

Constellation Energy

Nine Mile Point Nuclear Station

P.O. Box 63
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August 2, 2004
NMP1L 1854

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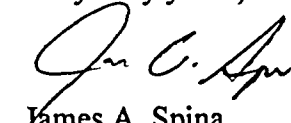
SUBJECT: Nine Mile Point Unit 1
Docket No. 50-220
License No. DPR-63

Cycle 16 Core Operating Limits Report, Rev. 2

Gentlemen:

Attached is a copy of the Cycle 16 Core Operating Limits Report (COLR), Rev. 2, for Nine Mile Point Unit 1 (NMP1). This report is being submitted pursuant to NMP1 Technical Specification 6.6.5.d.

Very truly yours,



James A. Spina
Vice President Nine Mile Point

JAS/RF/jm
Attachment

cc: Mr. H. J. Miller, NRC Regional Administrator, Region I
Mr. G. K. Hunegs, NRC Senior Resident Inspector
Mr. P. S. Tam, Senior Project Manager, NRR (2 copies)

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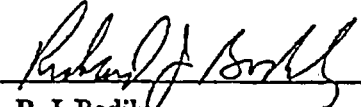


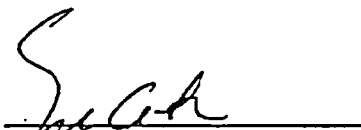


NINE MILE POINT UNIT 1

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CORE OPERATING LIMITS REPORT

Document No.: COLR1-16

Revision 2

| | <u>Name</u> | <u>Title</u> | <u>Date</u> |
|----------------------------|--|--|-------------|
| Prepared by: |  R. J. Bodily | Fuel Engineer | 6/30/04 |
| Reviewed by: |  J. L. Winklebleck | Fuel Engineer | 6/30/04 |
| Independently Reviewed by: |  P. E. Netusil | Fuel Engineer | 6/30/04 |
| Approved by: |  M. A. Armenta | Principal Engineer, Nuclear Fuels Services | 6/30/04 |
| Approved by: |  J. N. Darweesh | Supervisor, Reactor Engineering | 6/30/04 |
| Approved by: |  G. S. Pavis | Director, Nuclear Fuels Services | 6/30/04 |

This Controlled Document provides cycle specific core operating limits for use in conjunction with the Nine Mile Point Unit 1 Technical Specifications. Document pages may only be changed through a reissue of the entire document.

CORE OPERATING LIMITS REPORT

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CORE OPERATING LIMITS REPORT

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 in Tables 1a through 1e.

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 Tables 1a through 1e.

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 Tables 1a through 1e.

(*) 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 Table 1f during five recirculation loop operation or 98 percent of the limits shown in Table 1f 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 operating MCPR at rated power and flow shall be greater than or equal to the Operating Limit MCPR of 1.45⁽¹⁾.

For core flows other than rated, the MCPR limit shall be the Operating Limit MCPR identified above times K_f where K_f is as shown in Figure 2a.

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 Operating Limit MCPR shall be 1.59.

Conservative limits for operation between 45% and 90% RTP⁽³⁾ are required for operations without a backup pressure regulator. The MCPR based limit for operation without a backup pressure regulator is as shown in Figure 2b⁽²⁾⁽⁴⁾.

2.2 Limits for Technical Specification 3.1.7.e

During 3 loop operation, the Operating Limit MCPR shall be increased by 0.02.

NOTES:

- (1) Based on a 1.07 MCPR Safety Limit (SLCPR).
- (2) Based on an Operating Limit MCPR of 1.45.
- (3) Below 45% and above 90% RTP no additional limits are required for operation without a backup pressure regulator.
- (4) These limits are valid for 3, 4, or 5 loop operation..

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 11.0 KW/FT.

Conservative limits for operation between 45% and 90% RTP⁽¹⁾ are required for operations without a backup pressure regulator. The LHGR based limit for operation without a backup pressure regulator is as shown in Figure 3.

NOTE:

⁽¹⁾ Below 45% and above 90% RTP no additional limits are required for operation without a backup pressure regulator.

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 4.

5.0 REFERENCES FOR TECHNICAL SPECIFICATIONS

Technical Specification 6.6.5.b:

NEDE 24011-P-A, "General Electric Standard Application for Reactor Fuel," U.S. Supplement, Revision 14, June 2000.

