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BVY 02-84

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

Subject: **Vermont Yankee Nuclear Power Station**
License No. DPR-28 (Docket No. 50-271)
Core Operating Limits Report for Cycle 23

In accordance with Section 6.6.C of the Vermont Yankee Technical Specifications, enclosed is the Core Operating Limits Report (COLR) for Cycle 23. This report presents the cycle-specific operating limits for Cycle 23 of the Vermont Yankee Nuclear Power Station.

If you have any questions concerning this transmittal, please contact Mr. Jim DeVincentis at (802) 258-4236.

Sincerely,

Michael A. Balduzzi
Vice President, Operations

Enclosure

cc: USNRC Region 1 Administrator
USNRC Resident Inspector – VYNPS
USNRC Project Manager – VYNPS
Vermont Department of Public Service

A001

SUMMARY OF VERMONT YANKEE COMMITMENTS

BVY NO.: 02-84 Core Operating Limits Report for Cycle 23

The following table identifies commitments made in this document by Vermont Yankee. Any other actions discussed in the submittal represent intended or planned actions by Vermont Yankee. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the Licensing Manager of any questions regarding this document or any associated commitments.

COMMITMENT	COMMITTED DATE OR "OUTAGE"
None	N/A

Vermont Yankee Nuclear Power Station
Cycle 23
Core Operating Limits Report
Revision 0
October 2002

Prepared Ed Duda *Ed Duda* 10/14/2002
Reactor Engineer — Date

Reviewed Bob Vita *[signature]* 10/15/02
Reactor Engineer — Date

Approved David J. Mannay *[signature]* 10/15/02
Reactor Engineering Superintendent — Date

Reviewed Mona M. Houle Mtg 2002-060 10/18/02
Plant Operations Review Committee — Date

Approved *Kevin A. Bursa* 10/18/02
General Manager, Plant Operations — Date

Approved *Michael A Balduzzi* 10/18/02
Vice President, Operations — Date

REVISION RECORD

Cycle	Revision	Date	Description
23	0	10/2002	Cycle 23 revision. Reviewed by PORC and approved by management.

ABSTRACT

This report presents the cycle-specific operating limits for the operation of Cycle 23 of the Vermont Yankee Nuclear Power Station. The limits are the maximum average planar linear heat generation rate, maximum linear heat generation rate, minimum critical power ratio, and thermal-hydraulic stability exclusion region.

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1.0 INTRODUCTION

This report provides the cycle-specific limits for operation of the Vermont Yankee Nuclear Power Station in Cycle 23. It includes the limits for the maximum average planar linear heat generation rate, maximum linear heat generation rate, minimum critical power ratio, and thermal-hydraulic stability exclusion region. If any of these limits are exceeded, action will be taken as defined in the Technical Specifications.

This Core Operating Limits report for Cycle 23 has been prepared in accordance with the requirements of Technical Specifications 6.6.C. The core operating limits have been developed using the NRC-approved methodologies listed in References 1 through 3. The methodologies are also listed in Technical Specification 6.6.C. The bases for these limits are in References 5 through 8 and 11 through 13.

2.0 CORE OPERATING LIMITS

The Cycle 23 operating limits have been defined using NRC-approved methodologies. Cycle 23 must be operated within the bounds of these limits and all others specified in the Technical Specifications.

2.1 Maximum Average Planar Linear Heat Generation Rate Limits (T.S. 3.11.A)

During steady-state power operation, the Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) for each fuel type, as a function of the average planar exposure, shall not exceed the limiting values shown in Tables 2.1-1 through 2.1-8. For single recirculation loop operation, the limiting values shall be the values from these Tables listed under the heading "Single Loop Operation." These values are obtained by multiplying the values for two loop operation by 0.82 (References 5 and 12). The source of these values is identified on each table.

The MAPLHGR values are usually the most limiting composite of the fuel thermal-mechanical design analysis MAPLHGRs and the Loss-of-Coolant Accident (LOCA) MAPLHGRs. The fuel thermal-mechanical design analysis, using the methods in Reference 1, demonstrates that all fuel rods in a lattice, operating at the bounding power history, meet the fuel design limits specified in Reference 1. The Vermont Yankee LOCA analysis, performed in conformance with the requirements of 10CFR50.46 and Appendix K demonstrates that the LOCA analysis MAPLHGR values are bounded at all exposure points by the thermal-mechanical design analysis MAPLHGR values.

