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Pilgrim Nuclear Power Station
600 Rocky Hill Road
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June 8, 2011

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

Pilgrim Fuel Cycle 19, Core Operating Limits Report, Revision 31

LETTER NUMBER: 2.11.039

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 31 provides cycle-specific limits for operating Pilgrim during cycle 19.

This letter contains no new commitments.

Should you require further information concerning COLR, Revision 31, please contact me at (508) 830-8403.

Sincerely,

A handwritten signature in black ink, appearing to read "Joseph R. Lynch", with a horizontal line extending to the right.

Joseph R Lynch
Licensing Manager

WGL/dm

Enclosure: PNPS Core Operating Limits Report, Revision 31(51 pages)

cc: U.S. Nuclear Regulatory Commission
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**PILGRIM NUCLEAR POWER STATION
PNPS CORE OPERATING LIMITS REPORT**

RTYPE: G4.02

(CYCLE 19)

LBDCR2011-0/0 Documents Approvals

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RECORD OF REVISIONS**

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<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
25	Effective upon final approval	Limits for Single Loop Operation were incorporated. Rev number scheme changed to Merlin Convention
26	Effective upon final approval	Applicable for use during Cycle 17 Operation
27	Effective upon final approval	Corrected typographical errors on p. 30, 34, 38, 39 per CR-PNP-2008-256 and 285
28	Effective upon final approval	Extended Tables 3.1-1 to 63.5 GWD/ST (70 GWD/MT), updated Fig. 3.1-1, section 3.1 & references, addressed CR-PNP-2009-01066
29	Effective upon final approval	Applicable for use during Cycle 18 Operation
30	Effective upon final approval	Applicable for use during Cycle 19 Operation
31	Effective upon final approval	Corrected typographical error on fig. 3.4-1

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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 19. In this report, Cycle 19 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, for Two Loop Operation (TLO) and Figure 3.4-2 for Single Loop Operation (SLO). 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 for TLO and Figure 3.4-2, for SLO when the on-line Stability Monitor is inoperable.

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

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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 points (ATSP) for TLO are shown on Figure 2.1-1. The scram set point curve clamps power at 120% of rated core thermal power. Formulae used to develop Figure 2.1-1 are listed in Table 2.1-1.

APRM flux scram Allowable Trip Set points (ATSP) for SLO are shown on Figure 2.1-2, respectively. The scram set point curve clamps power at 120% of rated core thermal power. Formulae used to develop Figure 2.1-2 are listed in Table 2.1-2.

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. Flow clamp feature is not used in Cycle 19.

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 with Two Loops corresponds to 100% Rated Core Flow of 69 M#/hr.

Source: Reference 5.6, sec. 2.1

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**Table 2.1-1
Formulae For Allowable APRM Flux Scram Settings
in Figure 2.1-1**

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 is the basis for the values of constants listed in this Table.

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**Table 2.1-2
Formulae For Allowable APRM Flux Scram Settings
in Figure 2.1-2**

Single Loop Operation

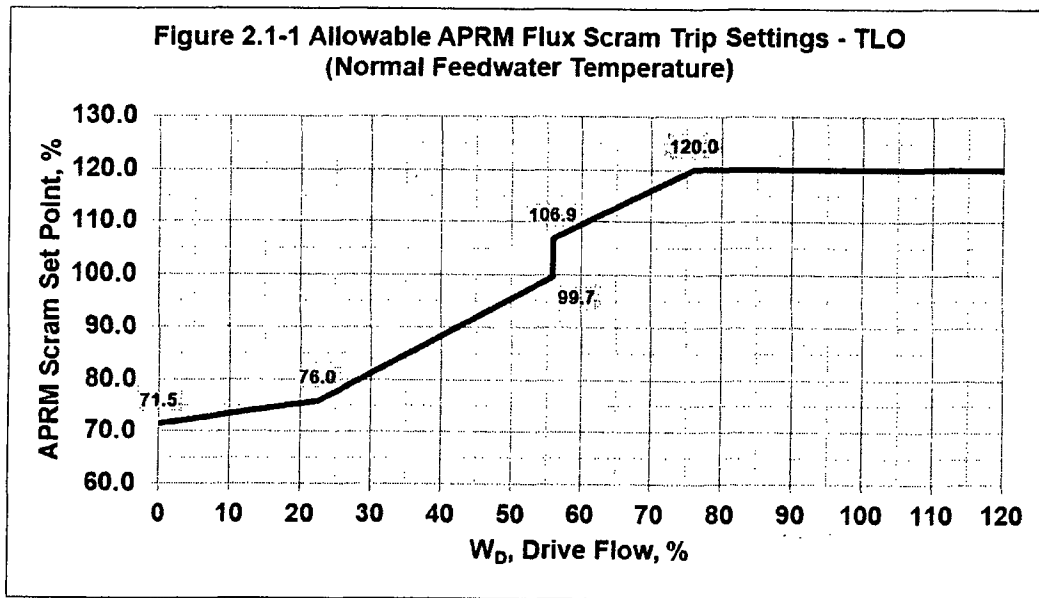
Allowable Trip Set Point (ATSP)		Drive Flow Range
C SLOPE	D INTERCEPT	% Rated
0.20	69.5	$0 \leq W_D \leq 32.5$
0.71	52.9	$32.5 < W_D \leq 65.9$
0.65	64.1	$65.9 < W_D \leq 86$
0	120.0	$86 < W_D \leq 125$

Notes:

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

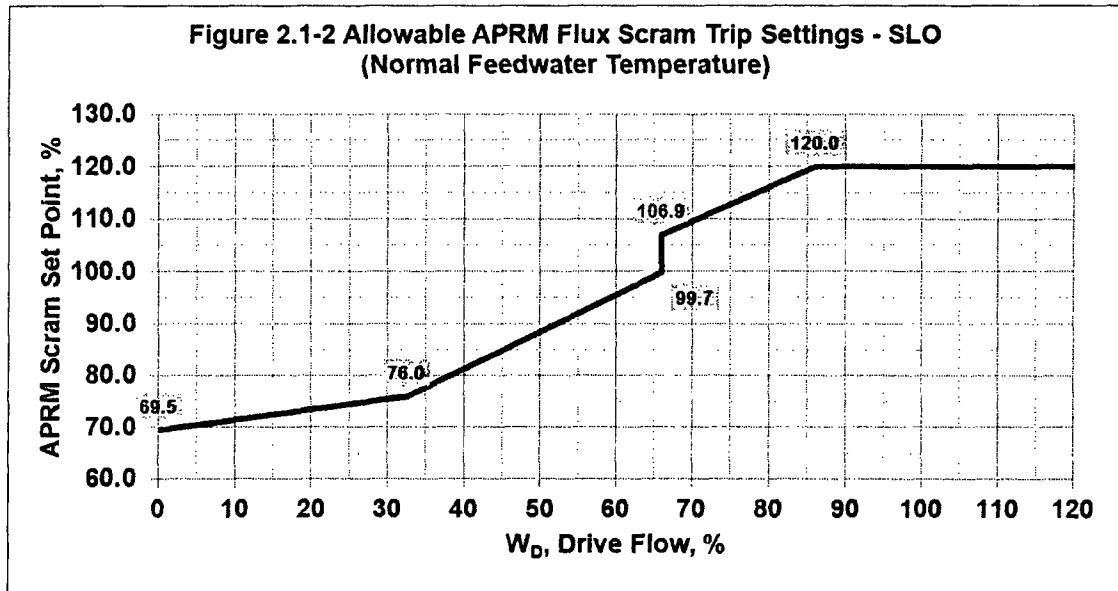
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2.2 APRM Rod Block Trip Setting (Run Mode)

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 for Two Loop Operation shall be as given by Figure 2.2-1. The $ATSP_{RB}$ 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 flow clamp feature is not used in Cycle 19.

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 for Single Loop Operation shall be as given by Figure 2.2-2. The $ATSP_{RB}$ is clamped at 115% of rated core thermal power. Formulae that form the basis of the Figures 2.2-2 are listed in Table 2.2-2. The flow clamp feature is not used in Cycle 19.

2.3 Rod Block Monitor Trip Setting

References:

Technical Specification Table 3.2.C-2, Ref. 5.15, Ref. 5.10 Table 4.5 (b)

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

Reactor Power, P (% of Rated)	Trip Set point (Allowable Value) (% of Reference Level)
$P \leq 25.9$	Not applicable (All RBM Trips Bypassed)
$25.9 < P \leq 62.0$	122
$62.0 < P \leq 82.0$	118
$82.0 < P$	113

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). Analytical Value of Rod Block set point of 117% is justified as the Rod Withdrawal Error is expected to reduce MCPR by 0.28 if this set point is used. Since the minimum OLMCPR value is 1.49, a reduction of 0.28 in MCPR, starting with operation at OLMCPR, is expected to lower MCPR to 1.21. This is substantially above the Safety Limit MCPR of 1.08. Allowable value of the HTSP is set at 113 % to provide additional conservatism to account for uncertainties. Table 4-5(b) of Reference 5.10 with a more restrictive OLMCPR of 1.35 was used to determine the RBM set points with margin.

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**Table 2.2-1
Formulae For Allowable APRM Rod Block Settings
in Figure 2.2-1
Two Loop Operation**

APRM Rod Block Allowable Trip Set Point (ATSP _{RB})		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. $ATSP_{RB} = C * \% W_D + D$, $ATSP_{RB}$ is in % Power
2. Figure 2.2-1 shows the plot of $ATSP_{RB}$ vs. W_D .
3. Reference 5.6, Table 1.a is the basis for the values of constants listed in this Table.

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**Table 2.2-2
Formulae For Allowable APRM Rod Block Settings
in Figure 2.2-2
Single Loop Operation**

APRM Rod Block Allowable Trip Set Point (ATSP _{RB})		Drive Flow Range
C SLOPE	D INTERCEPT	% Rated
0.20	64.5	$0 \leq W_D \leq 32.5$
0.71	47.9	$32.5 < W_D \leq 65.9$
0.65	57.1	$65.9 < W_D \leq 89.1$
0	115.0	$89.1 < W_D \leq 125$

Notes:

1. $ATSP_{RB} = C * \% W_D + D$, $ATSP_{RB}$ is in % Power
2. Figure 2.2-2 shows the plot of $ATSP_{RB}$ vs. W_D .
3. Reference 5.6, Table 1.b is the basis for the values of constants listed in this Table.

Figure 2.2-1 Allowable APRM Flux Rod Block Trip Settings - TLO
(Normal Feedwater Temperature)

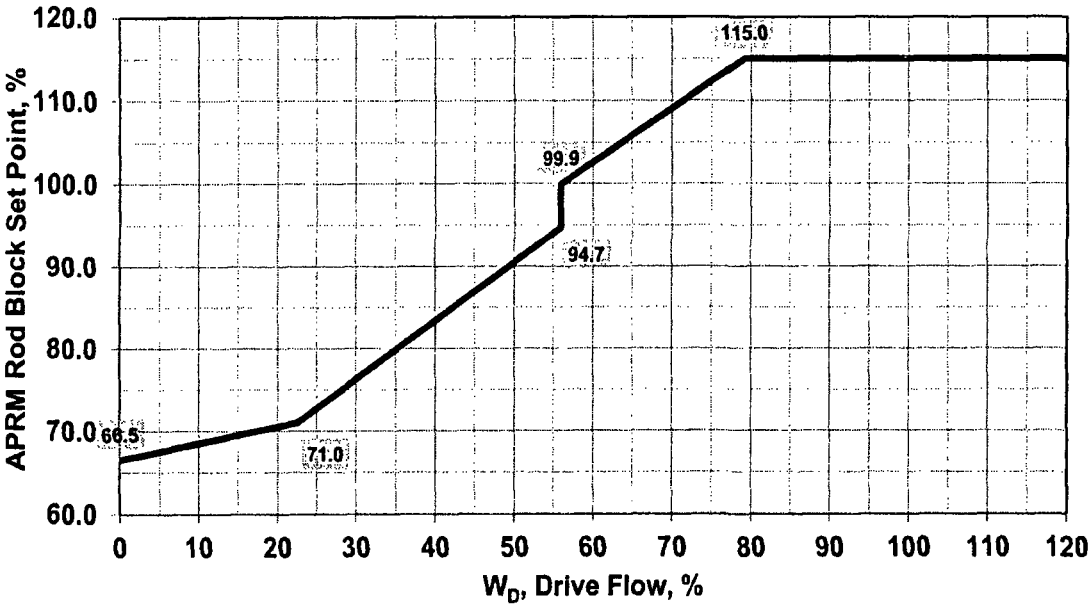
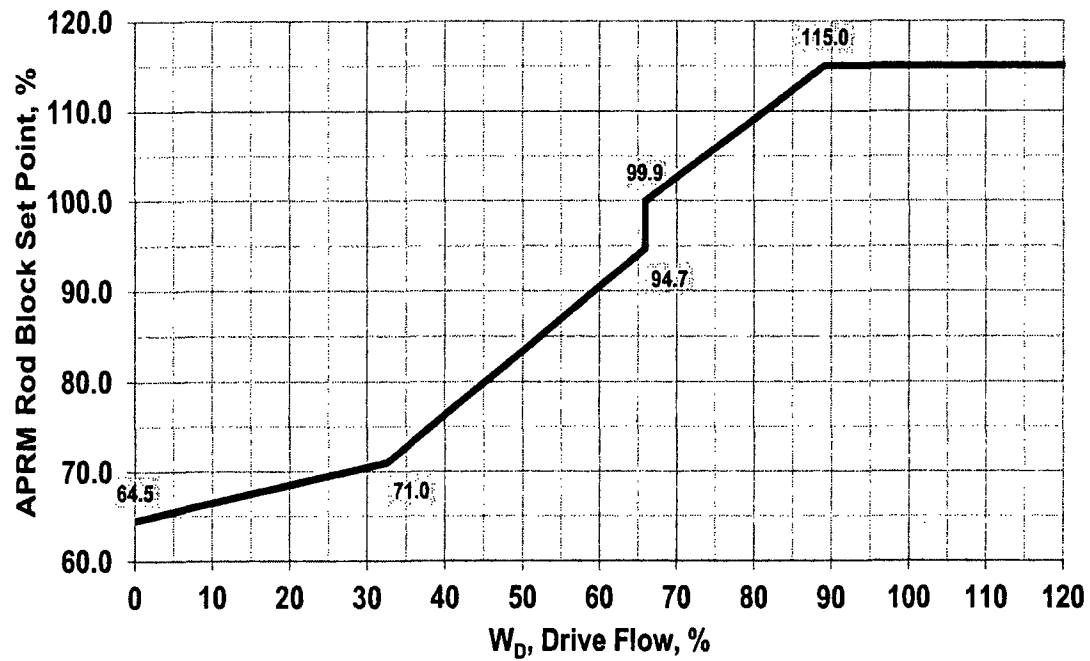


Figure 2.2-2 Allowable APRM Flux Rod Block Trip Settings - SLO
(Normal Feedwater Temperature)



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 3.1-2 and the MAPLHGR for rated power and flow conditions, given in Tables 3.1-1 and 3.1-2 for GE14 and GNF2, respectively. The power-dependent MAPLHGR limit, MAPLHGR_P , is the product of the MAPLHGR power factor, MAPFAC_P , in Figure 3.1-3 and the MAPLHGR limit for rated power and flow conditions, given in Tables 3.1-1 and 3.1-2.