6.0 SOURCE DOCUMENTS

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

| CORE OPERATING LIMITS | REFERENCE |
|---|--|
| <u>APLHGR Limits (Section 1.0)</u> Table 1a through 1f and corresponding three and four loop multipliers | GE J11-02962MAP, Revision 0, January 1997, Lattice Dependent MAPLHGR Report for Nine Mile Point Nuclear Power Station Unit 1, Reload 14 Cycle 13 GE J11-02962SRLR, Revision 0, January 1997, Supplemental Reload Licensing Report for Nine Mile Point Nuclear Station Unit 1 Reload 14 Cycle 13 GNF J11-03785ER, Revision 0, February 2001, Engineering Report for Nine Mile Point Nuclear Station Unit 1 Reload 16 0000-0012-7557ER, Revision 0, March 2003 Engineering Report for Nine Mile Point Nuclear Station Unit 1 Reload 17 |
| <u>MCPR Limits (Section 2)</u> | 0000-0012-7557ER, Revision 0, March 2003 Engineering Report for Nine Mile Point Nuclear Station Unit 1 Reload 17 |
| Pressure Regulator Out-of-Service Restriction | GE-NE-J11-03433-16-01-00, "Pressure Regulator Out of Service Calculations for Nine Mile Point Unit 1 Cycle 14", March 2001 |
| <u>LHGR Limits (Section 3)</u> | 0000-0012-7557ER, Revision 0, March 2003 Engineering Report for Nine Mile Point Nuclear Station Unit 1 Reload 17 |
| Pressure Regulator Out-of-Service restriction | GE-NE-J11-03433-16-01-00, "Pressure Regulator Out of Service Calculations for Nine Mile Point Unit 1 Cycle 14", March 2001 |
| <u>Power/Flow Relationship (Section 4)</u> | NMP1 Technical Specification Amendment 92, Figure 3.1.7.aa |

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Table 1a

MAPLHGR VERSUS AVERAGE PLANAR EXPOSURE
Bundle Type: GE11-P9DUB376-12GZ-100T-145-T-2583 (GE11)

| Average Planar Exposure Gwd/ST | MAPLHGR Limits (kw/ft) | | | | |
|-----------------------------------|------------------------|-----------------|-----------------|-----------------|-----------------|
| | Lattice 5662 | Lattice 5663 | Lattice 5664 | Lattice 5665 | Lattice 5666 |
| 0.00 | 9.26 | 8.47 | 8.50 | 9.31 | 9.77 |
| 0.20 | 9.21 | 8.51 | 8.54 | 9.26 | 9.75 |
| 1.00 | 9.07 | 8.58 | 8.62 | 9.14 | 9.67 |
| 2.00 | 9.04 | 8.69 | 8.74 | 9.12 | 9.66 |
| 3.00 | 9.07 | 8.80 | 8.87 | 9.14 | 9.69 |
| 4.00 | 9.11 | 8.93 | 9.01 | 9.19 | 9.73 |
| 5.00 | 9.16 | 9.07 | 9.16 | 9.23 | 9.77 |
| 6.00 | 9.20 | 9.17 | 9.32 | 9.28 | 9.75 |
| 7.00 | 9.23 | 9.24 | 9.48 | 9.31 | 9.71 |
| 8.00 | 9.26 | 9.31 | 9.57 | 9.34 | 9.68 |
| 9.00 | 9.28 | 9.39 | 9.64 | 9.36 | 9.64 |
| 10.00 | 9.29 | 9.47 | 9.61 | 9.38 | 9.61 |
| 12.50 | 9.31 | 9.57 | 9.57 | 9.39 | 9.57 |
| 15.00 | 9.30 | 9.53 | 9.53 | 9.39 | 9.53 |
| 17.50 | 8.97 | 9.53 | 9.53 | 9.08 | 9.53 |
| 20.00 | 8.64 | 8.88 * | 8.88 * | 8.75 | 9.08 |
| 25.00 | 7.98 | 8.61 * | 8.61 * | 8.09 | 8.70 |
| 30.00 | 7.34 | 8.33 | 8.40 | 7.45 | 8.05 |
| 35.00 | 6.70 | 7.78 | 7.85 | 6.81 | 7.42 |
| 40.00 | 6.07 | 7.24 | 7.29 | 6.18 | 6.80 |
| 45.00 | 5.45 | 6.70 | 6.72 | 5.56 | 6.17 |
| 45.02 | 5.44 | -- | -- | -- | -- |
| 45.48 | | -- | -- | 5.50 | -- |
| 48.07 | | -- | -- | | 5.79 |
| 49.34 | | 6.22 | -- | | |
| 49.82 | | | 6.10 | | |

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NOTE: A "--" indicates that there is no entry for this box and the limit can be determined by linearly interpolating between the previous and next point in each column. MAPLHGRs are interpolated between exposure points for which explicit values are given. The exposure for the last MAPLHGR listed for a lattice is the maximum allowed nodal exposure for that lattice.