The MAPLHGR actually varies axially, depending upon the specific combination of enriched uranium and gadolinia that comprises a fuel bundle cross section at a particular axial node. Each particular combination of enriched uranium and gadolinia is called a lattice type. Each lattice type has a set of MAPLHGR values that vary with fuel burnup. The process computer will verify that these lattice MAPLHGR limits are not violated. Tables 2.1-1 through 2.1-8 provide a limiting composite of MAPLHGR values for each fuel type, which envelope the lattice MAPLHGR values employed by the process computer. When hand calculations are required, these MAPLHGR values are used for all lattices in the bundle.

2.2 Minimum Critical Power Ratio Limits (T.S. 3.11.C)

During steady-state power operation, the Minimum Critical Power Ratio (MCPR) shall be equal to, or greater than the Operating Limit MCPR (OLMCPR), as calculated by the following method. Cycle exposure dependent limits are provided through the end of rated exposure point, which is expected to be the maximum exposure attainable at full power during ICF operation. Coastdown operation is allowable down to 40% rated CTP.

The OLMCPR shall be determined based upon all scram time surveillance data at position 36, generated thus far in the cycle (Ref. 13).

First, τ_{ave} shall be determined:

$$\tau_{ave} = \frac{\sum_{i=1}^{n} N_i \tau_i}{\sum_{i=1}^{n} N_i}$$

where:

n = number of scram time tests thus far this cycle,

N_i = number of active rods measured in surveillance i, and

τ_i = average scram time to position 36 dropout of all rods measured in surveillance i.

Second, τ_B shall be determined:

$$\tau_B = \mu + 1.65 \sqrt{\left(\frac{N_1}{\sum_{i=1}^{n} N_i} \right)} \sigma$$

where:

μ = 0.830 = mean of the distribution for average scram insertion time to position 36 dropout used in the ODYN Option B analysis.

σ = 0.019 = standard deviation of the distribution for average scram insertion time to position 36 dropout used in the ODYN Option B analysis.

N_1 = number of active rods measured during the first surveillance test at BOC.

Third, determine the OLMCPR, as follows:

If $\tau_{ave} \le \tau_B$, then $OLMCPR_{Option\,B}$ from Table 2.2.1 may be used.

If $\tau_{ave} > \tau_B$, then a new OLMCPR shall be calculated:

$$OLMCPR_{New} = OLMCPR_{Option\,B} + \frac{\tau_{ave} - \tau_B}{\tau_A - \tau_B} \left(OLMCPR_{Option\,A} - OLMCPR_{Option\,B} \right)$$

where:

$OLMCPR_{Option\ A}$ = Option A OLMCPR from Table 2.2.1 based on Option A analysis using full core scram times listed in Technical Specification 3.3.C.1.2.

$OLMCPR_{Option\ B}$ = Option B OLMCPR from Table 2.2.1 based on Option B analysis described in Reference 1.

τ_A = 1.096 seconds = Technical Specification 3.3.C.1.2 core average scram time to drop-out of position 36.

For single recirculation loop operation, the MCPR limits at rated flow shall be the values from Table 2.2-1 listed under the heading, "Single Loop Operation." The single loop values are obtained by adding 0.02 to the two loop operation values (TS 1.1.A.1).

For core flows other than the rated condition, the MCPR limit shall be the appropriate value from Table 2.2-1 multiplied by K_f, where K_f is given in Figure 2.2-1 as a function of the Recirc MG Set Stop setting. Interpolation between K_f curves is allowable, provided the curve used is conservative to the Recirc MG Set Stop setting.

Also listed is the maximum RBM rod block setpoint to which the designated MCPR limits apply. This value determines the RBM rod block clamp setpoint.

These limits are only valid for the fuel types in Cycle 23.

2.3 Maximum Linear Heat Generation Rate Limits (T.S. 3.11.B)

During steady-state power operation, the Linear Heat Generation Rate (LHGR) of any rod in any fuel bundle at any axial location shall not exceed the maximum allowable LHGR limits in Table 2.3-1. This table only lists the limits for fuel types in Cycle 23.