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

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

P_{bypass} 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. P_{bypass} is currently set at 32.5% power. If this setting is changed in the future, then the appropriate thermal limits can be determined using Tables 3.1-1 and 3.1-2 with Figure 3.1-3.

When in Single Loop Operation, an SLO Multiplier of 0.8 for GE14 fuel and 0.89 for GNF2 fuel applies to the Rated MAPLHGR limit. At off rated conditions, MAPLHGR limit is the lower of the SLO Multiplier times the rated MAPLHGR limit, the MAPLHGR_P or MAPLHGR_F .

Per the GNF letter in Reference 5.22, the dashes on the MAPLHGR Tables in the SRLR indicate that no specific calculation of MAPLHGR limit was done at that point. Additionally, the limit value given for last exposure state point listed is applicable for higher exposures up to 63.5 GWD/ST (70 GWD/MT). This is consistent with LOCA analysis reports (References 5.3 and 5.21). As in previous cycle, 3D monicore is designed to apply the MAPLHGR limits consistent with this explanation.

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Table 3.1-1 MAPLHGR Limits for Rated Power and Rated Flow for GE14 Fuel

Average Planar Exposure	Bundle Type: GE14-P10DNAB399-10G6.0/3G5.0/1G2.0-100T-145-T6-2828 (GE14C)						
	MAPLHGR Limit (kW/ft)						
GWd/MT	GWd/ST	Lattice 6843	Lattice 6844	Lattice 6845	Lattice 6846	Lattice 6847	Lattice 6848
0	0.00	9.8	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
1.1	1.00	9.5	8.96	8.96	8.95	10.01	10.78
2.2	2.00	9.44	9.1	9.13	9.12	9.98	10.77
3.31	3.00	9.45	9.23	9.31	9.31	10.01	10.8
4.41	4.00	9.49	9.31	9.5	9.5	10.05	10.84
5.51	5.00	9.53	9.4	9.6	9.64	10.1	10.89
6.61	6.00	9.57	9.48	9.7	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
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	10.4	10.24	11.01
15.43	14.00	9.6	10.08	10.4	10.47	10.2	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	10.5	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	10.6	9.89	10.68
27.56	25.00	8.95	10.25	10.58	10.63	9.66	10.51
32.19	29.20	8.4	9.94	10.26	10.32	9.11	10.05
33.07	30.00	8.3	9.88	10.2	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	9.2	7.73	8.69
49.6	45.00	6.38	8.51	8.66	8.67	7.1	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	--	5.5
62.7	56.88	--	4.87	--	--	--	--
62.74	56.91	--	--	--	--	--	4.52
63.5	57.61	--	--	5.32	5.49	--	--
64.36	58.38	--	--	4.92	--	--	--
64.7	58.69	--	--	--	4.94	--	--
70	63.50	3.98	4.87	4.92	4.94	4.21	4.52

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Table 3.1-1 MAPLHGR Limits for Rated Power and Rated Flow for GE14 Fuel (cont.)

Average Planar Exposure	Bundle Type: GE14-P10DNAB398-8G6.0/5G5.0/2G4.0-100T-145-T6-2829 (GE14C) MAPLHGR Limit (kW/ft)						
GWd/MT	GWd/ST	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	--	--
70.00	63.50	3.98	4.88	4.93	4.95	4.21	4.54

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

RTYPE: G4.02

Table 3.1-1 MAPLHGR Limits for Rated Power and Rated Flow for GE14 Fuel (cont.)

Average Planar Exposure	Bundle Type: GE14-P10DNAB399-15GZ-100T-145-T6-2957 (GE14C)						
	MAPLHGR Limit (kW/ft)						
	GWd/MT	GWd/ST	Lattice 7492	Lattice 7493	Lattice 7494	Lattice 7495	Lattice 7496
0.00	0.00	0.00	9.80	8.73	8.56	8.54	10.21
0.22	0.20	0.20	9.71	8.80	8.65	8.63	10.16
1.10	1.00	1.00	9.50	8.91	8.78	8.77	10.01
2.20	2.00	2.00	9.44	9.05	8.97	8.95	9.98
3.31	3.00	3.00	9.45	9.21	9.16	9.15	10.01
4.41	4.00	4.00	9.49	9.35	9.37	9.37	10.05
5.51	5.00	5.00	9.53	9.48	9.59	9.59	10.10
6.61	6.00	6.00	9.57	9.62	9.81	9.78	10.15
7.72	7.00	7.00	9.61	9.73	9.94	9.89	10.18
8.82	8.00	8.00	9.64	9.84	10.05	10.02	10.21
9.92	9.00	9.00	9.66	9.96	10.17	10.15	10.24
11.02	10.00	10.00	9.68	10.08	10.30	10.30	10.25
12.13	11.00	11.00	9.69	10.20	10.44	10.45	10.27
13.23	12.00	12.00	9.67	10.30	10.56	10.58	10.27
14.33	13.00	13.00	9.64	10.37	10.64	10.66	10.24
15.43	14.00	14.00	9.60	10.43	10.70	10.72	10.20
15.99	14.51	14.51	9.58	10.45	10.72	10.74	10.18
16.53	15.00	15.00	9.56	10.48	10.74	10.76	10.16
18.74	17.00	17.00	9.48	10.53	10.79	10.80	10.07
22.05	20.00	20.00	9.35	10.57	10.81	10.78	9.94
23.01	20.87	20.87	9.28	10.57	10.80	10.75	9.89
27.56	25.00	25.00	8.95	10.56	10.72	10.66	9.66
32.19	29.20	29.20	8.40	10.19	10.35	10.33	9.11
33.07	30.00	30.00	8.30	10.12	10.28	10.27	9.01
38.58	35.00	35.00	7.65	9.62	9.73	9.73	8.37
44.09	40.00	40.00	7.02	9.09	9.20	9.21	7.73
49.60	45.00	45.00	6.38	8.55	8.67	8.68	7.10
54.79	49.71	49.71	3.98	--	--	--	--
55.12	50.00	50.00	--	8.00	8.12	8.14	5.64
58.16	52.77	52.77	--	--	--	--	4.21
60.63	55.00	55.00	--	6.34	6.90	6.89	--
63.05	57.20	57.20	--	--	--	--	--
63.50	57.61	57.61	--	5.02	5.60	5.59	--
63.77	57.85	57.85	--	4.89	--	--	--
65.06	59.02	59.02	--	--	--	4.89	--
65.11	59.06	59.06	--	--	4.88	--	--
70.00	63.50	63.50	3.98	4.89	4.88	4.89	4.21

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

RTYPE: G4.02

Table 3.1-1 MAPLHGR Limits for Rated Power and Rated Flow for GE14 Fuel (cont.)

Average Planar Exposure	Bundle Type: GE14-P10DNAB398-5G6.0/10G5.0-100T-145-T6-2958 (GE14C) MAPLHGR Limit (kW/ft)						
GWd/MT	GWd/ST	Lattice 7492	Lattice 7498	Lattice 7499	Lattice 7500	Lattice 7501	Lattice 7502
0.00	0.00	9.80	8.73	8.69	8.66	10.21	10.97
0.22	0.20	9.71	8.80	8.76	8.74	10.16	10.94
1.10	1.00	9.50	8.91	8.89	8.87	10.01	10.86
2.20	2.00	9.44	9.06	9.07	9.06	9.98	10.85
3.31	3.00	9.45	9.21	9.26	9.25	10.01	10.87
4.41	4.00	9.49	9.34	9.46	9.44	10.05	10.90
5.51	5.00	9.53	9.47	9.62	9.56	10.10	10.94
6.61	6.00	9.57	9.61	9.74	9.69	10.15	10.97
7.72	7.00	9.61	9.72	9.86	9.82	10.18	11.00
8.82	8.00	9.64	9.83	9.99	9.96	10.21	11.02
9.92	9.00	9.66	9.94	10.13	10.11	10.24	11.04
11.02	10.00	9.68	10.06	10.28	10.28	10.25	11.05
12.13	11.00	9.69	10.18	10.43	10.44	10.27	11.06
13.23	12.00	9.67	10.28	10.56	10.58	10.27	11.06
14.33	13.00	9.64	10.36	10.65	10.67	10.24	11.06
15.43	14.00	9.60	10.42	10.71	10.73	10.20	11.02
15.99	14.51	9.58	10.45	10.73	10.75	10.18	11.00
16.53	15.00	9.56	10.47	10.75	10.77	10.16	10.98
18.74	17.00	9.48	10.53	10.80	10.81	10.07	10.90
22.05	20.00	9.35	10.57	10.82	10.78	9.94	10.77
23.01	20.87	9.28	10.57	10.80	10.76	9.89	10.73
27.56	25.00	8.95	10.55	10.73	10.66	9.66	10.56
32.19	29.20	8.40	10.19	10.34	10.33	9.11	10.12
33.07	30.00	8.30	10.12	10.27	10.26	9.01	10.03
38.58	35.00	7.65	9.62	9.73	9.73	8.37	9.39
44.09	40.00	7.02	9.08	9.19	9.20	7.73	8.76
49.60	45.00	6.38	8.55	8.66	8.67	7.10	8.13
54.79	49.71	3.98	--	--	--	--	--
55.12	50.00	--	8.00	8.12	8.13	5.64	7.50
58.16	52.77	--	--	--	--	4.21	--
60.63	55.00	--	6.32	6.86	6.85	--	5.67
63.05	57.20	--	--	--	--	--	4.54
63.50	57.61	--	5.00	5.56	5.55	--	--
63.75	57.83	--	4.89	--	--	--	--
64.96	58.93	--	--	--	4.89	--	--
65.01	58.98	--	--	4.88	--	--	--
70.00	63.50	3.98	4.89	4.88	4.89	4.21	4.54

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

RTYPE: G4.02

Table 3.1-1 MAPLHGR Limits for Rated Power and Rated Flow for GE14 Fuel (cont.)

Average Planar Exposure	Bundle Type: GE14-P10DNAB400-13GZ-100T-145-T6-2959 (GE14C) MAPLHGR Limit (kW/ft)						
	GWd/ST	Lattice 7492	Lattice 7503	Lattice 7504	Lattice 7505	Lattice 7506	Lattice 7507
	GWd/MT						
0.00	0.00	9.80	8.88	8.88	8.86	10.21	10.81
0.22	0.20	9.71	8.94	8.95	8.94	10.16	10.78
1.10	1.00	9.50	9.03	9.06	9.05	10.01	10.69
2.20	2.00	9.44	9.17	9.23	9.22	9.98	10.69
3.31	3.00	9.45	9.30	9.40	9.39	10.01	10.72
4.41	4.00	9.49	9.42	9.58	9.58	10.05	10.76
5.51	5.00	9.53	9.54	9.74	9.71	10.10	10.80
6.61	6.00	9.57	9.66	9.88	9.82	10.15	10.84
7.72	7.00	9.61	9.78	9.98	9.94	10.18	10.88
8.82	8.00	9.64	9.90	10.10	10.06	10.21	10.90
9.92	9.00	9.66	10.00	10.22	10.20	10.24	10.92
11.02	10.00	9.68	10.10	10.35	10.34	10.25	10.94
12.13	11.00	9.69	10.20	10.49	10.49	10.27	10.95
13.23	12.00	9.67	10.30	10.61	10.63	10.27	10.95
14.33	13.00	9.64	10.37	10.70	10.72	10.24	10.95
15.43	14.00	9.60	10.44	10.76	10.78	10.20	10.91
15.99	14.51	9.58	10.47	10.78	10.80	10.18	10.89
16.53	15.00	9.56	10.50	10.80	10.81	10.16	10.87
18.74	17.00	9.48	10.56	10.82	10.83	10.07	10.78
22.05	20.00	9.35	10.58	10.82	10.78	9.94	10.65
23.01	20.87	9.28	10.58	10.80	10.75	9.89	10.61
27.56	25.00	8.95	10.56	10.72	10.62	9.66	10.44
32.19	29.20	8.40	10.20	10.36	10.33	9.11	9.97
33.07	30.00	8.30	10.13	10.29	10.28	9.01	9.89
38.58	35.00	7.65	9.63	9.74	9.74	8.37	9.25
44.09	40.00	7.02	9.10	9.21	9.22	7.73	8.61
49.60	45.00	6.38	8.56	8.68	8.69	7.10	7.98
54.79	49.71	3.98	--	--	--	--	--
55.12	50.00	--	8.01	8.14	8.15	5.64	7.35
58.16	52.77	--	--	--	--	4.21	--
60.63	55.00	--	6.39	6.97	6.96	--	5.29
62.34	56.55	--	--	--	--	--	4.49
63.50	57.61	--	5.07	5.67	5.66	--	--
63.89	57.96	--	4.89	--	--	--	--
65.20	59.15	--	--	--	4.89	--	--
65.25	59.19	--	--	4.88	--	--	--
70.00	63.50	3.98	4.89	4.88	4.89	4.21	4.49

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

RTYPE: G4.02

Table 3.1-1 MAPLHGR Limits for Rated Power and Rated Flow for GE14 Fuel (cont.)