* Revised per EWG-N-04-016, NMP-1 Hydrogen/Oxygen Recombination MAPLHGR Setdown, Rev. 1

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Table 1b

MAPLHGR VERSUS AVERAGE PLANAR EXPOSURE
Bundle Type: GE11-P9DUB376-12GZ-100T-145-T-2584 (GE11)

| Average Planar Exposure GWd/ST | MAPLHGR Limits (kw/ft) | | | | |
|-----------------------------------|------------------------|-----------------|-----------------|-----------------|-----------------|
| | Lattice 5662 | Lattice 5663 | Lattice 5667 | Lattice 5665 | Lattice 5666 |
| 0.00 | 9.26 | 8.47 | 8.54 | 9.31 | 9.77 |
| 0.20 | 9.21 | 8.51 | 8.58 | 9.26 | 9.75 |
| 1.00 | 9.07 | 8.58 | 8.67 | 9.14 | 9.67 |
| 2.00 | 9.04 | 8.69 | 8.81 | 9.12 | 9.66 |
| 3.00 | 9.07 | 8.80 | 8.97 | 9.14 | 9.69 |
| 4.00 | 9.11 | 8.93 | 9.13 | 9.19 | 9.73 |
| 5.00 | 9.16 | 9.07 | 9.31 | 9.23 | 9.70 |
| 6.00 | 9.20 | 9.17 | 9.41 | 9.28 | 9.69 |
| 7.00 | 9.23 | 9.24 | 9.47 | 9.31 | 9.69 |
| 8.00 | 9.26 | 9.31 | 9.55 | 9.34 | 9.68 |
| 9.00 | 9.28 | 9.39 | 9.64 | 9.36 | 9.68 |
| 10.00 | 9.29 | 9.47 | 9.67 | 9.38 | 9.67 |
| 12.50 | 9.31 | 9.60 | 9.60 | 9.39 | 9.60 |
| 15.00 | 9.30 | 9.53 | 9.53 | 9.39 | 9.53 |
| 17.50 | 8.97 | 9.53 | 9.53 | 9.08 | 9.53 |
| 20.00 | 8.64 | 8.88 * | 8.88 * | 8.75 | 9.08 |
| 25.00 | 7.98 | 8.61 * | 8.61 * | 8.09 | 8.70 |
| 30.00 | 7.34 | 8.33 | 8.41 | 7.45 | 8.05 |
| 35.00 | 6.70 | 7.78 | 7.74 | 6.81 | 7.42 |
| 40.00 | 6.07 | 7.24 | 7.11 | 6.18 | 6.80 |
| 45.00 | 5.45 | 6.70 | 6.52 | 5.56 | 6.17 |
| 45.02 | 5.44 | -- | -- | -- | -- |
| 45.48 | | -- | -- | 5.50 | -- |
| 48.07 | | -- | -- | | 5.79 |
| 49.34 | | 6.22 | -- | | |
| 49.83 | | | 5.99 | | |

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NOTE: A "--" indicates that there is no entry for this box and the limit can be determined by linearly interpolating between the previous and next point in each column. MAPLHGRs are interpolated between exposure points for which explicit values are given. The exposure for the last MAPLHGR listed for a lattice is the maximum allowed nodal exposure for that lattice.

* Revised per EWG-N-04-016, NMP-1 Hydrogen/Oxygen Recombination MAPLHGR Setdown, Rev. 1

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Table 1c

MAPLHGR VERSUS AVERAGE PLANAR EXPOSURE
 Bundle Type: GE11-P9DUB362-13GZ-100T-145-T-2414 (GE11)

| Average Planar Exposure GWd/ST | MAPLHGR Limits (kw/ft) | | | | | |
|--------------------------------|------------------------|--------------|--------------|--------------|--------------|--------------|
| | Lattice 8047 | Lattice 8048 | Lattice 8049 | Lattice 8050 | Lattice 8051 | Lattice 8052 |
| 0.00 | 8.80 | 8.66 | 8.79 | 8.64 | 8.80 | 8.80 |
| 0.20 | 8.82 | 8.71 | 8.82 | 8.67 | 8.82 | 8.82 |
| 1.00 | 8.89 | 8.79 | 8.89 | 8.74 | 8.89 | 8.89 |
| 2.00 | 8.97 | 8.90 | 8.97 | 8.82 | 8.97 | 8.97 |
| 3.00 | 9.06 | 9.01 | 9.05 | 8.91 | 9.06 | 9.06 |
| 4.00 | 9.11 | 9.12 | 9.13 | 9.00 | 9.14 | 9.14 |
| 5.00 | 9.16 | 9.20 | 9.22 | 9.09 | 9.22 | 9.22 |
| 6.00 | 9.20 | 9.29 | 9.29 | 9.19 | 9.28 | 9.29 |
| 7.00 | 9.23 | 9.36 | 9.36 | 9.29 | 9.31 | 9.36 |
| 8.00 | 9.26 | 9.42 | 9.42 | 9.40 | 9.34 | 9.42 |
| 9.00 | 9.28 | 9.49 | 9.49 | 9.49 | 9.36 | 9.49 |
| 10.00 | 9.29 | 9.56 | 9.56 | 9.56 | 9.38 | 9.56 |
| 12.50 | 9.31 | 9.53 | 9.53 | 9.53 | 9.39 | 9.53 |
| 15.00 | 9.30 | 9.50 | 9.50 | 9.50 | 9.39 | 9.50 |
| 17.50 | 8.97 | 9.49 | 9.49 | 9.49 | 9.08 | 9.49 |
| 20.00 | 8.64 | 9.44 | 9.44 | 9.33 | 8.75 | 9.43 |
| 25.00 | 7.98 | 8.58 * | 8.58 * | 8.58 * | 8.09 | 8.76 |
| 30.00 | 7.34 | 8.32 | 8.32 | 8.20 | 7.45 | 8.14 |
| 35.00 | 6.70 | 7.76 | 7.76 | 7.64 | 6.81 | 7.51 |
| 40.00 | 6.07 | 7.20 | 7.20 | 7.11 | 6.18 | 6.88 |
| 45.00 | 5.45 | 6.64 | 6.64 | 6.53 | 5.56 | 6.26 |
| 45.02 | 5.44 | -- | -- | -- | -- | -- |
| 45.48 | | -- | -- | -- | 5.50 | -- |
| 48.44 | | -- | -- | -- | | 5.83 |
| 48.78 | | -- | -- | 6.17 | | |
| 49.20 | | -- | 6.19 | | | |
| 49.25 | | 6.18 | | | | |

