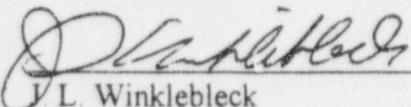
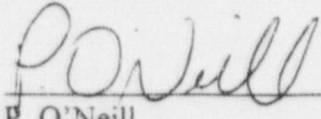
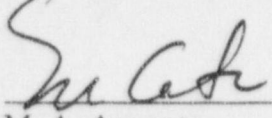
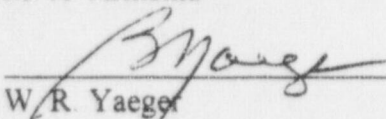
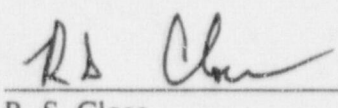
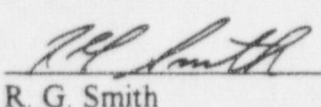
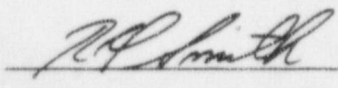


NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT UNIT 1

CORE OPERATING LIMITS REPORT

Document No.: COLR1
Revision 1, Cycle 14

	<u>Name</u>	<u>Title</u>	<u>Date</u>
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This NMPC Controlled Document provides cycle specific core operating limits for use in conjunction with Nine Mile Point Unit 1 Technical Specifications. Document pages may only be changed through a reissue of the entire document. This COLR must be signed by the Plant Manager to be valid.

NINE MILE POINT UNIT 1
CORE OPERATING LIMITS REPORT

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1.0 Average Planar Linear Heat Generation Rate (APLHGR)

1.1 Limits for Technical Specification 3.1.7 a(*)

During power operation, the APLHGR for each type of fuel as function of average planar exposure shall not exceed the limiting values shown on Figures a through q.

1.2 Limits for Technical Specification 3.1.7 e(*)

During partial loop operation with four recirculation loops in operation, the APLHGR as a function of average planar exposure shall not exceed 98 percent of the limiting values shown in Figures a through q.

During partial loop operation with three recirculation loops in operation, the APLHGR as a function of average planar exposure shall not exceed 98 percent of the limiting values shown in Figures a through q.

- (*) When hand calculations are required, the APLHGR for the respective fuel type as a function of average planar exposure, shall not exceed the limits shown in Figures r, s, and t, during five recirculation loop operation or 98 percent of the limits shown in Figures r, s, and t during four or three loop operation.

2.0 Minimum Critical Power Ratio (MCPR)

2.1 Limits for Technical Specification 3.1.7.c

During power operation, the MCPR for all fuel at rated power and flow shall be as shown in Table 1.

For core flows other than rated, the MCPR limit shall be the limit identified in Table 1 times K_f where K_f is as shown in Figure u.

2.2 Limits for Technical Specification 3.1.7.e

During 3 loop operation, the CPR limit shall be increased by 0.01.

TABLE 1

NINE MILE POINT UNIT 1:
CYCLE 14 LIMITING CONDITION FOR OPERATION MCPR

Core Average Incremental Exposure, MWD/STU	<u>Limiting MCPR⁽¹⁾⁽²⁾⁽³⁾</u>
	<u>All Fuel Types</u>
BOC to EOC	≥ 1.46
(1) Based on a 1.07 MCPR Safety Limit (SLCPR).	
(2) If the feedwater pump configuration as defined by Nuclear Engineering Report No. NER-1M-022 is such that a feedwater controller failure could result in maximum feedwater flow greater than that for two feedwater pumps (i.e., the shaft-driven pump plus one motor-driven pump), then the limiting MCPR for all fuel types shall be ≥ 1.59 .	
(3) Conservative limits have been established for operations with one of two pressure regulators out-of-service. The MCPR based limit for operation with one of two pressure regulators out-of-service is as follows:	
For operation below 90% of rated power, maintain MFLCPR less than or equal to the fraction of rated power at which the reactor is operating.	
For operation at or above 90% of rated power, no MFLCPR penalty is necessary.	

3.0 Linear Heat Generation Rate (LHGR)

3.1 Limits for Technical Specification 3.1.7 b

During power operation, the Linear Heat Generation Rate (LHGR) of any rod in any fuel assembly at any axial location shall not exceed the limits shown below:

<u>Fuel Type</u>	<u>LHGR(KW/FT)⁽¹⁾</u>
GE11	≤ 11.0

- (1) *Conservative limits have been established for operations with one of two pressure regulators out-of-service. The LHGR based limit for operation with one of two pressure regulators out-of-service is as follows:*

For operation below 90% of rated power, maintain MFLPD less than or equal to the fraction of rated power at which the reactor is operating

For operation at or above 90% of rated power, no MFLPD penalty is necessary.

4.0 Power/Flow Relationship During Operation

4.1 Limits for Technical Specification 3.1.7 d and e

The power/flow relationship shall not exceed the limiting values shown in Figure v.

5.0 Source Documents

The Core Operating Limits contained in this report were obtained from the following documents:

CORE OPERATING LIMITS

REFERENCE

APLHGR Limits (Section 1.0)
Figure a through t and corresponding
three and four loop multipliers

GENE J11-03433MAP, Revision 0, March
1999, Lattice Dependent MAPLHGR Report
for Nine Mile Point Nuclear Station Unit 1
Reload 15 Cycle 14

GENE J11-02962MAP, Revision 0, January
1997, Lattice Dependent MAPLHGR Report
for Nine Mile Point Nuclear Station Unit 1
Reload 14 Cycle 13

GENE 24A5157AA, Revision 1, February
1995, Lattice Dependent MAPLHGR Report
for Nine Mile Point Nuclear Station Unit 1
Reload 13 Cycle 12

MCPR Limits (Section 2)
Table 1

GENE J11-03433SRLR, Revision 0, March
1999, Supplemental Reload Licensing
Report for Nine Mile Point Nuclear Station
Unit 1 Reload 15 Cycle 14

Figure u

NEDE-J11-03433ER, Revision 0, March
1999, Engineering Report for Nine Mile
Point Nuclear Station Unit 1 Reload 15

0.01 Three Loop Adder

GENE J11-03433SRLR, Revision 0, March
1999, Supplemental Reload Licensing
Report for Nine Mile Point Nuclear Station
Unit 1 Reload 15 Cycle 14

Pressure Regulator Out-of-Service
restriction

GE Letter 262-99-028, E. Gibbs to
M. Armenta, "Limits for Operation
without a Backup Pressure Regulator",
dated May 17, 1999

LHGR Limits (Section 3)

NEDE-J11-03433ER, Revision 0, March
1999, Engineering Report for Nine Mile
Point Nuclear Station Unit 1 Reload 15

Pressure Regulator Out-of-Service
restriction

GE Letter 262-99-028, E. Gibbs to
M. Armenta, "Limits for Operation
without a Backup Pressure Regulator",
dated May 17, 1999

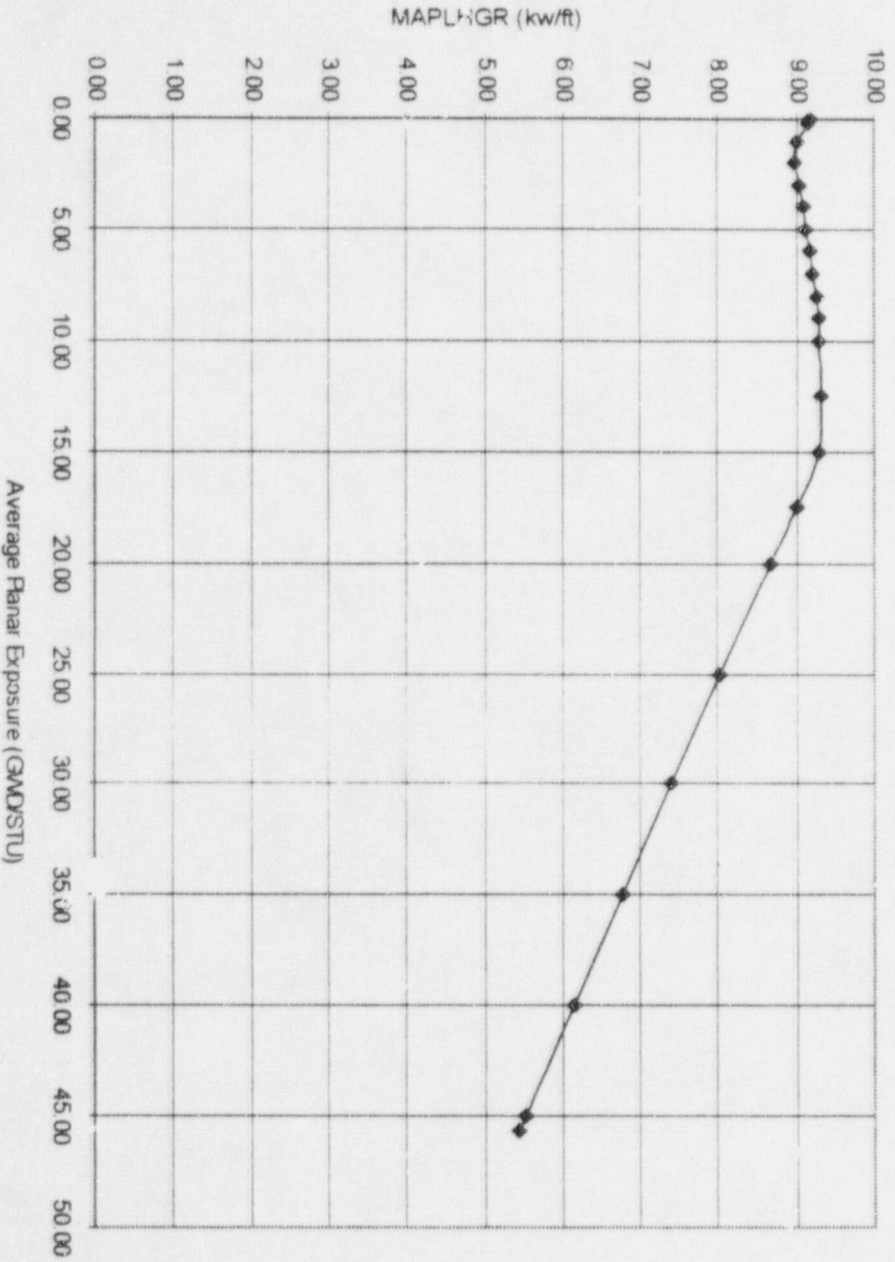
P/F Relationship (Section 4)
Figure v

NMPI Technical Specification
Amendment 92, Figure 3.1.7.aa

Exposure (MWD/STU)	MAPLHGR (kw/ft)
-----------------------	--------------------

0.00	9.18
0.20	9.14
1.00	9.01
2.00	8.99
3.00	9.03
4.00	9.08
5.00	9.13
6.00	9.18
7.00	9.22
8.00	9.25
9.00	9.28
10.00	9.29
12.50	9.31
15.00	9.30
17.50	9.00
20.00	8.67
25.00	8.02
30.00	7.38
35.00	6.76
40.00	6.14
45.00	5.52
45.64	5.44

