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May 5, 2005

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

SUBJECT: Entergy Nuclear Operations, Inc.  
Docket No.: 50-293  
License No.: DPR-35

Core Operating Limits Report, Revision 16B

LETTER NUMBER: 2.05.036

Dear Sir or Madam:

The enclosed revision of Pilgrim's Core Operating Limits Report (COLR) is submitted in accordance with the requirements of Pilgrim's Technical Specification 5.6.5. Revision 16B provides cycle-specific limits for operating Pilgrim during cycle 16 and replaces the previously submitted Revision 16A.

This letter contains no new commitments.

Should you require further information concerning COLR, Revision 16B, please contact me at (508) 830-8403.

Sincerely,

Bryan S. Ford  
Licensing Manager

WGL/dm

Enclosure: PNPS Core Operating Limits Report, Revision 16B

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A001

PILGRIM NUCLEAR POWER STATION  
PNPS CORE OPERATING LIMITS REPORT

RTYPE: G4.02

(CYCLE 16)

APPROVED: T. Trank for G. James 4/29/05  
Gary James, Reactor Engineering Superintendent Date

APPROVED: Robert H. Smith 4/29/05  
Robert Smith, Nuclear Engineering Director Date

APPROVED: Steve Bethay 4/29/05  
Operations Review Committee Date  
ORC Meeting #: 2005-009

APPROVED: E. Olson 05/01/05  
E. Olson, Operations Manager Date

APPROVED: P. Dietrich 5/2/05  
P. Dietrich, Plant Operations General Manager Date

APPROVED: M. Balduzzi 5/1/05  
M. Balduzzi, Senior Vice President - Operations Date

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RECORD OF REVISIONS

<u>Revision</u>	<u>Effective Date</u>	<u>Description</u>
8A	Effective date based on issuance of license amendment by NRC	Applicable for use during Cycle 8 Operation
9A	Effective date based on issuance of license amendment by NRC for ARTS and SAFER/GESTR	Applicable for use during Cycle 9 operation
10A	Effective date based on initial startup of Cycle 10	Applicable for use during Cycle 10 Operation
11A	Effective date based on initial startup of Cycle 11	Applicable for use during Cycle 11 Operation
11B	Effective upon final approval	Applicable for use during Cycle 11 Operation
11C	Effective upon final approval	Applicable for use during Cycle 11 Operation
11D	Effective upon final approval	Applicable for use during Cycle 11 Operation
12A	Effective date based on issuance of license amendment by NRC for SLMCPR of 1.08	Applicable for use during Cycle 12 Operation
12B	Effective upon final approval	Renumbered Table 3.3-2 to 3.3-1, Sh. 2 of 2 and Table 3.3-1 to 3.3-1, Sh. 1 of 2
12C	Effective upon final approval	Changed Tech Spec section numbers referenced due to Tech Amendment #177. Pages affected: 6, 24
12D	Effective upon final approval	Incorporated stability log-term solution option I-A.
13A	Effective upon final approval	Applicable for use during Cycle 13 Operation
14A	Effective upon final approval	Applicable for use during Cycle 14 Operation
15A	Effective upon final approval	Applicable for use during Cycle 15 Operation
15B	Effective upon final approval	Changed MAPLHGR Limits for GE14 fuel in response to an input error GE corrected. Applicable for use during Cycle 15 Operation
16A	Effective upon final approval	Applicable for use during Cycle 16 Operation
16B	Effective upon final approval	Core Loading Change to replace leaking fuel bundle JLG621. Clarified P-F Map graphic on P. 36. Applicable for use during Cycle 16 Operation

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## 1.0 INTRODUCTION

This report provides the cycle-specific limits for operation of the Pilgrim Nuclear Power Station (PNPS) during Cycle 16. In this report, Cycle 16 will be referred to as the present cycle.

Although this report is not a part of the PNPS Technical Specifications, the Technical Specifications refer to this report for the applicable values of the following fuel-related parameters:

	<u>Reference Technical Specification</u>
APRM Flux Scram Trip Setting (Run Mode)	Table 3.1.1
APRM Rod Block Trip Setting (Run Mode)	Table 3.2.C-2
Rod Block Monitor Trip Setting	Table 3.2.C-2
Average Planar Linear Heat Generation Rate	3.11.A
Linear Heat Generation Rate (LHGR)	3.11.B
Minimum Critical Power Ratio (MCPR)	3.11.C
Power/Flow Relationship	3.11.D
Reactor Vessel Core Design	4.2

If any of the core operating limits in this report is exceeded, actions will be taken as defined in the referenced Technical Specification.

The core operating limits in this report have been established for the present cycle using the NRC-approved methodology provided in the documents listed in Technical Specification 5.6.5. These limits are established such that the applicable limits of the plant safety analysis are met.

### 1.1 **Stability Option 1-D Exclusion Region and Buffer Zone.**

The reactor shall not be intentionally operated within the Exclusion Region given in Figure 3.4-1. Immediate exit is required for inadvertent entry into the exclusion region.

The reactor shall not be intentionally operated within the Buffer Zone given in Figure 3.4-1 when the on-line Stability Monitor is inoperable.

Allowable values for APRM Scram and Rod Block trip set points are defined in section 2.

2.0 INSTRUMENTATION TRIP SETTINGS:

2.1 APRM Flux Scram Trip Setting (Run Mode)  
Ref. Technical Specifications: Table 3.1.1

APRM flux scram Allowable Trip Set point (ATSP) is shown on Figure 2.1-1 and is clamped at 120% of rated core thermal power. Formulae used to develop Figure 2.1-1 are listed in Table 2.1-1.

The APRM flux scram trip setting is valid only for operation using two recirculation loops. Operation with one recirculation loop out of service is restricted by License Condition 3.E.

In accordance with Technical Specification Table 3.1.1, Note 15, for no combination of loop recirculation flow rate and core thermal power shall the APRM flux scram trip setting be allowed to exceed 120% of rated thermal power.

Drive Flow to Core Flow relationship:

APRM Trip settings use Drive flow to determine the power trip setting for both scrams and rod blocks, as the drive flow is a more reliable flow indication than core flow. The analysis calculates the stability based trip settings based on Core Flow.

Drive Flow ( $W_D$ ) normalization with core flow shall be done such that 100% Drive Flow corresponds to 100% Rated Core Flow of 69 M#/hr.

Source: Reference 5.6, sec. 2.1

**Table 2.1-1**  
**Formulae For Allowable APRM Flux Scram Settings**  
**Two Loop Operation**

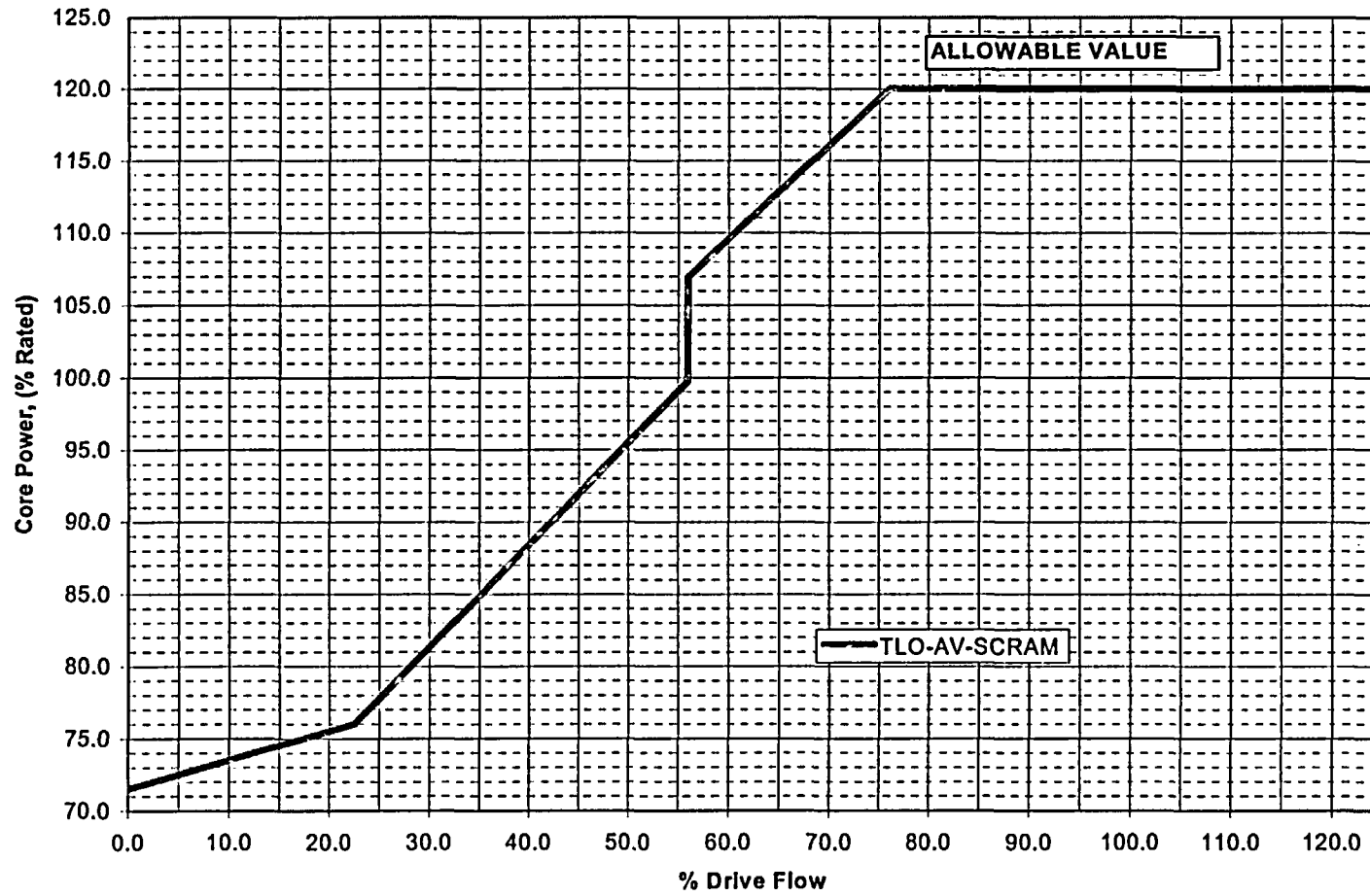
Allowable Trip Set Point (ATSP)		Drive Flow Range
C SLOPE	D INTERCEPT	% Rated
0.20	71.5	$0 \leq W_D \leq 22.5$
0.71	60.0	$22.5 < W_D \leq 55.9$
0.65	70.6	$55.9 < W_D \leq 76$
0	120.0	$76 < W_D \leq 125$

Notes:

1.  $ATSP = C * \% W_D + D$ , ATSP is in % Power
2. Figure 2.1-1 shows the plot of ATSP vs.  $W_D$ .
3. Reference 5.6, Table 1.a lists the values of constants listed in this Table.



Figure 2.1-1 Allowable APRM Flux Scram Trip Settings



2.2 APRM Rod Block Trip Setting (Run Mode)

Reference Technical Specifications: Table 3.2.C-2, 3.1.B.1

When the mode switch is in the RUN position, the average power range monitor (APRM) rod block Allowable Trip setting ( $ATSP_{RB}$ ) as a function of drive flow shall be as given by Figure 2.2-1.  $ATSP_{RB}$  is clamped at 115% of rated core thermal power. Formulae that form the basis of the Figure 2.2-1 are listed in Table 2.2-1.

The APRM rod block trip settings are valid only for operation using two recirculation loops. Operation with one recirculation loop out of service is restricted by License Condition 3.E.

2.3 Rod Block Monitor Trip Setting

References:  
 Technical Specification Table 3.2.C-2, Ref. 5.15, Ref. 5.1 Table 4.5 (b)

Allowable values for the power-dependent Rod Block Monitor trip set points shall be:

<u>Reactor Power, P (% of Rated)</u>	<u>Trip Set point (% of Reference Level)</u>
$P \leq 25.9$	Not applicable (All RBM Trips Bypassed)
$25.9 < P \leq 62.0$	120
$62.0 < P \leq 82.0$	115
$82.0 < P$	110

The allowable value for the RBM downscale trip set point shall be  $\leq 94.0\%$  of the reference level. The RBM downscale trip is bypassed for reactor power  $\leq 25.9\%$  of rated (Technical Specification Table 3.2.C-1, Note 5).