2.4 Thermal-Hydraulic Stability Exclusion Region (T.S. 3.6.J)

For Cycle 23, based on decay ratios at the most limiting point on the power/flow, the predominate oscillation mode is core-wide. Normal plant operation is not allowed inside the bounds of the exclusion region defined in Figure 2.4-1 (Reference 7). These power and flow limits are applicable for Cycle 23. Operation inside of the exclusion region may result in a thermal-hydraulic oscillation. Intentional operation within the buffer region is not allowed unless the Stability Monitor is operable. Otherwise, the buffer region is considered part of the exclusion region.

The coordinates of the Exclusion Region are as follows:

Point	Power (%)	Flow (%)
A	73.5	50.3
B	31.8	30.6

The equation for the boundary is as follows:

$$P = P_B \left(\frac{P_A}{P_B} \right)^{\frac{1}{2}\left[\frac{W - W_B}{W_A - W_B} + \left(\frac{W - W_B}{W_A - W_B} \right)^2 \right]}$$

where,

$P =$ a core thermal power value on the Exclusion Region boundary (% of rated),
$W =$ the core flow rate corresponding to power, P, on the Exclusion Region boundary (% of rated),
$P_A =$ core thermal power at State Point A (% of rated),
$P_B =$ core thermal power at State Point B (% of rated),

$W_A =$ core flow rate at State Point A (% of rated),
$W_B =$ core flow rate at State Point B (% of rated),

The range of validity of the fit is:30.6% $\leq$%Flow $\leq$50.3%

The coordinates of the Buffer Region are as follows:

Point	Power (%)	Flow (%)
C	77.6	55.3
D	26.8	29.6

The generic equation used to generate the 5% buffer zone exclusion region boundary is:

$$P = P_D \left(\frac{P_C}{P_D} \right)^{\frac{1}{2}\left[\frac{W - W_D}{W_C - W_D} + \left(\frac{W - W_D}{W_C - W_D} \right)^2 \right]}$$

where,

$P =$ a core thermal power value on the Buffer Zone boundary (% of rated),
$W =$ the core flow rate corresponding to power, P, on the 5% Buffer Zone boundary (% of rated),
$P_C =$ core thermal power at State Point C (% of rated),
$P_D =$ core thermal power at State Point D (% of rated),
$W_C =$ core flow rate at State Point C (% of rated),
$W_D =$ core flow rate at State Point D (% of rated),

The range of validity of the fit is:29.6% $\leq$%Flow $\leq$55.3%.

2.5 Power/Flow Map

Power operation, with respect to Core Thermal Power/Total Core Flow combinations, is allowed within the boldly outlined area of Figure 2.4-1. This area is bounded by the following lines:

- Minimum Pump Speed Line; This line approximates operation at minimum pump speed. Plant start-up is performed with the recirculation pumps operating at approximately 20% speed. Reactor power level will approximately follow this line during the normal control rod withdrawal sequence.

- 5% Buffer Region Boundary; The Buffer Region is determined by adjusting the endpoints of the of the Exclusion Region and increasing the flow on the highest rod line by 5% and decreasing power on the natural circulation line by 5%. Operational restrictions regarding the Exclusion and Buffer Regions are described in Section 2.4.

- High Flow Control Line; This line is defined by the path the plant would follow if a Dual Recirculation Pump Trip/Runback were to occur starting at the Extended Load Line Limit Analysis (ELLLA) Point, 100 %Power/87% Flow.

- Rated Power Line; This line provides an upper power limit assumed in transient analyses. The Rated Power line is equivalent to 1593 MW(th), or rated power for Vermont Yankee. The value is defined in the operating license and supplied in Technical Specifications.

- 107% Flow Line; This line represents the highest allowable analyzed core flow. The analysis in Reference 11 supports the maximum attainable core flow being approximately 107% of rated core flow.

- Minimum Power Line; This lines approximates the interlock that requires recirc pump speed to be at a minimum below 20% of feedwater flow. This interlock ensures NPSH requirements are met.

Additionally, up to approximately 20% Core Thermal Power, operation is allowed only at Minimum Pump Speed to ensure cavitation of Recirc Pumps and Jet Pumps does not occur.