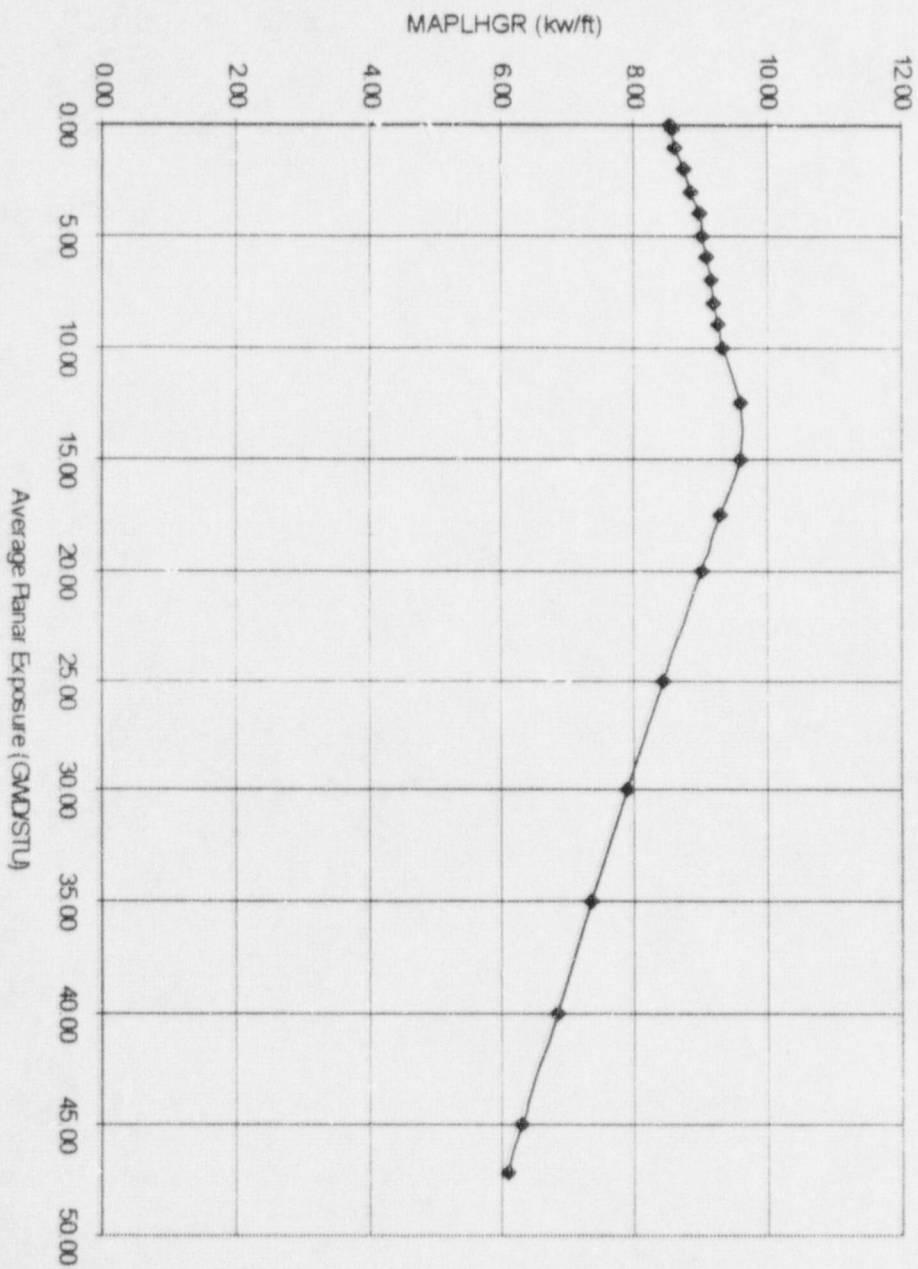
Figure a: MAPLHGR Limits for Lattices 1522 & 1523 of
GE11-P9HUB340-10GZ-100M-145-T



Exposure (MWD/STU)	MAPLHGR (kw/ft)
-----------------------	--------------------

0.00	8.54
0.20	8.56
1.00	8.61
2.00	8.72
3.00	8.85
4.00	8.96
5.00	9.02
6.00	9.08
7.00	9.13
8.00	9.19
9.00	9.25
10.00	9.32
12.50	9.58
15.00	9.58
17.50	9.29
20.00	9.00
25.00	8.42
30.00	7.37
35.00	7.34
40.00	6.82
45.00	6.30
47.16	6.08

Figure b: MAPLHGR Limits for Lattices 1937 of
GE11-P9HUB340-10GZ-100M-145-T



Exposure (MMDSTU)	MAPLHGR (kw/ft)
----------------------	--------------------

0.00	8.73
0.20	8.74
1.00	8.78
2.00	8.84
3.00	8.89
4.00	8.94
5.00	8.99
6.00	9.05
7.00	9.10
8.00	9.15
9.00	9.22
10.00	9.30
12.50	9.58
15.00	9.58
17.50	9.29
20.00	9.00
25.00	8.43
30.00	7.87
35.00	7.34
40.00	6.82
45.00	6.31
47.24	6.08

Figure c: MAPLHGR Limits for Lattices 1938 of
GE1-P9HUB340-10GZ-109M-145-T

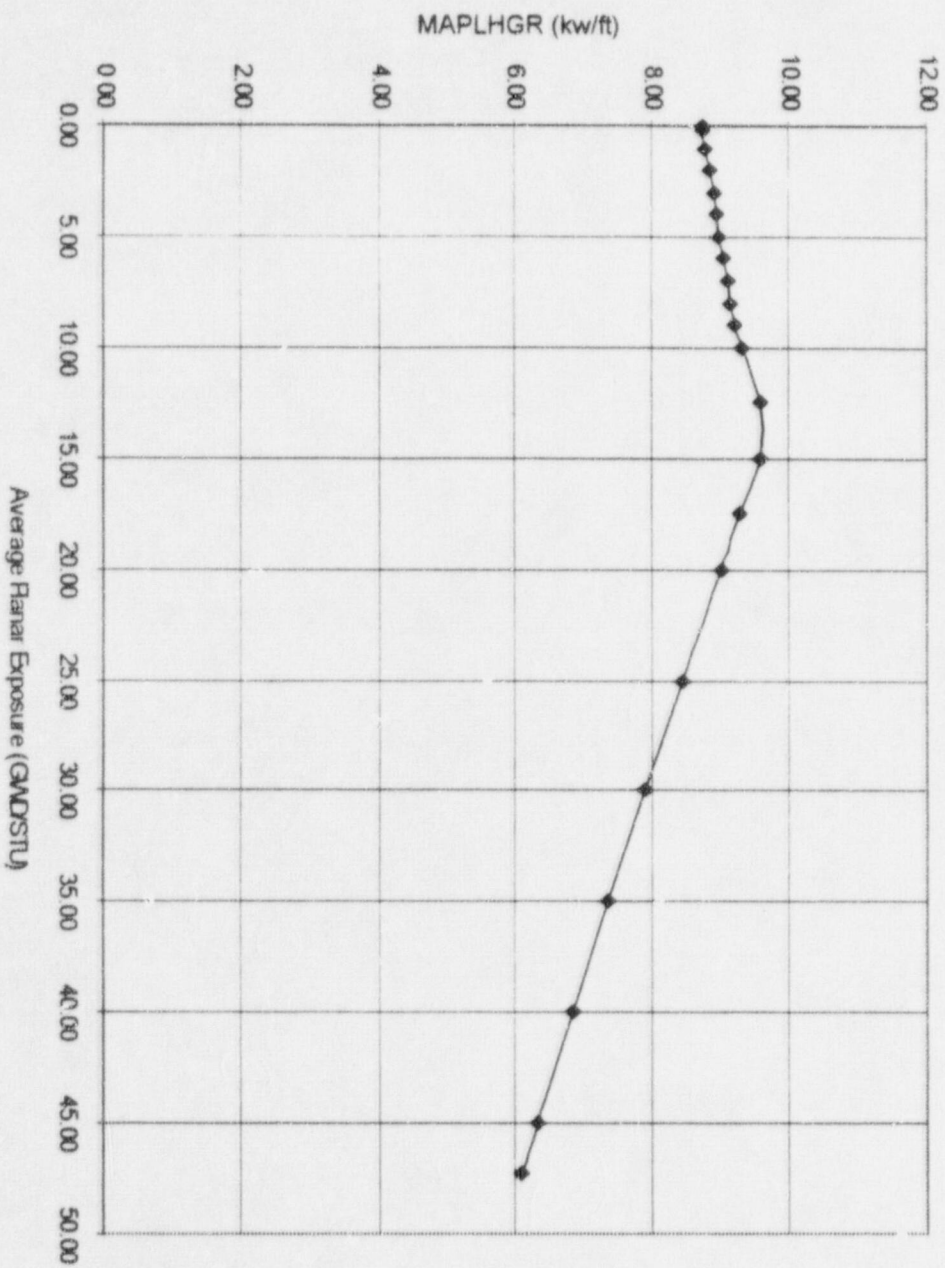
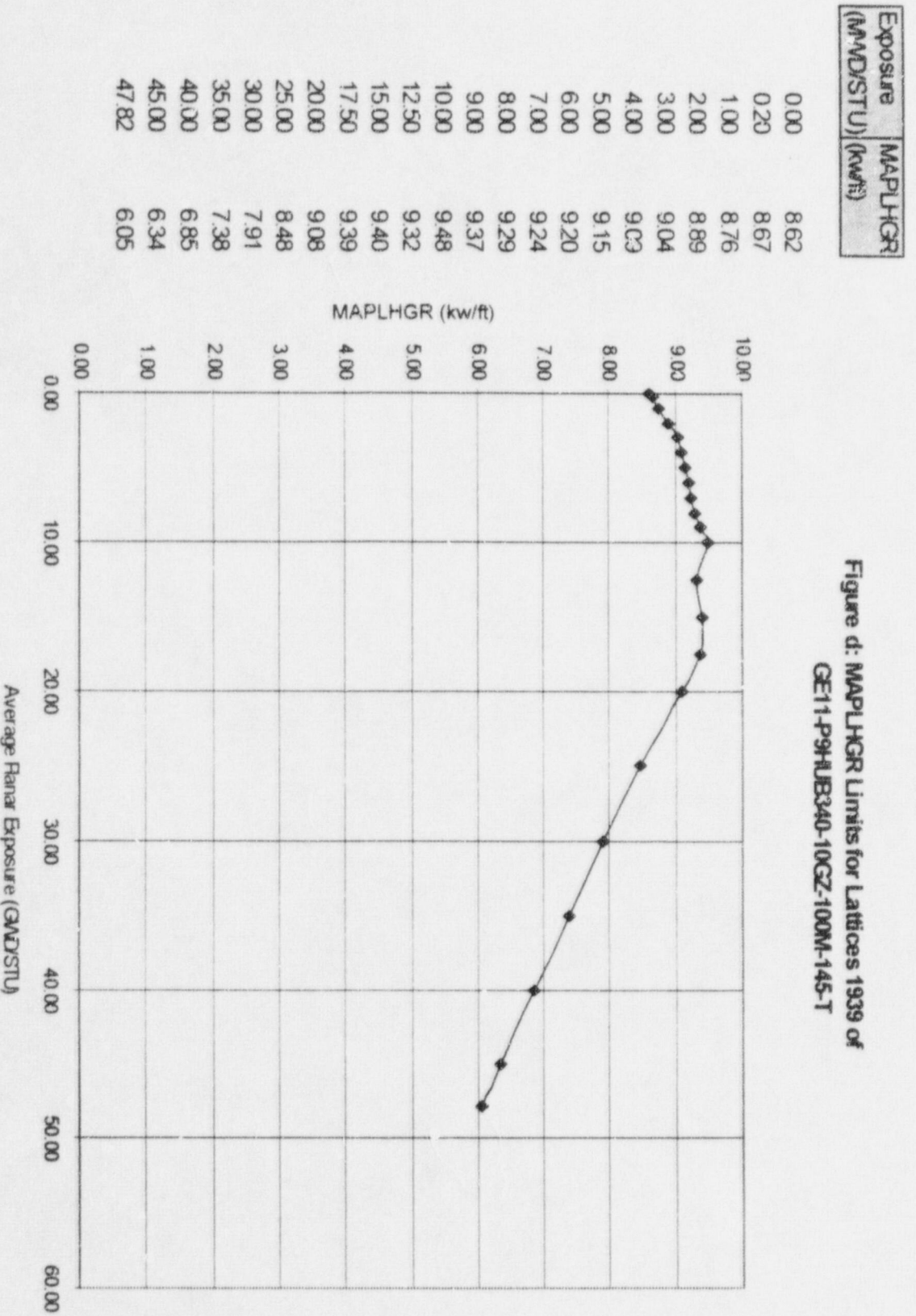


