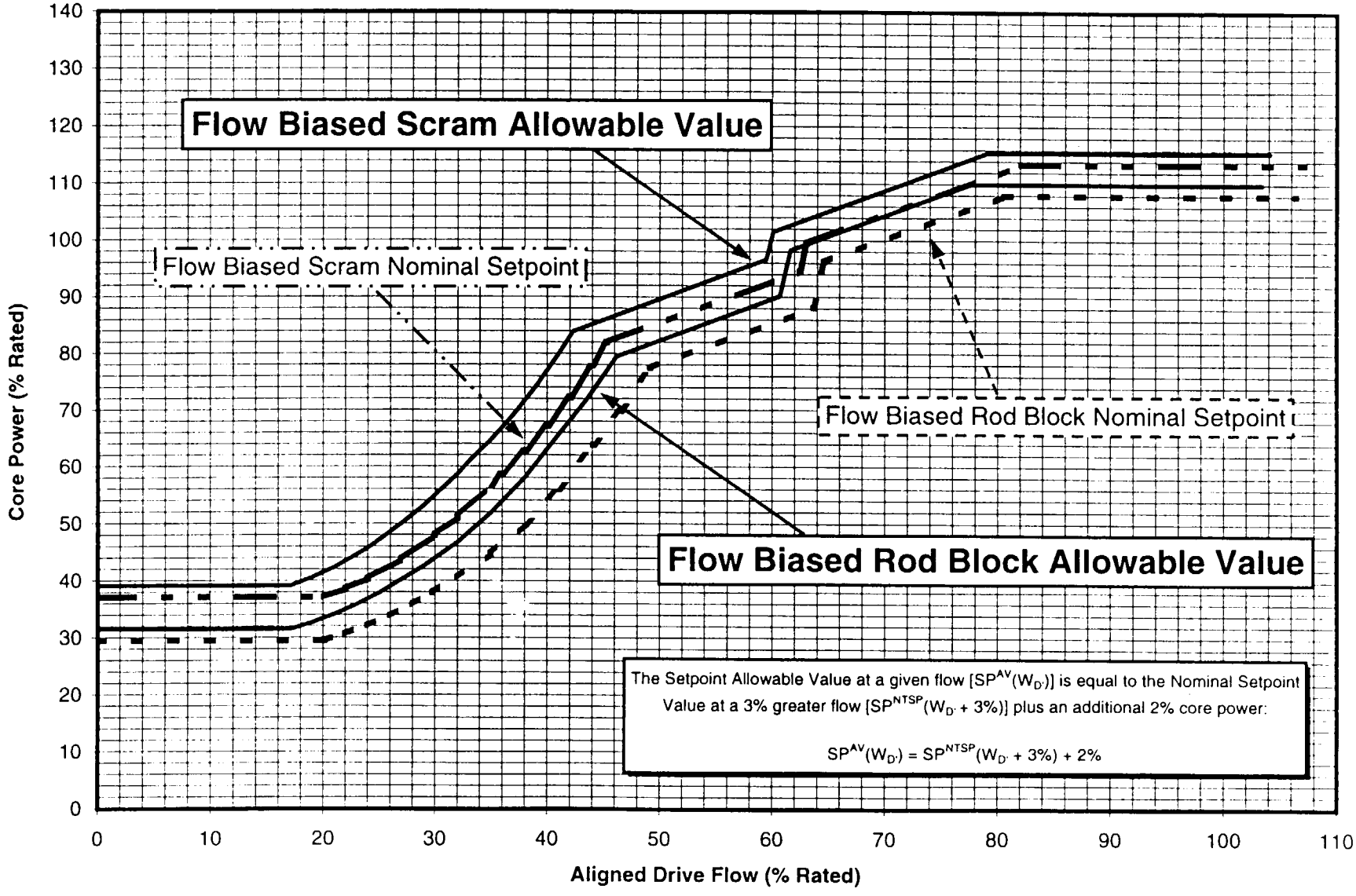
This Figure supports Technical Specification 3.3.1.1 and the Technical Requirements Manual Specifications 3.2 and 3.3

Figure 19
E1A Setpoint Allowable Values versus Aligned Drive Flow:
Reduced TFW, Non-Setup



This Figure supports Technical Specification 3.3.1.1 and the Technical Requirements Manual Specifications 3.2 and 3.3

Figure 20
E1A Setpoint Allowable Values versus Aligned Drive Flow:
Reduced TFW, Setup



This Figure supports Technical Specification 3.3.1.1 and the Technical Requirements Manual Specifications 3.2 and 3.3

ENCLOSURE 4

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-324/LICENSE NO. DPR-62
TRANSMITTAL OF THE UNIT 2 CYCLE 15
CORE OPERATING LIMITS REPORT,
SUPPLEMENTAL RELOAD LICENSING REPORT,
LOSS-OF-COOLANT ACCIDENT ANALYSIS REPORT,
AND SUPPLEMENT TO THE PLANT-SPECIFIC
EMERGENCY CORE COOLING SYSTEM (ECCS) EVALUATION

Global Nuclear Fuels Affidavit Regarding
Withholding From Public Disclosure
In Accordance With 10 CFR 2.790

Affidavit

I, Glen A. Watford, being duly sworn, depose and state as follows:

(1) I am Manager, Nuclear Fuel Engineering, Global Nuclear Fuel – Americas, L.L.C. ("GNF-A") and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in the attachment, NEDC-31624P, Supplement 2, Revision 7, "Loss-of Coolant Accident Analysis Report for Brunswick Steam Electric Plant Unit 2 Reload 14 Cycle 15," February, 2001.