Table 2.1-1

MAPLHGR Versus Average Planar Exposure for GE9B-P8DWB335-10GZ-80M-150-T
Fuel Bundle No. 2017

Average Planar Exposure (GWd/ST)	MAPLHGR (kW/ft)	
	Two Loop Operation	Single Loop Operation[1]
0.00	11.29	9.25
0.20	11.34	9.29
1.00	11.48	9.41
2.00	11.69	9.58
3.00	11.92	9.77
4.00	12.17	9.97
5.00	12.43	10.19
6.00	12.68	10.39
7.00	12.87	10.55
8.00	13.06	10.70
9.00	13.24	10.85
10.00	13.35	10.94
12.50	13.20	10.82
15.00	13.01	10.66
20.00	12.27	10.06
25.00	11.43	9.37
35.00	9.88	8.10
45.00	8.38	6.87
50.59	5.65	4.63

The process computer utilizes exposure dependent MAPLHGR limits for each lattice type as provided in Reference 8. When hand calculations of MAPLHGR are performed, the limits shall not exceed the limits provided in the table above for this fuel type (Ref. 1).

Technical Specification References: 3.6.G.1a and 3.11.A.

1 MAPLHGR for single loop operation is obtained by multiplying MAPLHGR for two loop operation by 0.82.

Table 2.1-2

MAPLHGR Versus Average Planar Exposure for GE13-P9HTB380-12GZ-100T-146-T
Fuel Bundle No 2278

Average Planar Exposure (GWd/ST)	MAPLHGR (kW/ft)	
	Two Loop Operation	Single Loop Operation[1]
0.00	10.64	8.72
0.20	10.71	8.78
1.00	10.85	8.89
2.00	11.04	9.05
3.00	11.23	9.20
4.00	11.43	9.37
5.00	11.64	9.54
6.00	11.82	9.69
7.00	11.96	9.80
8.00	12.12	9.93
9.00	12.27	10.06
10 00	12.44	10.20
12.50	12.57	10.30
15.00	12.24	10.03
17.50	11.90	9.75
20.00	11.54	9.46
25.00	10.82	8.87
30.00	10.12	8.29
35.00	9.43	7.73
40.00	8.76	7.18
45.00	8.10	6.64
50.00	7.44	6.10
55.00	6.77	5.55
57.58	6.42	5.26

The process computer utilizes exposure dependent MAPLHGR limits for each lattice type as provided in Reference 8. When hand calculations of MAPLHGR are performed, the limits shall not exceed the limits provided in the table above for this fuel type (Ref. 1).

Technical Specification References: 3.6.G.1a and 3.11.A.

1 MAPLHGR for single loop operation is obtained by multiplying MAPLHGR for two loop operation by 0.82.

Table 2.1-3

MAPLHGR Versus Average Planar Exposure for GE13-P9HTB379-13GZ-100T-146-T
Fuel Bundle No. 2279

Average Planar Exposure (GWd/ST)	MAPLHGR (kW/ft)	
	Two Loop Operation	Single Loop Operation[1]
0.00	10.64	8.72
0.20	10.69	8.76
1.00	10.81	8.86
2.00	10.99	9.01
3.00	11.18	9.16
4.00	11.36	9.31
5.00	11.49	9.42
6.00	11.63	9.53
7.00	11.78	9.65
8.00	11.92	9.77
9.00	12.07	9.89
10.00	12.22	10.02
12.50	12.33	10.11
15.00	12.23	10.02
17.50	11.90	9.75
20.00	11.54	9.46
25.00	10.82	8.87
30.00	10.11	8.29
35.00	9.42	7.72
40.00	8.75	7.17
45.00	8.09	6.63
50.00	7.43	6.09
55.00	6.76	5.54
57.56	6.40	5.24

The process computer utilizes exposure dependent MAPLHGR limits for each lattice type as provided in Reference 8. When hand calculations of MAPLHGR are performed, the limits shall not exceed the limits provided in the table above for this fuel type (Ref. 1).

Technical Specification References: 3.6.G.1a and 3.11.A.

1 MAPLHGR for single loop operation is obtained by multiplying MAPLHGR for two loop operation by 0.82.

Table 2.1-4

MAPLHGR Versus Average Planar Exposure for GE13-P9DTB386-11G4 0/1G3.0-100T-146-T-2425
Fuel Bundle No 2425