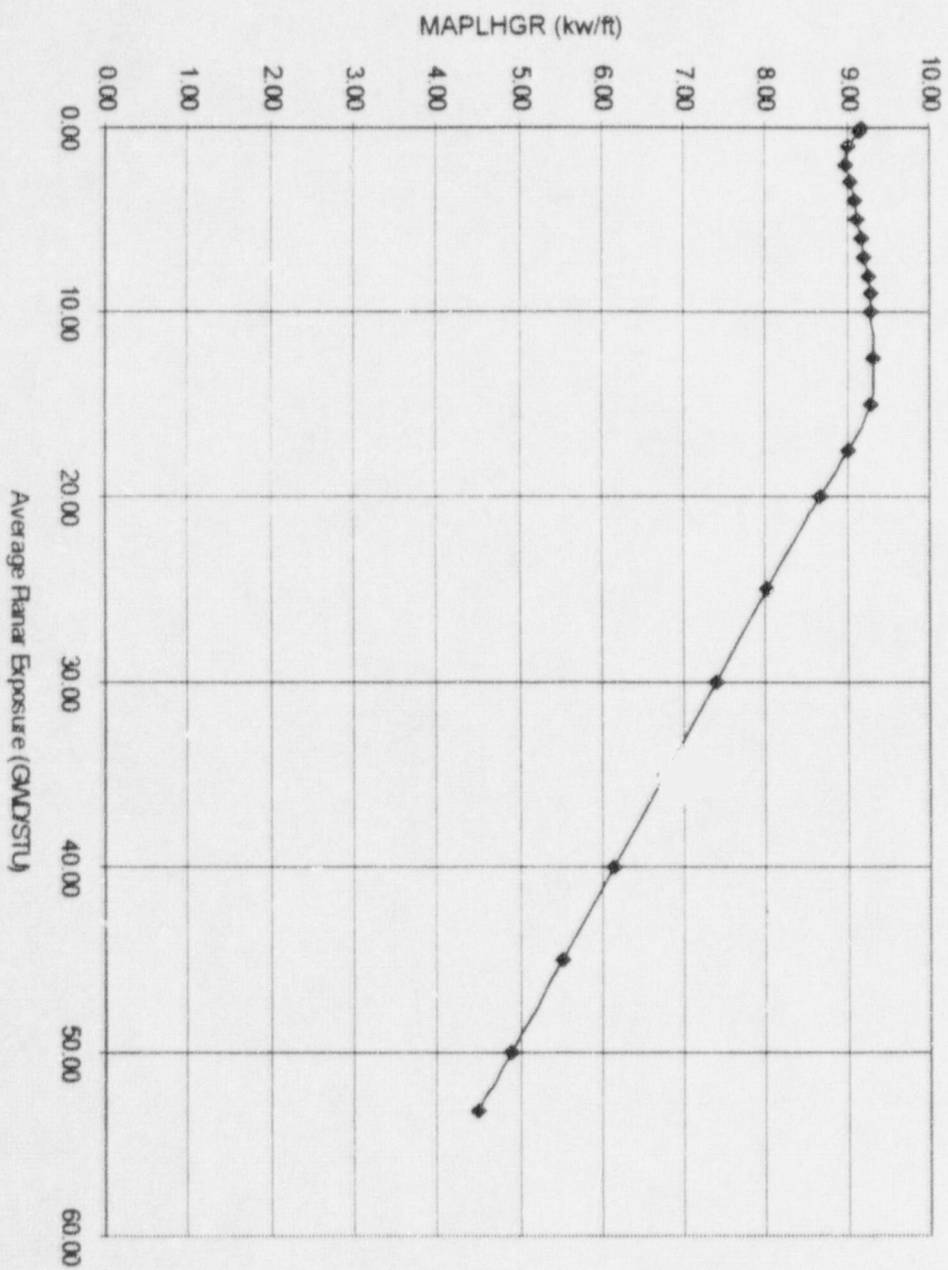
Figure d: MAPLHGR Limits for Lattices 1939 of
GE11-P9HUB340-10GZ-100M-145-T



Exposure (MWD/STU)	MAPLHGR (kw/ft)
-----------------------	--------------------

0.00	9.18
0.20	9.14
1.00	9.01
2.00	8.99
3.00	9.03
4.00	9.08
5.00	9.13
6.00	9.18
7.00	9.22
8.00	9.25
9.00	9.28
10.00	9.29
12.50	9.31
15.00	9.30
17.50	9.00
20.00	8.67
25.00	8.02
30.00	7.38
35.00	6.76
40.00	6.14
45.00	5.52
50.00	4.90
53.23	4.50

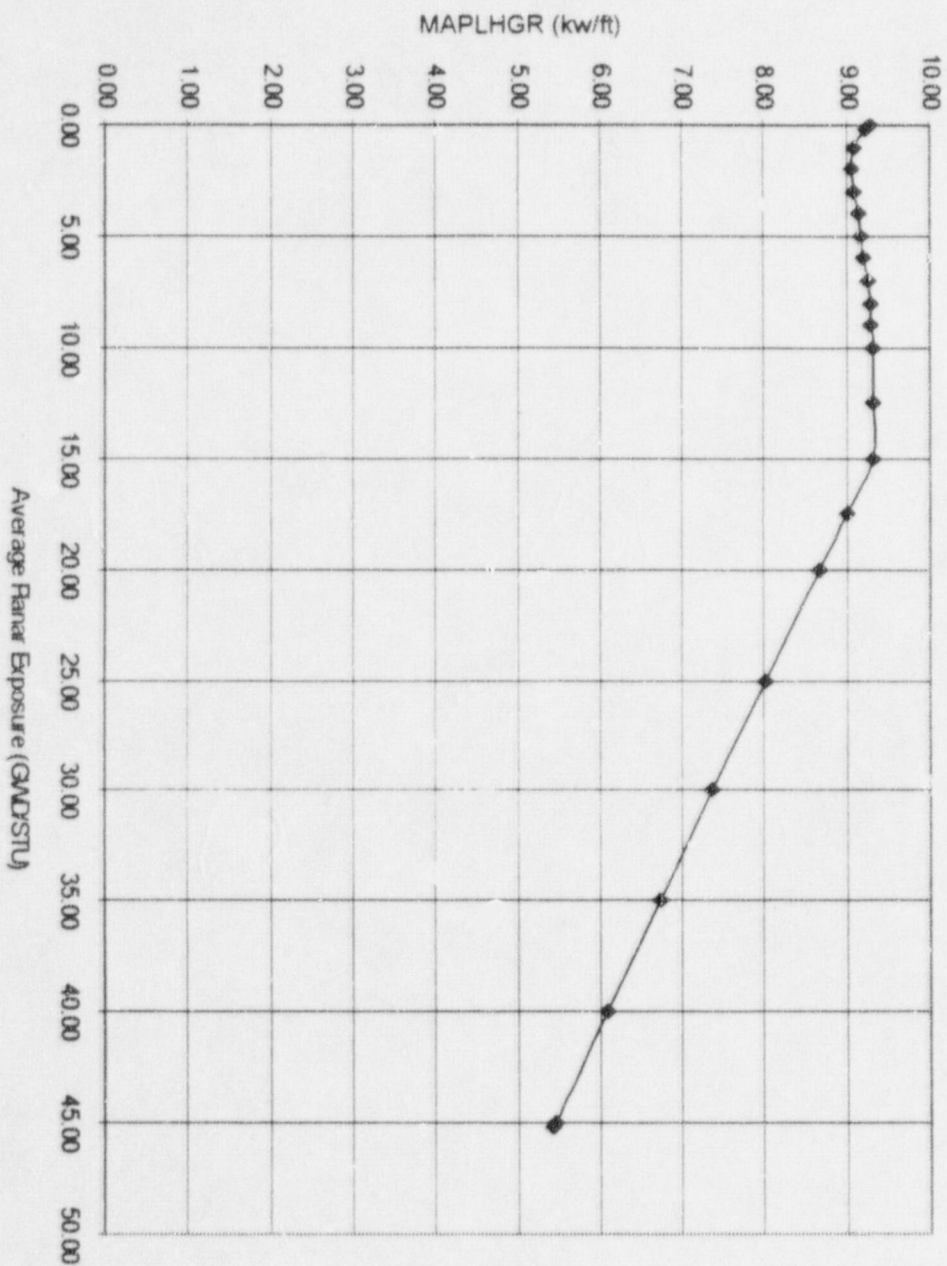
Figure e: MAPLHGR Limits for Lattices 1940 of
GE11-P9HUB340-10GZ-100M-145-T



Exposure (MMD/STU)	MAPLHGR (kw/ft)
-----------------------	--------------------

0.00	9.28
0.20	9.23
1.00	9.10
2.00	9.07
3.00	9.10
4.00	9.14
5.00	9.18
6.00	9.22
7.00	9.26
8.00	9.28
9.00	9.30
10.00	9.32
12.50	9.33
15.00	9.32
17.50	9.00
20.00	8.67
25.00	8.01
30.00	7.37
35.00	6.73
40.00	6.10
45.00	5.48
45.18	5.45

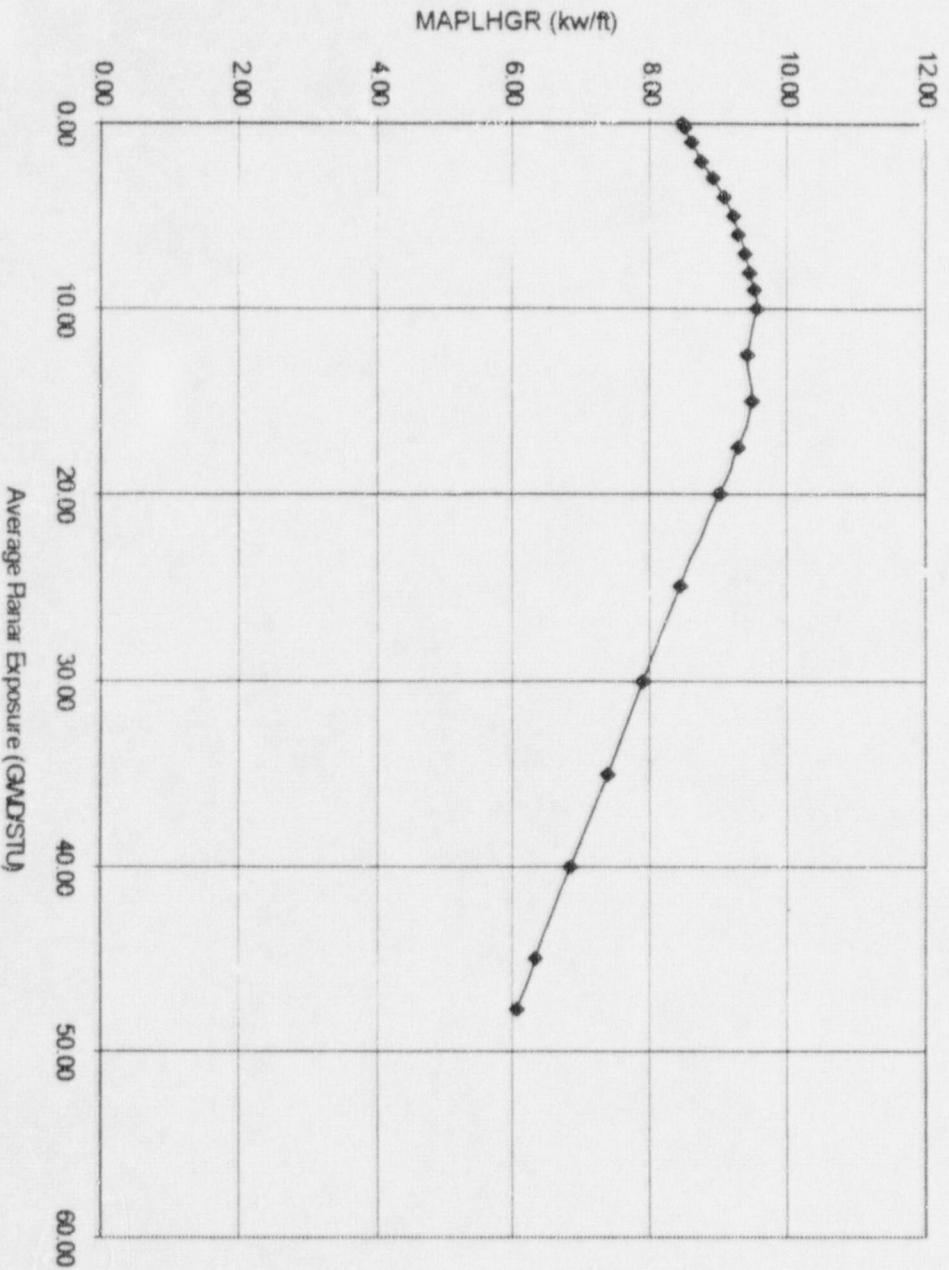
Figure f: MAPLHGR Limits for Lattices 2361 of
GE11-P9DJB340-12GZ1-100T-145-T