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NOTE: A "--" indicates that there is no entry for this box and the limit can be determined by linearly interpolating between the previous and next point in each column. MAPLHGRs are interpolated between exposure points for which explicit values are given. The exposure for the last MAPLHGR listed for a lattice is the maximum allowed nodal exposure for that lattice.

* Revised per EWG-N-04-016, NMP-1 Hydrogen/Oxygen Recombination MAPLHGR Setdown, Rev. 1

Table 1d

MAPLHGR VERSUS AVERAGE PLANAR EXPOSURE
Bundle Type: GE11-P9DUB340-12GZ1-100T-145-T (GE11)

| Average Planar Exposure GWd/ST | MAPLHGR Limits (kw/ft) | | | | | |
|--------------------------------|------------------------|--------------|--------------|--------------|--------------|--------------|
| | Lattice 2361 | Lattice 2419 | Lattice 2420 | Lattice 2364 | Lattice 2366 | Lattice 2367 |
| 0.00 | 9.28 | 8.39 | 8.53 | 8.45 | 9.34 | 9.79 |
| 0.20 | 9.23 | 8.42 | 8.55 | 8.49 | 9.29 | 9.77 |
| 1.00 | 9.10 | 8.48 | 8.60 | 8.60 | 9.16 | 9.69 |
| 2.00 | 9.07 | 8.62 | 8.73 | 8.75 | 9.14 | 9.68 |
| 3.00 | 9.10 | 8.75 | 8.90 | 8.92 | 9.17 | 9.71 |
| 4.00 | 9.14 | 8.84 | 8.98 | 9.09 | 9.21 | 9.75 |
| 5.00 | 9.18 | 8.94 | 9.06 | 9.20 | 9.26 | 9.79 |
| 6.00 | 9.22 | 9.02 | 9.14 | 9.29 | 9.30 | 9.82 |
| 7.00 | 9.26 | 9.10 | 9.21 | 9.37 | 9.34 | 9.85 |
| 8.00 | 9.28 | 9.19 | 9.28 | 9.45 | 9.36 | 9.87 |
| 9.00 | 9.30 | 9.27 | 9.34 | 9.51 | 9.38 | 9.89 |
| 10.00 | 9.32 | 9.34 | 9.40 | 9.55 | 9.40 | 9.90 |
| 12.50 | 9.33 | 9.44 | 9.44 | 9.41 | 9.42 | 9.90 |
| 15.00 | 9.32 | 9.45 | 9.45 | 9.47 | 9.41 | 9.89 |
| 17.50 | 9.00 | 9.18 | 9.18 | 9.29 | 9.11 | 9.70 |
| 20.00 | 8.67 | 8.90 | 8.91 | 9.00 | 8.77 | 9.37 |
| 25.00 | 8.01 | 8.35 | 8.36 | 8.42 | 8.12 | 8.71 |
| 30.00 | 7.37 | 7.82 | 7.83 | 7.88 | 7.48 | 8.07 |
| 35.00 | 6.73 | 7.31 | 7.31 | 7.36 | 6.84 | 7.44 |
| 40.00 | 6.10 | 6.80 | 6.81 | 6.84 | 6.21 | 6.82 |
| 45.00 | 5.48 | 6.29 | 6.30 | 6.33 | 5.59 | 6.19 |
| 45.18 | 5.45 | -- | -- | -- | -- | -- |
| 45.64 | | -- | -- | -- | 5.51 | -- |
| 47.13 | | 6.07 | -- | -- | | -- |
| 47.21 | | | 6.07 | -- | | -- |
| 47.77 | | | | 6.05 | | -- |
| 48.19 | | | | | | 5.79 |

NOTE: A "--" indicates that there is no entry for this box and the limit can be determined by linearly interpolating between the previous and next point in each column. MAPLHGRs are interpolated between exposure points for which explicit values are given. The exposure for the last MAPLHGR listed for a lattice is the maximum allowed nodal exposure for that lattice.