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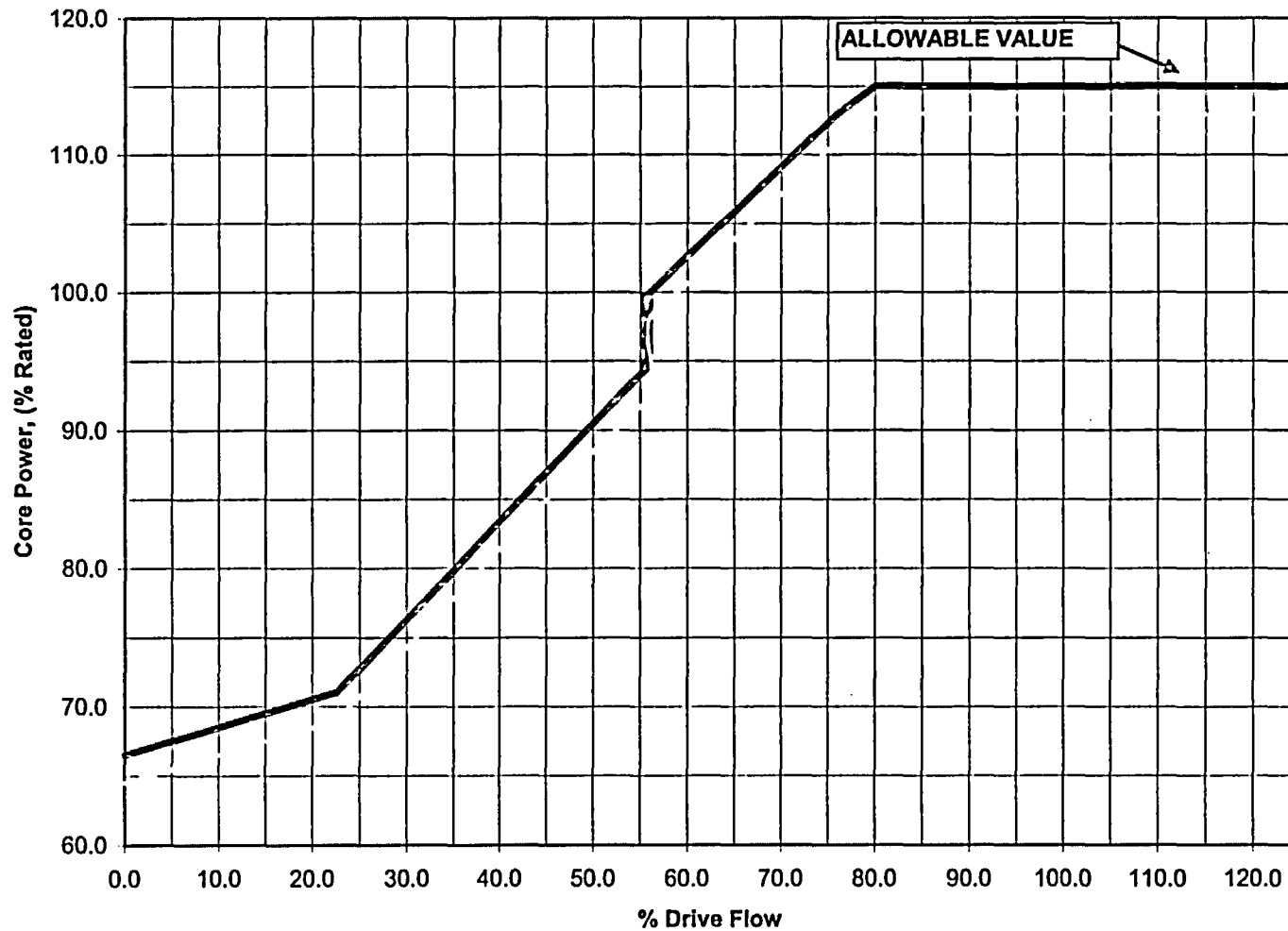
Table 2.2-1  
 Formulae For Allowable APRM Rod Block Settings  
 (Two Loop Operation)

APRM Rod Block Allowable Trip Set Point (ATSP <sub>RB</sub> )		Drive Flow Range
C SLOPE	D INTERCEPT	% Rated
0.20	66.5	$0 \leq W_D \leq 22.5$
0.71	55.0	$22.5 < W_D \leq 55.9$
0.65	63.6	$55.9 < W_D \leq 79.1$
0	115.0	$79.1 < W_D \leq 125$

Notes:

1.  $ATSP = C * \% W_D + D$ , ATSP is in % Power
2. Figure 2.1-1 shows the plot of ATSP vs.  $W_D$ .
3. Reference 5.6, Table 2.a lists the values of constants listed in this Table.

Figure 2.2-1 Allowable APRM Flux Rod Block Trip Settings



### 3.0 CORE OPERATING LIMITS

#### 3.1 Maximum Average Planar Linear Heat Generation Rate (MAPLHGR)

##### Reference Technical Specification: 3.11.A

During power operation, MAPLHGR for each fuel type as a function of axial location and average planar exposure shall not exceed the applicable limiting value. The applicable limiting value for each fuel type is the smaller of the flow-dependent and power-dependent MAPLHGR limits,  $MAPLHGR_F$  and  $MAPLHGR_P$ . The flow-dependent MAPLHGR limit,  $MAPLHGR_F$ , is the product of the MAPLHGR flow factor,  $MAPFAC_F$ , shown in Figure 3.1-3 for both GE11 and GE14 fuels and the MAPLHGR for rated power and flow conditions, given in Tables 3.1-1 for GE11 fuel or Table 3.1-2 for GE14 fuel. The power-dependent MAPLHGR limit,  $MAPLHGR_P$ , is the product of the MAPLHGR power factor,  $MAPFAC_P$ , (shown in Figure 3.1-4 for both GE11 and GE14 fuels) and the MAPLHGR limit for rated power and flow conditions, given in Tables 3.1-1 for GE11 fuel or Table 3.1-2 for GE14 fuel.

MAPLHGR for rated power and flow conditions for the most limiting lattice in each fuel type (excluding natural uranium lattices) are presented in Figures 3.1-1 and 3.1-2.

MAPLHGR limits are based on ECCS-LOCA considerations. For each lattice type, the MAPLHGR values for rated power and flow conditions are listed in Table 3.1-1 for GE11 fuel and Table 3.1-2 for GE14 fuel, which are obtained from the Supplemental Reload Licensing Report (Ref. 5.15).

Pbypass is the power level below which more restrictive thermal limits are applied, as the Turbine Stop Valve closure and Turbine Control Valve fast closure scrams are assumed to be bypassed. It can be set anywhere in the range from 32.5% power to 45% power. Pbypass is currently set at 32.5% power. If this setting is changed in the future, then the appropriate thermal limits can be determined using Figures 3.1-1 and 3.1-2.

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Table 3.1-1 MAPLHGR Limits for Rated Power and Rated Flow for GE11 fuel  
Bundle Type: GE11-P9DUB407-14GZ-100T-141-T6

Average Planar Exposure	MAPLHGR Limit (kW/ft)			
	Lattice 4338	Lattice 4339	Lattice 4340	Lattice 4341
0.00 ( 0.00)	11.43	10.37	10.28	12.14
0.22 ( 0.20)	11.37	10.43	10.33	12.11
1.10 ( 1.00)	11.20	10.48	10.44	12.02
2.20 ( 2.00)	11.16	10.60	10.59	12.02
3.31 ( 3.00)	11.19	10.72	10.74	12.06
4.41 ( 4.00)	11.24	10.83	10.88	12.11
5.51 ( 5.00)	11.30	10.94	11.02	12.16
6.61 ( 6.00)	11.35	11.06	11.16	12.20
7.72 ( 7.00)	11.39	11.18	11.31	12.24
8.82 ( 8.00)	11.42	11.30	11.47	12.27
9.92 ( 9.00)	11.45	11.42	11.63	12.29
11.02 (10.00)	11.46	11.54	11.80	12.30
12.13 (11.00)	11.47	11.64	11.96	12.31
13.23 (12.00)	11.42	11.72	12.07	12.30
14.33 (13.00)	11.38	11.79	12.16	12.25
14.59 (13.24)	11.36	11.81	12.17	12.23
15.43 (14.00)	11.32	11.86	12.21	12.19
16.53 (15.00)	11.27	11.92	12.23	12.14
18.74 (17.00)	11.15	11.98	12.22	12.02
22.05 (20.00)	10.98	11.96	12.18	11.84
27.56 (25.00)	10.69	11.91	12.10	11.56
33.07 (30.00)	10.16	11.67	11.83	11.26
36.76 (33.35)	9.63	11.24	11.46	10.73
38.58 (35.00)	9.37	11.02	11.28	10.47
44.09 (40.00)	8.59	10.29	10.52	9.69
49.60 (45.00)	7.81	9.57	9.80	8.91
55.12 (50.00)	6.29	8.85	9.10	8.14
57.76 (52.40)	5.36	--	--	--
60.63 (55.00)	--	7.63	8.07	6.31
62.25 (56.47)	--	--	--	5.74
62.50 (56.70)	--	7.00	7.42	--
64.88 (58.86)	--	6.20	--	--
65.74 (59.63)	--	--	6.31	--

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Table 3.1-1 Continued: Bundle Type: GE11-P9DUB408-6G5.0/7G4.0-100T-141-T6

Average Planar Exposure GWd/MT (GWd/ST)	MAPLHGR Limit (kW/ft)			
	Lattice 4324	Lattice 4325	Lattice 4326	Lattice 4327
0.00 (0.00)	11.43	10.59	10.57	12.01
0.22 (0.20)	11.37	10.64	10.61	11.98
1.10 (1.00)	11.20	10.73	10.70	11.88
2.20 (2.00)	11.16	10.83	10.82	11.88
3.31 (3.00)	11.19	10.94	10.95	11.92
4.41 (4.00)	11.24	11.06	11.08	11.97
5.51 (5.00)	11.30	11.17	11.22	12.03
6.61 (6.00)	11.35	11.29	11.36	12.07
7.72 (7.00)	11.39	11.41	11.51	12.11
8.82 (8.00)	11.42	11.53	11.66	12.14
9.92 (9.00)	11.45	11.65	11.83	12.16
11.02 (10.00)	11.46	11.77	11.99	12.18
12.13 (11.00)	11.47	11.88	12.13	12.19
13.23 (12.00)	11.42	11.94	12.21	12.17
14.33 (13.00)	11.38	11.98	12.25	12.12
14.59 (13.24)	11.36	11.99	12.26	12.11
15.43 (14.00)	11.32	12.01	12.27	12.07
16.53 (15.00)	11.27	12.03	12.27	12.01
18.74 (17.00)	11.15	12.02	12.19	11.89
22.05 (20.00)	10.98	11.98	12.02	11.71
27.56 (25.00)	10.69	11.92	11.76	11.43
33.07 (30.00)	10.16	11.71	11.56	11.09
36.76 (33.35)	9.63	11.28	11.33	10.56
38.58 (35.00)	9.37	11.07	11.22	10.30
44.09 (40.00)	8.59	10.33	10.56	9.52
49.60 (45.00)	7.81	9.60	9.83	8.75
55.12 (50.00)	6.29	8.88	9.13	7.94
57.76 (52.40)	5.36	--	--	--
60.63 (55.00)	--	7.67	8.09	6.01
61.57 (55.85)	--	--	--	5.68
62.50 (56.70)	--	7.04	7.46	--
65.09 (59.05)	--	6.16	--	--
65.90 (59.78)	--	--	6.31	--

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Table 3.1-2 MAPLHGR Limits for Rated Power and Rated Flow for GE14 fuel  
Bundle Type: GE14-P10DNAB399-10G6.0/3G5.0/1G2.0-100T-145-T6-2828 (GE14C)

Average Planar Exposure GWd/MT (GWd/ST)	MAPLHGR Limit (kW/ft)					
	Lattice 6843	Lattice 6844	Lattice 6845	Lattice 6846	Lattice 6847	Lattice 6848
0.00 ( 0.00)	9.80	8.79	8.76	8.74	10.21	10.89
0.22 ( 0.20)	9.71	8.86	8.84	8.82	10.16	10.86
1.10 ( 1.00)	9.50	8.96	8.96	8.95	10.01	10.78
2.20 ( 2.00)	9.44	9.10	9.13	9.12	9.98	10.77
3.31 ( 3.00)	9.45	9.23	9.31	9.31	10.01	10.80
4.41 ( 4.00)	9.49	9.31	9.50	9.50	10.05	10.84
5.51 ( 5.00)	9.53	9.40	9.60	9.64	10.10	10.89
6.61 ( 6.00)	9.57	9.48	9.70	9.74	10.15	10.92
7.72 ( 7.00)	9.61	9.57	9.79	9.84	10.18	10.95
8.82 ( 8.00)	9.64	9.65	9.89	9.94	10.21	10.97
9.92 ( 9.00)	9.66	9.74	9.98	10.03	10.24	10.99
11.02 (10.00)	9.68	9.82	10.07	10.12	10.25	11.00
12.13 (11.00)	9.69	9.91	10.17	10.22	10.27	11.01
13.23 (12.00)	9.67	9.97	10.26	10.32	10.27	11.01
14.33 (13.00)	9.64	10.02	10.34	10.40	10.24	11.01
15.43 (14.00)	9.60	10.08	10.40	10.47	10.20	10.97
15.99 (14.51)	9.58	10.11	10.43	10.49	10.18	10.95
16.53 (15.00)	9.56	10.14	10.45	10.51	10.16	10.93
18.74 (17.00)	9.48	10.21	10.50	10.56	10.07	10.84
22.05 (20.00)	9.35	10.27	10.54	10.59	9.94	10.71
23.01 (20.87)	9.28	10.27	10.55	10.60	9.89	10.68
27.56 (25.00)	8.95	10.25	10.58	10.63	9.66	10.51
32.19 (29.20)	8.40	9.94	10.26	10.32	9.11	10.05
33.07 (30.00)	8.30	9.88	10.20	10.26	9.01	9.97
38.58 (35.00)	7.65	9.48	9.72	9.72	8.37	9.33
44.09 (40.00)	7.02	9.03	9.19	9.20	7.73	8.69
49.60 (45.00)	6.38	8.51	8.66	8.67	7.10	8.06
54.79 (49.71)	3.98	--	--	--	--	--
55.12 (50.00)	--	7.94	8.12	8.13	5.64	7.43
58.16 (52.77)	--	--	--	--	4.21	--
60.63 (55.00)	--	5.83	6.65	6.82	--	5.50
62.70 (56.88)	--	4.87	--	--	--	--
62.74 (56.91)	--	--	--	--	--	4.52
63.50 (57.61)	--	--	5.32	5.49	--	--
64.36 (58.38)	--	--	4.92	--	--	--
64.70 (58.69)	--	--	--	4.94	--	--