Average Planar Exposure (GWd/ST)	MAPLHGR (kW/ft)	
	Two Loop Operation	Single Loop Operation[1]
0.00	10.87	8.91
0.20	10.94	8.97
1.00	11.09	9.09
2.00	11.29	9.25
3.00	11.50	9.43
4.00	11.68	9.57
5.00	11.87	9.73
6.00	12.06	9.88
7.00	12.26	10.05
8.00	12.41	10.17
9.00	12.55	10.29
10.00	12.66	10.38
12.50	12.59	10.32
15.00	12.28	10.06
17.50	11.95	9.79
20.00	11.62	9.52
25.00	10.92	8.95
30.00	10.22	8.38
35.00	9.54	7.82
40.00	8.87	7.27
45.00	8.20	6.72
50.00	7.52	6.16
55.00	6.84	5.60
57.58	6.47	5.30

The process computer utilizes exposure dependent MAPLHGR limits for each lattice type as provided in Reference 8. When hand calculations of MAPLHGR are performed, the limits shall not exceed the limits provided in the table above for this fuel type (Ref. 1).

Technical Specification References: 3.6.G.1a and 3.11.A.

1 MAPLHGR for single loop operation is obtained by multiplying MAPLHGR for two loop operation by 0.82.

Table 2.1-5

MAPLHGR Versus Average Planar Exposure for GE13-P9DTB225-NOG-100T-146-T-2570
Fuel Bundle No. 2570

Average Planar Exposure (GWd/ST)	MAPLHGR (kW/ft)	
	Two Loop Operation	Single Loop Operation[1]
0.00	12.95	10.61
0.20	12.91	10.58
1.00	12.88	10.56
2.00	12.88	10.56
3.00	12.91	10.58
4.00	12.94	10.61
5.00	12.99	10.65
6.00	13.05	10.70
7.00	13.10	10.74
8.00	13.10	10.74
9.00	13.10	10.74
10.00	13.10	10.74
12.50	13.10	10.74
15.00	13.03	10.68
17.50	12.75	10.45
20.00	12.45	10.20
25.00	11.56	9.47
30.00	10 54	8.64
35.00	9.51	7.79
40.00	8.53	6.99
45.00	7.61	6.24
50.00	6.75	5.53
55.00	5.93	4.86
56.78	5.65	4.63

The process computer utilizes exposure dependent MAPLHGR limits for each lattice type as provided in Reference 8. When hand calculations of MAPLHGR are performed, the limits shall not exceed the limits provided in the table above for this fuel type (Ref. 1).

Technical Specification References: 3.6 G.1a and 3.11.A.

1 MAPLHGR for single loop operation is obtained by multiplying MAPLHGR for two loop operation by 0.82.

Table 2.1-6

MAPLHGR Versus Average Planar Exposure for GE14-P10DNAB394-7G5.0/6G4.0-100T-150-T-2538
Fuel Bundle No 2538

Average Planar Exposure (GWd/ST)	MAPLHGR (kW/ft)	
	Two Loop Operation	Single Loop Operation[1]
0.00	9.66	7.92
0.20	9.73	7.97
1.00	9.87	8.09
2.00	10.03	8.22
3.00	10.19	8.35
4.00	10.37	8.50
5.00	10.55	8.65
6.00	10.74	8.80
7.00	10.93	8.96
8.00	11.10	9.10
9.00	11.26	9.23
10.00	11.42	9.36
11.00	11.57	9.48
12.00	11.64	9.54
13.00	11.62	9.52
14.00	11.57	9.48
15.00	11.50	9.43
17.00	11.31	9.27
20.00	10.98	9.00
25.00	10.44	8.56
30.00	9.92	8.13
35.00	9.40	7.70
40.00	8.90	7.29
45.00	8.38	6.87
50.00	7.84	6.42
55.00	5.91	4.84
57.13	4.85	3.97

The process computer utilizes exposure dependent MAPLHGR limits for each lattice type as provided in Reference 8. When hand calculations of MAPLHGR are performed, the limits shall not exceed the limits provided in the table above for this fuel type (Ref. 1).

Technical Specification References· 3.6.G.1a and 3.11.A.