Table 1e

MAPLHGR VERSUS AVERAGE PLANAR EXPOSURE
Bundle Type: GE11-P9DUB339-12GZ-100T-145-T-2334 (GE11)

| Average Planar Exposure GWd/ST | MAPLHGR Limits (kw/ft) | | | | | |
|--------------------------------|------------------------|--------------|--------------|--------------|--------------|--------------|
| | Lattice 2718 | Lattice 2719 | Lattice 2720 | Lattice 2721 | Lattice 2722 | Lattice 2723 |
| 0.00 | 8.88 | 8.72 | 8.85 | 8.60 | 8.88 | 8.88 |
| 0.20 | 8.90 | 8.75 | 8.90 | 8.65 | 8.90 | 8.90 |
| 1.00 | 8.96 | 8.81 | 8.96 | 8.76 | 8.96 | 8.96 |
| 2.00 | 9.04 | 8.88 | 9.03 | 8.92 | 9.05 | 9.05 |
| 3.00 | 9.07 | 8.96 | 9.10 | 9.08 | 9.14 | 9.14 |
| 4.00 | 9.11 | 9.04 | 9.17 | 9.23 | 9.19 | 9.23 |
| 5.00 | 9.16 | 9.12 | 9.24 | 9.32 | 9.23 | 9.32 |
| 6.00 | 9.20 | 9.20 | 9.32 | 9.39 | 9.28 | 9.39 |
| 7.00 | 9.23 | 9.29 | 9.39 | 9.46 | 9.31 | 9.46 |
| 8.00 | 9.26 | 9.38 | 9.47 | 9.52 | 9.34 | 9.52 |
| 9.00 | 9.28 | 9.47 | 9.55 | 9.59 | 9.36 | 9.59 |
| 10.00 | 9.29 | 9.56 | 9.63 | 9.66 | 9.38 | 9.66 |
| 12.50 | 9.31 | 9.62 | 9.62 | 9.62 | 9.39 | 9.62 |
| 15.00 | 9.30 | 9.57 | 9.57 | 9.57 | 9.39 | 9.57 |
| 17.50 | 8.97 | 9.33 | 9.33 | 9.33 | 9.08 | 9.33 |
| 20.00 | 8.64 | 8.64 * | 8.64 * | 8.64 * | 8.75 | 8.85 |
| 25.00 | 7.98 | 8.46 * | 8.46 * | 8.46 * | 8.09 | 8.68 |
| 30.00 | 7.34 | 8.18 * | 8.18 * | 8.18 * | 7.45 | 8.05 |
| 35.00 | 6.70 | 7.72 | 7.73 | 7.90 | 6.81 | 7.42 |
| 40.00 | 6.07 | 7.23 | 7.24 | 7.33 | 6.18 | 6.80 |
| 45.00 | 5.45 | 6.76 | 6.76 | 6.79 | 5.56 | 6.17 |
| 45.02 | 5.44 | -- | -- | -- | -- | -- |
| 45.48 | | -- | -- | -- | 5.50 | -- |
| 48.07 | | -- | -- | -- | | 5.79 |
| 49.70 | | 6.28 | -- | -- | | |
| 49.75 | | | 6.28 | -- | | |
| 50.00 | | | | 6.28 | | |

Rev 1

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NOTE: A "--" indicates that there is no entry for this box and the limit can be determined by linearly interpolating between the previous and next point in each column. MAPLHGRs are interpolated between exposure points for which explicit values are given. The exposure for the last MAPLHGR listed for a lattice is the maximum allowed nodal exposure for that lattice.

* Revised per EWG-N-04-016, NMP-1 Hydrogen/Oxygen Recombination MAPLHGR Setdown, Rev. 1