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Table 3.1-2 Continued: Bundle Type: GE14-P10DNAB398-8G6.0/5G5.0/2G4.0-100T-145-T6-2829 (GE14C)

Average Planar Exposure Gwd/MT (Gwd/ST)	MAPLHGR Limit (kW/ft)					
	Lattice 6849	Lattice 6850	Lattice 6851	Lattice 6852	Lattice 6853	Lattice 6854
0.00 (0.00)	9.80	8.69	8.67	8.63	10.21	10.94
0.22 (0.20)	9.71	8.75	8.74	8.71	10.16	10.92
1.10 (1.00)	9.50	8.86	8.86	8.83	10.01	10.84
2.20 (2.00)	9.44	9.00	9.04	9.01	9.98	10.83
3.31 (3.00)	9.45	9.08	9.21	9.19	10.01	10.86
4.41 (4.00)	9.49	9.17	9.33	9.36	10.05	10.90
5.51 (5.00)	9.53	9.25	9.42	9.45	10.10	10.93
6.61 (6.00)	9.57	9.34	9.51	9.55	10.15	10.96
7.72 (7.00)	9.61	9.43	9.61	9.64	10.18	10.99
8.82 (8.00)	9.64	9.51	9.71	9.74	10.21	11.01
9.92 (9.00)	9.66	9.60	9.82	9.86	10.24	11.03
11.02 (10.00)	9.68	9.70	9.94	9.99	10.25	11.04
12.13 (11.00)	9.69	9.81	10.08	10.13	10.27	11.05
13.23 (12.00)	9.67	9.89	10.19	10.25	10.27	11.05
14.33 (13.00)	9.64	9.96	10.28	10.35	10.24	11.05
15.43 (14.00)	9.60	10.04	10.36	10.43	10.20	11.02
15.99 (14.51)	9.58	10.07	10.39	10.46	10.18	11.00
16.53 (15.00)	9.56	10.10	10.42	10.49	10.16	10.97
18.74 (17.00)	9.48	10.19	10.49	10.55	10.07	10.89
22.05 (20.00)	9.35	10.27	10.54	10.59	9.94	10.76
23.01 (20.87)	9.28	10.26	10.55	10.59	9.89	10.72
27.56 (25.00)	8.95	10.24	10.56	10.62	9.66	10.55
32.19 (29.20)	8.40	9.93	10.26	10.30	9.11	10.11
33.07 (30.00)	8.30	9.87	10.20	10.24	9.01	10.02
38.58 (35.00)	7.65	9.47	9.71	9.71	8.37	9.38
44.09 (40.00)	7.02	9.02	9.18	9.19	7.73	8.75
49.60 (45.00)	6.38	8.51	8.65	8.66	7.10	8.12
54.79 (49.71)	3.98	--	--	--	--	--
55.12 (50.00)	--	7.93	8.11	8.13	5.64	7.49
58.16 (52.77)	--	--	--	--	4.21	--
60.63 (55.00)	--	5.75	6.57	6.75	--	5.64
62.52 (56.72)	--	4.88	--	--	--	--
63.01 (57.16)	--	--	--	--	--	4.54
63.50 (57.61)	--	--	5.24	5.41	--	--
64.17 (58.22)	--	--	4.93	--	--	--
64.51 (58.52)	--	--	--	4.95	--	--

**PILGRIM NUCLEAR POWER STATION  
PNPS CORE OPERATING LIMITS REPORT**

RTYPE: G4.02

Table 3.1-2 Continued: Bundle Type: GE14-P10DNAB412-16GZ-100T-145-T6-3901

Average Planar Exposure GWd/MT (GWd/ST)	MAPLHGR Limit (kW/ft)						
	Lat. 4820	Lat. 4827	Lat. 4828	Lat. 4829	Lat. 4830	Lat. 4825	Lat. 4831
0.00 ( 0.00)	9.80	8.78	8.57	8.72	8.62	10.21	10.98
0.22 ( 0.20)	9.71	8.81	8.61	8.76	8.70	10.16	10.95
1.10 ( 1.00)	9.50	8.87	8.68	8.85	8.79	10.01	10.86
2.20 ( 2.00)	9.44	8.97	8.80	8.98	8.93	9.98	10.84
3.31 ( 3.00)	9.45	9.08	8.92	9.12	9.07	10.01	10.86
4.41 ( 4.00)	9.49	9.20	9.05	9.24	9.19	10.05	10.88
5.51 ( 5.00)	9.53	9.32	9.17	9.36	9.31	10.10	10.91
6.61 ( 6.00)	9.57	9.42	9.28	9.48	9.44	10.14	10.94
7.72 ( 7.00)	9.61	9.52	9.39	9.60	9.58	10.18	10.96
8.82 ( 8.00)	9.64	9.62	9.51	9.73	9.72	10.21	10.98
9.92 ( 9.00)	9.66	9.72	9.62	9.87	9.87	10.24	10.99
11.02 (10.00)	9.68	9.82	9.74	10.01	10.02	10.25	11.00
12.13 (11.00)	9.69	9.92	9.86	10.16	10.18	10.26	11.00
13.23 (12.00)	9.67	9.99	9.93	10.25	10.28	10.27	11.00
14.33 (13.00)	9.64	10.04	10.00	10.32	10.34	10.23	11.00
15.43 (14.00)	9.60	10.08	10.05	10.35	10.37	10.19	10.96
15.99 (14.51)	9.58	10.09	10.07	10.36	10.38	10.17	10.94
16.53 (15.00)	9.56	10.10	10.08	10.37	10.38	10.15	10.92
18.74 (17.00)	9.48	10.11	10.11	10.37	10.38	10.07	10.83
22.05 (20.00)	9.35	10.11	10.12	10.36	10.37	9.94	10.70
23.01 (20.87)	9.28	10.09	10.10	10.35	10.35	9.89	10.66
27.56 (25.00)	8.95	10.01	10.00	10.28	10.25	9.66	10.49
32.19 (29.20)	8.40	9.65	9.65	9.92	9.94	9.11	10.04
33.07 (30.00)	8.30	9.58	9.58	9.85	9.87	9.01	9.95
38.58 (35.00)	7.65	9.15	9.15	9.42	9.40	8.36	9.31
44.09 (40.00)	7.02	8.70	8.70	8.97	8.92	7.73	8.68
49.60 (45.00)	6.38	8.22	8.21	8.49	8.46	7.09	8.05
54.78 (49.70)	3.98	--	--	--	--	--	--
55.12 (50.00)	--	7.68	7.63	7.95	7.98	5.63	7.42
58.14 (52.75)	--	--	--	--	--	4.21	--
60.63 (55.00)	--	5.21	5.16	5.89	5.96	--	5.46
61.32 (55.63)	--	--	4.84	--	--	--	--
61.44 (55.74)	--	4.84	--	--	--	--	--
62.67 (56.86)	--	--	--	--	--	--	4.51
62.81 (56.98)	--	--	--	4.90	--	--	--
62.91 (57.07)	--	--	--	--	4.92	--	--

**PILGRIM NUCLEAR POWER STATION  
PNPS CORE OPERATING LIMITS REPORT**

RTYPE: G4.02

Table 3.1-2 Continued: Bundle Type: GE14-P10DNAB397-10G6.0/3G5.0-100T-145-T6-2613

Average Planar Exposure	MAPLHGR Limit (kW/ft)					
	Lattice 5841	Lattice 5848	Lattice 5849	Lattice 5850	Lattice 5846	Lattice 5851
0.00 (0.00)	9.80	8.75	8.72	8.71	10.21	10.87
0.22 (0.20)	9.71	8.81	8.79	8.78	10.16	10.84
1.10 (1.00)	9.50	8.91	8.91	8.91	10.01	10.74
2.20 (2.00)	9.44	9.05	9.07	9.07	9.98	10.71
3.31 (3.00)	9.45	9.20	9.24	9.25	10.01	10.73
4.41 (4.00)	9.49	9.30	9.42	9.44	10.05	10.76
5.51 (5.00)	9.53	9.38	9.56	9.61	10.10	10.79
6.61 (6.00)	9.57	9.45	9.65	9.70	10.14	10.82
7.72 (7.00)	9.61	9.54	9.74	9.80	10.18	10.85
8.82 (8.00)	9.64	9.62	9.83	9.89	10.21	10.87
9.92 (9.00)	9.66	9.70	9.92	9.98	10.24	10.88
11.02 (10.00)	9.68	9.78	10.01	10.07	10.25	10.89
12.13 (11.00)	9.69	9.87	10.11	10.18	10.26	10.90
13.23 (12.00)	9.67	9.93	10.21	10.28	10.27	10.90
14.33 (13.00)	9.64	9.99	10.29	10.36	10.23	10.89
15.43 (14.00)	9.60	10.05	10.35	10.43	10.19	10.85
15.99 (14.51)	9.58	10.07	10.37	10.45	10.17	10.83
16.53 (15.00)	9.56	10.10	10.40	10.47	10.15	10.81
18.74 (17.00)	9.48	10.18	10.45	10.51	10.07	10.72
22.05 (20.00)	9.35	10.24	10.49	10.55	9.94	10.59
23.01 (20.87)	9.28	10.24	10.50	10.56	9.89	10.55
27.56 (25.00)	8.95	10.22	10.52	10.60	9.66	10.38
32.19 (29.20)	8.40	9.92	10.22	10.29	9.11	9.91
33.07 (30.00)	8.30	9.86	10.16	10.23	9.01	9.82
38.58 (35.00)	7.65	9.46	9.69	9.70	8.36	9.18
44.09 (40.00)	7.02	9.01	9.17	9.18	7.73	8.54
49.60 (45.00)	6.38	8.50	8.64	8.65	7.09	7.91
54.78 (49.70)	3.98	--	--	--	--	--
55.12 (50.00)	--	7.92	8.10	8.12	5.63	7.28
58.14 (52.75)	--	--	--	--	4.21	--
60.63 (55.00)	--	5.76	6.51	6.74	--	5.12
62.02 (56.27)	--	--	--	--	--	4.47
62.56 (56.75)	--	4.87	--	--	--	--
63.50 (57.61)	--	--	5.18	5.41	--	--
64.09 (58.14)	--	--	4.91	--	--	--
64.53 (58.54)	--	--	--	4.94	--	--

**PILGRIM NUCLEAR POWER STATION  
PNPS CORE OPERATING LIMITS REPORT**

RTYPE: G4.02

Table 3.1-2 Continued: Bundle Type: GE14-P10DNAB397-14GZ-100T-145-T6-2621

Average Planar Exposure GWd/MT (GWd/ST)	MAPLHGR Limit (kW/ft)						
	Lat. 5841	Lat. 5842	Lat. 5843	Lat. 5844	Lat. 5845	Lat. 5846	Lat. 5847
0.00 (0.00)	9.80	8.66	8.76	8.73	8.72	10.21	10.94
0.22 (0.20)	9.71	8.73	8.82	8.80	8.79	10.16	10.91
1.10 (1.00)	9.50	8.84	8.93	8.92	8.92	10.01	10.81
2.20 (2.00)	9.44	8.99	9.07	9.09	9.09	9.98	10.79
3.31 (3.00)	9.45	9.14	9.20	9.26	9.27	10.01	10.81
4.41 (4.00)	9.49	9.24	9.27	9.43	9.46	10.05	10.83
5.51 (5.00)	9.53	9.33	9.34	9.51	9.56	10.10	10.87
6.61 (6.00)	9.57	9.41	9.41	9.59	9.64	10.14	10.89
7.72 (7.00)	9.61	9.50	9.49	9.67	9.72	10.18	10.92
8.82 (8.00)	9.64	9.58	9.57	9.75	9.80	10.21	10.94
9.92 (9.00)	9.66	9.67	9.65	9.85	9.90	10.24	10.95
11.02 (10.00)	9.68	9.75	9.73	9.97	10.02	10.25	10.96
12.13 (11.00)	9.69	9.84	9.83	10.10	10.16	10.26	10.96
13.23 (12.00)	9.67	9.90	9.91	10.21	10.28	10.27	10.96
14.33 (13.00)	9.64	9.97	9.99	10.30	10.37	10.23	10.96
15.43 (14.00)	9.60	10.03	10.05	10.36	10.44	10.19	10.92
15.99 (14.51)	9.58	10.06	10.08	10.39	10.46	10.17	10.90
16.53 (15.00)	9.56	10.09	10.11	10.41	10.48	10.15	10.88
18.74 (17.00)	9.48	10.18	10.19	10.46	10.53	10.07	10.79
22.05 (20.00)	9.35	10.25	10.25	10.50	10.57	9.94	10.66
23.01 (20.87)	9.28	10.24	10.25	10.51	10.57	9.89	10.62
27.56 (25.00)	8.95	10.22	10.23	10.53	10.61	9.66	10.45
32.19 (29.20)	8.40	9.91	9.92	10.23	10.29	9.11	9.99
33.07 (30.00)	8.30	9.86	9.86	10.17	10.23	9.01	9.90
38.58 (35.00)	7.65	9.46	9.46	9.70	9.70	8.36	9.26
44.09 (40.00)	7.02	9.01	9.01	9.17	9.18	7.73	8.63
49.60 (45.00)	6.38	8.50	8.50	8.64	8.65	7.09	7.99
54.78 (49.70)	3.98	--	--	--	--	--	--
55.12 (50.00)	--	7.92	7.92	8.10	8.12	5.63	7.36
58.14 (52.75)	--	--	--	--	--	4.21	--
60.63 (55.00)	--	5.74	5.75	6.50	6.73	--	5.34
62.43 (56.64)	--	--	--	--	--	--	4.50
62.52 (56.72)	--	4.87	--	--	--	--	--
62.53 (56.73)	--	--	4.87	--	--	--	--
63.50 (57.61)	--	--	--	5.17	5.40	--	--
64.06 (58.11)	--	--	--	4.91	--	--	--
64.49 (58.51)	--	--	--	--	4.94	--	--