1 MAPLHGR for single loop operation is obtained by multiplying MAPLHGR for two loop operation by 0.82.

Table 2.1-7

MAPLHGR Versus Average Planar Exposure for GE14-P10DNAB394-8G5.0/6G4 0-100T-150-T-2589
Fuel Bundle No 2589

Average Planar Exposure (GWd/ST)	MAPLHGR (kW/ft)	
	Two Loop Operation	Single Loop Operation[1]
0.00	9.56	7.83
0.20	9.63	7.89
1.00	9.77	8.01
2.00	9.95	8.15
3.00	10.11	8.29
4.00	10.29	8.43
5.00	10.47	8.58
6.00	10.66	8.74
7.00	10.85	8.89
8.00	11.02	9.03
9.00	11.18	9.16
10.00	11.34	9.29
11.00	11.51	9.43
12.00	11.58	9.49
13.00	11.58	9.49
14.00	11.55	9.47
15.00	11.49	9.42
17.00	11.30	9.26
20.00	10.98	9.00
25.00	10.44	8.56
30.00	9.91	8.12
35.00	9.40	7.70
40.00	8.89	7.28
45.00	8.38	6.87
50.00	7.83	6.42
55.00	5.89	4.82
57.08	4.85	3.97

The process computer utilizes exposure dependent MAPLHGR limits for each lattice type as provided in Reference 8. When hand calculations of MAPLHGR are performed, the limits shall not exceed the limits provided in the table above for this fuel type (Ref. 1).

Technical Specification References: 3.6.G.1a and 3.11.A.

1 MAPLHGR for single loop operation is obtained by multiplying MAPLHGR for two loop operation by 0.82.

Table 2.1-8

MAPLHGR Versus Average Planar Exposure for GE14-P10DNAB394-12G5.0-100T-150-T-2590
Fuel Bundle No. 2590

Average Planar Exposure (GWd/ST)	MAPLHGR (kW/ft)	
	Two Loop Operation	Single Loop Operation[1]
0.00	9.81	8.04
0.20	9.87	8.09
1.00	9.97	8.17
2.00	10.11	8.29
3.00	10.26	8.41
4.00	10.41	8.53
5.00	10.57	8.66
6.00	10.74	8.80
7.00	10.91	8.94
8.00	11.06	9.06
9.00	11.19	9.17
10.00	11.33	9.29
11.00	11.46	9.39
12.00	11.53	9.45
13.00	11.52	9.44
14.00	11.49	9.42
15.00	11.44	9.38
17.00	11.28	9.24
20.00	10.97	8.99
25.00	10.44	8.56
30.00	9.91	8.12
35.00	9.40	7.70
40.00	8.89	7.28
45.00	8.38	6.87
50.00	7.84	6.42
55.00	5.92	4.85
57.14	4.85	3.97

The process computer utilizes exposure dependent MAPLHGR limits for each lattice type as provided in Reference 8. When hand calculations of MAPLHGR are performed, the limits shall not exceed the limits provided in the table above for this fuel type (Ref. 1).

Technical Specification References: 3.6.G.1a and 3.11.A.

1 MAPLHGR for single loop operation is obtained by multiplying MAPLHGR for two loop operation by 0.82.

Table 2.2-1

Cycle 23 MCPR Operating Limits (OLMCPR) and RBM Setpoints

MCPR Operating Limits (OLMCPR)

Option	Cycle Exposure Range	Two Loop Operation[2]	Single Loop Operation[1]
Option A	0 to 10375 MWd/St	1.49	1.51
	beyond 10375 MWd/St	1.61	1.63
Option B	0 to 10375 MWd/St	1.40	1.42
	beyond 10375 MWd/St	1.44	1.46

Source: References 6 and 7.

1 The MCPR operating limit is increased by 0.02 for single loop operation.

2 The two loop MCPR operating limits bound ICF operation throughout the cycle.

RBM Setpoints[3]

Maximum Value of "N" in RBM Setpoint Equation – 44.

Maximum Allowable RBM Rod Block setpoint – 110% power.

Source: Reference 7.

Technical Specification References: Table 3.2.5.

3 The Rod Block Monitor (RBM) trip setpoints are determined by the equation shown in Table 3.2.5 of the Technical Specifications.

Table 2.3-1

Maximum Allowable Linear Heat Generation Rate Limits

Fuel Type	Maximum Allowable Linear Heat Generation Rate (kW/ft)
GE9B-P8DWB335-10GZ-80M-150-T	14.4
GE13-P9HTB380-12GZ-100T-146-T	14.4
GE13-P9HTB379-13GZ-100T-146-T	14.4
GE13-P9DTB386-11G4.0/1G3.0-100T-146-T-2425	14.4
GE13-P9DTB225-NOG-100T-146-T-2570	14.4
GE14-P10DNAB394-7G5.0/6G4.0-100T-150-T-2538	13.4
GE14-P10DNAB394-8G5.0/6G4.0-100T-150-T-2589	13.4
GE14-P10DNAB394-12G5.0-100T-150-T-2590	13.4

The process computer utilizes exposure dependent LHGR limits for each lattice type as provided in Reference 8.