Table 1f
Most Limiting MAPLHGR vs. Average Planar Exposure

| Average Planar Exposure (GWd/ST) | MAPLHGR Limits (kw/ft) | | | | |
|----------------------------------|------------------------|----------|----------|-----------------|-----------------|
| | P9DUB339 | P9DUB362 | P9DUB340 | P9DUB376 (2583) | P9DUB376 (2584) |
| 0.00 | 8.60 | 8.64 | 8.39 | 8.47 | 8.47 |
| 0.20 | 8.65 | 8.67 | 8.42 | 8.51 | 8.51 |
| 1.00 | 8.76 | 8.74 | 8.48 | 8.58 | 8.58 |
| 2.00 | 8.88 | 8.82 | 8.62 | 8.69 | 8.69 |
| 3.00 | 8.96 | 8.91 | 8.75 | 8.80 | 8.80 |
| 4.00 | 9.04 | 9.00 | 8.84 | 8.93 | 8.93 |
| 5.00 | 9.12 | 9.09 | 8.94 | 9.07 | 9.07 |
| 6.00 | 9.20 | 9.19 | 9.02 | 9.17 | 9.17 |
| 7.00 | 9.29 | 9.29 | 9.10 | 9.24 | 9.24 |
| 8.00 | 9.38 | 9.40 | 9.19 | 9.31 | 9.31 |
| 9.00 | 9.47 | 9.49 | 9.27 | 9.39 | 9.39 |
| 10.00 | 9.56 | 9.56 | 9.34 | 9.47 | 9.47 |
| 12.50 | 9.62 | 9.53 | 9.41 | 9.57 | 9.60 |
| 15.00 | 9.57 | 9.50 | 9.45 | 9.53 | 9.53 |
| 17.50 | 9.33 | 9.49 | 9.18 | 9.53 | 9.53 |
| 20.00 | 8.64 * | 9.33 | 8.90 | 8.88 * | 8.88 * |
| 25.00 | 8.46 * | 8.58 * | 8.35 | 8.61 * | 8.61 * |
| 30.00 | 8.18 * | 8.20 | 7.82 | 8.33 | 8.33 |
| 35.00 | 7.72 | 7.64 | 7.31 | 7.78 | 7.74 |
| 40.00 | 7.23 | 7.11 | 6.80 | 7.24 | 7.11 |
| 45.00 | 6.76 | 6.53 | 6.29 | 6.70 | 6.52 |
| 47.13 | -- | -- | 6.07 | -- | -- |
| 47.16 | -- | -- | | -- | -- |
| 48.78 | -- | 6.17 | | -- | -- |
| 49.34 | -- | | | 6.16 | 6.04 |
| 49.82 | -- | | | | |
| 49.83 | -- | | | | |
| 49.70 | 6.28 | | | | |

Rev 2

NOTE: A "--" indicates that there is no entry for this box and the limit can be determined by linearly interpolating between the previous and next point in each column. MAPLHGRs are interpolated between exposure points for which explicit values are given. The exposure for the last MAPLHGR listed for a lattice is the maximum allowed nodal exposure for that lattice.

* Revised per EWG-N-04-016, NMP-1 Hydrogen/Oxygen Recombination MAPLHGR Setdown, Rev. 1