**PILGRIM NUCLEAR POWER STATION  
PNPS CORE OPERATING LIMITS REPORT**

RTYPE: G4.02

Table 3.1-2 Continued:

Bundle Type: GE14-P10DNAB398-8G6.0/5G5.0/1G2.0-100T-145-T6-2614

Average Planar	MAPLHGR Limit (kW/ft)					
Exposure GWd/MT (GWd/ST)	Lattice 5841	Lattice 5852	Lattice 5853	Lattice 5854	Lattice 5846	Lattice 5855
0.00 (0.00)	9.80	8.77	8.75	8.73	10.21	10.93
0.22 (0.20)	9.71	8.83	8.81	8.80	10.16	10.90
1.10 (1.00)	9.50	8.94	8.94	8.94	10.01	10.80
2.20 (2.00)	9.44	9.08	9.12	9.12	9.98	10.78
3.31 (3.00)	9.45	9.16	9.30	9.31	10.01	10.79
4.41 (4.00)	9.49	9.25	9.42	9.47	10.05	10.82
5.51 (5.00)	9.53	9.34	9.51	9.57	10.10	10.85
6.61 (6.00)	9.57	9.42	9.61	9.66	10.14	10.88
7.72 (7.00)	9.61	9.51	9.70	9.76	10.18	10.91
8.82 (8.00)	9.64	9.59	9.79	9.85	10.21	10.93
9.92 (9.00)	9.66	9.68	9.89	9.95	10.24	10.94
11.02 (10.00)	9.68	9.77	10.01	10.07	10.25	10.95
12.13 (11.00)	9.69	9.87	10.13	10.19	10.26	10.95
13.23 (12.00)	9.67	9.94	10.23	10.30	10.27	10.95
14.33 (13.00)	9.64	10.01	10.31	10.38	10.23	10.95
15.43 (14.00)	9.60	10.07	10.37	10.45	10.19	10.91
15.99 (14.51)	9.58	10.10	10.39	10.47	10.17	10.89
16.53 (15.00)	9.56	10.12	10.42	10.49	10.15	10.87
18.74 (17.00)	9.48	10.20	10.47	10.54	10.07	10.78
22.05 (20.00)	9.35	10.26	10.51	10.58	9.94	10.65
23.01 (20.87)	9.28	10.26	10.52	10.58	9.89	10.61
27.56 (25.00)	8.95	10.24	10.54	10.62	9.66	10.44
32.19 (29.20)	8.40	9.93	10.24	10.30	9.11	9.98
33.07 (30.00)	8.30	9.87	10.18	10.24	9.01	9.89
38.58 (35.00)	7.65	9.47	9.71	9.71	8.36	9.25
44.09 (40.00)	7.02	9.02	9.18	9.19	7.73	8.61
49.60 (45.00)	6.38	8.51	8.66	8.67	7.09	7.98
54.78 (49.70)	3.98	--	--	--	--	--
55.12 (50.00)	--	7.93	8.11	8.13	5.63	7.35
58.14 (52.75)	--	--	--	--	4.21	--
60.63 (55.00)	--	5.77	6.53	6.77	--	5.30
62.37 (56.58)	--	--	--	--	--	4.49
62.58 (56.77)	--	4.88	--	--	--	--
63.50 (57.61)	--	--	5.20	5.43	--	--
64.13 (58.17)	--	--	4.91	--	--	--
64.56 (58.57)	--	--	--	4.94	--	--

Figure 3.1-1 Most Limiting MAPLHGR For Fuel Type GE11

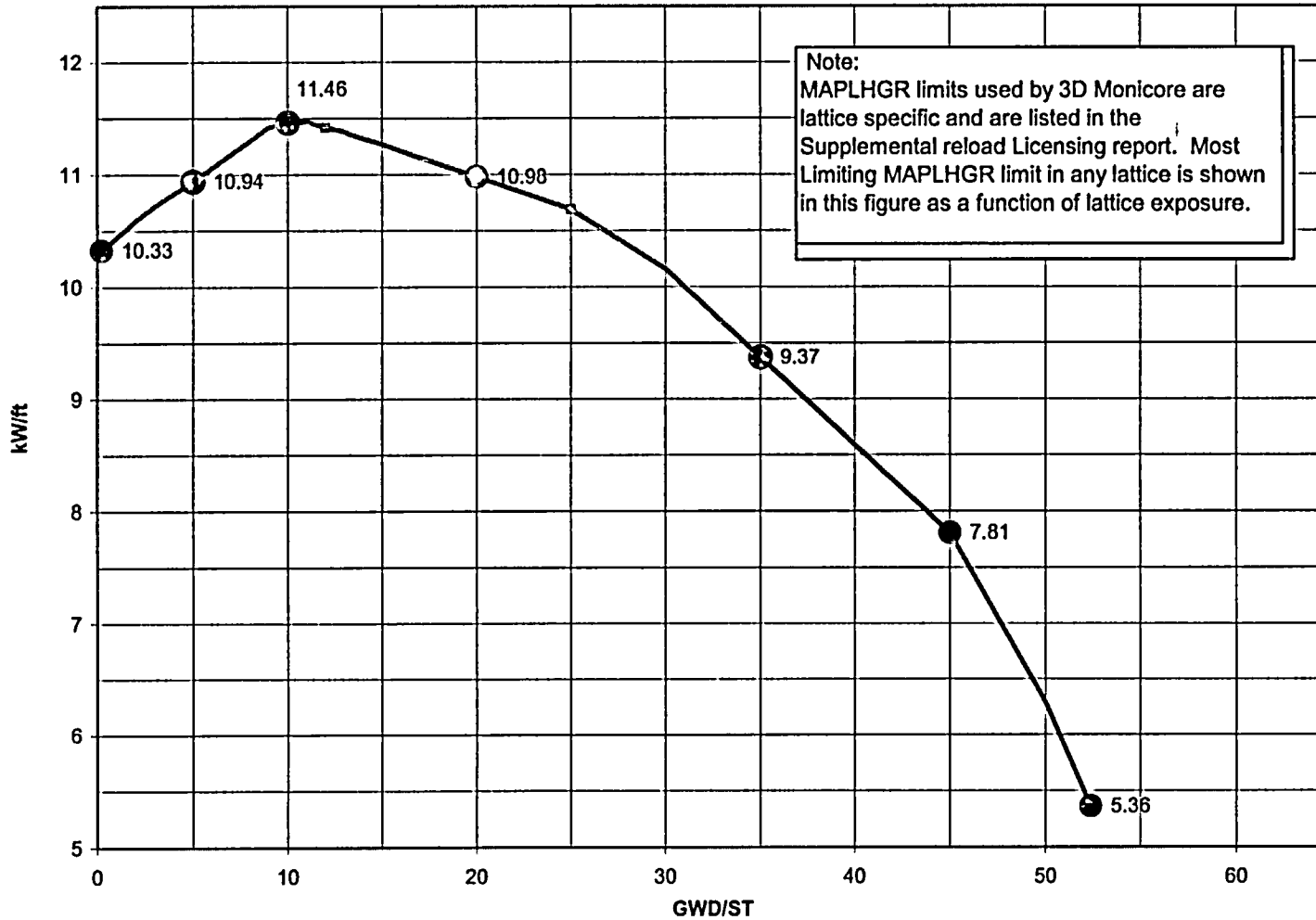


Figure 3.1-2 Most limiting MAPLHGR For GE14 Fuel

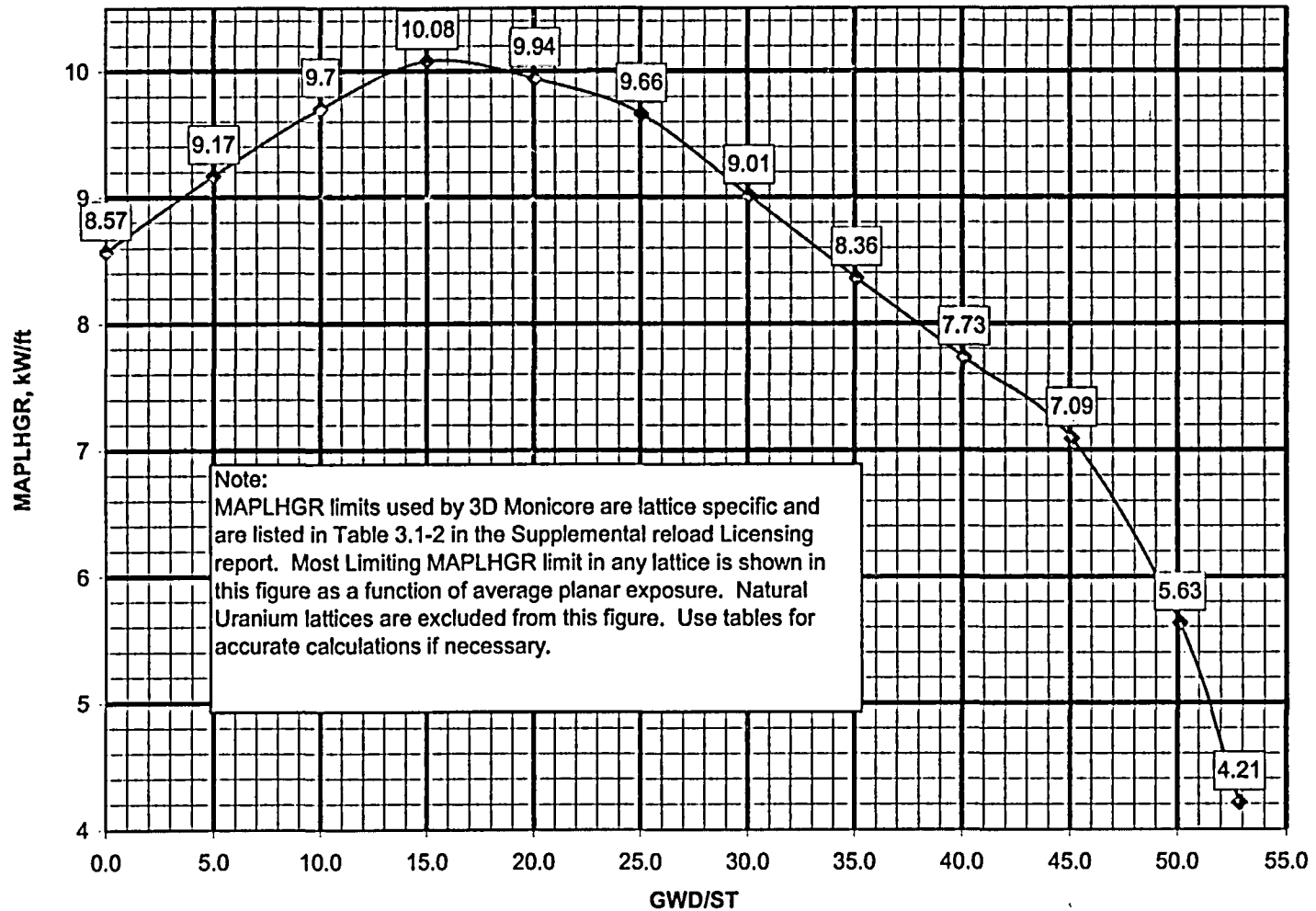


Figure 3.1-3 Flow Dependent MAPLHGR Factor (MAPFAC<sub>F</sub>) for both GE11 and GE14 fuels