Average Planar Exposure	Bundle Type: GE14-P10DNAB404-5G6.0/10G5.0-100T-145-T6-2960 (GE14C)						
	MAPLHGR Limit (kW/ft)						
GWd/MT	GWd/ST	Lattice 7492	Lattice 7508	Lattice 7509	Lattice 7510	Lattice 7511	Lattice 7512
0.00	0.00	9.80	8.76	8.72	8.70	10.21	10.97
0.22	0.20	9.71	8.83	8.80	8.78	10.16	10.94
1.10	1.00	9.50	8.94	8.93	8.91	10.01	10.86
2.20	2.00	9.44	9.09	9.11	9.10	9.98	10.85
3.31	3.00	9.45	9.24	9.30	9.29	10.01	10.87
4.41	4.00	9.49	9.38	9.50	9.48	10.05	10.90
5.51	5.00	9.53	9.51	9.66	9.60	10.10	10.94
6.61	6.00	9.57	9.64	9.78	9.73	10.15	10.97
7.72	7.00	9.61	9.75	9.90	9.86	10.18	11.00
8.82	8.00	9.64	9.86	10.03	10.00	10.21	11.02
9.92	9.00	9.66	9.97	10.16	10.15	10.24	11.04
11.02	10.00	9.68	10.08	10.31	10.31	10.25	11.05
12.13	11.00	9.69	10.20	10.46	10.47	10.27	11.06
13.23	12.00	9.67	10.31	10.59	10.61	10.27	11.06
14.33	13.00	9.64	10.38	10.68	10.70	10.24	11.06
15.43	14.00	9.60	10.45	10.75	10.77	10.20	11.02
15.99	14.51	9.58	10.47	10.77	10.79	10.18	11.00
16.53	15.00	9.56	10.50	10.79	10.81	10.16	10.98
18.74	17.00	9.48	10.56	10.85	10.86	10.07	10.90
22.05	20.00	9.35	10.61	10.87	10.85	9.94	10.77
23.01	20.87	9.28	10.61	10.84	10.82	9.89	10.73
27.56	25.00	8.95	10.60	10.70	10.67	9.66	10.56
32.19	29.20	8.40	10.24	10.42	10.41	9.11	10.12
33.07	30.00	8.30	10.17	10.36	10.36	9.01	10.03
38.58	35.00	7.65	9.69	9.81	9.77	8.37	9.39
44.09	40.00	7.02	9.15	9.23	9.17	7.73	8.76
49.60	45.00	6.38	8.61	8.65	8.60	7.10	8.13
54.79	49.71	3.98	--	--	--	--	--
55.12	50.00	--	8.06	8.11	8.06	5.64	7.50
58.16	52.77	--	--	--	--	4.21	--
60.63	55.00	--	6.46	7.08	7.07	--	5.67
63.05	57.20	--	--	--	--	--	4.54
63.50	57.61	--	5.14	5.78	5.77	--	--
64.01	58.07	--	4.91	--	--	--	--
65.41	59.34	--	--	--	4.91	--	--
65.45	59.37	--	--	4.90	--	--	--
70.00	63.50	3.98	4.91	4.90	4.91	4.21	4.54

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

RTYPE: G4.02

Table 3.1-1 MAPLHGR Limits for Rated Power and Rated Flow for GE14 Fuel (cont.)

Average Planar Exposure	Bundle Type: GE14-P10DNAB400-12G6.0/3G5.0-100T-145-T6-2961 (GE14C) MAPLHGR Limit (kW/ft)						
	GWd/ST	Lattice 7492	Lattice 7513	Lattice 7514	Lattice 7515	Lattice 7516	Lattice 7517
0.00	0.00	9.80	8.71	8.67	8.65	10.21	10.97
0.22	0.20	9.71	8.78	8.74	8.72	10.16	10.94
1.10	1.00	9.50	8.88	8.86	8.84	10.01	10.86
2.20	2.00	9.44	9.02	9.03	9.01	9.98	10.85
3.31	3.00	9.45	9.16	9.20	9.19	10.01	10.87
4.41	4.00	9.49	9.31	9.39	9.38	10.05	10.90
5.51	5.00	9.53	9.43	9.58	9.52	10.10	10.94
6.61	6.00	9.57	9.56	9.70	9.64	10.15	10.97
7.72	7.00	9.61	9.67	9.81	9.76	10.18	11.00
8.82	8.00	9.64	9.78	9.93	9.89	10.21	11.02
9.92	9.00	9.66	9.88	10.05	10.03	10.24	11.04
11.02	10.00	9.68	9.99	10.19	10.18	10.25	11.05
12.13	11.00	9.69	10.11	10.34	10.34	10.27	11.06
13.23	12.00	9.67	10.21	10.47	10.48	10.27	11.06
14.33	13.00	9.64	10.29	10.57	10.59	10.24	11.06
15.43	14.00	9.60	10.37	10.66	10.68	10.20	11.02
15.99	14.51	9.58	10.40	10.69	10.72	10.18	11.00
16.53	15.00	9.56	10.43	10.73	10.75	10.16	10.98
18.74	17.00	9.48	10.52	10.81	10.83	10.07	10.90
22.05	20.00	9.35	10.59	10.84	10.80	9.94	10.77
23.01	20.87	9.28	10.59	10.82	10.77	9.89	10.73
27.56	25.00	8.95	10.57	10.73	10.64	9.66	10.56
32.19	29.20	8.40	10.21	10.35	10.33	9.11	10.12
33.07	30.00	8.30	10.14	10.28	10.27	9.01	10.03
38.58	35.00	7.65	9.63	9.74	9.74	8.37	9.39
44.09	40.00	7.02	9.09	9.21	9.21	7.73	8.76
49.60	45.00	6.38	8.56	8.67	8.68	7.10	8.13
54.79	49.71	3.98	--	--	--	--	--
55.12	50.00	--	8.01	8.13	8.14	5.64	7.50
58.16	52.77	--	--	--	--	4.21	--
60.63	55.00	--	6.35	6.92	6.91	--	5.67
63.05	57.20	--	--	--	--	--	4.54
63.50	57.61	--	5.03	5.62	5.61	--	--
63.79	57.87	--	4.90	--	--	--	--
65.09	59.05	--	--	--	4.89	--	--
65.15	59.10	--	--	4.88	--	--	--
70.00	63.50	3.98	4.90	4.88	4.89	4.21	4.54

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

RTYPE: G4.02

Table 3.1-2 MAPLHGR Limits for Rated Power and Rated Flow for GNF2 Fuel

Average Planar Exposure	Bundle Type: GNF2-P10DG2B389-6G6.0/8G5.0-100T2-145-T6-3141 (GNF2) MAPLHGR Limit (kW/ft)							
GWd/MT	GWd/ST	Lat. 8661	Lattice 8668	Lattice 8669	Lattice 8670	Lattice 8671	Lattice 8672	Lat. 8667
0.00	0.00	9.76	9.24	9.37	9.49	8.96	8.66	10.44
0.22	0.20	9.67	9.26	9.41	9.54	8.99	8.70	10.38
1.10	1.00	9.45	9.33	9.49	9.62	9.08	8.79	10.22
2.20	2.00	9.39	9.42	9.60	9.72	9.20	8.92	10.16
3.31	3.00	9.39	9.52	9.70	9.83	9.32	9.06	10.17
4.41	4.00	9.42	9.62	9.81	9.94	9.45	9.20	10.19
5.51	5.00	9.46	9.73	9.92	10.05	9.58	9.34	10.22
6.61	6.00	9.50	9.83	10.02	10.16	9.72	9.49	10.25
7.72	7.00	9.53	9.94	10.13	10.27	9.86	9.64	10.27
8.82	8.00	9.56	10.04	10.25	10.38	10.00	9.79	10.29
9.92	9.00	9.58	10.14	10.36	10.38	10.14	9.95	10.31
11.02	10.00	9.60	10.24	10.48	10.39	10.29	10.10	10.32
12.13	11.00	9.54	10.31	10.58	10.42	10.19	10.16	10.33
13.23	12.00	9.45	10.31	10.61	10.23	10.09	10.16	10.24
14.33	13.00	9.36	10.31	10.60	10.17	10.07	10.14	10.14
15.43	14.00	9.26	10.30	10.49	10.09	10.00	10.07	10.04
16.53	15.00	9.16	10.28	10.38	10.02	9.93	10.00	9.94
17.64	16.00	9.06	10.25	10.25	9.94	9.86	9.92	9.84
18.74	17.00	8.96	10.20	10.14	9.86	9.77	9.83	9.74
19.84	18.00	8.86	10.14	10.04	9.77	9.68	9.74	9.63
20.94	19.00	8.76	10.08	9.94	9.68	9.59	9.64	9.53
22.05	20.00	8.65	10.01	9.83	9.59	9.50	9.55	9.42
23.15	21.00	8.55	9.91	9.73	9.49	9.41	9.45	9.32
24.25	22.00	8.45	9.81	9.63	9.40	9.32	9.36	9.22
25.35	23.00	8.35	9.70	9.53	9.31	9.23	9.27	9.11
26.46	24.00	8.24	9.60	9.43	9.22	9.14	9.18	9.01
27.56	25.00	8.14	9.50	9.33	9.13	9.05	9.08	8.91
33.07	30.00	7.64	8.99	8.84	8.68	8.62	8.64	8.40
38.58	35.00	7.14	8.51	8.37	8.26	8.21	8.23	7.91
41.22	37.39	6.91	8.29	8.16	8.06	8.03	8.04	7.67
44.09	40.00	6.65	8.05	7.93	7.84	7.83	7.84	7.42
49.60	45.00	6.16	7.63	7.52	7.44	7.44	7.44	6.93
54.42	49.37	5.25	--	--	--	--		--
55.12	50.00	--	7.22	7.12	7.05	7.07	7.08	6.45
58.61	53.17	--	--	--	--	--		5.61
60.63	55.00	--	6.83	6.74	6.55	6.54	6.59	--
62.27	56.49	--	--	--	--	6.13		--
62.31	56.52	--	--	--	--	--	6.42	--
62.50	56.70	--	--	--	6.09	--		--
63.44	57.55	--	6.48	--	--	--		--
63.78	57.86	--	--	6.03	--	--		--
70.00	63.50	5.25	6.48	6.03	6.09	6.13	6.42	5.61

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

RTYPE: G4.02

Table 3.1-2 MAPLHGR Limits for Rated Power and Rated Flow for GNF2 Fuel (cont.)

Average Planar Exposure	Bundle Type: GNF2-P10DG2B389-6G6.0/2G5.0/6G4.0-100T2-145-T6-3142 (GNF2) MAPLHGR Limit (kW/ft)							
	GWd/ST	Lat. 8661	Lat. 8662	Lat. 8663	Lat. 8664	Lat. 8665	Lat. 8666	Lat. 8667
0.00	0.00	9.76	9.22	9.41	9.53	9.00	8.70	10.44
0.22	0.20	9.67	9.24	9.43	9.57	9.03	8.73	10.38
1.10	1.00	9.45	9.30	9.50	9.65	9.13	8.83	10.22
2.20	2.00	9.39	9.40	9.61	9.76	9.26	8.98	10.16
3.31	3.00	9.39	9.49	9.72	9.87	9.39	9.11	10.17
4.41	4.00	9.42	9.59	9.83	9.99	9.53	9.25	10.19
5.51	5.00	9.46	9.69	9.95	10.12	9.68	9.39	10.22
6.61	6.00	9.50	9.79	10.08	10.25	9.83	9.54	10.25
7.72	7.00	9.53	9.90	10.21	10.38	9.98	9.70	10.27
8.82	8.00	9.56	10.01	10.34	10.49	10.14	9.86	10.29
9.92	9.00	9.58	10.13	10.47	10.50	10.29	10.02	10.31
11.02	10.00	9.60	10.25	10.60	10.51	10.43	10.18	10.32
12.13	11.00	9.54	10.33	10.72	10.54	10.33	10.24	10.33
13.23	12.00	9.45	10.35	10.73	10.35	10.20	10.25	10.24
14.33	13.00	9.36	10.36	10.69	10.26	10.15	10.22	10.14
15.43	14.00	9.26	10.35	10.57	10.15	10.05	10.12	10.04
16.53	15.00	9.16	10.32	10.42	10.06	9.96	10.03	9.94
17.64	16.00	9.06	10.27	10.27	9.97	9.87	9.93	9.84
18.74	17.00	8.96	10.21	10.16	9.87	9.78	9.84	9.74
19.84	18.00	8.86	10.15	10.05	9.78	9.69	9.74	9.63
20.94	19.00	8.76	10.09	9.94	9.69	9.60	9.65	9.53
22.05	20.00	8.65	10.01	9.84	9.59	9.50	9.55	9.42
23.15	21.00	8.55	9.92	9.74	9.50	9.41	9.46	9.32
24.25	22.00	8.45	9.81	9.64	9.41	9.32	9.36	9.22
25.35	23.00	8.35	9.71	9.54	9.31	9.23	9.27	9.11
26.46	24.00	8.24	9.60	9.44	9.22	9.14	9.18	9.01
27.56	25.00	8.14	9.50	9.34	9.13	9.05	9.09	8.91
33.07	30.00	7.64	8.99	8.84	8.69	8.62	8.64	8.40
38.58	35.00	7.14	8.51	8.37	8.26	8.21	8.23	7.91
41.22	37.39	6.91	8.29	8.16	8.06	8.03	8.04	7.67
44.09	40.00	6.65	8.06	7.93	7.84	7.83	7.84	7.42
49.60	45.00	6.16	7.63	7.52	7.44	7.44	7.44	6.93
54.42	49.37	5.25	--	--	--	--	--	--
55.12	50.00	--	7.22	7.12	7.05	7.07	7.08	6.45
58.61	53.17	--	--	--	--	--	--	5.61
60.63	55.00	--	6.83	6.74	6.57	6.56	6.61	--
62.34	56.55	--	--	--	--	6.13	6.42	--
62.56	56.76	--	--	--	6.08	--	--	--
63.48	57.59	--	6.48	--	--	--	--	--
63.83	57.91	--	--	6.03	--	--	--	--
70.00	63.50	5.25	6.48	6.03	6.08	6.13	6.42	5.61

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

RTYPE: G4.02

Table 3.1-2 MAPLHGR Limits for Rated Power and Rated Flow for GNF2 Fuel (cont.)