Exposure (MMD/STU)	MAPLHGR (kw/ft)
-----------------------	--------------------

0.00	8.45
0.20	8.49
1.00	8.60
2.00	8.75
3.00	8.92
4.00	9.09
5.00	9.20
6.00	9.29
7.00	9.37
8.00	9.45
9.00	9.51
10.00	9.55
12.50	9.41
15.00	9.47
17.50	9.29
20.00	9.00
25.00	8.42
30.00	7.88
35.00	7.36
40.00	6.84
45.00	6.33
47.77	6.06

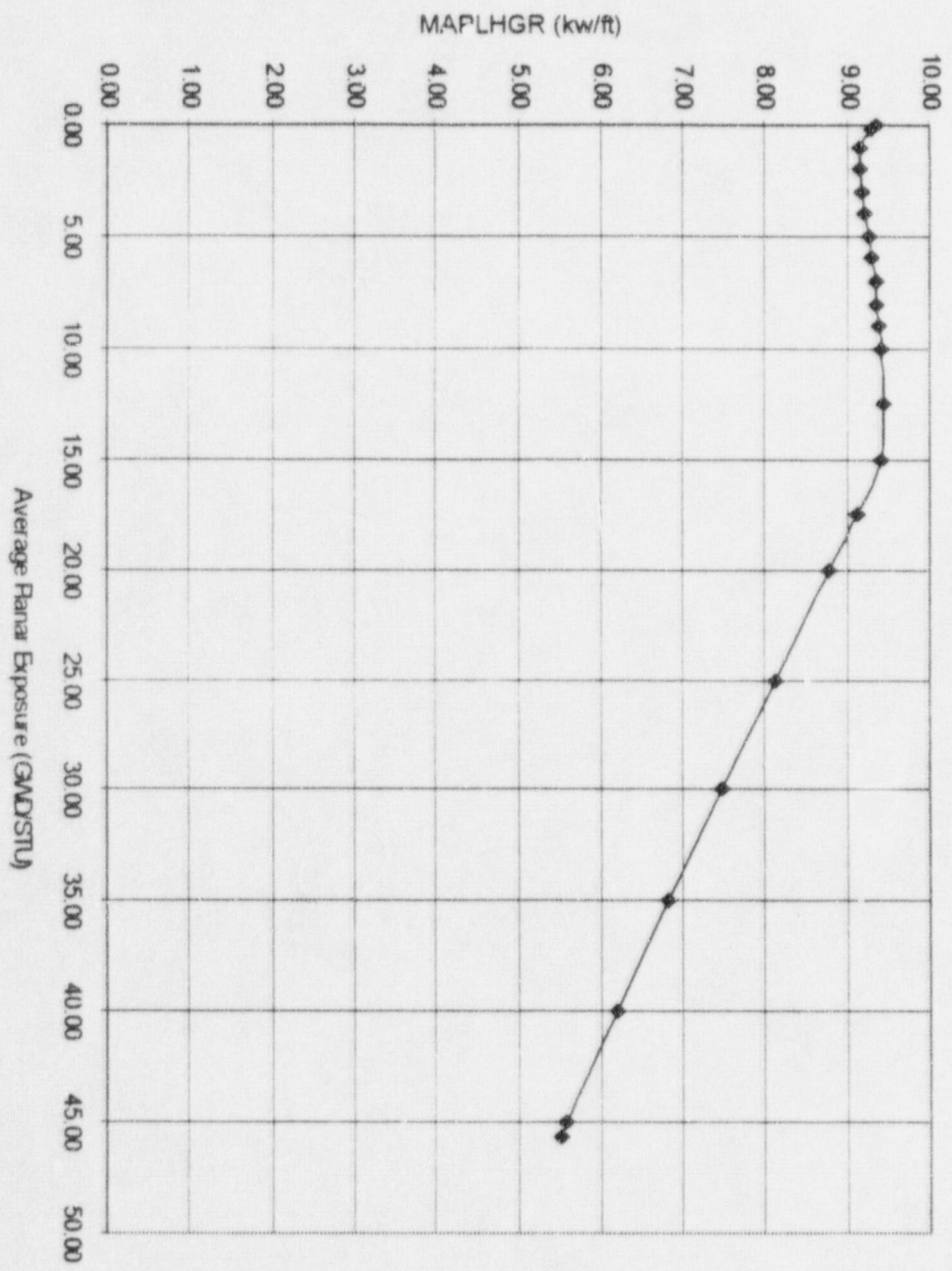
Figure g: MAPLHGR Limits for Lattices 2364 of
GE11-P9DJB340-12GZ1-100T-145-T



Exposure (MMD/STU)	MAPLHGR (kw/ft)
-----------------------	--------------------

0.00	9.34
0.20	9.29
1.00	9.16
2.00	9.14
3.00	9.17
4.00	9.21
5.00	9.26
6.00	9.30
7.00	9.34
8.00	9.36
9.00	9.38
10.00	9.40
12.50	9.42
15.00	9.41
17.50	9.11
20.00	8.77
25.00	8.12
30.00	7.48
35.00	6.84
40.00	6.21
45.00	5.59
45.64	5.51

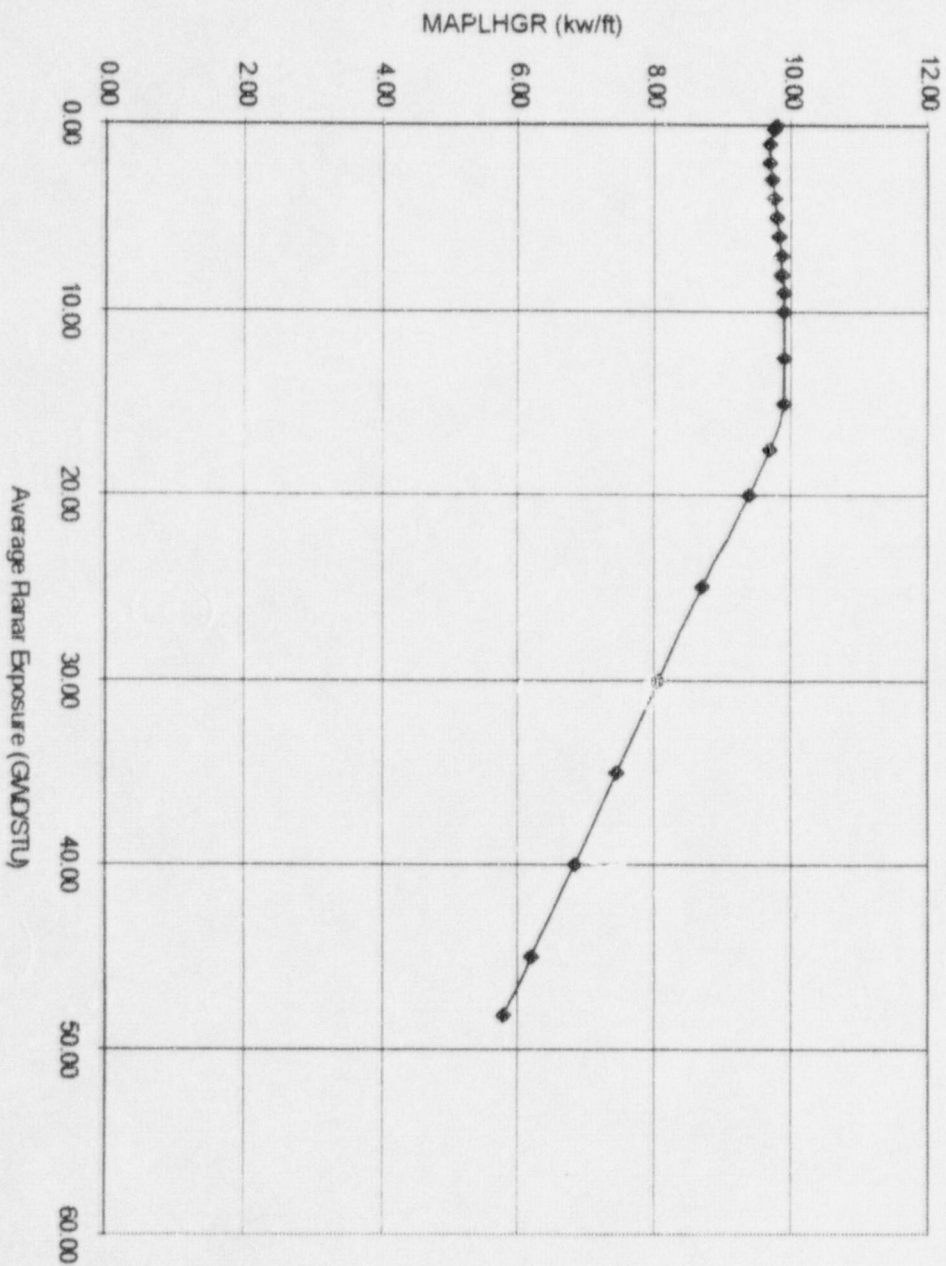
Figure h: MAPLHGR Limits for Lattices 2366 of
GE11-P9DUB340-12GZ1-100T-145-T



Exposure (MMD/STU)	MAPLHGR (kw/ft)
-----------------------	--------------------

0.00	9.79
0.20	9.77
1.00	9.69
2.00	9.68
3.00	9.71
4.00	9.75
5.00	9.79
6.00	9.82
7.00	9.85
8.00	9.87
9.00	9.89
10.00	9.90
12.50	9.90
15.00	9.89
17.50	9.70
20.00	9.37
25.00	8.71
30.00	8.07
35.00	7.44
40.00	6.82
45.00	6.19
48.19	5.79

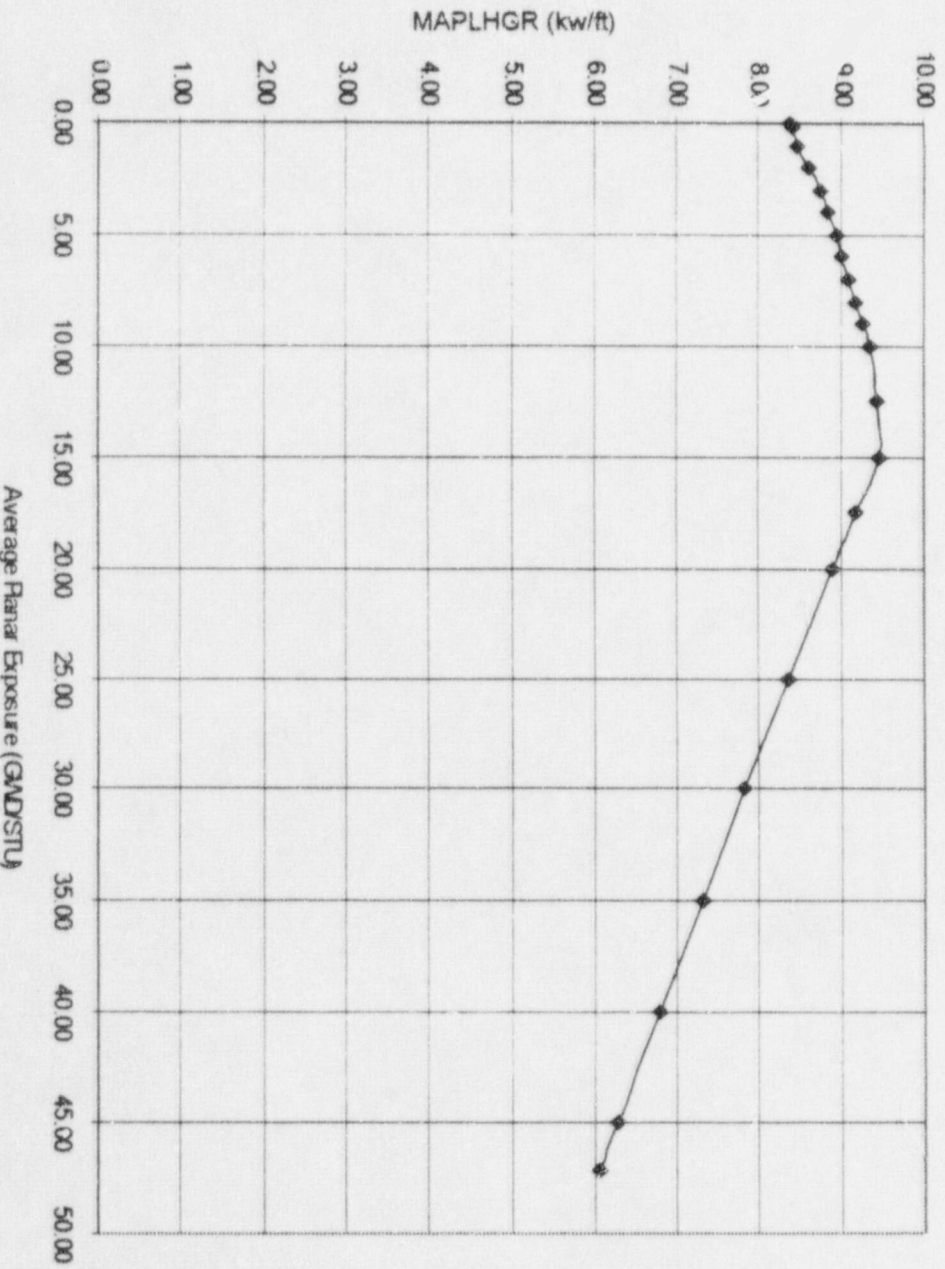
Figure 1: MAPLHGR Limits for Lattices 2367 of
GE11-P9DUB340-12GZ1-100T-145-T