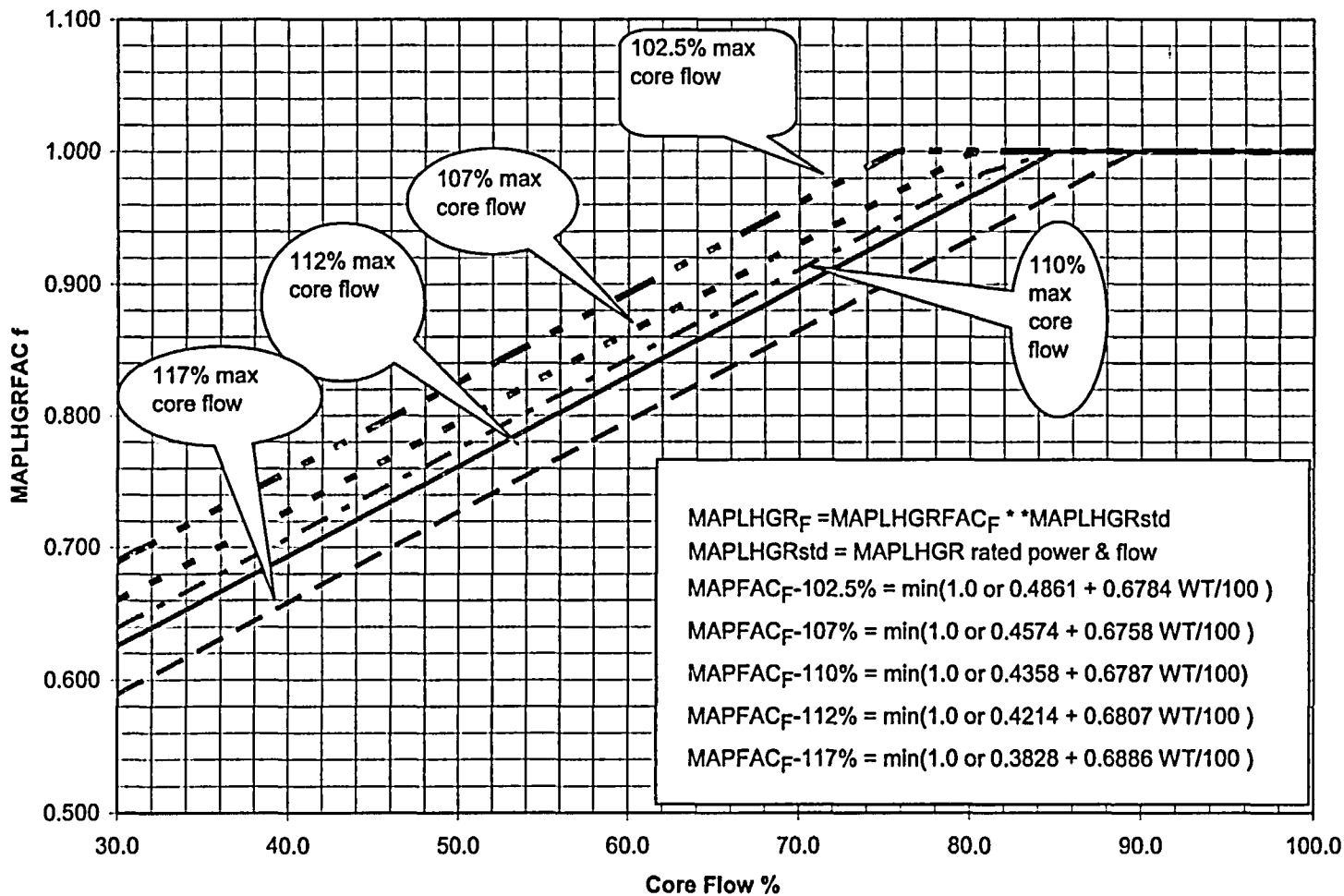
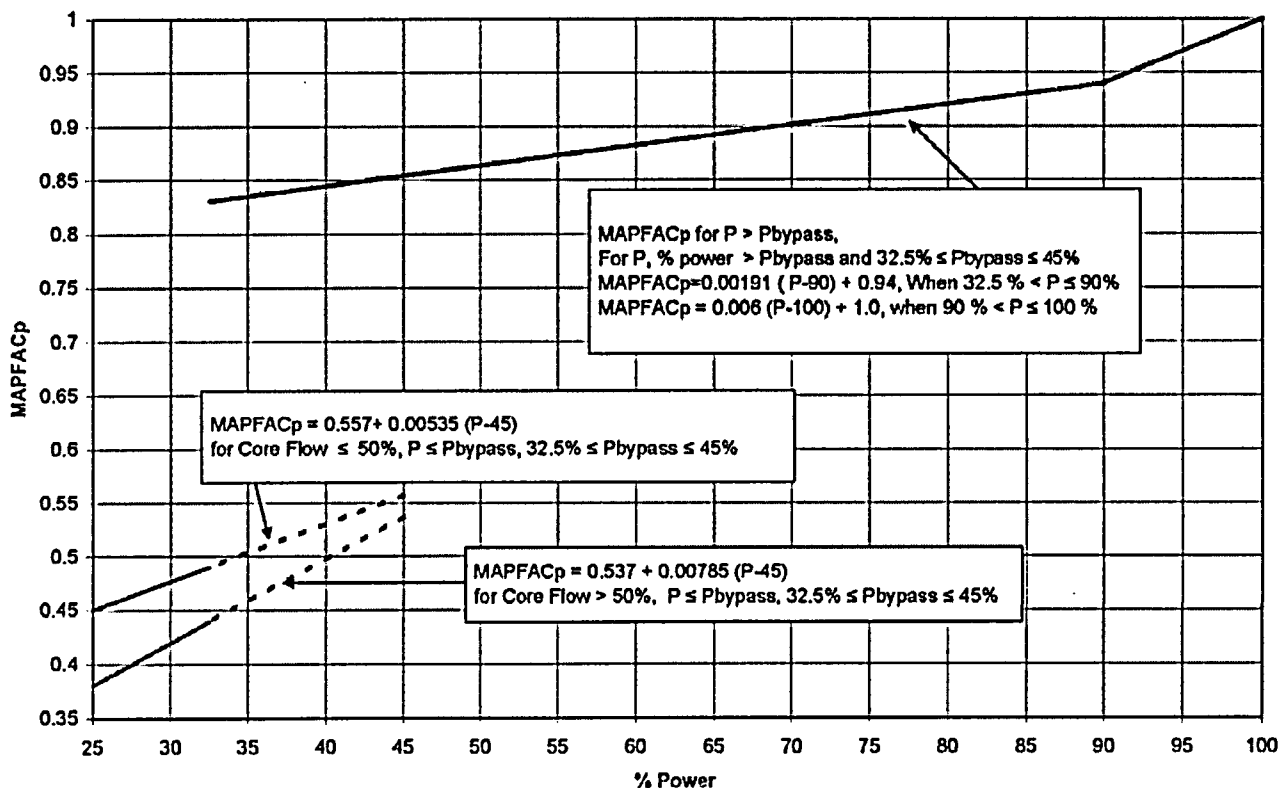




Figure 3.1-4 Power Dependent MAPLHGR Factors for GE11 and GE14 Fuel

Note: These MAPFACp factors are valid for Turbine bypass in or out of service and for Normal & Reduced Feedwater heating



### 3.2 Linear Heat Generation Range (LHGR)

#### Reference Technical Specification: 3.11.B

During reactor power operation, the LHGR of any rod in any fuel assembly at any axial location shall not exceed the rated power and rated core flow limits represented by Figures 3.2-1 and 3.2-2, with the detailed values presented in Reference 5.17. At other than rated power and rated flow conditions, the applicable limiting LHGR value for each fuel type is the smaller of the flow- and power-dependent LHGR limits,  $LHGR_F$  and  $LHGR_P$ . The flow-dependent LHGR limit,  $LHGR_F$ , is the product of the LHGR flow factor,  $LHGRFAC_F$ , shown in Figure 3.2-3 and the LHGR for rated power and flow conditions in Reference 5.17. The power-dependent LHGR limit,  $LHGR_P$ , is the product of the LHGR power factor,  $LHGRFAC_P$ , shown in Figure 3.2-4 and the LHGR for rated power and flow conditions in Reference 5.17.

LHGR Curves in Figures 3.2-1 and 3.2-2 are representative curves for UO<sub>2</sub> fuel rods and Gd containing rods in GE11 and GE14 fuel bundles. Gd containing fuel rods have different LHGR limits that are also exposure dependent. Reference 5.17 documents the detailed proprietary curves and values.

Pbypass is the power level below which more restrictive thermal limits are applied, as Turbine Stop Valve closure and Turbine Control Valve Fast Closure scrams are assumed to be bypassed. Pbypass can be set in anywhere in the range 32.5 to 45% core thermal power. Pbypass is currently set at 32.5% power.

Figure 3.2-1 Most Limiting LHGR Limit for GE11 Fuel At Rated Power and rated Core Flow