Average Planar Exposure	Bundle Type: GNF2-P10DG2B388-6G6.0/7G5.0-100T2-145-T6-3143 (GNF2) MAPLHGR Limit (kW/ft)							
GWd/MT	GWd/ST	Lat. 8661	Lattice 8655	Lattice 8656	Lattice 8657	Lattice 8658	Lattice 8659	Lat. 8667
0.00	0.00	9.76	8.73	8.94	9.08	9.09	8.73	10.44
0.22	0.20	9.67	8.78	8.99	9.13	9.13	8.77	10.38
1.10	1.00	9.45	8.89	9.11	9.26	9.22	8.86	10.22
2.20	2.00	9.39	9.04	9.27	9.42	9.34	8.99	10.16
3.31	3.00	9.39	9.20	9.44	9.60	9.47	9.13	10.17
4.41	4.00	9.42	9.36	9.62	9.78	9.60	9.27	10.19
5.51	5.00	9.46	9.52	9.80	9.94	9.74	9.42	10.22
6.61	6.00	9.50	9.69	9.94	10.09	9.89	9.57	10.25
7.72	7.00	9.53	9.81	10.08	10.23	10.04	9.73	10.27
8.82	8.00	9.56	9.91	10.20	10.29	10.17	9.88	10.29
9.92	9.00	9.58	10.00	10.31	10.33	10.30	10.02	10.31
11.02	10.00	9.60	10.09	10.41	10.38	10.42	10.16	10.32
12.13	11.00	9.54	10.11	10.48	10.43	10.49	10.20	10.33
13.23	12.00	9.45	10.10	10.47	10.40	10.48	10.20	10.24
14.33	13.00	9.36	10.09	10.46	10.37	10.45	10.18	10.14
15.43	14.00	9.26	10.07	10.44	10.34	10.40	10.14	10.04
16.53	15.00	9.16	10.05	10.41	10.30	10.34	10.10	9.94
17.64	16.00	9.06	10.01	10.37	10.24	10.28	10.04	9.84
18.74	17.00	8.96	9.97	10.31	10.17	10.19	9.98	9.74
19.84	18.00	8.86	9.92	10.25	10.10	10.11	9.91	9.63
20.94	19.00	8.76	9.87	10.19	10.02	10.01	9.84	9.53
22.05	20.00	8.65	9.82	10.12	9.94	9.92	9.77	9.42
23.15	21.00	8.55	9.76	10.06	9.86	9.83	9.70	9.32
24.25	22.00	8.45	9.70	9.99	9.77	9.74	9.64	9.22
25.35	23.00	8.35	9.65	9.93	9.67	9.65	9.57	9.11
26.46	24.00	8.24	9.59	9.84	9.58	9.56	9.50	9.01
27.56	25.00	8.14	9.53	9.74	9.49	9.47	9.43	8.91
33.07	30.00	7.64	9.22	9.24	9.03	9.03	9.06	8.40
38.58	35.00	7.14	8.84	8.77	8.60	8.60	8.63	7.91
41.22	37.39	6.91	8.66	8.55	8.39	8.41	8.42	7.67
44.09	40.00	6.65	8.46	8.32	8.17	8.20	8.19	7.42
49.60	45.00	6.16	8.06	7.88	7.75	7.80	7.75	6.93
54.42	49.37	5.25	--	--	--	--		--
55.12	50.00	--	7.66	7.46	7.34	7.40	7.33	6.45
58.61	53.17	--	--	--	--	--		5.61
60.63	55.00	--	7.22	7.04	6.93	6.99	6.89	--
62.39	56.60	--	--	--	--	--	6.42	--
63.22	57.35	--	--	--	--	6.42		--
63.28	57.41	--	--	--	6.41	--		--
63.44	57.55	--	6.48	--	--	--		--
64.62	58.62	--	--	6.46	--	--		--
70.00	63.50	5.25	6.48	6.46	6.41	6.42	6.42	5.61

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

RTYPE: G4.02

Table 3.1-2 MAPLHGR Limits for Rated Power and Rated Flow for GNF2 Fuel(cont.)

Average Planar Exposure	Bundle Type: GNF2-P10DG2B401-6G6.0/8G5.0/1G4.0-100T2-145-T6-3421 (GNF2) MAPLHGR Limit (kW/ft)							
	GWd/ST	Lat. 9676	Lat. 9677	Lat. 9678	Lat. 9679	Lat. 9680	Lat. 9681	Lat. 9682
0.00	0.00	9.76	9.01	9.15	9.25	8.68	8.39	10.44
0.22	0.20	9.67	9.05	9.19	9.29	8.71	8.42	10.38
1.10	1.00	9.45	9.12	9.27	9.38	8.79	8.51	10.21
2.20	2.00	9.38	9.21	9.36	9.49	8.91	8.63	10.16
3.31	3.00	9.39	9.30	9.46	9.59	9.02	8.76	10.16
4.41	4.00	9.42	9.39	9.56	9.69	9.14	8.89	10.19
5.51	5.00	9.46	9.48	9.66	9.79	9.27	9.03	10.22
6.61	6.00	9.49	9.57	9.76	9.90	9.40	9.17	10.25
7.72	7.00	9.53	9.66	9.86	10.00	9.53	9.32	10.27
8.82	8.00	9.56	9.75	9.96	10.11	9.66	9.46	10.29
9.92	9.00	9.58	9.85	10.07	10.21	9.80	9.61	10.31
11.02	10.00	9.60	9.94	10.18	10.32	9.94	9.74	10.32
12.13	11.00	9.53	9.97	10.24	10.40	9.98	9.79	10.32
13.23	12.00	9.44	9.97	10.25	10.41	10.02	9.84	10.24
14.33	13.00	9.35	9.97	10.25	10.41	10.04	9.87	10.14
15.43	14.00	9.25	9.96	10.25	10.40	10.05	9.89	10.04
16.53	15.00	9.16	9.95	10.24	10.31	10.05	9.89	9.94
17.64	16.00	9.06	9.93	10.21	10.23	10.02	9.88	9.83
18.74	17.00	8.95	9.90	10.17	10.14	9.99	9.85	9.73
19.84	18.00	8.85	9.86	10.13	10.05	9.94	9.82	9.62
20.94	19.00	8.75	9.81	10.07	9.95	9.84	9.78	9.52
22.05	20.00	8.65	9.77	10.02	9.85	9.75	9.74	9.42
23.15	21.00	8.54	9.72	9.96	9.76	9.65	9.70	9.31
24.25	22.00	8.44	9.67	9.88	9.66	9.56	9.60	9.21
25.35	23.00	8.34	9.61	9.78	9.56	9.46	9.51	9.10
26.46	24.00	8.23	9.56	9.67	9.47	9.37	9.41	9.00
27.56	25.00	8.13	9.51	9.57	9.37	9.27	9.31	8.90
33.07	30.00	7.63	9.19	9.06	8.90	8.82	8.84	8.39
38.58	35.00	7.13	8.69	8.56	8.45	8.38	8.40	7.90
41.22	37.39	6.89	8.46	8.34	8.23	8.19	8.20	7.66
44.09	40.00	6.64	8.21	8.10	8.00	7.97	7.98	7.41
49.60	45.00	6.15	7.76	7.66	7.57	7.56	7.57	6.92
54.38	49.33	5.24	--	--	--	--	--	--
55.12	50.00	--	7.33	7.24	7.16	7.17	7.18	6.44
58.58	53.14	--	--	--	--	--	--	5.61
60.63	55.00	--	6.92	6.84	6.77	6.79	6.80	--
63.11	57.25	--	--	--	--	--	6.45	--
63.39	57.51	--	6.57	--	--	--	--	--
63.44	57.55	--	--	--	--	6.14	--	--
63.75	57.84	--	--	--	6.09	--	--	--
64.60	58.60	--	--	6.26	--	--	--	--
70.00	63.50	5.24	6.57	6.26	6.09	6.14	6.45	5.61

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

RTYPE: G4.02

Table 3.1-2 MAPLHGR Limits for Rated Power and Rated Flow for GNF2 Fuel(cont.)

Average Planar Exposure	Bundle Type: GNF2-P10DG2B395-6G6.0/9G5.0-100T2-145-T6-3422 (GNF2) MAPLHGR Limit (kW/ft)							
	GWd/MT	GWd/ST	Lat. 9676	Lat. 9683	Lat. 9684	Lat. 9685	Lat. 9686	Lat. 9687
0.00	0.00	0.00	9.76	9.09	9.23	9.33	8.81	8.52
0.22	0.20	0.20	9.67	9.13	9.28	9.39	8.85	8.57
1.10	1.00	1.00	9.45	9.21	9.38	9.49	8.96	8.68
2.20	2.00	2.00	9.38	9.33	9.52	9.64	9.12	8.85
3.31	3.00	3.00	9.39	9.45	9.67	9.79	9.29	9.00
4.41	4.00	4.00	9.42	9.57	9.81	9.94	9.46	9.15
5.51	5.00	5.00	9.46	9.70	9.95	10.11	9.63	9.31
6.61	6.00	6.00	9.49	9.83	10.11	10.28	9.79	9.47
7.72	7.00	7.00	9.53	9.97	10.24	10.42	9.95	9.65
8.82	8.00	8.00	9.56	9.87	10.18	10.41	10.11	9.82
9.92	9.00	9.00	9.58	9.65	9.93	10.11	10.26	9.99
11.02	10.00	10.00	9.60	9.68	9.94	10.11	10.37	10.14
12.13	11.00	11.00	9.53	9.78	10.05	10.21	10.48	10.20
13.23	12.00	12.00	9.44	9.86	10.18	10.34	10.33	10.22
14.33	13.00	13.00	9.35	9.88	10.20	10.38	10.29	10.22
15.43	14.00	14.00	9.25	9.89	10.21	10.28	10.21	10.20
16.53	15.00	15.00	9.16	9.89	10.21	10.20	10.13	10.15
17.64	16.00	16.00	9.06	9.88	10.18	10.12	10.05	10.10
18.74	17.00	17.00	8.95	9.85	10.15	10.03	9.96	10.02
19.84	18.00	18.00	8.85	9.81	10.10	9.94	9.87	9.92
20.94	19.00	19.00	8.75	9.77	10.05	9.84	9.77	9.82
22.05	20.00	20.00	8.65	9.73	9.97	9.75	9.67	9.73
23.15	21.00	21.00	8.54	9.69	9.86	9.65	9.58	9.63
24.25	22.00	22.00	8.44	9.64	9.76	9.55	9.48	9.53
25.35	23.00	23.00	8.34	9.60	9.66	9.46	9.39	9.43
26.46	24.00	24.00	8.23	9.55	9.55	9.36	9.30	9.34
27.56	25.00	25.00	8.13	9.51	9.45	9.27	9.20	9.24
33.07	30.00	30.00	7.63	9.09	8.95	8.80	8.75	8.78
38.58	35.00	35.00	7.13	8.59	8.47	8.36	8.32	8.34
41.22	37.39	37.39	6.89	8.37	8.25	8.15	8.13	8.14
44.09	40.00	40.00	6.64	8.13	8.01	7.92	7.91	7.92
49.60	45.00	45.00	6.15	7.69	7.59	7.50	7.51	7.51
54.38	49.33	49.33	5.24	--	--	--	--	--
55.12	50.00	50.00	--	7.27	7.18	7.10	7.12	7.13
58.58	53.14	53.14	--	--	--	--	--	--
60.63	55.00	55.00	--	6.87	6.79	6.71	6.72	6.76
62.67	56.86	56.86	--	--	--	--	--	6.44
63.01	57.16	57.16	--	--	--	--	6.13	--
63.18	57.32	57.32	--	--	--	6.08	--	--
63.72	57.81	57.81	--	6.49	--	--	--	--
64.32	58.35	58.35	--	--	6.03	--	--	--
70.00	63.50	63.50	5.24	6.49	6.03	6.08	6.13	6.44

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

RTYPE: G4.02

Table 3.1-2 MAPLHGR Limits for Rated Power and Rated Flow for GNF2 Fuel(cont.)

Average Planar Exposure	Bundle Type: GNF2-P10DG2B375-6G6.0/7G5.0-100T2-145-T6-3434 (GNF2) MAPLHGR Limit (kW/ft)							
	GWd/ST	Lat. 9676	Lat. 9688	Lat. 9689	Lat. 9690	Lat. 9691	Lat. 9692	Lat. 9682
0.00	0.00	9.76	9.01	9.21	9.30	8.77	8.42	10.44
0.22	0.20	9.67	9.03	9.24	9.35	8.81	8.46	10.38
1.10	1.00	9.45	9.12	9.34	9.46	8.91	8.57	10.21
2.20	2.00	9.38	9.24	9.47	9.59	9.05	8.71	10.16
3.31	3.00	9.39	9.37	9.61	9.72	9.18	8.85	10.16
4.41	4.00	9.42	9.50	9.75	9.85	9.33	9.00	10.19
5.51	5.00	9.46	9.63	9.88	9.95	9.47	9.16	10.22
6.61	6.00	9.49	9.77	10.01	10.00	9.63	9.32	10.25
7.72	7.00	9.53	9.38	9.65	9.87	9.78	9.49	10.27
8.82	8.00	9.56	9.06	9.29	9.46	9.71	9.65	10.29
9.92	9.00	9.58	9.06	9.27	9.42	9.66	9.74	10.31
11.02	10.00	9.60	9.17	9.39	9.53	9.78	9.85	10.32
12.13	11.00	9.53	9.29	9.53	9.67	9.93	9.94	10.32
13.23	12.00	9.44	9.32	9.59	9.74	10.04	9.94	10.24
14.33	13.00	9.35	9.35	9.62	9.77	10.07	9.92	10.14
15.43	14.00	9.25	9.37	9.65	9.79	10.08	9.89	10.04
16.53	15.00	9.16	9.38	9.65	9.79	10.06	9.84	9.94
17.64	16.00	9.06	9.38	9.64	9.78	10.02	9.79	9.83
18.74	17.00	8.95	9.37	9.62	9.75	9.95	9.73	9.73
19.84	18.00	8.85	9.36	9.60	9.72	9.87	9.66	9.62
20.94	19.00	8.75	9.34	9.57	9.69	9.78	9.60	9.52
22.05	20.00	8.65	9.32	9.54	9.65	9.69	9.54	9.42
23.15	21.00	8.54	9.29	9.51	9.61	9.60	9.47	9.31
24.25	22.00	8.44	9.27	9.48	9.52	9.51	9.41	9.21
25.35	23.00	8.34	9.25	9.45	9.43	9.42	9.35	9.10
26.46	24.00	8.23	9.22	9.42	9.34	9.33	9.28	9.00
27.56	25.00	8.13	9.19	9.39	9.25	9.25	9.22	8.90
33.07	30.00	7.63	9.04	9.02	8.82	8.82	8.85	8.39
38.58	35.00	7.13	8.68	8.57	8.40	8.42	8.44	7.90
41.22	37.39	6.89	8.50	8.36	8.21	8.23	8.24	7.66
44.09	40.00	6.64	8.32	8.14	8.00	8.03	8.02	7.41
49.60	45.00	6.15	7.94	7.73	7.61	7.65	7.60	6.92
54.38	49.33	5.24	--	--	--	--	--	--
55.12	50.00	--	7.55	7.33	7.21	7.27	7.20	6.44
58.58	53.14	--	--	--	--	--	--	5.61
60.63	55.00	--	6.92	6.93	6.80	6.79	6.57	--
61.27	55.59	--	--	--	--	--	6.40	--
62.10	56.33	--	--	--	--	6.40	--	--
62.24	56.46	--	--	--	6.38	--	--	--
62.37	56.58	--	6.47	--	--	--	--	--
63.46	57.57	--	--	6.49	--	--	--	--
70.00	63.50	5.24	6.47	6.49	6.38	6.40	6.40	5.61

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Table 3.1-2 MAPLHGR Limits for Rated Power and Rated Flow for GNF2 Fuel(cont.)