(3) In making this application for withholding of proprietary information of which it is the owner or licensee, GNF-A relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4) and 2.790(a)(4) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information," and some portions also qualify under the narrower definition of "trade secret," within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GNF-A's competitors without license from GNF-A constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information which reveals cost or price information, production capacities, budget levels, or commercial strategies of GNF-A, its customers, or its suppliers;

d. Information which reveals aspects of past, present, or future GNF-A customer–funded development plans and programs, of potential commercial value to GNF-A;

e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a. and (4)b., above.

(5) The information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GNF-A, and is in fact so held. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in (6) and (7) following. The information sought to be withheld has, to the best of my

knowledge and belief, consistently been held in confidence by GNF-A, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or subject to the terms under which it was licensed to GNF-A. Access to such documents within GNF-A is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GNF-A are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information identified in paragraph (2) is classified as proprietary because it contains details of GNF-A's fuel design and licensing methodology.

The development of the methods used in these analyses, along with the testing, development and approval of the supporting methodology was achieved at a significant cost, on the order of several million dollars, to GNF-A or its licensor.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GNF-A's competitive position and foreclose or reduce the availability of profit–making opportunities. The fuel design and licensing methodology is part of GNF-A's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC–approved methods.

The research, development, engineering, analytical, and NRC review costs comprise a substantial investment of time and money by GNF-A or its licensor.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GNF-A's competitive advantage will be lost if its competitors are able to use the results of the GNF-A experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GNF-A would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GNF-A of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining these very valuable analytical tools.

Affidavit

State of North Carolina)
County of New Hanover) SS:

Glen A. Watford, being duly sworn, deposes and says:

That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge, information, and belief.

Executed at Wilmington, North Carolina, this 16th day of February, 2001

Glen A. Watford
Global Nuclear Fuel – Americas, LLC

Subscribed and sworn before me this 16 day of FEBRUARY, 2001

James E. McGinness

JAMES E. McGINNESS
Notary Public, State of North Carolina
New Hanover County
My Commision Expires 1/23/2006

Notary Public, State of North Carolina

My Commission Expires _____

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ENCLOSURE 6

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-324/LICENSE NO. DPR-62
TRANSMITTAL OF THE UNIT 2 CYCLE 15
CORE OPERATING LIMITS REPORT,
SUPPLEMENTAL RELOAD LICENSING REPORT,
LOSS-OF-COOLANT ACCIDENT ANALYSIS REPORT,
AND SUPPLEMENT TO THE PLANT-SPECIFIC
EMERGENCY CORE COOLING SYSTEM (ECCS) EVALUATION

General Electric Company Affidavit Regarding
Withholding From Public Disclosure
In Accordance With 10 CFR 2.790

General Electric Company

AFFIDAVIT

I, George B. Stramback, being duly sworn, depose and state as follows:

(1) I am Project Manager, Regulatory Services, General Electric Company ("GE") and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in the GE proprietary report GE-NE-J1103781-09-02P, *Brunswick Steam Electric Plant Units 1 and 2 ECCS-LOCA Evaluation for GE14,* Class III (GE Proprietary Information), dated February 2001. The proprietary information is delineated by bars marked in the margin adjacent to the specific material.

(3) In making this application for withholding of proprietary information of which it is the owner, GE relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), 2.790(a)(4), and 2.790(d)(1) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information", and some portions also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by General Electric's competitors without license from General Electric constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information which reveals cost or price information, production capacities, budget levels, or commercial strategies of General Electric, its customers, or its suppliers;

d. Information which reveals aspects of past, present, or future General Electric customer-funded development plans and programs, of potential commercial value to General Electric;

e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in both paragraphs (4)a. and (4)b., above.

(5) The information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GE, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GE, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within GE is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GE are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information identified in paragraph (2), above, is classified as proprietary because it contains detailed results of analytical models, methods and processes, including computer codes, which GE has developed, obtained NRC approval of, and applied to perform evaluations of the loss-of-coolant accident for the BWR.

The development and approval of the BWR loss-of-coolant accident analysis computer codes used in this analysis was achieved at a significant cost, on the order of several million dollars, to GE.

The development of the evaluation process along with the interpretation and application of the analytical results is derived from the extensive experience database that constitutes a major GE asset.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GE's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GE's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GE.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GE's competitive advantage will be lost if its competitors are able to use the results of the GE experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GE would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GE of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

STATE OF CALIFORNIA)
) ss:
COUNTY OF SANTA CLARA)

George B. Stramback, being duly sworn, deposes and says:

That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge, information, and belief.

Executed at San Jose, California, this 16th day of February 2001.

George B. Stramback
General Electric Company

Subscribed and sworn before me this 16TH day of FEBRUARY 2001.

Notary Public, State of California

ANNA HANLIN
Commission # 1184507
Notary Public - California
Santa Clara County
My Comm. Expires Jun 19, 2002