Technical Specification References: 2.1.A.1a, 2.1.B.1, and 3.11.B.

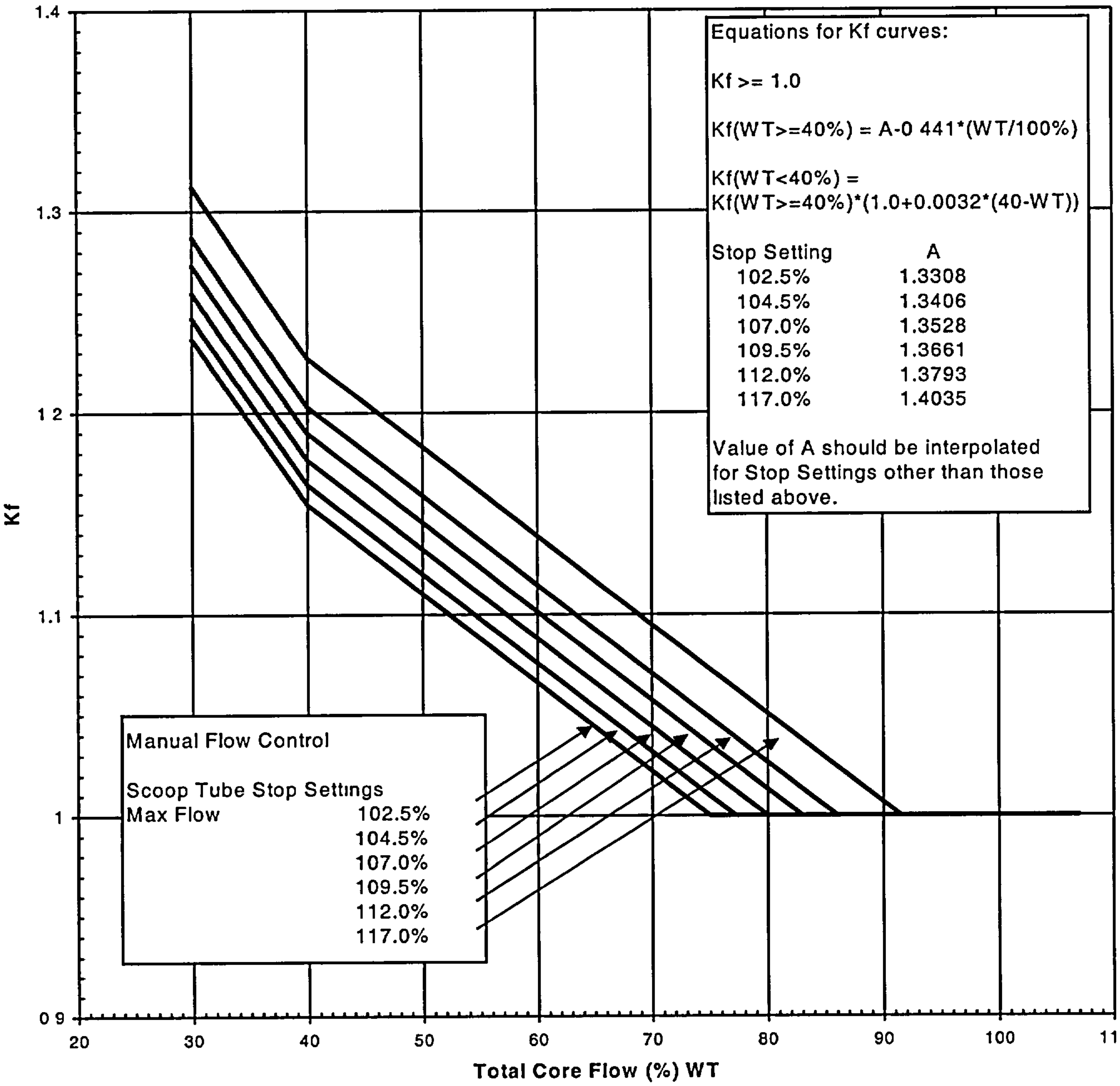

Figure 2.2-1

K_f vs Total Core Flow
(Technical Specification Reference 3.11.C)