Average Planar Exposure	Bundle Type: GNF2-P10DG2B401-6G6.0/2G5.0/6G4.0-100T2-145-T6-3640 (GNF2) MAPLHGR Limit (kW/ft)							
GWd/MT	GWd/ST	Lat. 9676	Lat. 9693	Lat. 9694	Lat. 9695	Lat. 9696	Lat. 9697	Lat. 9682
0.00	0.00	9.76	9.04	9.17	9.30	8.72	8.43	10.44
0.22	0.20	9.67	9.08	9.22	9.34	8.75	8.47	10.38
1.10	1.00	9.45	9.15	9.30	9.42	8.84	8.56	10.21
2.20	2.00	9.38	9.25	9.40	9.53	8.96	8.69	10.16
3.31	3.00	9.39	9.34	9.51	9.64	9.09	8.82	10.16
4.41	4.00	9.42	9.43	9.61	9.74	9.22	8.97	10.19
5.51	5.00	9.46	9.53	9.72	9.85	9.35	9.11	10.22
6.61	6.00	9.49	9.63	9.83	9.97	9.49	9.26	10.25
7.72	7.00	9.53	9.72	9.94	10.08	9.63	9.42	10.27
8.82	8.00	9.56	9.82	10.05	10.20	9.78	9.58	10.29
9.92	9.00	9.58	9.92	10.17	10.32	9.92	9.74	10.31
11.02	10.00	9.60	10.03	10.28	10.43	10.06	9.87	10.32
12.13	11.00	9.53	10.06	10.35	10.52	10.10	9.91	10.32
13.23	12.00	9.44	10.06	10.35	10.52	10.11	9.93	10.24
14.33	13.00	9.35	10.05	10.35	10.50	10.12	9.95	10.14
15.43	14.00	9.25	10.03	10.32	10.46	10.10	9.94	10.04
16.53	15.00	9.16	10.01	10.29	10.35	10.08	9.92	9.94
17.64	16.00	9.06	9.97	10.24	10.25	10.04	9.89	9.83
18.74	17.00	8.95	9.93	10.19	10.16	9.99	9.86	9.73
19.84	18.00	8.85	9.88	10.14	10.06	9.95	9.82	9.62
20.94	19.00	8.75	9.83	10.08	9.96	9.85	9.78	9.52
22.05	20.00	8.65	9.78	10.02	9.86	9.76	9.74	9.42
23.15	21.00	8.54	9.72	9.97	9.77	9.66	9.71	9.31
24.25	22.00	8.44	9.67	9.89	9.67	9.56	9.61	9.21
25.35	23.00	8.34	9.62	9.78	9.57	9.47	9.51	9.10
26.46	24.00	8.23	9.57	9.68	9.48	9.38	9.42	9.00
27.56	25.00	8.13	9.51	9.57	9.38	9.28	9.32	8.90
33.07	30.00	7.63	9.20	9.06	8.91	8.82	8.85	8.39
38.58	35.00	7.13	8.69	8.57	8.45	8.39	8.41	7.90
41.22	37.39	6.89	8.46	8.34	8.24	8.19	8.21	7.66
44.09	40.00	6.64	8.21	8.10	8.00	7.98	7.99	7.41
49.60	45.00	6.15	7.76	7.66	7.57	7.56	7.57	6.92
54.38	49.33	5.24	--	--	--	--	--	--
55.12	50.00	--	7.34	7.24	7.17	7.17	7.18	6.44
58.58	53.14	--	--	--	--	--	--	5.61
60.63	55.00	--	6.93	6.84	6.77	6.79	6.80	--
63.19	57.32	--	--	--	--	--	6.45	--
63.45	57.56	--	6.57	--	--	--	--	--
63.45	57.56	--	--	--	--	6.14	--	--
63.76	57.84	--	--	--	6.10	--	--	--
64.65	58.65	--	--	6.25	--	--	--	--
70.00	63.50	5.24	6.57	6.25	6.10	6.14	6.45	5.61

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Table 3.1-2 MAPLHGR Limits for Rated Power and Rated Flow for GNF2 Fuel(cont.)

Average Planar Exposure	Bundle Type: GNF2-P10DG2B406-6G6.0/6G5.0/2G4.0-100T2-145-T6-3641 (GNF2) MAPLHGR Limit (kW/ft)							
	GWd/MT	GWd/ST	Lat. 9676	Lat. 9698	Lat. 9699	Lat. 9700	Lat. 9701	Lat. 9702
0.00	0.00	0.00	9.76	9.00	9.15	9.25	8.67	8.39
0.22	0.20	0.20	9.67	9.05	9.20	9.30	8.71	8.43
1.10	1.00	1.00	9.45	9.12	9.28	9.39	8.80	8.53
2.20	2.00	2.00	9.38	9.22	9.40	9.50	8.93	8.67
3.31	3.00	3.00	9.39	9.33	9.51	9.62	9.06	8.81
4.41	4.00	4.00	9.42	9.43	9.63	9.75	9.21	8.96
5.51	5.00	5.00	9.46	9.54	9.75	9.87	9.36	9.12
6.61	6.00	6.00	9.49	9.62	9.86	10.00	9.51	9.28
7.72	7.00	7.00	9.53	9.70	9.96	10.10	9.64	9.42
8.82	8.00	8.00	9.56	9.78	10.07	10.21	9.77	9.57
9.92	9.00	9.00	9.58	9.86	10.17	10.31	9.91	9.72
11.02	10.00	10.00	9.60	9.94	10.27	10.42	10.04	9.86
12.13	11.00	11.00	9.53	9.96	10.35	10.51	10.10	9.90
13.23	12.00	12.00	9.44	9.95	10.35	10.52	10.13	9.95
14.33	13.00	13.00	9.35	9.93	10.35	10.52	10.15	9.98
15.43	14.00	14.00	9.25	9.91	10.33	10.49	10.16	9.99
16.53	15.00	15.00	9.16	9.88	10.29	10.40	10.14	9.99
17.64	16.00	16.00	9.06	9.85	10.23	10.31	10.11	9.96
18.74	17.00	17.00	8.95	9.80	10.17	10.22	10.07	9.93
19.84	18.00	18.00	8.85	9.75	10.11	10.12	10.03	9.90
20.94	19.00	19.00	8.75	9.69	10.04	10.03	9.93	9.86
22.05	20.00	20.00	8.65	9.63	9.97	9.93	9.83	9.82
23.15	21.00	21.00	8.54	9.56	9.90	9.83	9.74	9.78
24.25	22.00	22.00	8.44	9.50	9.83	9.73	9.64	9.69
25.35	23.00	23.00	8.34	9.44	9.76	9.64	9.54	9.59
26.46	24.00	24.00	8.23	9.37	9.69	9.54	9.45	9.49
27.56	25.00	25.00	8.13	9.31	9.62	9.44	9.35	9.39
33.07	30.00	30.00	7.63	8.99	9.13	8.97	8.89	8.92
38.58	35.00	35.00	7.13	8.67	8.63	8.51	8.45	8.47
41.22	37.39	37.39	6.89	8.48	8.40	8.29	8.25	8.27
44.09	40.00	40.00	6.64	8.27	8.16	8.06	8.03	8.05
49.60	45.00	45.00	6.15	7.81	7.71	7.62	7.61	7.62
54.38	49.33	49.33	5.24	--	--	--	--	--
55.12	50.00	50.00	--	7.37	7.28	7.20	7.21	7.22
58.58	53.14	53.14	--	--	--	--	--	5.61
60.63	55.00	55.00	--	6.93	6.88	6.80	6.83	6.84
62.21	56.44	56.44	--	6.51	--	--	--	--
63.60	57.69	57.69	--	--	--	--	6.44	--
63.78	57.86	57.86	--	--	--	--	6.15	--
63.79	57.87	57.87	--	--	6.55	--	--	--
64.04	58.10	58.10	--	--	--	6.10	--	--
70.00	63.50	63.50	5.24	6.51	6.55	6.10	6.15	6.44

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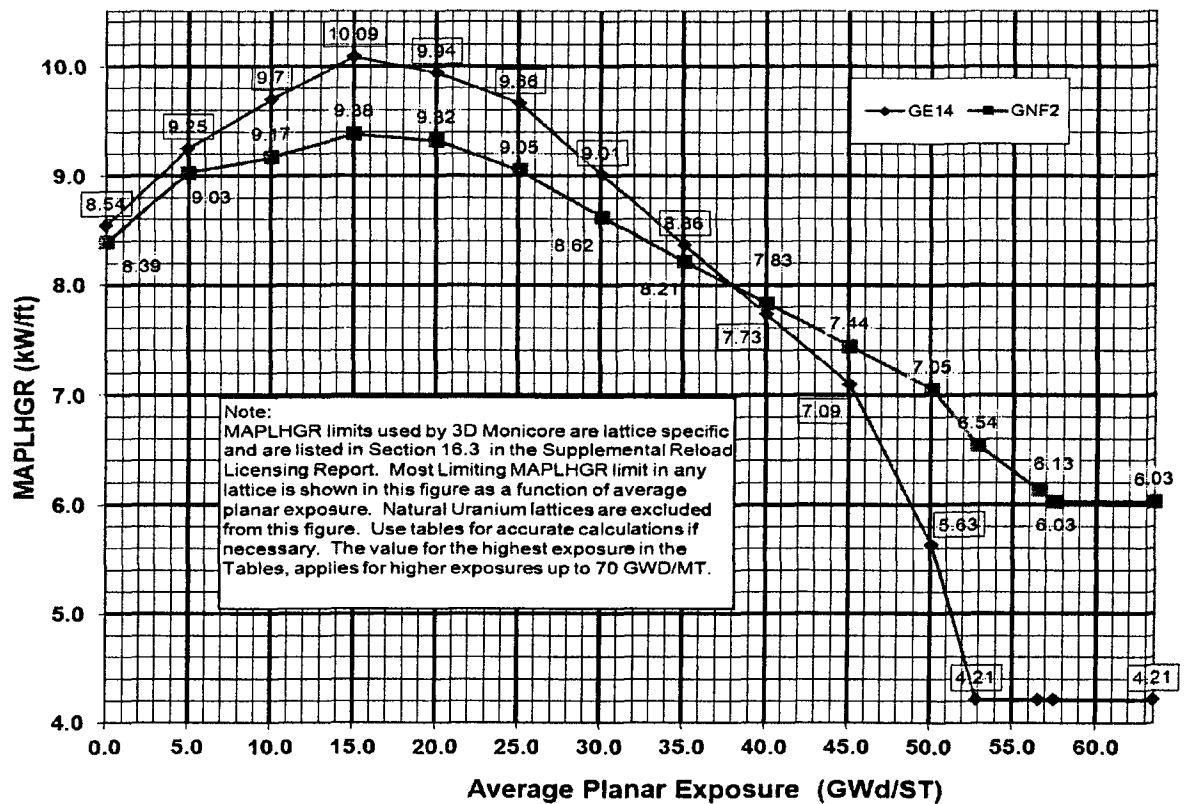
Table 3.1-2 MAPLHGR Limits for Rated Power and Rated Flow for GNF2 Fuel(cont.)

Average Planar Exposure	Bundle Type: GNF2-P10DG2B407-6G6.0/2G5.0/6G4.0-100T2-145-T6-3642 (GNF2) MAPLHGR Limit (kW/ft)							
	GWd/ST	Lat. 9676	Lat. 9703	Lat. 9704	Lat. 9705	Lat. 9706	Lat. 9707	Lat. 9682
0.00	0.00	9.76	8.79	8.91	9.00	8.69	8.42	10.44
0.22	0.20	9.67	8.84	8.95	9.04	8.74	8.46	10.38
1.10	1.00	9.45	8.91	9.03	9.12	8.83	8.56	10.21
2.20	2.00	9.38	9.00	9.13	9.23	8.97	8.70	10.16
3.31	3.00	9.39	9.10	9.23	9.33	9.11	8.85	10.16
4.41	4.00	9.42	9.19	9.34	9.44	9.26	9.01	10.19
5.51	5.00	9.46	9.29	9.44	9.55	9.42	9.18	10.22
6.61	6.00	9.49	9.39	9.55	9.66	9.58	9.36	10.25
7.72	7.00	9.53	9.49	9.66	9.78	9.73	9.52	10.27
8.82	8.00	9.56	9.59	9.78	9.89	9.88	9.67	10.29
9.92	9.00	9.58	9.69	9.89	10.01	10.02	9.83	10.31
11.02	10.00	9.60	9.79	10.01	10.13	10.15	9.97	10.32
12.13	11.00	9.53	9.80	10.05	10.18	10.20	10.01	10.32
13.23	12.00	9.44	9.80	10.05	10.19	10.22	10.03	10.24
14.33	13.00	9.35	9.79	10.05	10.18	10.22	10.04	10.14
15.43	14.00	9.25	9.77	10.02	10.15	10.20	10.03	10.04
16.53	15.00	9.16	9.74	9.98	10.10	10.17	10.01	9.94
17.64	16.00	9.06	9.69	9.93	10.05	10.13	9.98	9.83
18.74	17.00	8.95	9.64	9.87	9.98	10.09	9.95	9.73
19.84	18.00	8.85	9.58	9.81	9.92	10.04	9.91	9.62
20.94	19.00	8.75	9.52	9.74	9.85	9.94	9.87	9.52
22.05	20.00	8.65	9.46	9.68	9.78	9.85	9.83	9.42
23.15	21.00	8.54	9.40	9.61	9.71	9.75	9.79	9.31
24.25	22.00	8.44	9.34	9.55	9.65	9.65	9.70	9.21
25.35	23.00	8.34	9.28	9.48	9.58	9.56	9.60	9.10
26.46	24.00	8.23	9.22	9.42	9.51	9.46	9.50	9.00
27.56	25.00	8.13	9.16	9.36	9.45	9.37	9.41	8.90
33.07	30.00	7.63	8.86	9.04	9.00	8.90	8.93	8.39
38.58	35.00	7.13	8.56	8.65	8.53	8.46	8.48	7.90
41.22	37.39	6.89	8.40	8.43	8.32	8.26	8.27	7.66
44.09	40.00	6.64	8.24	8.18	8.08	8.04	8.05	7.41
49.60	45.00	6.15	7.82	7.72	7.64	7.62	7.62	6.92
54.38	49.33	5.24	--	--	--	--	--	--
55.12	50.00	--	7.39	7.30	7.22	7.22	7.22	6.44
58.58	53.14	--	--	--	--	--	--	5.61
60.63	55.00	--	6.67	6.89	6.81	6.83	6.84	--
61.35	55.66	--	6.48	--	--	--	--	--
62.41	56.62	--	--	6.51	--	--	--	--
62.90	57.06	--	--	--	6.53	--	--	--
63.63	57.73	--	--	--	--	--	6.44	--
63.86	57.93	--	--	--	--	6.15	--	--
70.00	63.50	5.24	6.48	6.51	6.53	6.15	6.44	5.61