Exposure (MMD/STU)	MAPLHGR (kw/ft)
-----------------------	--------------------

0.00	8.39
0.20	8.42
1.00	8.48
2.00	8.62
3.00	8.75
4.00	8.84
5.00	8.94
6.00	9.02
7.00	9.10
8.00	9.19
9.00	9.27
10.00	9.34
12.50	9.44
15.00	9.45
17.50	9.18
20.00	8.90
25.00	8.35
30.00	7.82
35.00	7.31
40.00	6.80
45.00	6.29
47.13	6.07

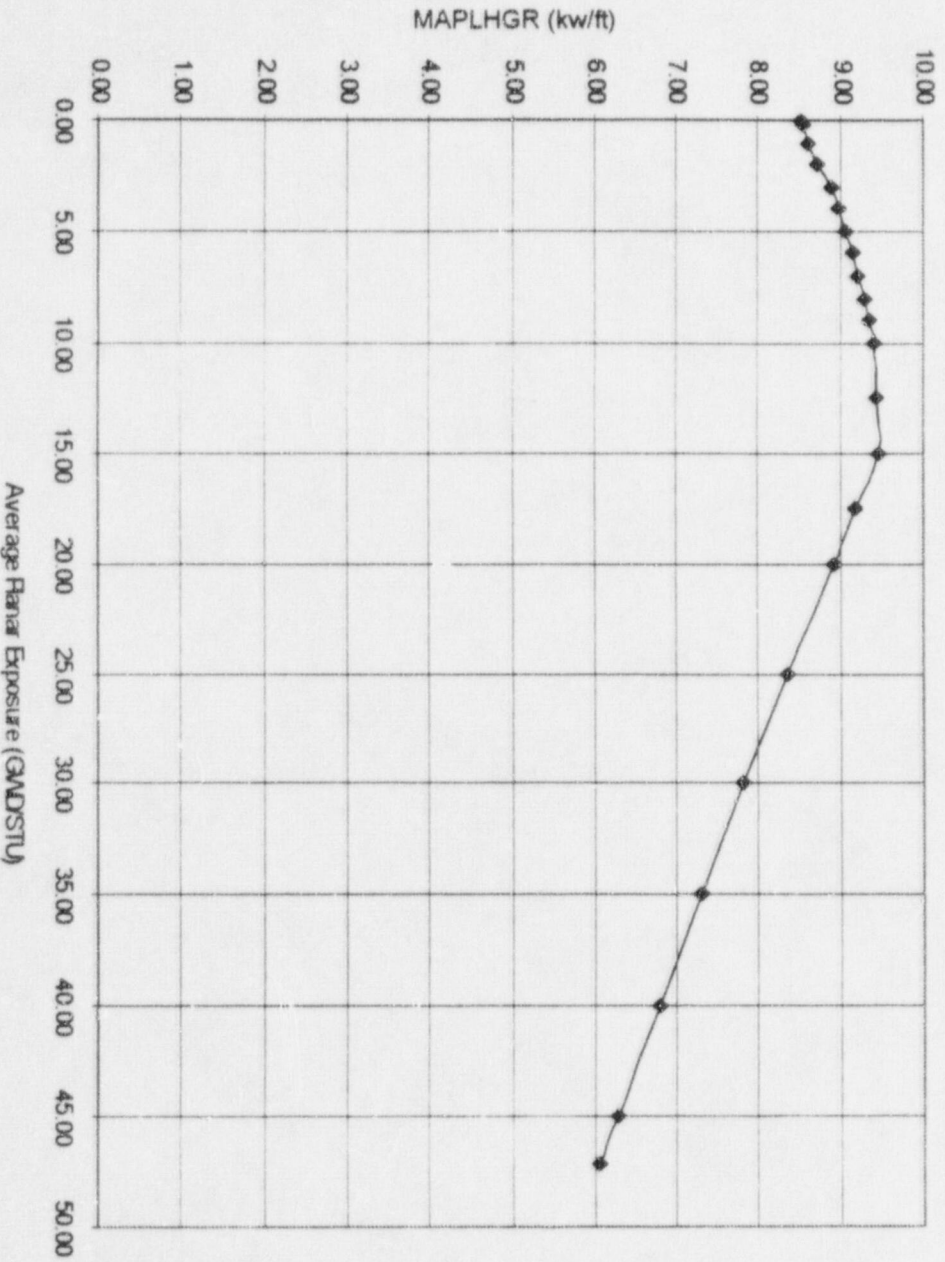
Figure j: MAPLHGR Limits for Lattices 2419 of
GE11-P9DUB340-12GZ1-100T-145-T



Exposure (MMD/STU)	MAPLHGR (kw/ft)
-----------------------	--------------------

0.00	8.53
0.20	8.55
1.00	8.60
2.00	8.73
3.00	8.90
4.00	8.98
5.00	9.06
6.00	9.14
7.00	9.21
8.00	9.28
9.00	9.34
10.00	9.40
12.50	9.44
15.00	9.45
17.50	9.18
20.00	8.91
25.00	8.36
30.00	7.83
35.00	7.31
40.00	6.81
45.00	6.30
47.21	6.07

Figure k: MAPLHGR Limits for Lattices 2420 of
GE11-P9DUB340-12G21-100T-145-T



Exposure (MMD/STU)	MAPLHGR (kw/ft)
-----------------------	--------------------

0.00	9.26
0.20	9.21
1.00	9.07
2.00	9.04
3.00	9.07
4.00	9.11
5.00	9.16
6.00	9.20
7.00	9.23
8.00	9.26
9.00	9.28
10.00	9.29
12.50	9.31
15.00	9.30
17.50	8.97
20.00	8.64
25.00	7.98
30.00	7.34
35.00	6.70
40.00	6.07
45.00	5.45
45.02	5.44