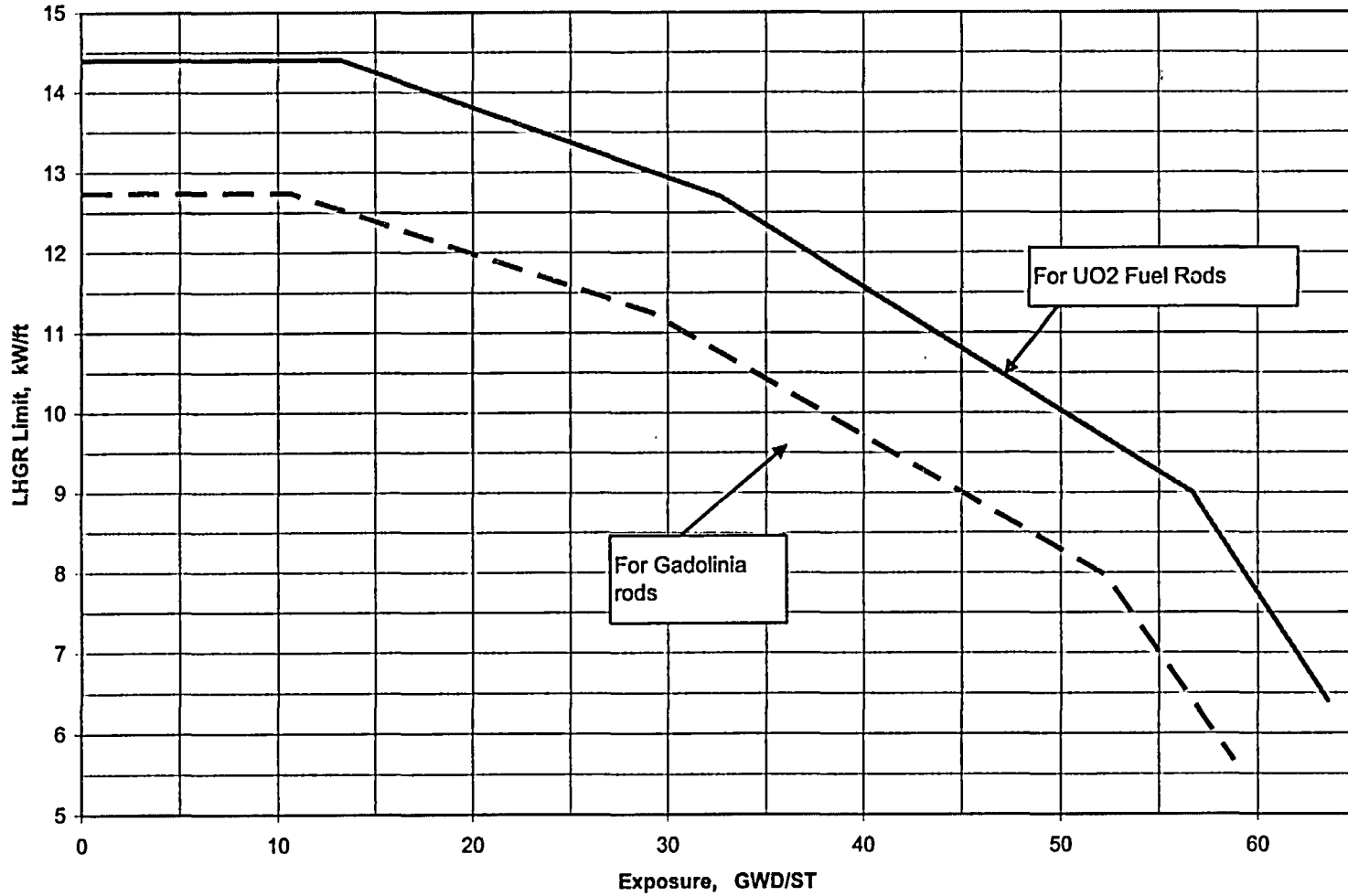


Figure 3.2-2 Most Limiting LHGR for GE14 Fuel At Rated Power and rated Core Flow

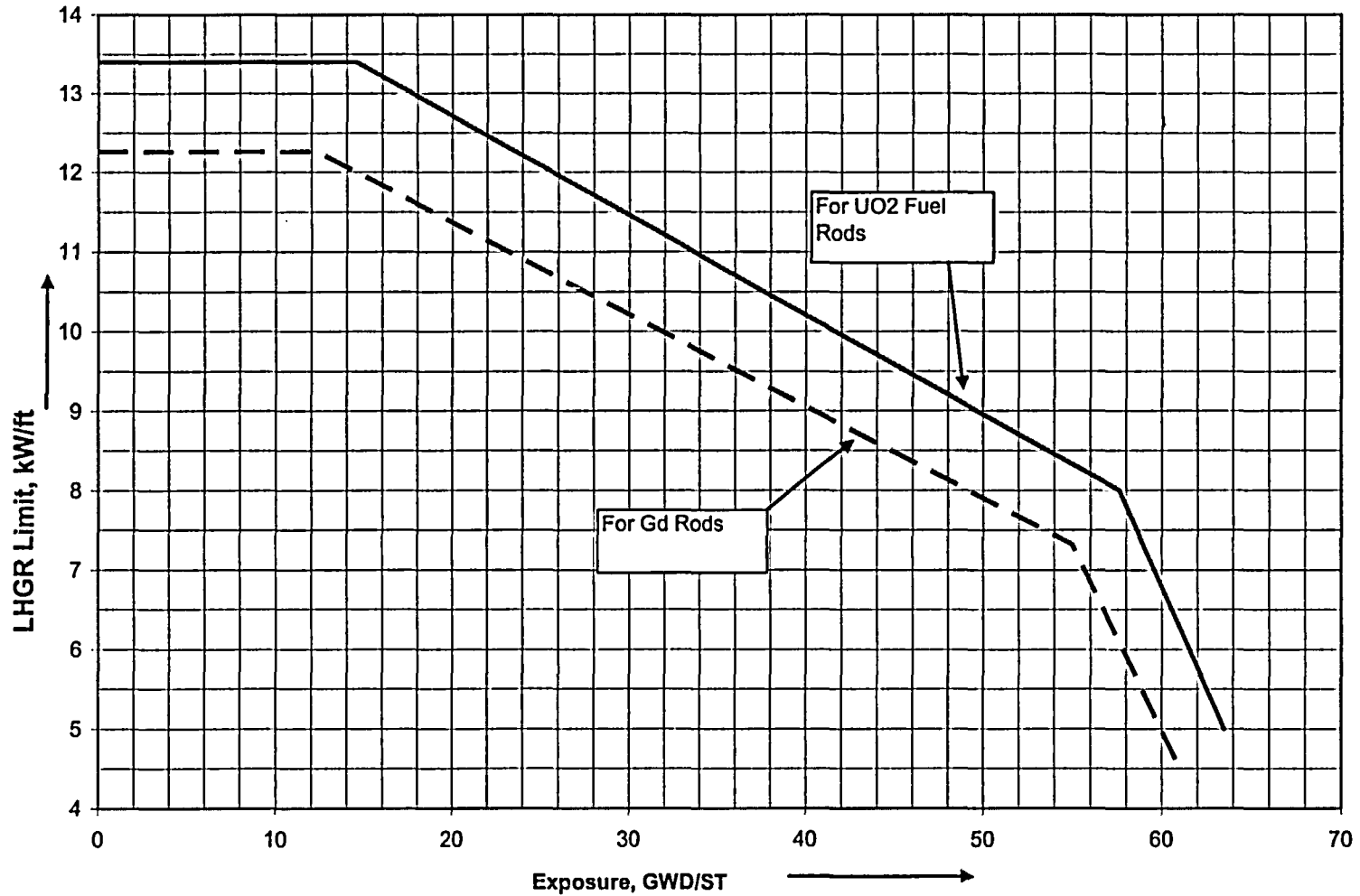


Figure 3.2-3 Flow Dependent LHGR Factor (LHGRFAC<sub>F</sub>) for both GE11 and GE14 fuels

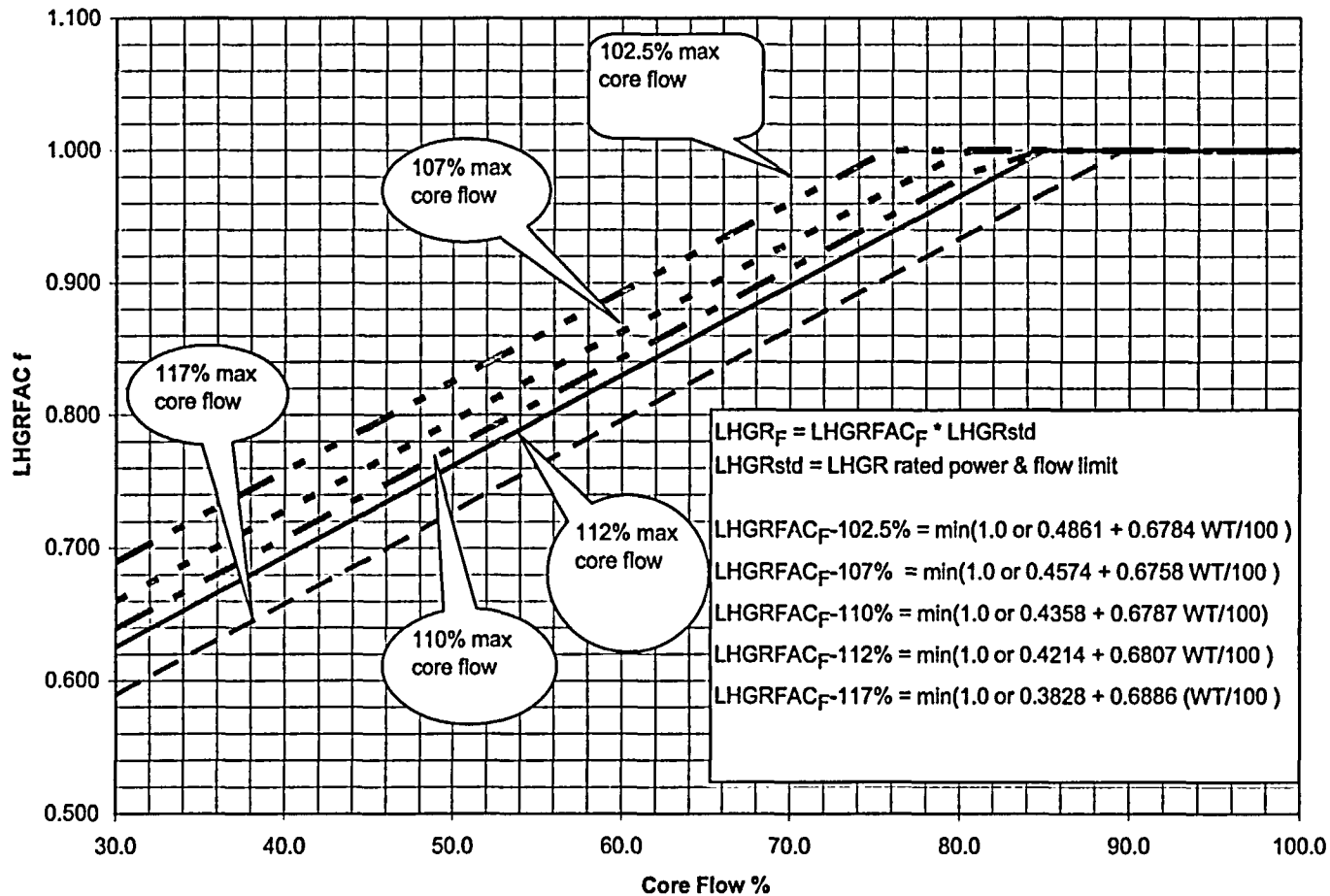
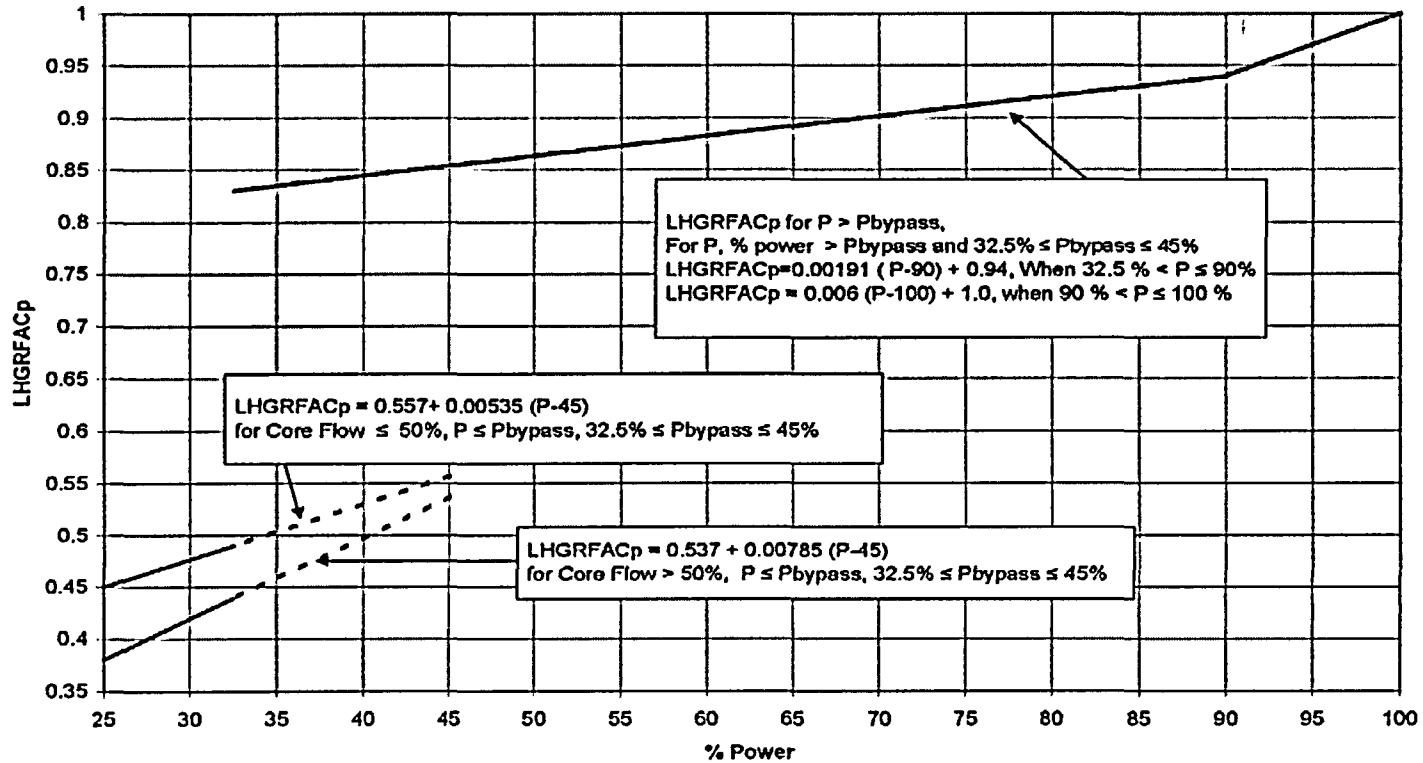


Figure 3.2-4 Power Dependent LHGR Factors for GE11 and GE14 Fuel

Note: These LHGRFACp factors are valid for Turbine bypass in or out of service and for Normal & Reduced Feedwater heating



3.3 Minimum Critical Power Ratio (MCPR)

Reference Technical Specification: 3.11.C

During power operation, the MCPR shall be greater than or equal to the Operating Limit MCPR (OLMCPR). The operating limit MCPR is the greater of the flow- and power-dependent MCPR operating limits,  $MCPR_F$  and  $MCPR_P$ . The flow-dependent MCPR operating limit,  $MCPR_F$ , is provided in Figure 3.3-1. For core thermal powers less than or equal to  $P_{Bypass}$ , the power-dependent MCPR operating limit,  $MCPR_P$ , is provided in Figure 3.3-2. For power level less than  $P_{bypass}$ , the  $MCPR_P$  is independent of the fuel type and can be directly read from Figure 3.3-2, when Turbine Bypass is operable and from Figure 3.3-3, when Turbine bypass is out of service.

Above  $P_{Bypass}$ ,  $MCPR_P$  is the product of the rated power and flow MCPR operating limit presented in Table 3.3-1, and the  $K_p$  factor presented in Figure 3.3-2, when Turbine Bypass is in service and Feed water Temperature is normal. The rated power and flow MCPR operating limits presented in Tables 3.3-1 are functions of  $\tau$  for both GE11 and GE14 fuels.

Both Figures 3.3-2 and 3.2-3 include normal and reduced feed water temperature operating modes.

The value of  $\tau$  in Table 3.3-1 shall be equal to 1.0, unless it is calculated from the results of the surveillance testing of Technical Specification 4.3.C, as follows:

$$\tau = \frac{\tau_{ave} - \tau_B}{1.252 - \tau_B}$$

Where:

$$\tau_{ave} = \text{Average scram time to drop out of Notch 34} = \frac{\sum_{i=1}^n N_i \tau_i}{\sum_{i=1}^n N_i}$$

$$\tau_B = \text{Adjusted analysis mean scram time} = \mu + 1.65\sigma \sqrt{\frac{N_1}{\sum_{i=1}^n N_i}}$$

- n = Number of surveillance tests performed to date in the present cycle
- $N_1$  = Total number of active control rods
- $N_i$  = Number of active control rods measured in the  $i^{th}$  surveillance test
- $\tau_i$  = Average scram time to drop out of Notch 34 position of all rods measured in the  $i^{th}$  surveillance test
- $\mu$  = Mean of the distribution for average scram insertion time to drop out of Notch 34  
= 0.937 sec
- $\sigma$  = Standard deviation of the distribution for average scram insertion time to dropout of Notch 34  
= 0.021 sec

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Pbypass is the power level below which more restrictive thermal limits are applied, as Turbine Stop Valve Closure and Turbine Control Valve Fast Closure scrams are assumed to be bypassed. Pbypass can be set anywhere in the range 32.5% to 45% core thermal power. Pbypass is currently set at 32.5%.