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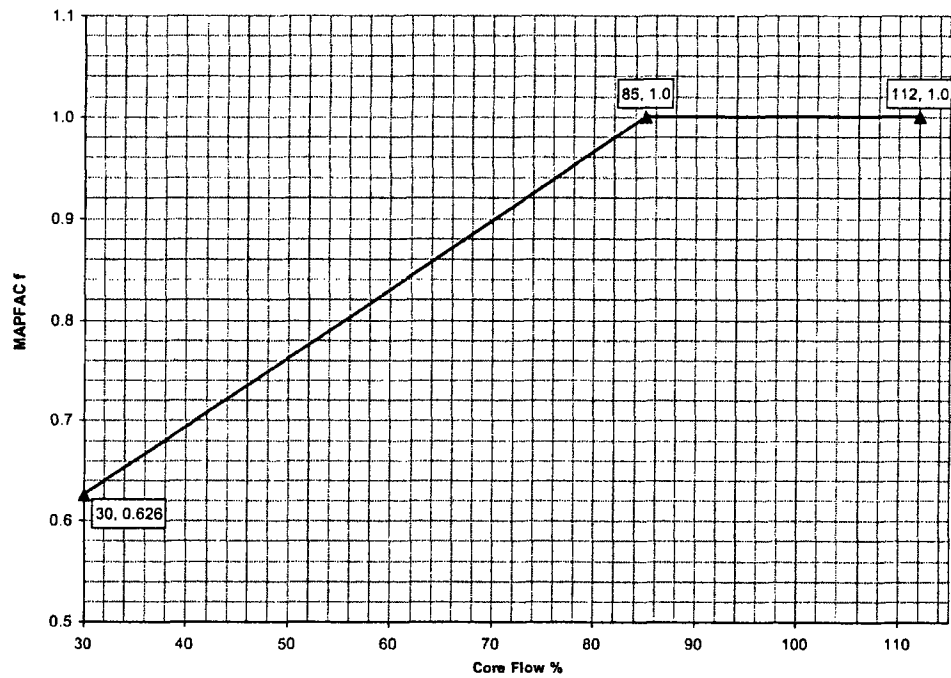
Figure 3.1-1 Most limiting MAPLHGR



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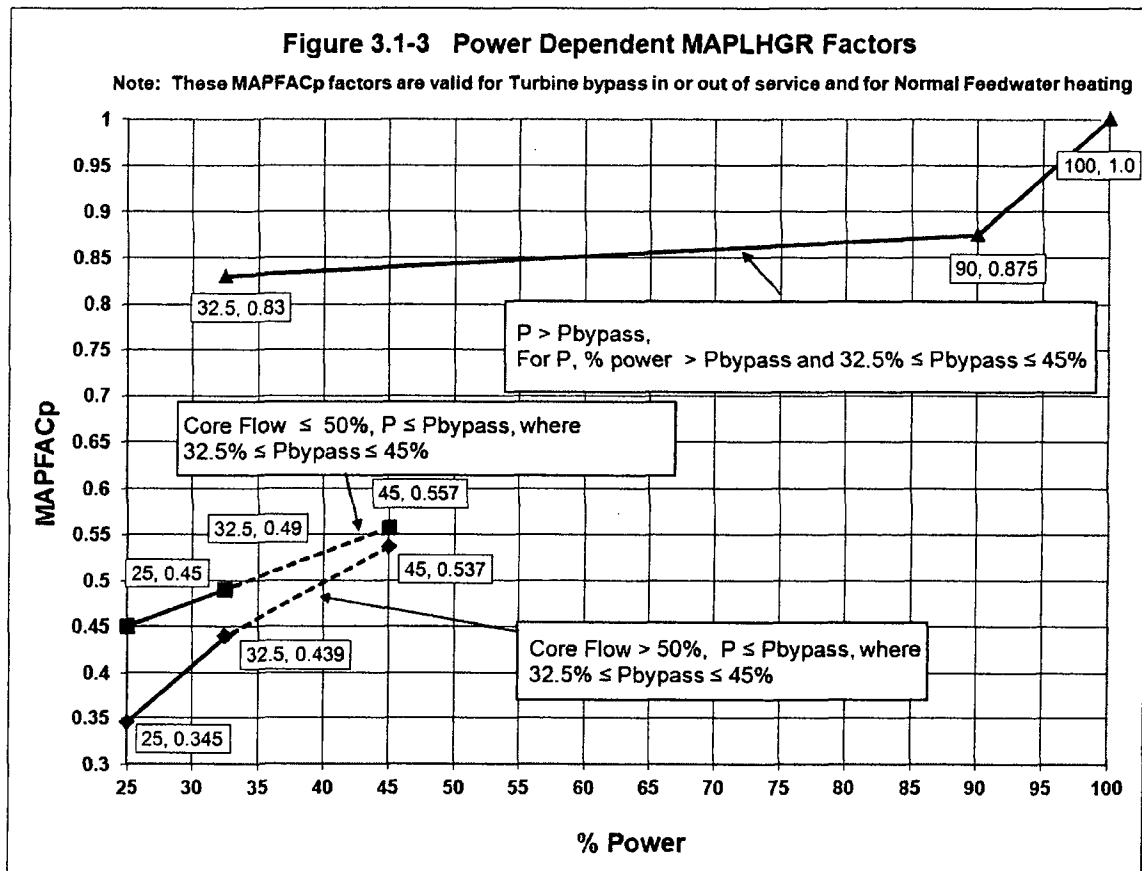
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Figure 3.1-2 Flow Dependent MAPLHGR Factor (MAPFAC_F)



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3.2 Linear Heat Generation Rate (LHGR)

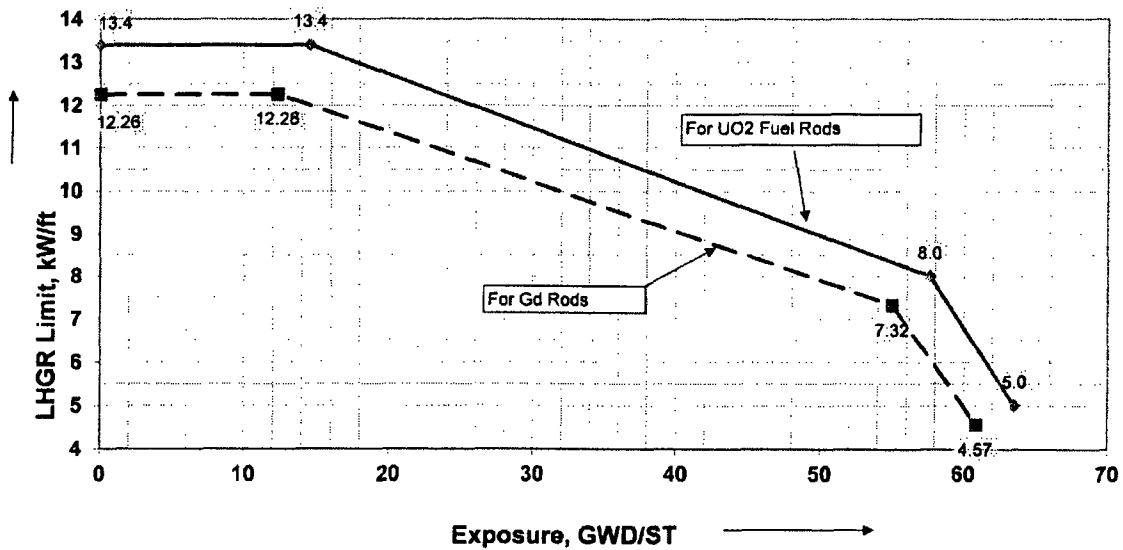
Reference Technical Specification: 3.11.B

When reactor power is greater than 25%, the LHGR of any rod in any fuel assembly at any axial location shall not exceed the rated power and rated core flow limits presented in Reference 5.17. Figure 3.2-1 represents LHGR curves for GE14 fuel. Proprietary detailed values for both GE14 and GNF2 fuels are 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 3.2-2 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 3.2-3 and the LHGR for rated power and flow conditions in Reference 5.17.

LHGR Curves in Figure 3.2-1 are representative curves for UO₂ fuel rods and Gd containing rods for GE14 Fuel. A Figure comparable to Figure 3.2-1 for GNF2 is not included because GNF has requested Entergy to protect this proprietary information. Gd containing fuel rods have different LHGR limits that are also exposure dependent. Reference 5.17 documents the detailed proprietary curves and values for both GE14 and GNF2 fuels. Reference 5.23 documents the GESTAR II compliance of GNF2 fuel, as amended. Amendment 33 to GESTAR II incorporated Prime T-M methods. Cycle 19 LHGR limits are based on using PRIME for UO₂ fuel rods and GESTR-M for Gd rods, as GESTR-M limits for Gd rods are more conservative.

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 for GE14 Fuel At Rated Power and rated Core Flow



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Figure 3.2-2 Flow Dependent LHGR Factor ($LHGRFAC_f$)

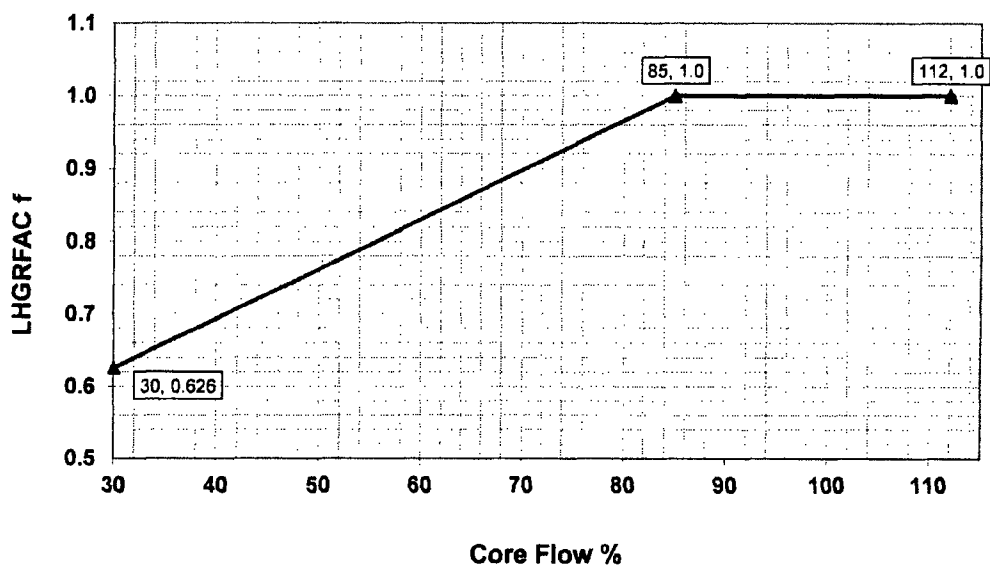
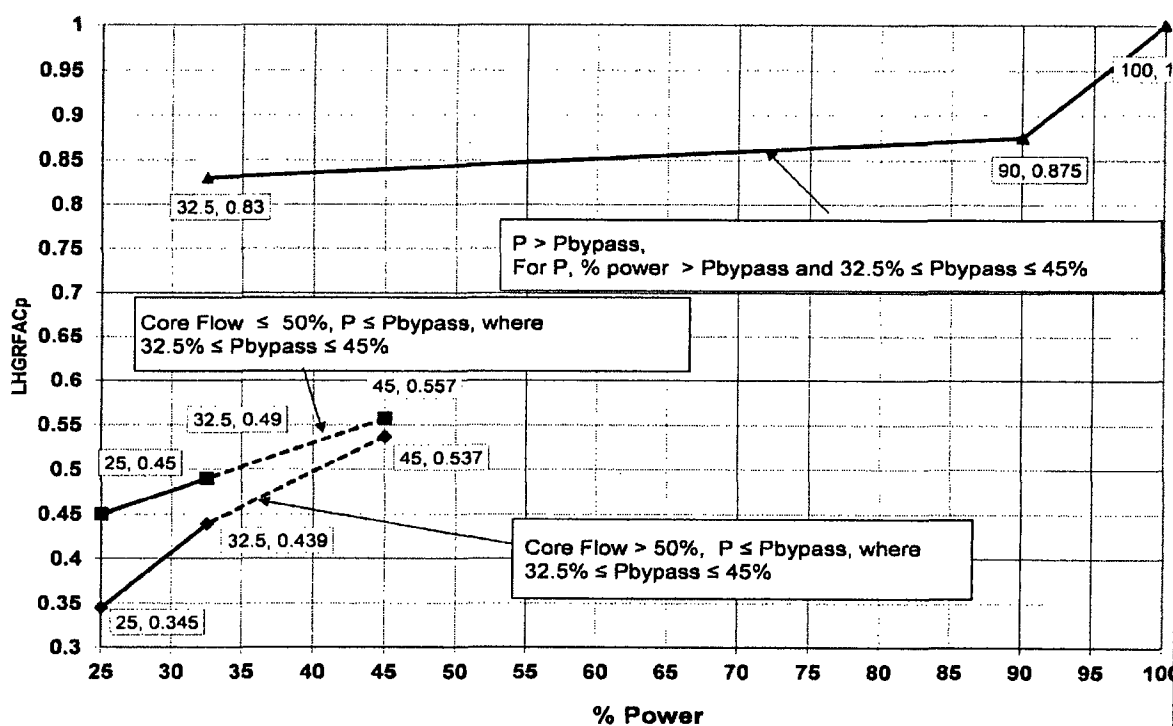


Figure 3.2-3 Power Dependent LHGR Factors

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



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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 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 from Figure 3.3-3, when Turbine Bypass is out of service. The rated power and flow MCPR operating limits presented in Tables 3.3-1 are functions of τ .