Rev 2

Figure 2a NMP-1 K(f) Curve for MCPR

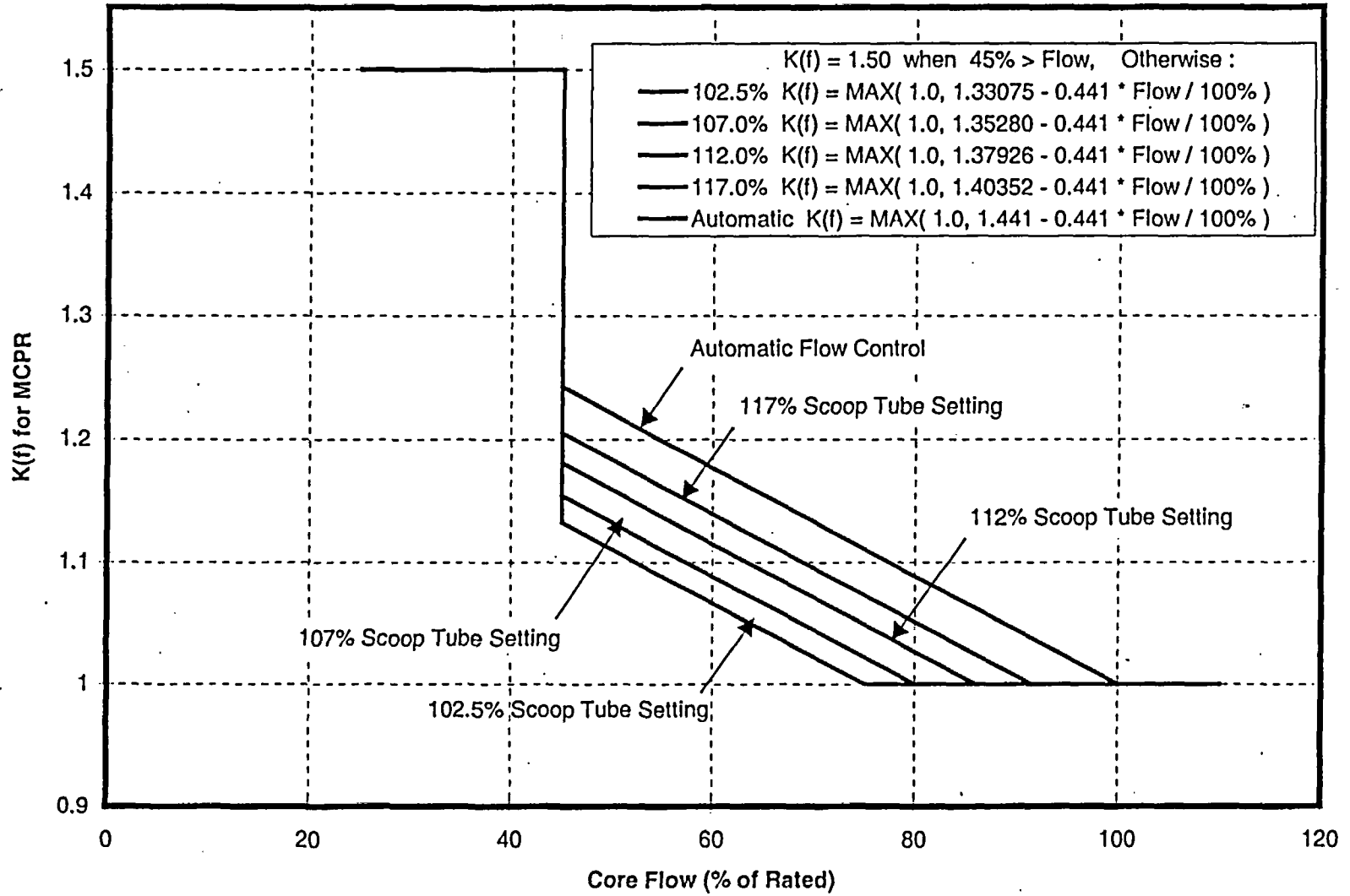


Figure 2b: MCPR Limits for Operation Between 45% and 90% RTP
Without a Backup Pressure Regulator