**Table 3.3-1**

MCPR Operating Limits At Rated Power and Rated Flow

The MCPR Operating Limit (OLMCPR) is a function of fuel type, exposure and  $\tau$ , derived from scram timing measurements

$\tau$		GE11		GE14	
		<u>BOC to (EOR-2)</u> <u>GWD/ST</u>	<u>(EOR-2) to EOC</u> <u>GWD/ST</u>	<u>BOC to (EOR-2)</u> <u>GWD/ST</u>	<u>(EOR-2) to EOC</u> <u>GWD/ST</u>
from	to				
0.0	0.0	1.39	1.41	1.44	1.49
0.0	0.1	1.40	1.43	1.45	1.51
0.1	0.2	1.42	1.44	1.46	1.53
0.2	0.3	1.43	1.45	1.47	1.54
0.3	0.4	1.44	1.46	1.48	1.56
0.4	0.5	1.45	1.47	1.49	1.58
0.5	0.6	1.46	1.48	1.51	1.59
0.6	0.7	1.47	1.49	1.52	1.61
0.7	0.8	1.48	1.50	1.53	1.63
0.8	0.9	1.49	1.51	1.54	1.65
0.9	1.0	1.50	1.52	1.55	1.66

BOC = Beginning Of Cycle

EOC = End Of Cycle

EOR = End Of Rated Power Operation At Rated Flow

Note: Rated OLMCPR Limits for Turbine Bypass Valve OOS and Final Feedwater Temperature Reduction are the same as those for normal Feed water Temperature and Turbine bypass Valves in service, as OLMCPR is limited by the inadvertent HPCI injection event that is conservatively assumed to cause a Turbine Trip. Off rated MCPR limits are affected by TBVOOS condition and are shown in the off-rated limit curves in Figures 3.3-1, 3.3-2 and 3.3-3 and the Supplemental Reload Licensing Report (Reference 5.15).



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Figure 3.3-1 Flow Dependent MCPR Limits (MCPR<sub>F</sub>) for both GE11 and GE14 fuels

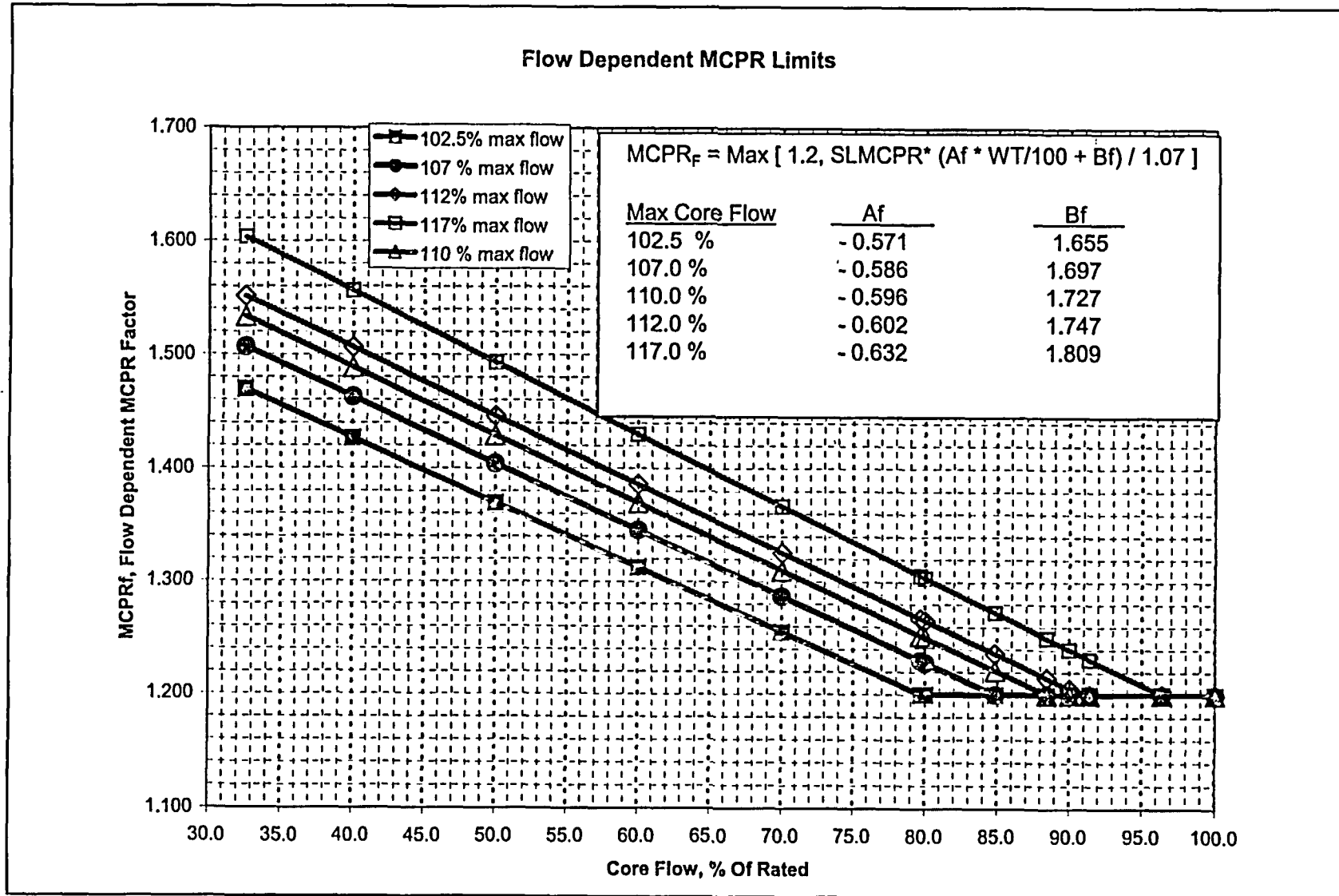


Figure 3.3-2  
 Power Dependent M CPR Limits (M CPRp) for both GE11 and GE14 fuels  
 Turbine Bypass Is Assumed Operable and Normal and Reduced Feed Water Temperature

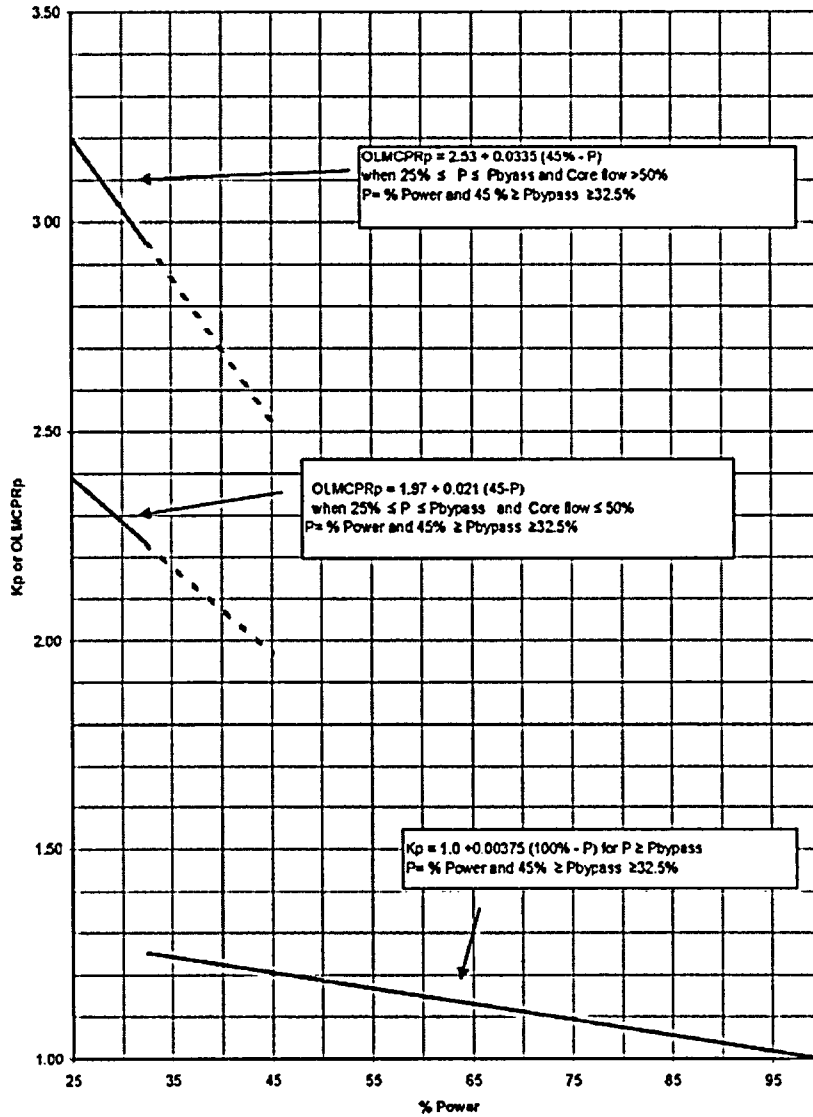
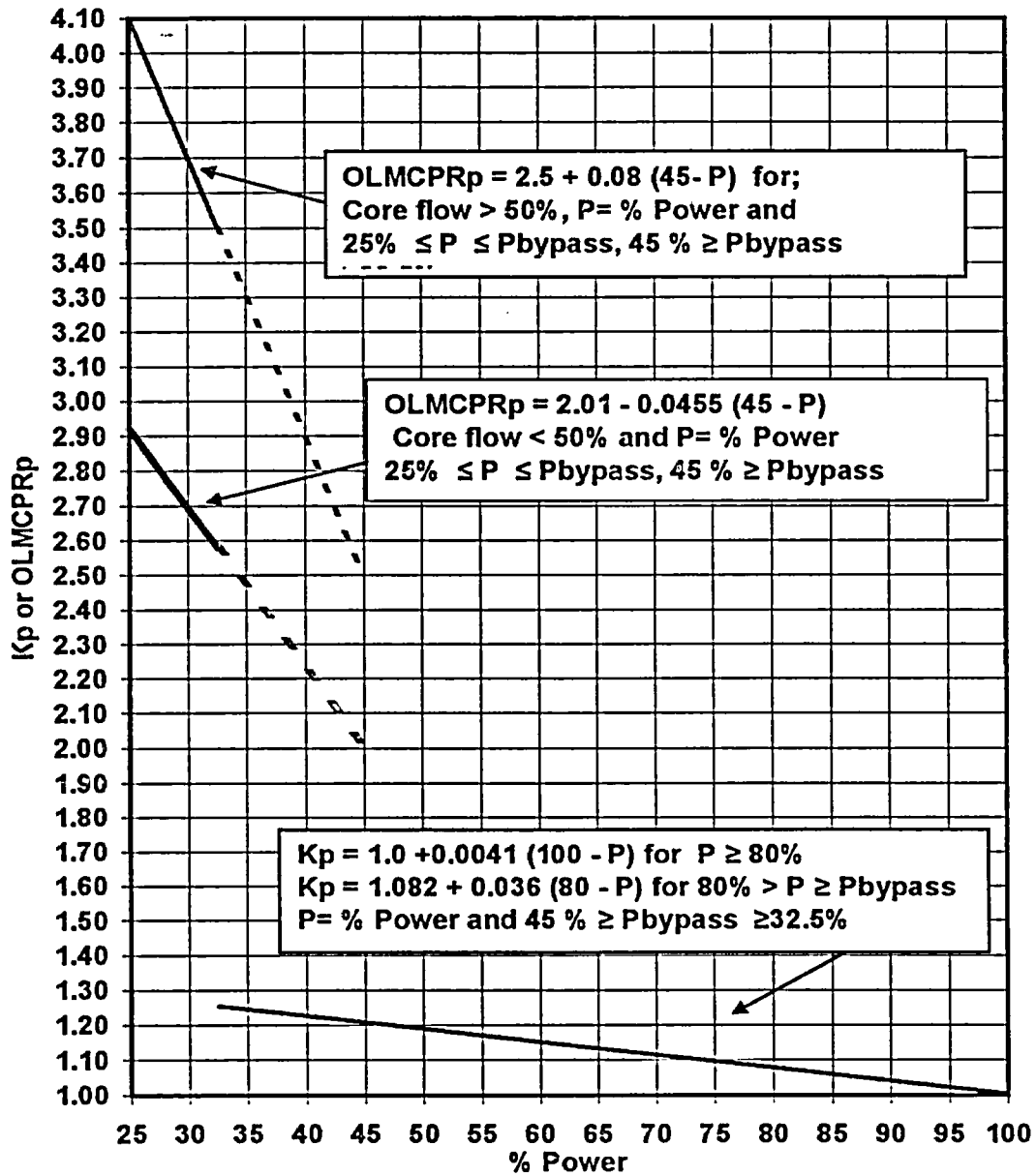


Figure 3.3-3  
 Power Dependent MCPR Limits (MCPR<sub>p</sub>) for both GE11 & GE14 fuels  
 Turbine Bypass Out of service & Reduced Feed Water Temperature