Both Figures 3.3-2 and 3.3-3 include normal and reduced feed water temperature operating modes. For SLO $MCPR_P$ and $MCPR_F$ are raised by 0.03 compared to TLO values shown in Figures 3.3-2 and 3.3-3.

The value of τ 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. TS 4.11.C defines τ .

P_{bypass} 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. P_{bypass} can be set anywhere in the range 32.5% to 45% core thermal power. P_{bypass} is currently set at 32.5%.

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Table 3.3-1**

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MCPR Operating Limits At Rated Power and Rated Flow

The MCPR Operating Limit for Two Loop Operation ($OLMCPR_{TLO}$) is a function of fuel type, exposure, and τ , which is derived from scram timing measurements.

Tau		<u>GNF2</u>		<u>GE14</u>	
		BOC to MOC	MOC to EOC	BOC to MOC	MOC to EOC
From	To				
0.0		1.50	1.55	1.46	1.51
0.0	0.1	1.51	1.56	1.48	1.53
0.1	0.2	1.52	1.57	1.49	1.55
0.2	0.3	1.53	1.58	1.50	1.57
0.3	0.4	1.54	1.59	1.51	1.58
0.4	0.5	1.55	1.60	1.52	1.60
0.5	0.6	1.56	1.61	1.53	1.62
0.6	0.7	1.57	1.62	1.54	1.63
0.7	0.8	1.58	1.63	1.55	1.65
0.8	0.9	1.59	1.64	1.56	1.67
0.9	1.0	1.60	1.65	1.57	1.68

BOC = Beginning Of Cycle

MOC = Middle of Cycle = End Of Rated Power Operation At Rated Flow (EOR) – 1.455 GWd/ST

EOC = End Of Cycle

Note: The rated OLMCPR Limits given above apply to both normal and reduced Feedwater Temperature as well as Turbine Bypass Valve OOS and Turbine bypass Valves in service. Off rated MCPR limits are given in Figures 3.3-1, 3.3-2 and 3.3-3 as taken from the Supplemental Reload Licensing Report (Reference 5.15).

Single Loop Operation

$OLMCPR_{SLO} = 0.03 + OLMCPR_{TLO}$, where $OLMCPR_{TLO}$ is selected from the Table above.

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RTYPE: G4.02

Figure 3.3-1 Flow Dependent MCPR Limits ($MCPR_f$)

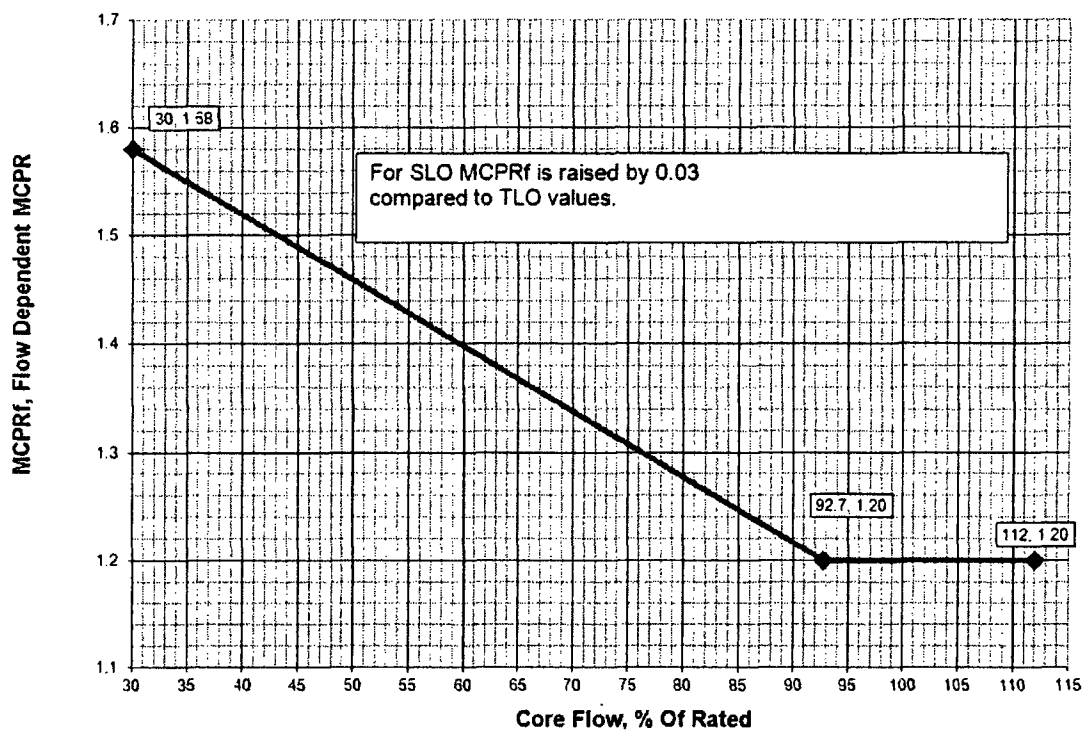


Figure 3.3-2
Power Dependent MCPR Limits (MCPR_p)
Turbine Bypass is Assumed Operable and Normal and Reduced
Feedwater Temperature

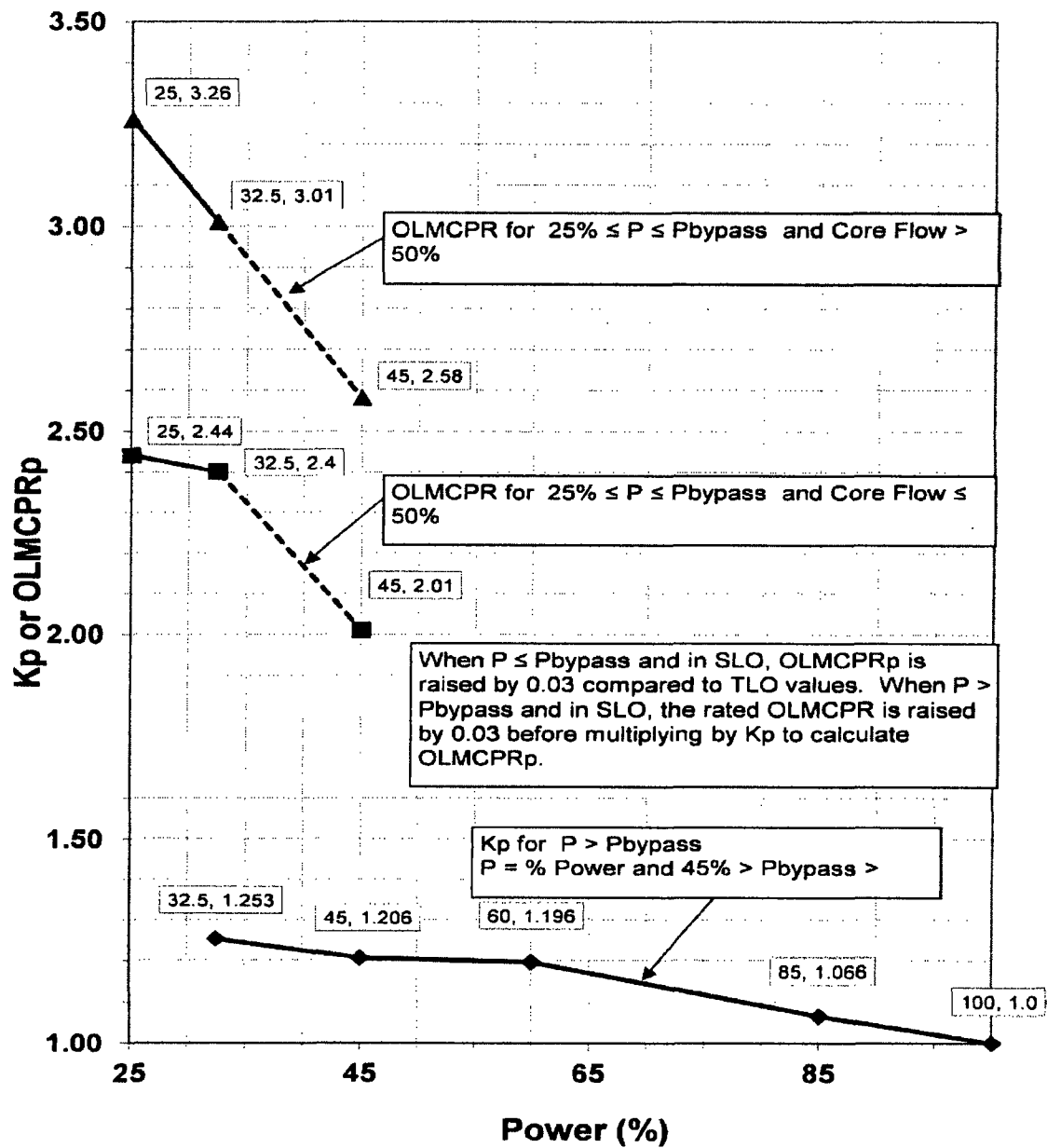
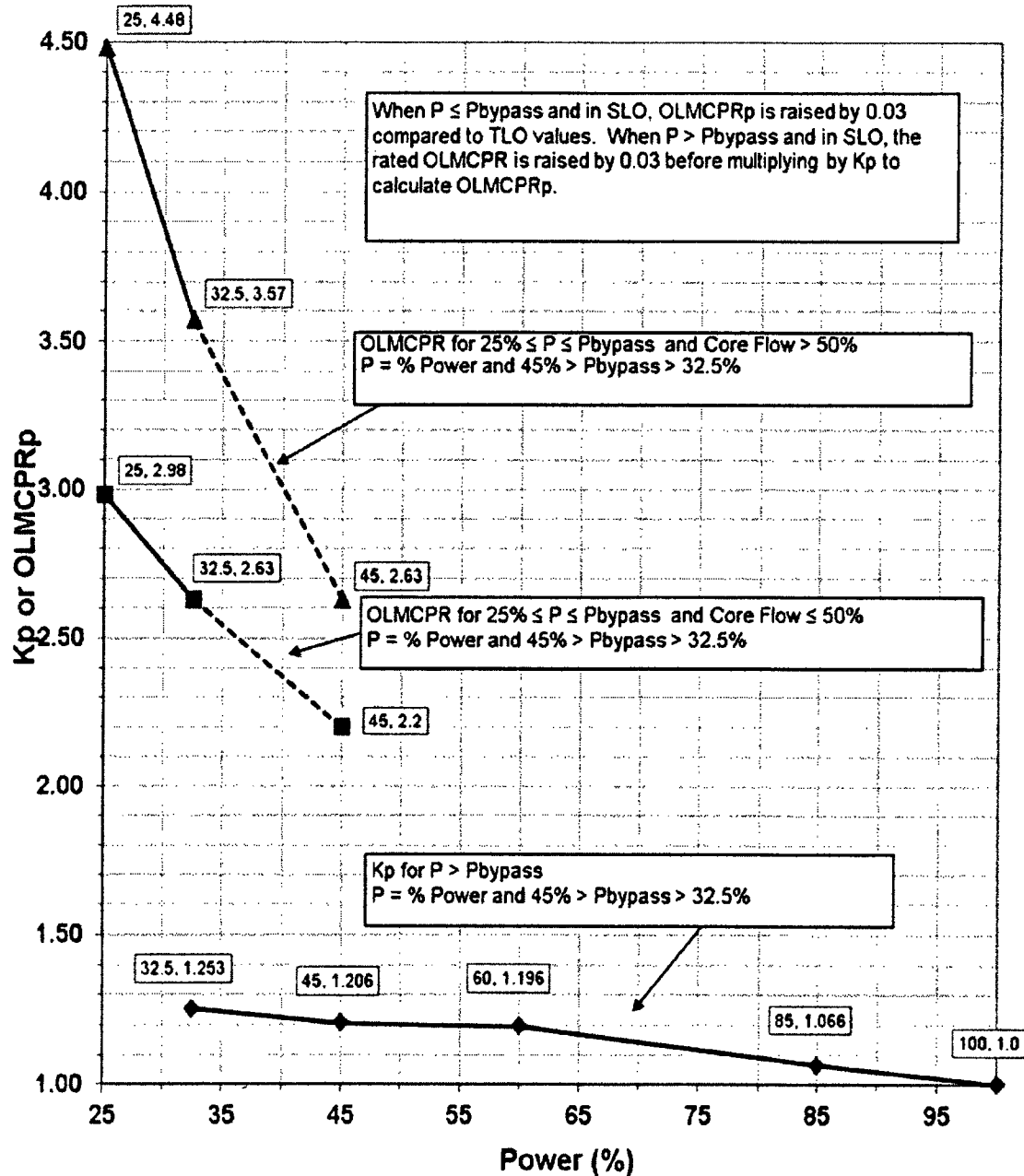


Figure 3.3-3
Power Dependent MCPR Limits (MCPRp)
Turbine Bypass is Assumed Out of Service and Normal and Reduced
Feedwater Temperature



3.4 Power/Flow Relationship During Power Operation

Reference Technical Specification: 3.11.D

The Cycle 19 stability analysis does not credit the flow clamp feature of the FCTR cards. The dominance of Core Wide Oscillations was demonstrated without the use of the flow clamp. APRM Flux scram and Rod Block curves without the flow clamp are therefore applicable to Cycle 19.

The power/flow relationship shall not exceed the limiting values shown on the Power/Flow Operating Maps in Figures 3.4-1 when in Two Loop Operation and 3.4-2 when in Single Loop Operation.

Cycle 19 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.

The exclusion and the buffer regions shown in Figures 3.4-1 and 3.4-2 are based on Stability Solution I-D (references 5.4, 5.12, 5.15 and 5.20). Cycle 19 Stability Analysis utilizes Reference 5.24 ODYSY LTR that removed the decay ratio adder of 0.15. Figures 3.4-1 and 3.4-2 show APRM Scram and Rod Block lines using Allowable values as a function of Core Flow.