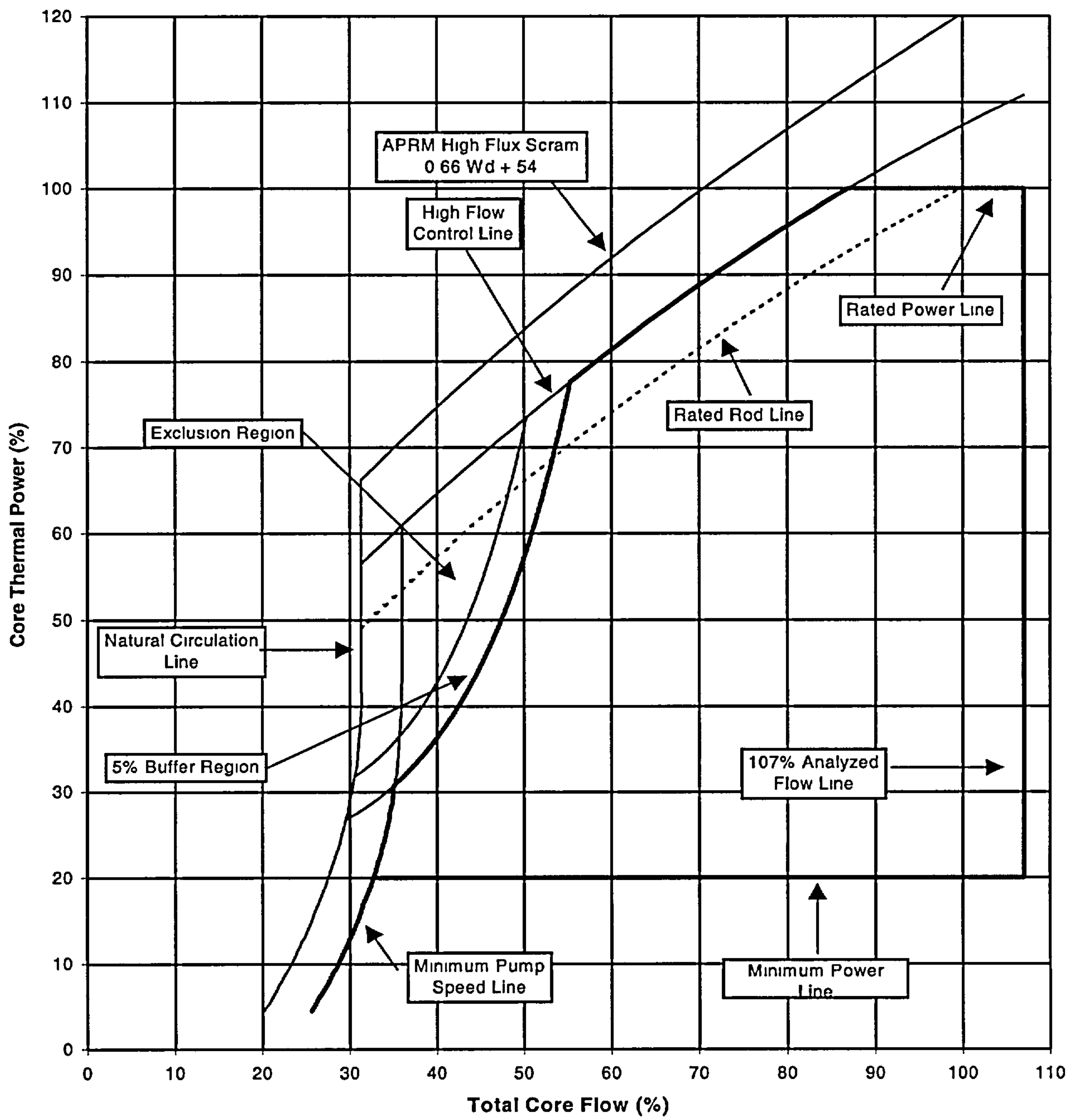

Figure 2.4-1

Limits of Power/Flow Operation
(Technical Specification Reference 3.6.J)

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13. Global Nuclear Fuels Letter WHV:2001-023, William H. Hetzel (GNF) to Dave Mannai (VYNPC), Vermont Yankee Option B Licensing Basis, November 9, 2001.

*References 9 and 10 are the generically approved documents for References 2 and 3, including the SER from Reference 4.