Figure 1: MAPLHGR Limits for Lattices 2718 of
GE11-P90UB339-12GZ-100T-145-T

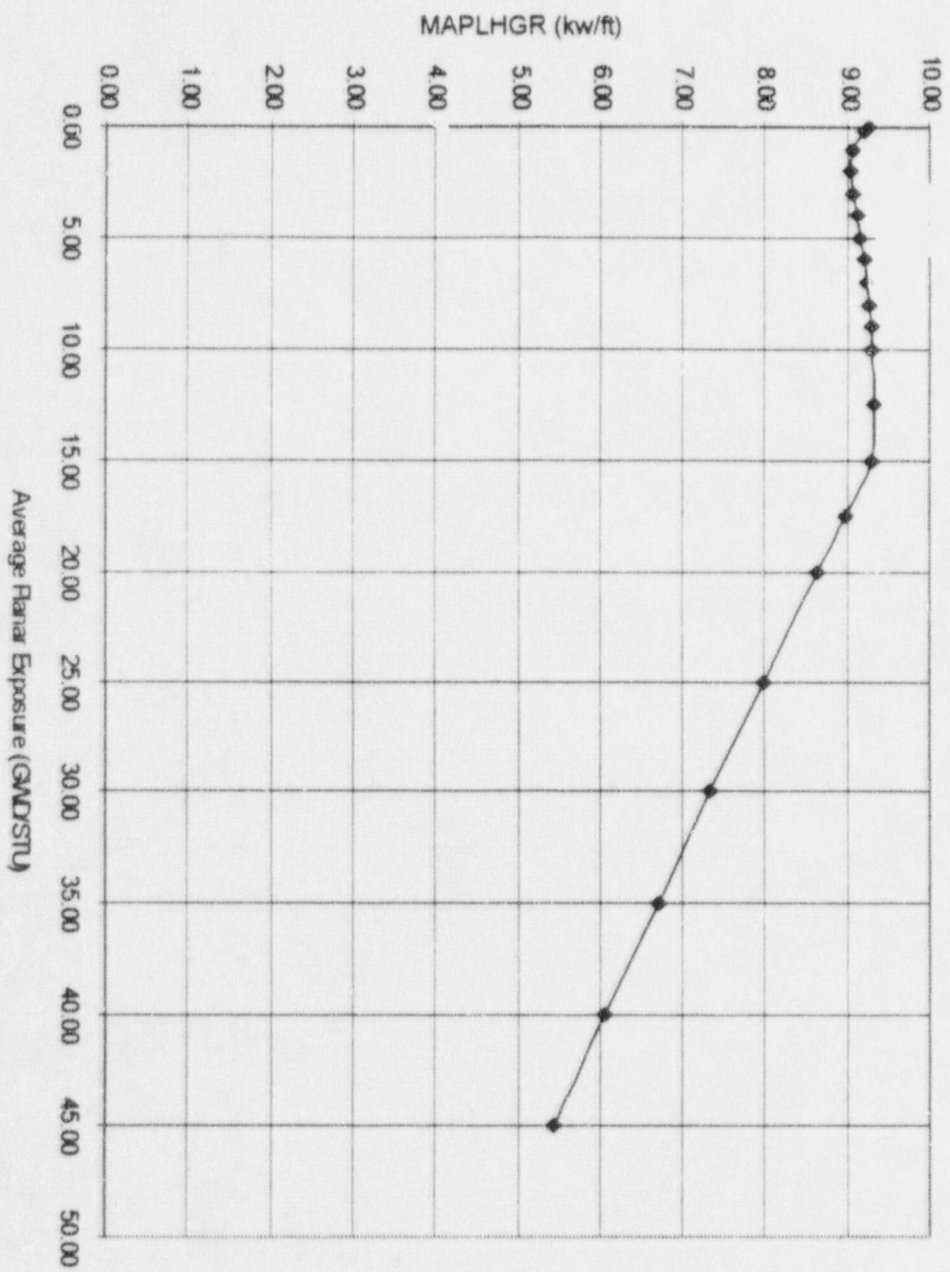


Figure m: MAPLHGR limits for Lattices 2719 of
GE11-P90B309-123Z-100T-145-T

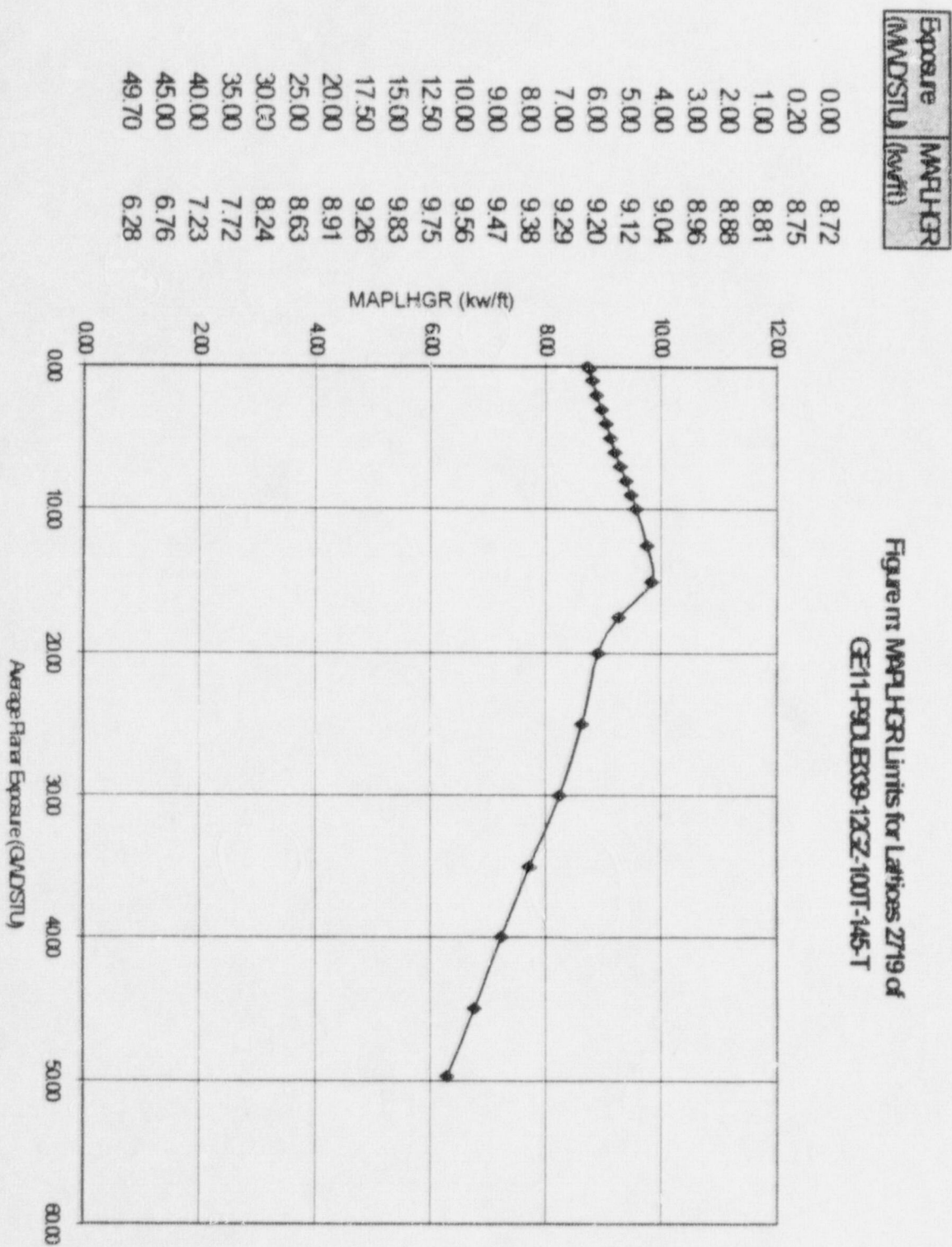
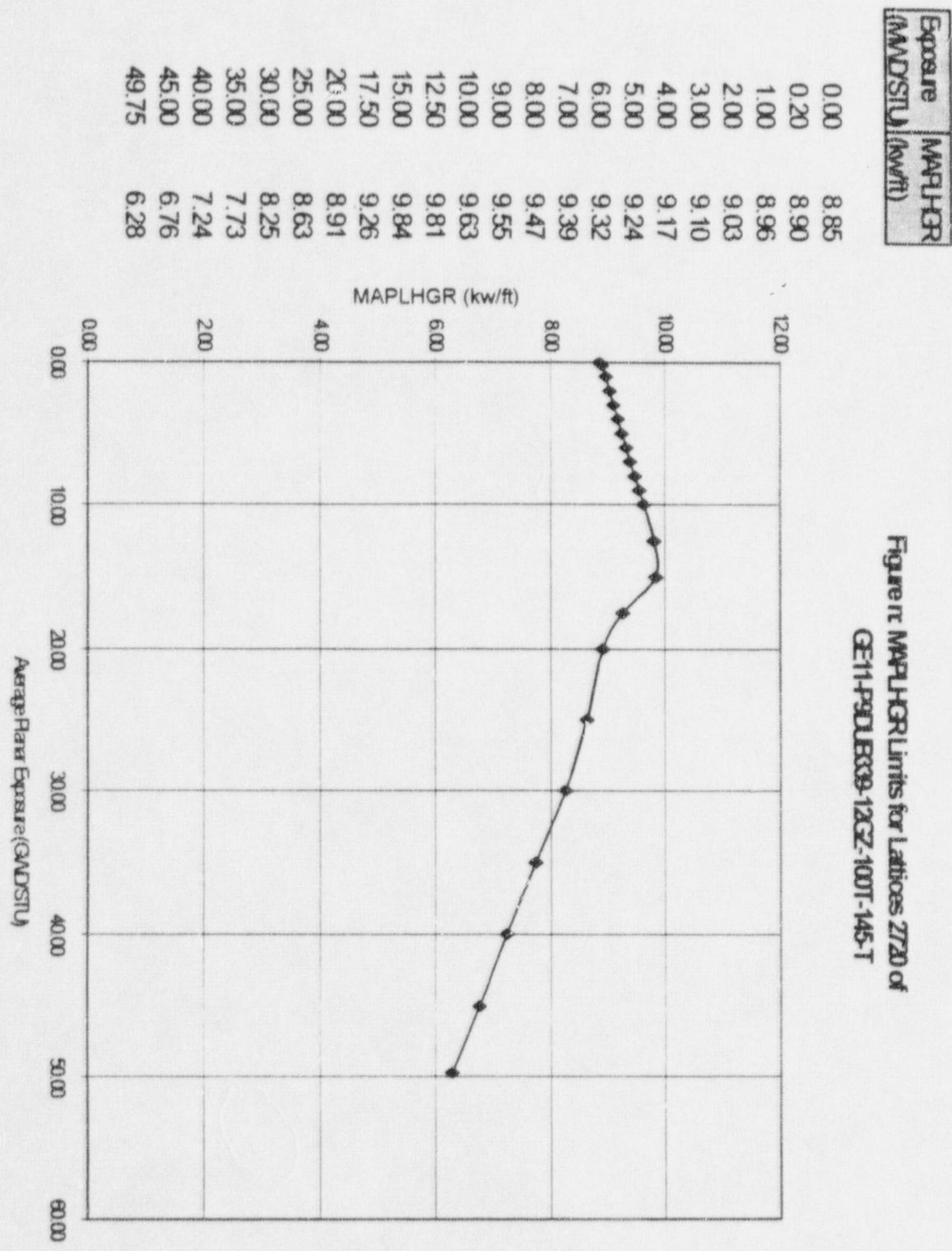


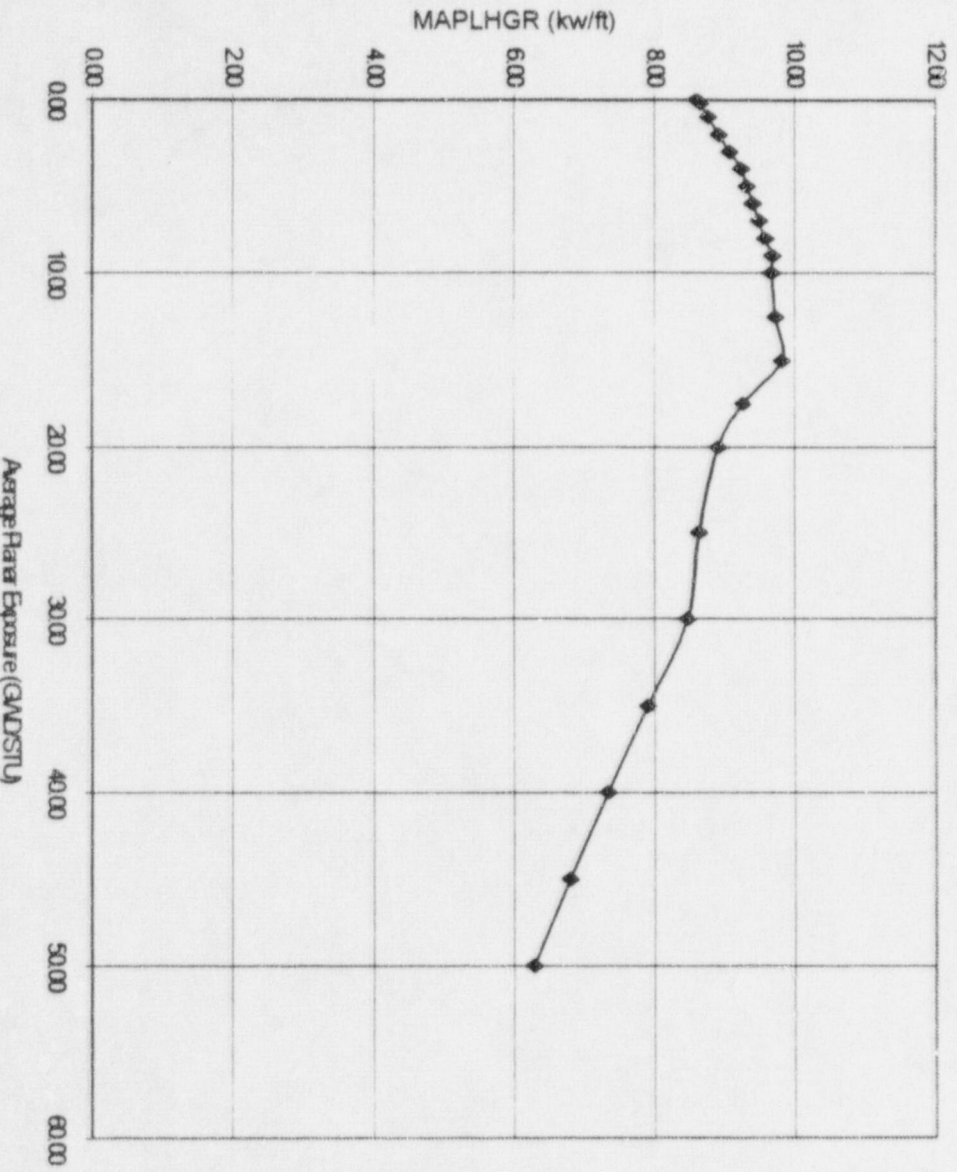
Figure 11 MAPLHGR Limits for Lattices 2720 of
GE11-P90LB39-12GZ-100T-145-T



Exposure (GMDSTU)	MAPLHGR (kw/ft)
----------------------	--------------------

0.00	8.60
0.20	8.65
1.00	8.76
2.00	8.92
3.00	9.08
4.00	9.24
5.00	9.32
6.00	9.41
7.00	9.50
8.00	9.59
9.00	9.68
10.00	9.67
12.50	9.73
15.00	9.82
17.50	9.26
20.00	8.91
25.00	8.63
30.00	8.46
35.00	7.90
40.00	7.33
45.00	6.79
50.00	6.28