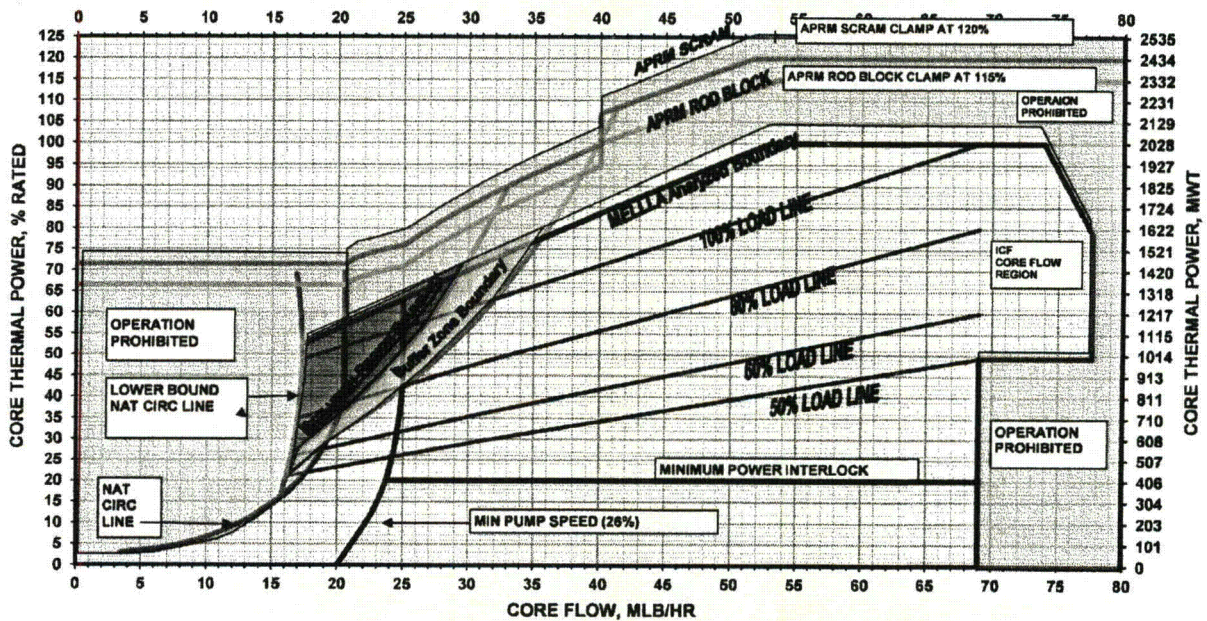
Single Loop Analysis limits maximum Core Flow to 52% of Rated Core Flow and maximum Power to 65% of Rated due to SLO vessel internal vibration (Ref. 5.7, p. 1-2).

Various lines on the Power to flow map are described in Ref. 5.14.

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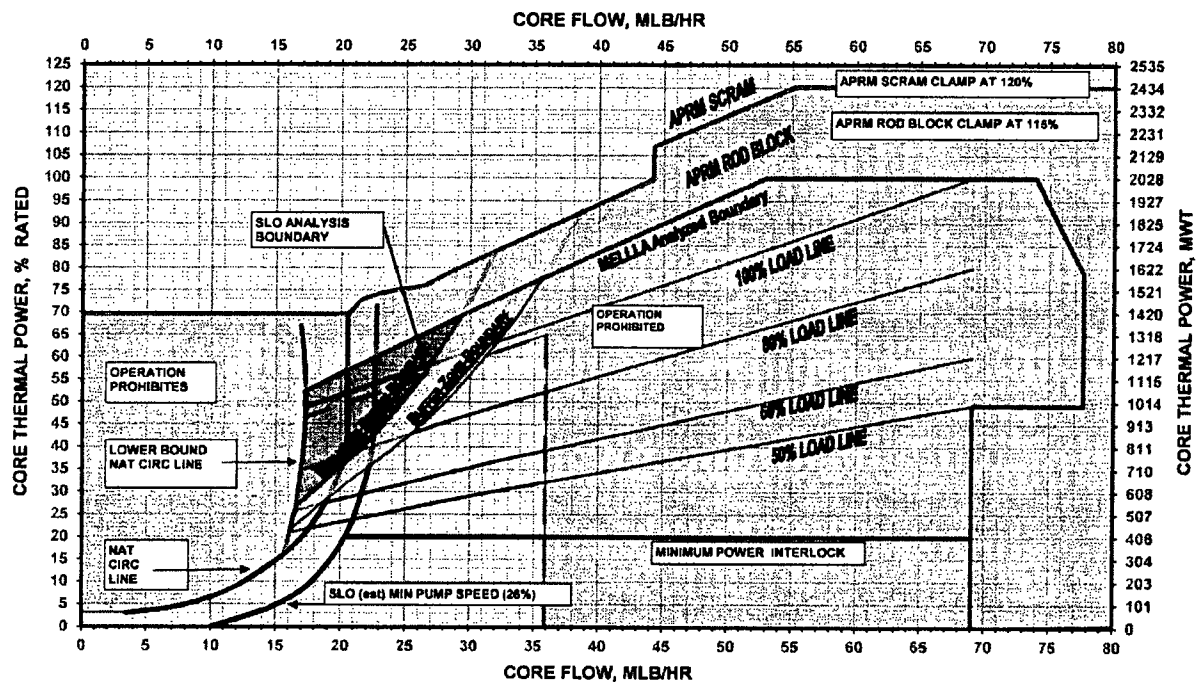
FIGURE 3.4-1
PILGRIM POWER / FLOW MAP - Two Loop Operation
Scram and Rod Block Data based on Allowable Values
CORE FLOW, MLB/HR



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FIGURE 3.4-2
PILGRIM POWER / FLOW MAP - Single Loop Operation
Scram and Rod Block Data based on Allowable Value Setpoint



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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 (Ref. 5.15) for each type of fuel is shown for the present cycle in Figure 4.0-1.

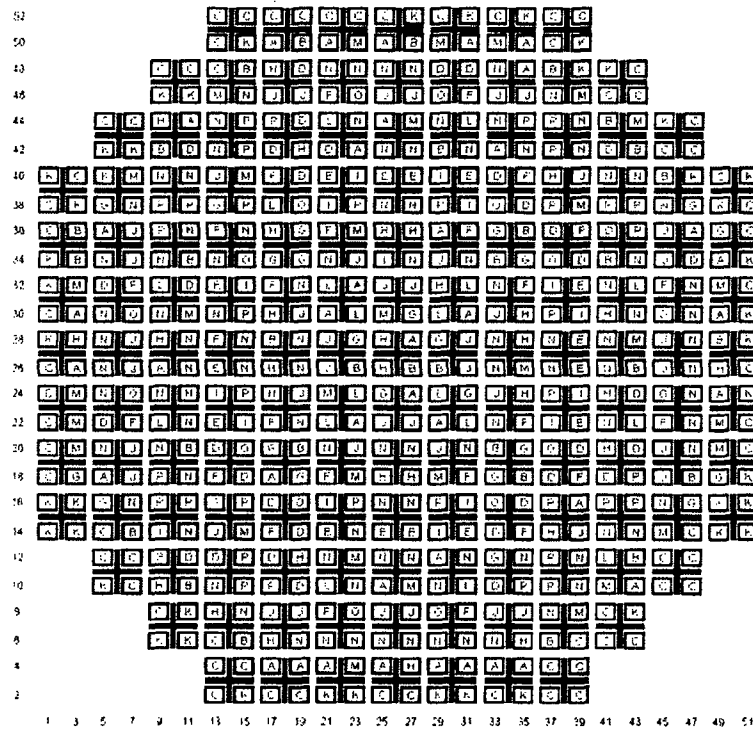
Fuel Type	Cycle Load	Number
Irradiated:		
GE14-P10DNAB399-10G6.0/3G5.0/1G2.0-100T-145-T6-2828	16	67
GE14-P10DNAB398-8G6.0/5G5.0/2G4.0-100T-145-T6-2829 (GE14C)	16	45
GE14-P10DNAB399-15GZ-100T-145-T6-2957 (GE14C)	17	32
GE14-P10DNAB398-5G6.0/10G5.0-100T-145-T6-2958 (GE14C)	17	32
GE14-P10DNAB400-13GZ-100T-145-T6-2959 (GE14C)	17	24
GE14-P10DNAB404-5G6.0/10G5.0-100T-145-T6-2960 (GE14C)	17	40
GE14-P10DNAB400-12G6.0/3G5.0-100T-145-T6-2961 (GE14C)	17	32
GNF2-P10DG2B389-6G6.0/8G5.0-100T2-145-T6-3141 (GNF2)	18	16
GNF2-P10DG2B389-6G6.0/2G5.0/6G4.0-100T2-145-T6-3142 (GNF2)	18	104
GNF2-P10DG2B388-6G6.0/7G5.0-100T2-145-T6-3143 (GNF2)	18	36
New:		
GNF2-P10DG2B401-6G6.0/8G5.0/1G4.0-100T2-145-T6-3421 (GNF2)	19	24
GNF2-P10DG2B395-6G6.0/9G5.0-100T2-145-T6-3422 (GNF2)	19	16
GNF2-P10DG2B375-6G6.0/7G5.0-100T2-145-T6-3434 (GNF2)	19	16
GNF2-P10DG2B401-6G6.0/2G5.0/6G4.0-100T2-145-T6-3640 (GNF2)	19	36
GNF2-P10DG2B406-6G6.0/6G5.0/2G4.0-100T2-145-T6-3641 (GNF2)	19	16
GNF2-P10DG2B407-6G6.0/2G5.0/6G4.0-100T2-145-T6-3642 (GNF2)	19	44
Total:		580

The reactor vessel core contains 145 cruciform-shaped control rods. The control materials used are either boron carbide powder (B₄C) compacted to approximately 70% of the theoretical density or a combination of boron carbide powder and solid hafnium.

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FIGURE 4.0-1 Reactor Vessel Core Loading Pattern



Fuel Type

- A=GE14-P10DNAB404-5G6.0/10G5.0-100T-145-T6-2960 (Cycle 17)
- B=GE14-P10DNAB398-5G6.0/10G5.0-100T-145-T6-2958 (Cycle 17)
- C=GE14-P10DNAB399-10G6.0/3G5.0/1G2.0-100T-145-T6-2828 (Cycle 16)
- D=GNF2-P10DG2B388-6G6.0/7G5.0-100T2-145-T6-3143 (Cycle 18)
- E=GNF2-P10DG2B395-6G6.0/9G5.0-100T2-145-T6-3422 (Cycle 19)
- F=GNF2-P10DG2B401-6G6.0/8G5.0/1G4.0-100T2-145-T6-3421 (Cycle 19)
- G=GE14-P10DNAB400-13G2-100T-145-T6-2959 (Cycle 17)
- H=GE14-P10DNAB399-15G2-100T-145-T6-2957 (Cycle 17)
- I=GNF2-P10DG2B389-6G6.0/8G5.0-100T2-145-T6-3141 (Cycle 18)
- J=GNF2-P10DG2B407-6G6.0/2G5.0/6G4.0-100T2-145-T6-3642 (Cycle 19)
- K=GE14-P10DNAB398-8G6.0/5G5.0/2G4.0-100T-145-T6-2829 (Cycle 16)
- L=GNF2-P10DG2B406-6G6.0/6G5.0/2G4.0-100T2-145-T6-3641 (Cycle 19)
- M=GE14-P10DNAB400-12G6.0/3G5.0-100T-145-T6-2961 (Cycle 17)
- N=GNF2-P10DG2B389-6G6.0/2G5.0/6G4.0-100T2-145-T6-3142 (Cycle 18)
- O=GNF2-P10DG2B375-6G6.0/7G5.0-100T2-145-T6-3434 (Cycle 19)
- P=GNF2-P10DG2B401-6G6.0/2G5.0/6G4.0-100T2-145-T6-3640 (Cycle 19)

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5.0 REFERENCES

- 5.1. NEDE-24011-P-A-17 and NEDE-24011-P-A-17-US, "General Electric Standard Application for Reactor Fuel", September 2010, eB record: RA-ENO-GEN-10-147.
- 5.2. EC17226, Cycle 19 Reload Core Design.
- 5.3. NEDC-31852-P, rev. 4, "Pilgrim Nuclear Power Station SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis for PNPS", January 2008.
- 5.4. NEDC-33155P, Rev.0, Application of Stability Long-Term Solution Option I-D To Pilgrim Nuclear Power Station, October 2004.
- 5.5. Letter 1.09.015, Letter from the NRC approving TS Amendment 232 for Cycle 18 SLMCPR.
- 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, Rev 2, Pilgrim Nuclear Power Station Single Loop Operation, April 2006.
- 5.8. S&SA-186, % ΔW_D for use with Stability Option I-D for Pilgrim (applicable to SLO).
- 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.
- 5.11. A22-00109-00 MAPLHGR set down process explanation for Pilgrim, November 2001.
- 5.12. GNF2NFI, GEH-0000-0085-9069-R0, GNF2 Fuel Design Cycle Independent Analyses for Entergy PNPS, February 2009.
- 5.13. ER 03110960, Stability I-D implementation.
- 5.14. PNPS-RPT-03-00001, Rev. 6, "Pilgrim Power To Flow Map Report." (EC27443)
- 5.15. ECH-NE-11-00013, 0000-0119-4309-SRLR, "Supplemental Reload Licensing Report, Reload 18, Cycle 19." January 2010 and GESTAR Assessments.
- 5.16. PNPS-NE-10-00006, EC23405, Cycle 19 OPL-3, Transient Analyses Inputs.
- 5.17. ECH-NE-11-00014, 0000-0119-4309-FBIR, Rev.0, Fuel Bundle Information Report, Cycle 19, January 2011 (EC27442).
- 5.18. SUDDS/RF 02-86, GNF SER issued by NRC approving elimination of Upper Bound PCT limit requirement.
- 5.19. EC7933 documents OPL-4 & 5 LOCA Inputs.
- 5.20. NEDO-32465A, Licensing Topical report "Stability Detect and Suppress Solutions Licensing Basis Methodology for Reload Application, August 1996.
- 5.21. GNF2LOCA, 0000-0095-4071-R0, PNPS GNF2 ECCS-LOCA Evaluation, February 2009.
- 5.22. RA-ENO-HK1-09-027, Pilgrim Cycle 17 MAPLHGR Extension, March 24, 2009
- 5.23. NEDE-33270P, GNF2 Advantage Generic Compliance with GESTAR II), Revision 3, March 2010 (This reference is also known as Amendment 22 report for GNF2). (record in eB: RA-ENO-GEN-10-040)
- 5.24. NEDE-33213, ODYSY Application for Stability Licensing Calculations Including Option I-D and II Long Term Solutions, April 2009