3.4 Power/Flow Relationship During Power Operation

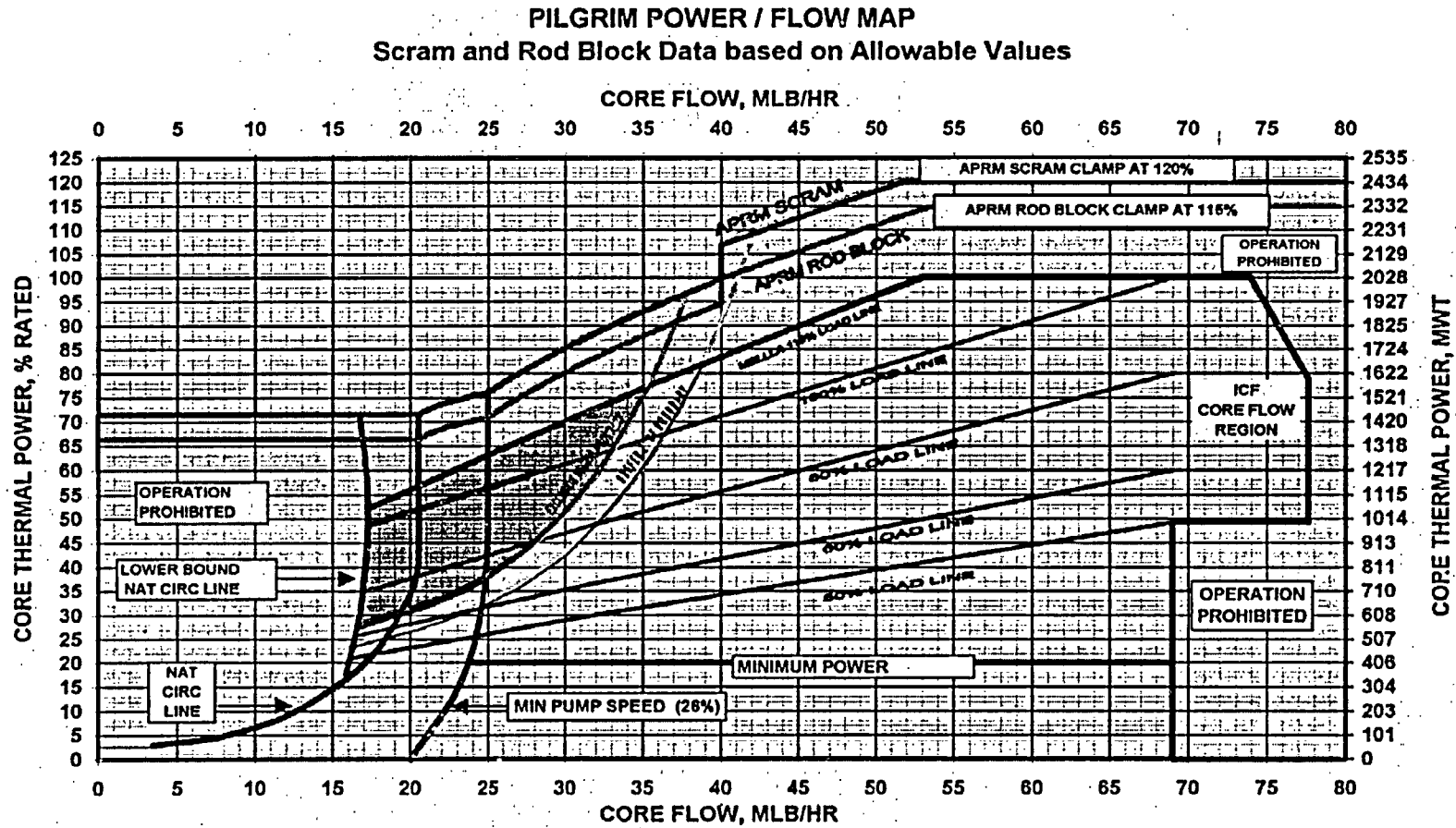
Reference Technical Specification: 3.11.D

The power/flow relationship shall not exceed the limiting values shown on the Power/Flow Operating Map in Figure 3.4-1. The Power/Flow Map, Figure 3.4-1 is applicable to operation with Two Loop Operation with either normal or reduced feed water temperature. Cycle 16 operation is not fully analyzed for reduced feedwater temperature for issues other than thermal limits. This report contains only the thermal limit analysis results for reduced feed water temperature mode. Cycle 16 is currently limited to 24 hours of operation while in Single Loop due to License condition 3.E.

Cycle 16 Stability analysis, the exclusion and the buffer regions shown in Figure 3.4-1 are based on Stability Solution I-D (reference 5.13 and 5.22). APRM trip set points are based on Drive flow rather than core flow. Scram and Rod Block Allowable trip set points as a function of drive flow are shown in Figure 2.1-1 and Figure 2.2 -1.

Figure 3.4-1 shows APRM Scram and Rod Block lines using Allowable values as a function of Core Flow. Equations for various lines on the Power to flow map are described in Ref. 5.14.

Figure 3.4-1



4.0 REACTOR VESSEL CORE DESIGN

Reference Technical Specification: 4.2

The reactor vessel core for the present cycle consists of 580 fuel assemblies of the types listed below. The core loading pattern for each type of fuel is shown for the present cycle in Figure 4.0-1.

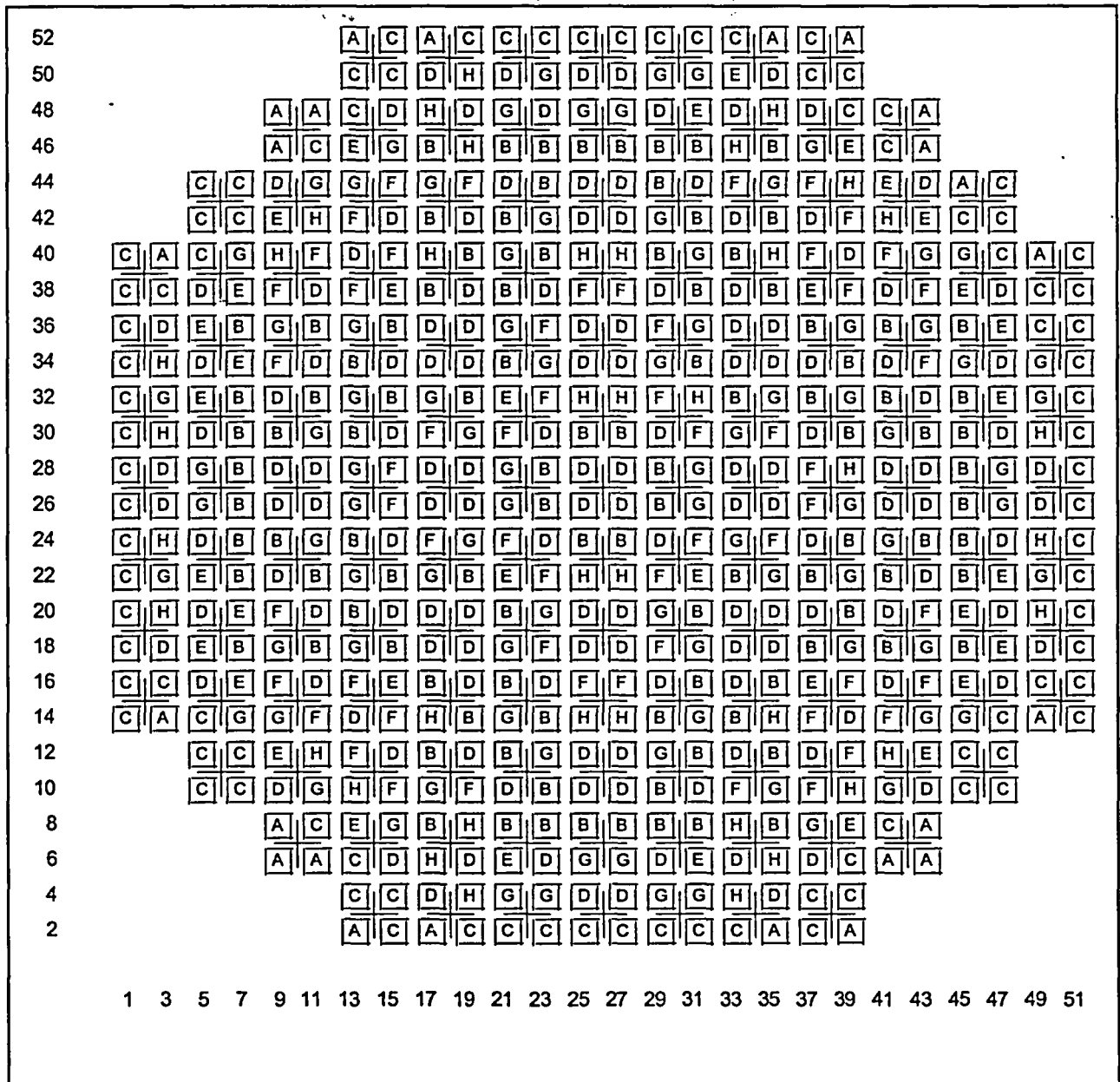
<u>Fuel Type</u>	<u>Cycle Loaded</u>	<u>Number</u>
<b>Irradiated</b>		
GE11-P9DUB407-14GZ-100T-141-T6	13	89
GE11-P9DUB408-6G5.0/7G4.0-100T-141-T6	13	24
GE14-P10DNAB412-16GZ-100T-145-T6-3901	14	144
GE14-P10DNAB397-10G6.0/3G5.0-100T-145-T6-2613	15	35
GE14-P10DNAB397-14GZ-100T-145-T6-2621	15	88
GE14-P10DNAB398-8G6.0/5G5.0/1G2.0-100T-145-T6-2614	15	40
<b>New</b>		
GE14-P10DNAB398-8G6.0/5G5.0/2G4.0-100T-145-T6-2829 (GE14C)	16	56
GE14-P10DNAB399-10G6.0/3G5.0/1G2.0-100T-145-T6-2828 (GE14C)	16	104
<b>Total</b>		<b>580</b>

The reactor vessel core contains 145 cruciform-shaped control rods. The control materials used are either boron carbide powder (B<sub>4</sub>C) compacted to approximately 70% of the theoretical density or a combination of boron carbide powder and solid hafnium.

During RFO15, Fuel Bundle JLG621 was found to be leaking and was discharged and Bundle YJS293, originally selected for discharge, was retained in the core. Reference 5.22 documents the GESTAR Assessment by GNF concluding that the analytical limits based on the original reference loading pattern for Cycle 16 remain applicable to the changed core loading as described above.

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Fuel Type	
A	=GE11-P9DUB408-6G5.0/7G4.0-100T-141-T6 (Cycle 13)
B	=GE14-P10DNAB399-10G6.0/3G5.0/1G2.0-100T-145-T6-2828 (Cycle 16)
C	=GE11-P9DUB407-14GZ-100T-141-T6 (Cycle 13)
D	=GE14-P10DNAB412-16GZ-100T-145-T6-3901 (Cycle 14)
E	=GE14-P10DNAB397-10G6.0/3G5.0-100T-145-T6-2613 (Cycle 15)
F	=GE14-P10DNAB398-8G6.0/5G5.0/2G4.0-100T-145-T6-2829 (Cycle 16)
G	=GE14-P10DNAB397-14GZ-100T-145-T6-2621 (Cycle 15)
H	=GE14-P10DNAB398-8G6.0/5G5.0/1G2.0-100T-145-T6-2614 (Cycle 15)

5.0 REFERENCES

- 5.1. SUDDS/RF 00-73, NEDE-24011-P-A-14 and NEDE-24011-P-A-14-US, "General Electric Standard Application for Reactor Fuel", June 2000 (includes Amendments through #26)
- 5.2. ER03118299, Cycle 16 Reload Core Design.
- 5.3. NEDC-31852-P, rev. 3, "Pilgrim Nuclear Power Station SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis for GE11 and GE14 Fuels", February 2005
- 5.4. NEDC-33155P, Rev.0, Application of Stability Long-Term Solution Option I-D To Pilgrim Nuclear Power Station, October 2004
- 5.5. GE-NE-0000-0035-9029-RO, Option I-D Reload Stability Analysis for Pilgrim Cycle 16
- 5.6. GE-NE-GENE-0000-0033-6871-01, Rev. 0, Pilgrim Option I-D APRM Flow Biased Set points, October 2004
- 5.7. GE-NE-0000-0027-5301, Pilgrim Nuclear Power Station Single Loop Operation, July 2004
- 5.8. S&SA-186, Stability  $\Delta W_D$  calculation
- 5.9. SUDDS/RF 94-42, NEDC-32306P, "Maximum Extended Load Line Limit Analyses", March 1994.
- 5.10. SUDDS/RF 88-160, NEDC-31312-P, "ARTS Improvement Program Analysis for Pilgrim Nuclear Power Station", September 4, 1987.
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- 5.12. OG01-0228-001, Determination Of Figure Of Merit for Stability DIVOM curve applicability, July 2004.
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- 5.14. PNPS-RPT-03-00001, Rev. 1, "Pilgrim Power To Flow Map Report."
- 5.15. 0000-0030-7302SRLR, "Supplemental Reload Licensing Report, Reload 15, Cycle 16." February 2005
- 5.16. Calculation S&SA-188, Cycle 16 OPL-3, transient Analysis Inputs
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- 5.18. DRF 0000-0030-7286, Cycle 16 SLMCPR
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- 5.20. Calculation S&SA-158, OPL 4 & 5, Cycle 15 Accident Analysis Inputs (unchanged for Cycle16)
- 5.21. NEDO-32465A, Licensing Topical report "Stability Detect and Suppress Solutions Licensing Basis Methodology for Reload Application, August 1996.
- 5.22. 0000-0039-2731, Pilgrim Cycle 16 GESTAR II Section 3.4.3 Assessment