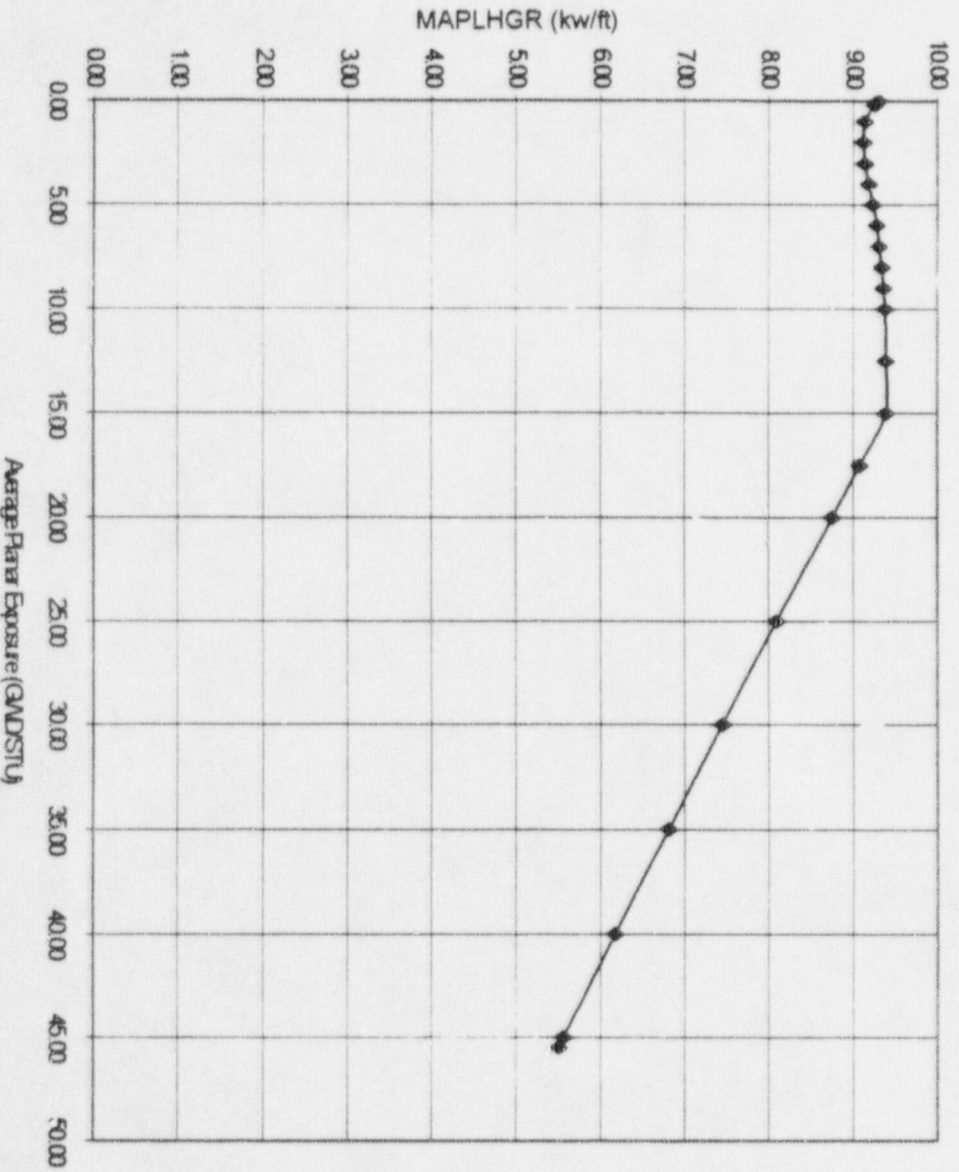
Figure α MAPLHGR Limits for Lattices 2721 of
GE-11-P90LBK39-12GZ-100T-145-T



Exposure (MM/STU) (kw/ft)	MAPLHGR
------------------------------	---------

0.00	9.31
0.20	9.26
1.00	9.14
2.00	9.12
3.00	9.14
4.00	9.19
5.00	9.23
6.00	9.28
7.00	9.31
8.00	9.34
9.00	9.36
10.00	9.38
12.50	9.39
15.00	9.39
17.50	9.08
20.00	8.75
25.00	8.09
30.00	7.45
35.00	6.81
40.00	6.18
45.00	5.56
45.48	5.50

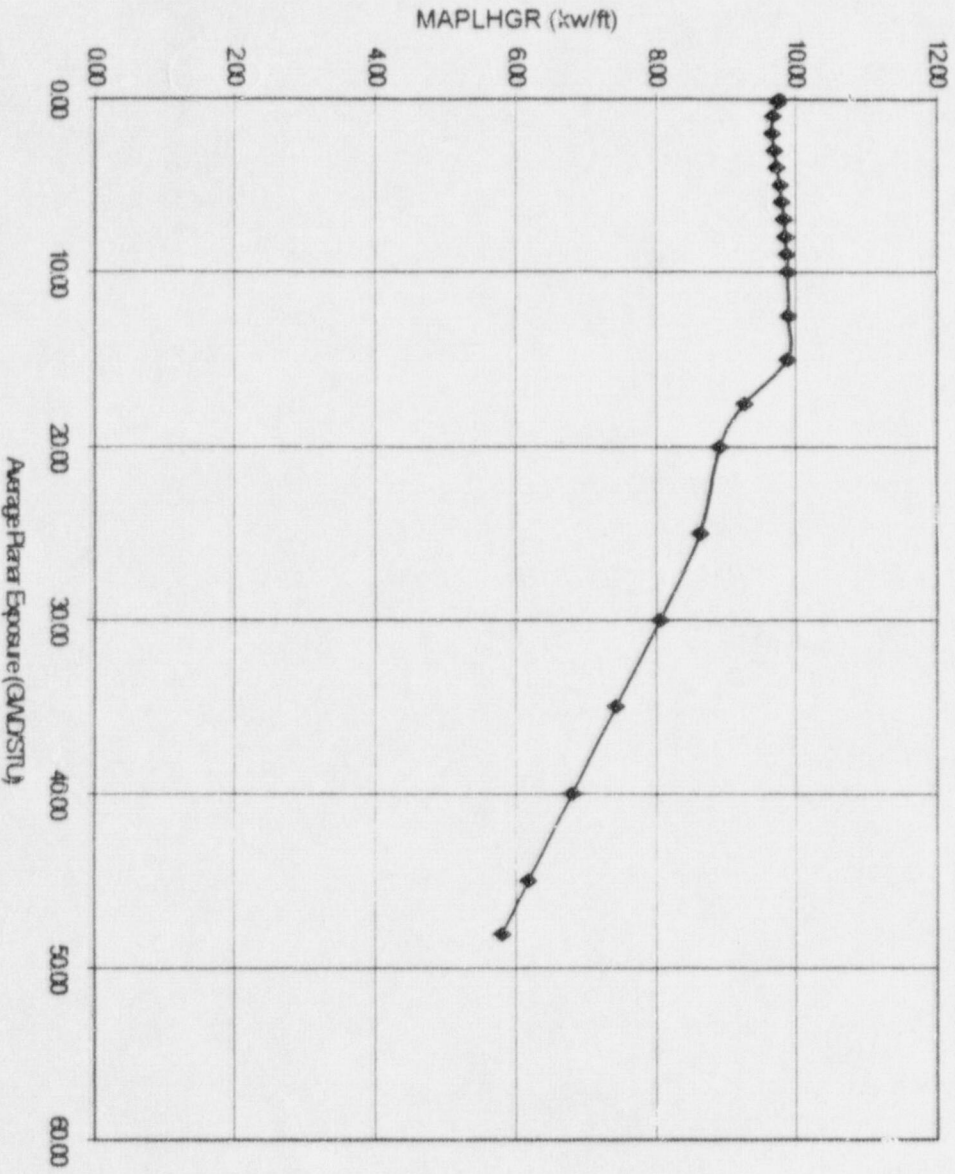
Figure 1: MAPLHGR limits for Lattices 2722 of
GE11-P90EXR-12GZ-100T-145-T



Exposure (MMDSTU ₂)	MAPLHGR (kw/ft)
------------------------------------	--------------------

0.00	9.77
0.20	9.75
1.00	9.67
2.00	9.66
3.00	9.69
4.00	9.73
5.00	9.77
6.00	9.80
7.00	9.83
8.00	9.85
9.00	9.87
10.00	9.88
12.50	9.89
15.00	9.88
17.50	9.26
20.00	8.91
25.00	8.63
30.00	8.05
35.00	7.42
40.00	6.80
45.00	6.17
48.07	5.79

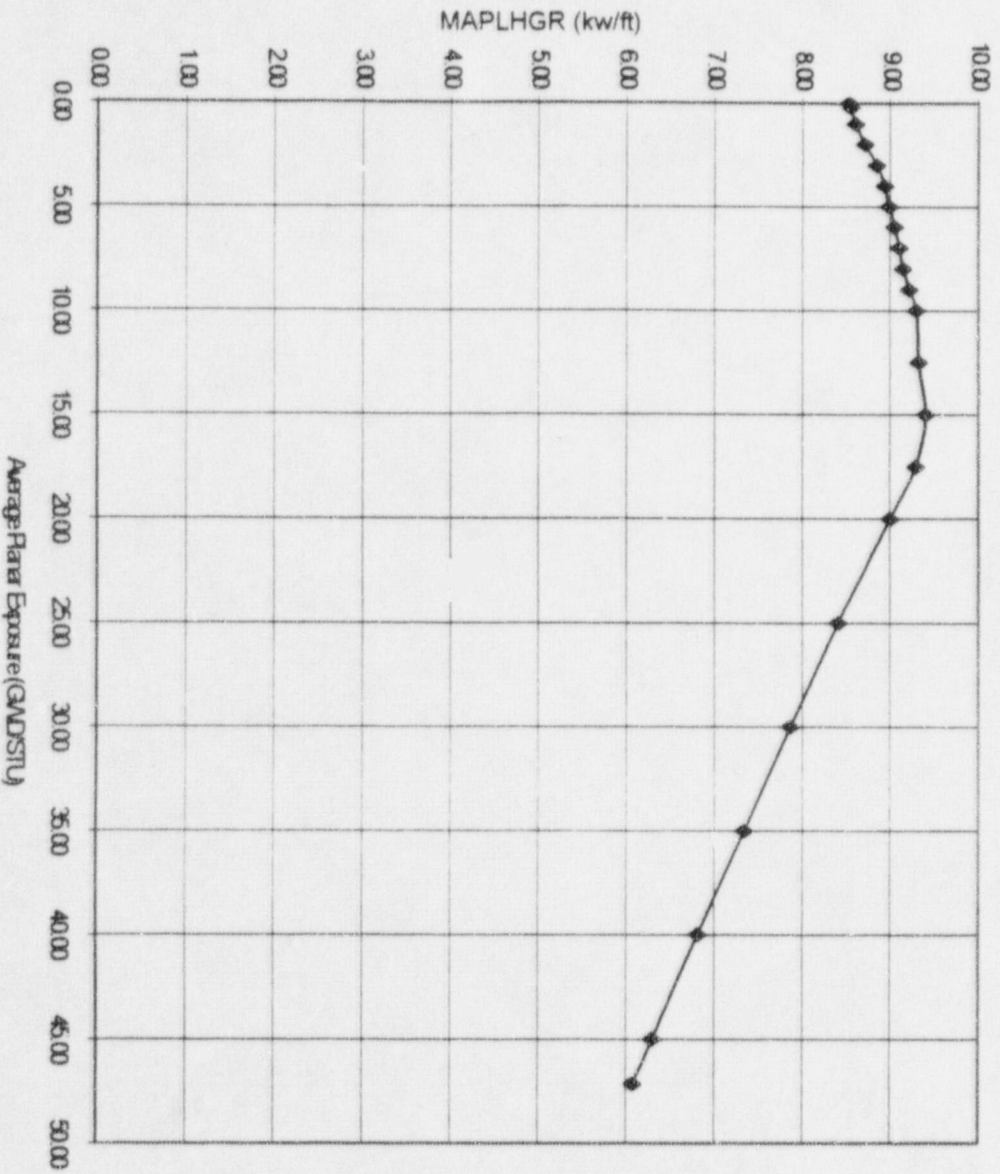
Figure of MAPLHGR Limits for Lattices 2723 of
GE11-P90UBK9-12GZ-100T-145-T



Exposure (MADSIL) (kw/ft)	MAPLHGR
------------------------------	---------

0.00	8.54
0.20	8.56
1.00	8.61
2.00	8.72
3.00	8.85
4.00	8.94
5.00	8.99
6.00	9.05
7.00	9.10
8.00	9.15
9.00	9.22
10.00	9.30
12.50	9.32
15.00	9.40
17.50	9.29
20.00	9.00
25.00	8.42
30.00	7.87
35.00	7.34
40.00	6.82
45.00	6.30
47.16	6.08