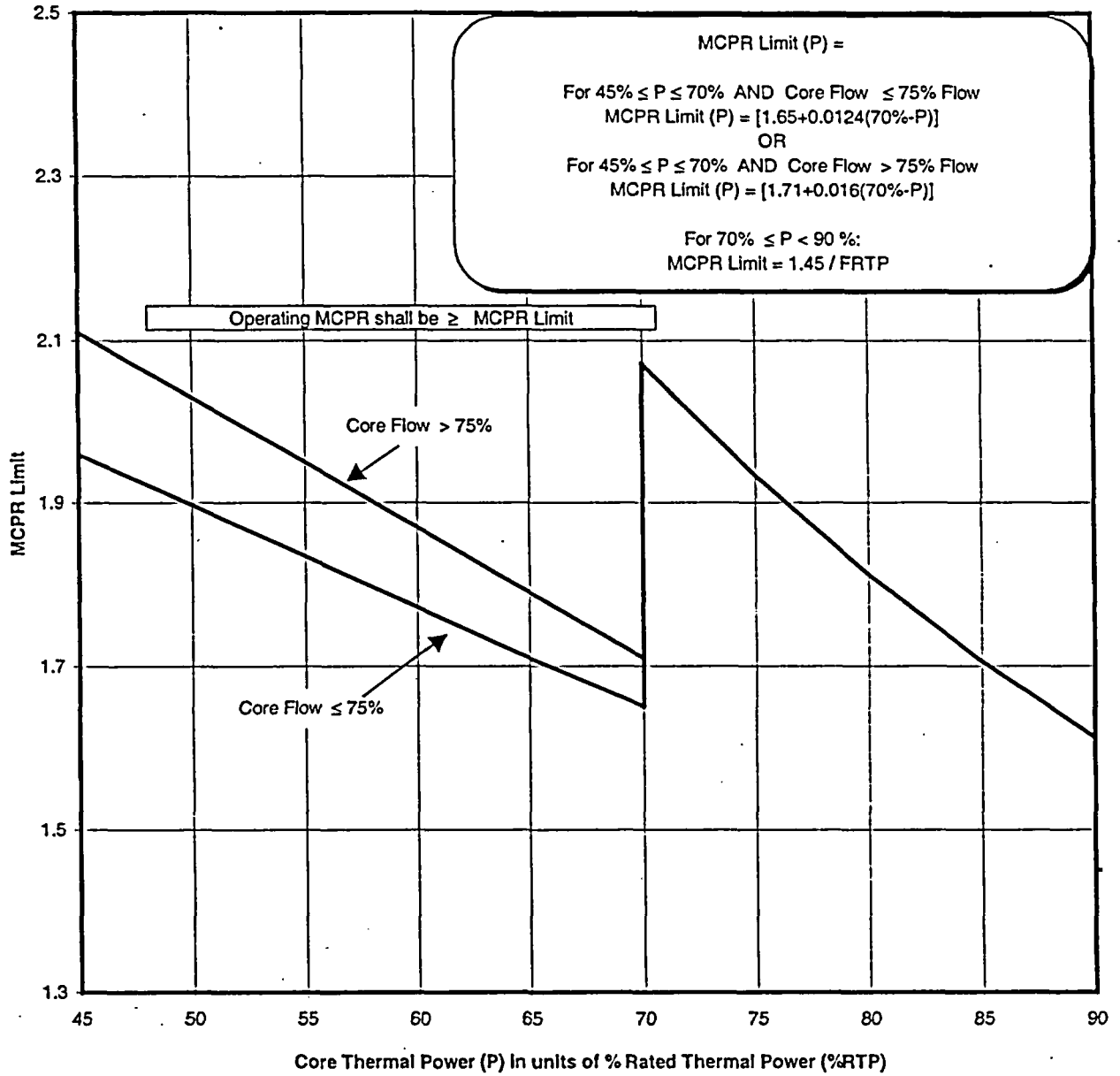


Figure 3: LHGR Limits for Operation Between 45% and 90% RTP
Without a Backup Pressure Regulator

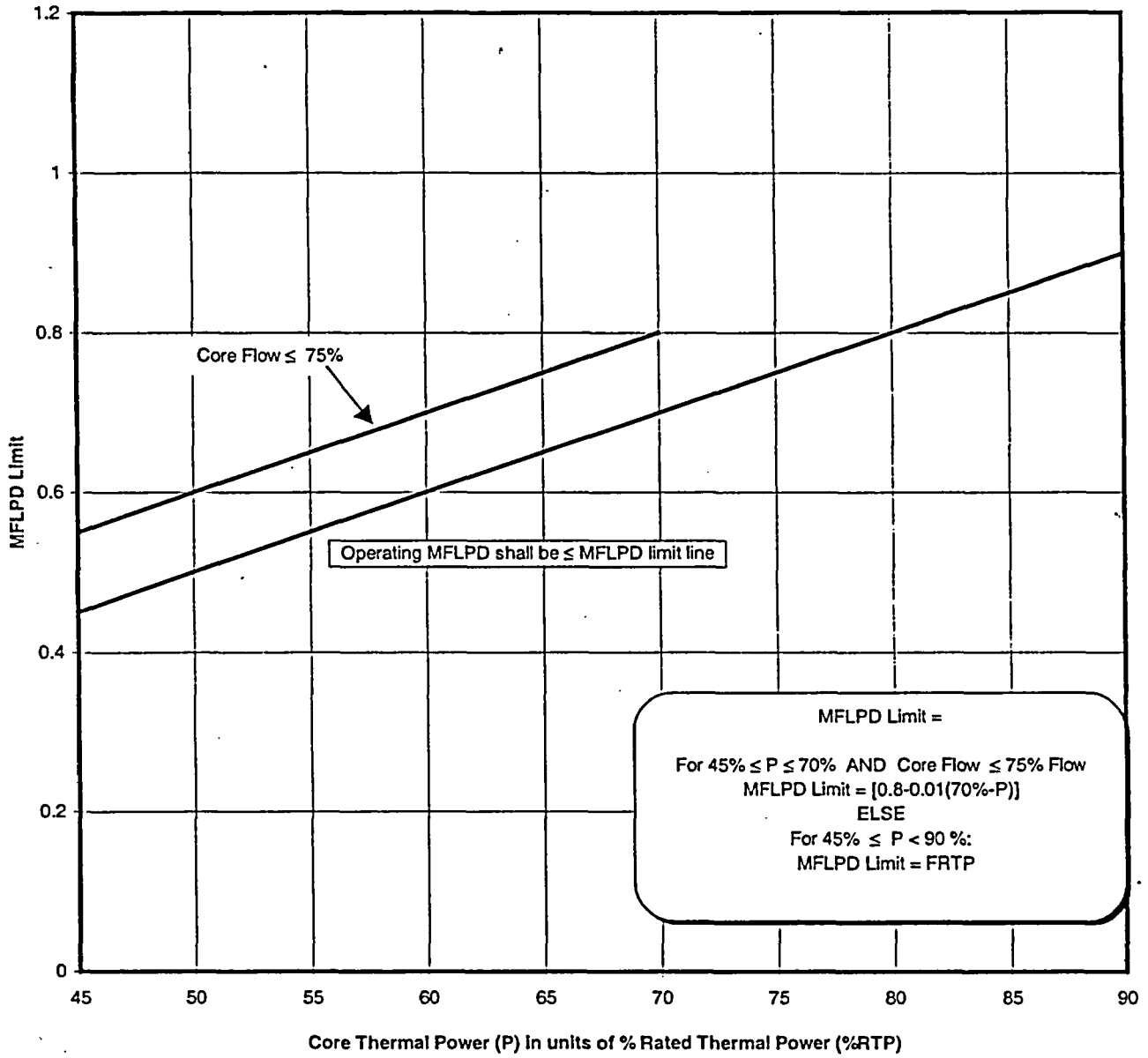


Figure 4 Limiting Power / Flow Line