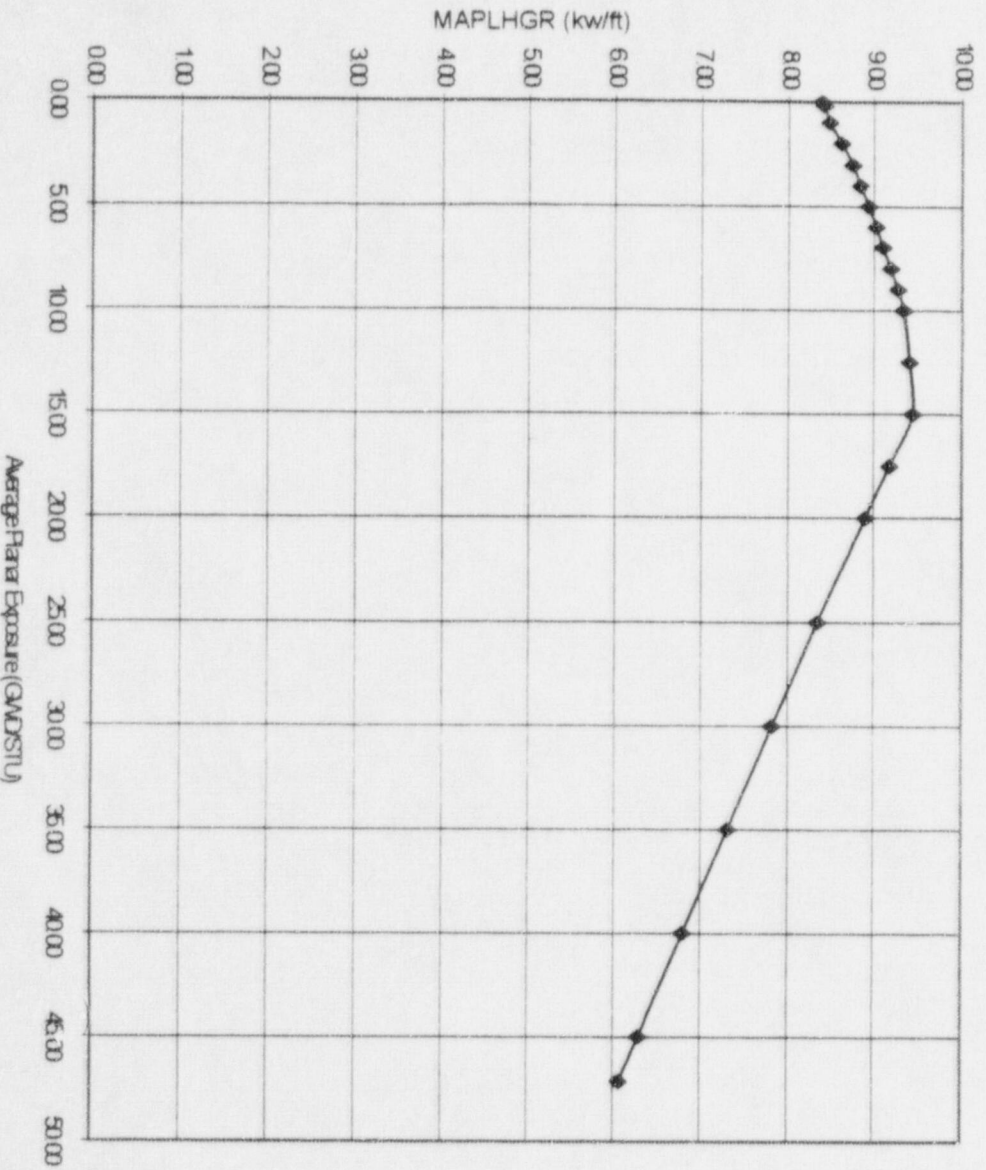
Figure r. Most Limiting MAPLHGR Limits for GE11+PHUB340-10CZ-100M-145-T



Exposure (IMDSTU)	MAPLHGR (kw/ft)
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0.00	8.39
0.20	8.42
1.00	8.48
2.00	8.62
3.00	8.75
4.00	8.84
5.00	8.94
6.00	9.02
7.00	9.10
8.00	9.19
9.00	9.27
10.00	9.34
12.50	9.41
15.00	9.45
17.50	9.18
20.00	8.90
25.00	8.35
30.00	7.82
35.00	7.31
40.00	6.80
45.00	6.29
47.13	6.07

Figure 5: Most Limiting MAPLHGR Limits for GE1-P90UB340-12C21-100T-145-T



Exposure (hMDSTU)	MAPLHGR (kw/ft)
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0.00	8.60
0.20	8.65
1.00	8.76
2.00	8.88
3.00	8.96
4.00	9.04
5.00	9.12
6.00	9.20
7.00	9.29
8.00	9.38
9.00	9.47
10.00	9.56
12.50	9.73
15.00	9.82
17.50	9.26
20.00	8.91
25.00	8.63
30.00	8.24
35.00	7.72
40.00	7.23
45.00	6.76
49.70	6.28

Figure t Most Limiting MAPLHGR Limits for GE11-P90UB339-12GZ-100T-145-T

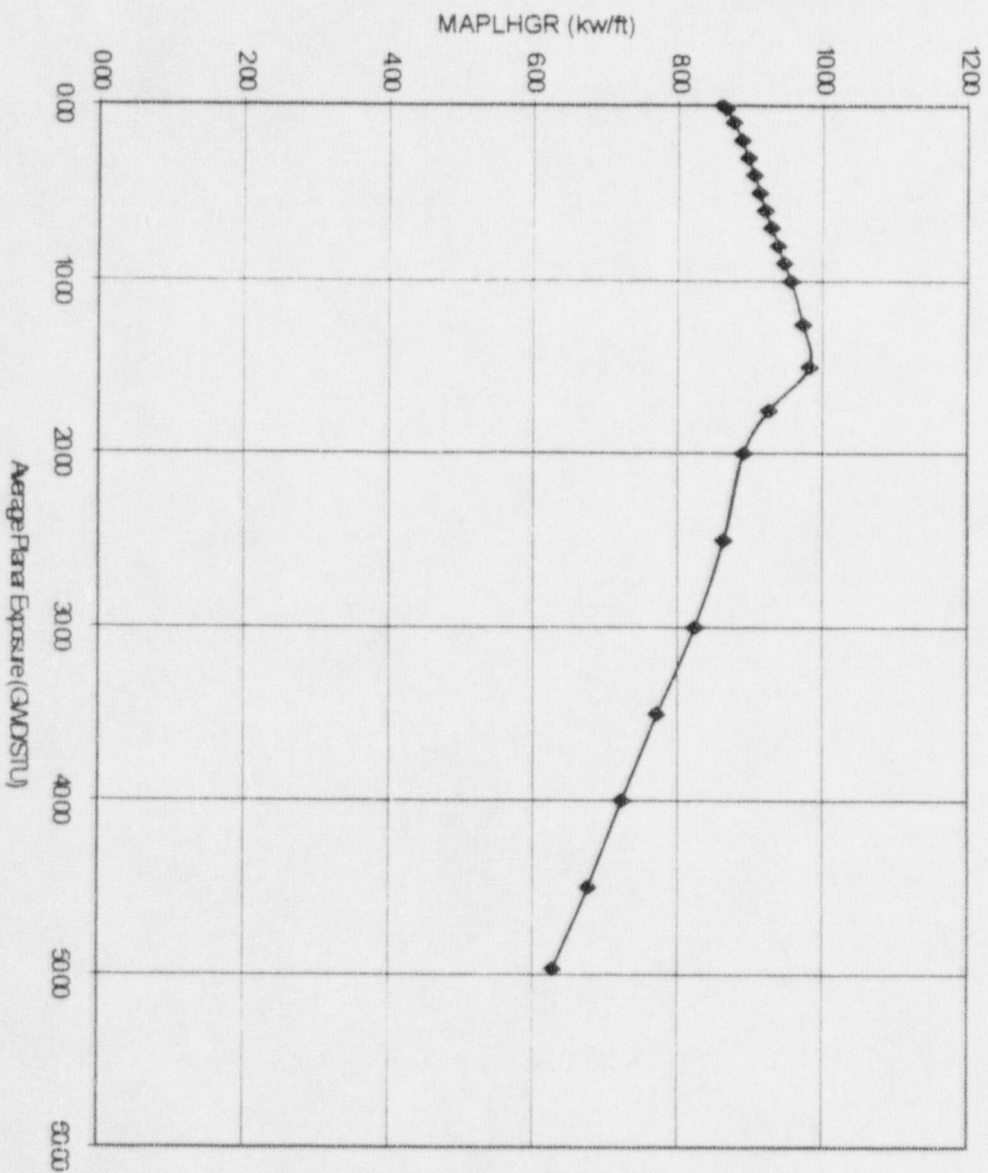


Figure u NMP-1 K(f) Curve for MCPR

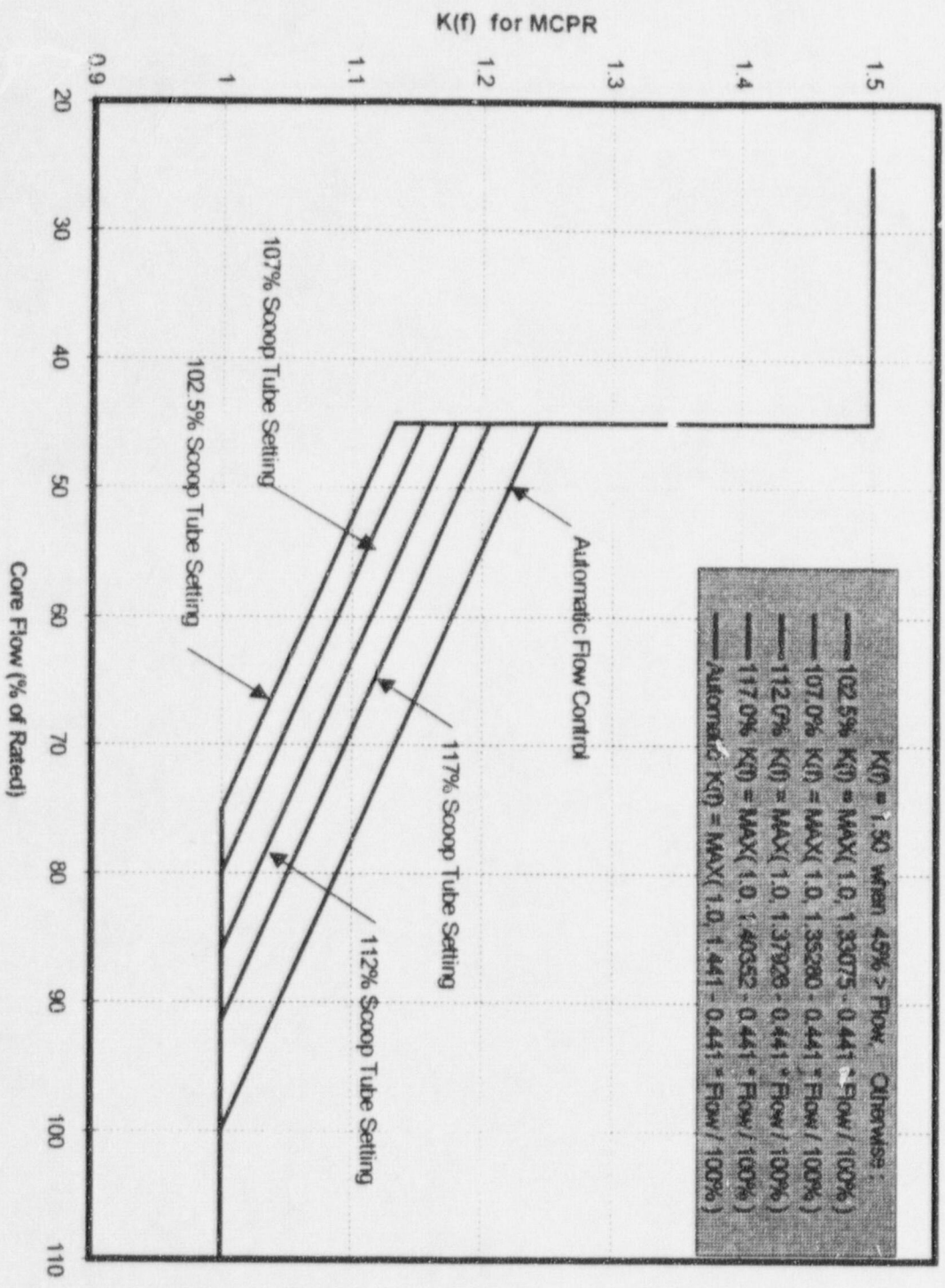


Figure v Limiting Power/Flow Line

