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October 20, 2006

Docket Nos.: 50-424  
50-425

NL-06-2319

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D. C. 20555-0001

**Vogtle Electric Generating Plant**  
**Unit 1 Cycle 14 and Unit 2 Cycle 12 Core Operating Limits Reports**

Ladies and Gentlemen:

Pursuant to the reporting requirements of Vogtle Electric Generating Plant (VEGP) Technical Specification 5.6.5, Southern Nuclear Operating Company is submitting Revision 0 of the Unit Cycle 14 Core Operating Limits Report (COLR) and Revision 1 of the Unit 2 Cycle 12 COLR.

This letter contains no NRC commitments. If you have any questions, please advise.

Sincerely,

A handwritten signature in black ink, appearing to read "Don E. Grissette".

Don E. Grissette

DEG/LPH/daj

Enclosures: 1. Revision 0 of the Unit Cycle 14 Core Operating Limits Report (COLR)  
2. Revision 1 of the Unit 2 Cycle 12 Core Operating Limits Report (COLR)

cc: Southern Nuclear Operating Company  
Mr. J. T. Gasser, Executive Vice President  
Mr. T. E. Tynan, General Manager – Plant Vogtle  
RType: CVC7000

U. S. Nuclear Regulatory Commission  
Dr. W. D. Travers, Regional Administrator  
Mr. C. Gratton, NRR Project Manager – Vogtle  
Mr. G. J. McCoy, Senior Resident Inspector – Vogtle

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**Enclosure 1**

**Vogtle Electric Generating Plant  
Revision 0 of the Unit Cycle 14 Core Operating Limits Report (COLR)**

**VOGTLE ELECTRIC GENERATING PLANT (VEGP) UNIT 1 CYCLE 14**

**CORE OPERATING LIMITS REPORT**

**REVISION 0**

**October 2006**

## COLR for VEGP UNIT 1 CYCLE 14

### 1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report (COLR) for VEGP UNIT 1 CYCLE 14 has been prepared in accordance with the requirements of Technical Specification 5.6.5.

The Technical Requirement affected by this report is listed below:

13.1.1 SHUTDOWN MARGIN - MODES 1 and 2

The Technical Specifications affected by this report are listed below:

3.1.1 SHUTDOWN MARGIN - MODES 3, 4 and 5

3.1.3 Moderator Temperature Coefficient

3.1.5 Shutdown Bank Insertion Limits

3.1.6 Control Bank Insertion Limits

3.2.1 Heat Flux Hot Channel Factor -  $F_Q(Z)$

3.2.2 Nuclear Enthalpy Rise Hot Channel Factor -  $F_{\Delta H}^N$

3.2.3 Axial Flux Difference

3.9.1 Boron Concentration

## COLR for VEGP UNIT 1 CYCLE 14

### 2.0 OPERATING LIMITS

The cycle-specific parameter limits for the specifications listed in section 1.0 are presented in the following subsections. These limits have been developed using NRC-approved methodologies, including those specified in Technical Specification 5.6.5.

#### 2.1 SHUTDOWN MARGIN - MODES 1 AND 2 (Technical Requirement 13.1.1)

2.1.1 The SHUTDOWN MARGIN shall be greater than or equal to 1.30 percent  $\Delta k/k$ .

#### 2.2 SHUTDOWN MARGIN - MODES 3, 4 AND 5 (Specification 3.1.1)

2.2.1 The SHUTDOWN MARGIN shall be greater than or equal to the limits shown in Figures 1 and 2.

#### 2.3 Moderator Temperature Coefficient (Specification 3.1.3)

2.3.1 The Moderator Temperature Coefficient (MTC) limits are:

The BOL/ARO/HZP - MTC shall be less positive than  $+0.7 \times 10^{-4} \Delta k/k/^\circ F$  for power levels up to 70 percent RTP with a linear ramp to  $0 \Delta k/k/^\circ F$  at 100 percent RTP.

The EOL/ARO/RTP-MTC shall be less negative than  $-5.50 \times 10^{-4} \Delta k/k/^\circ F$ .<sup>1</sup>

2.3.2 The MTC Surveillance limits are:

The 300 ppm/ARO/RTP-MTC should be less negative than or equal to  $-4.75 \times 10^{-4} \Delta k/k/^\circ F$ .<sup>1</sup>

The 60 ppm/ARO/RTP-MTC should be less negative than  $-5.35 \times 10^{-4} \Delta k/k/^\circ F$ .<sup>1</sup>

where: BOL stands for Beginning of Cycle Life  
ARO stands for All Rods Out  
HZP stands for Hot Zero THERMAL POWER  
EOL stands for End of Cycle Life  
RTP stands for RATED THERMAL POWER

#### 2.4 Shutdown Bank Insertion Limits (Specification 3.1.5)

2.4.1 The shutdown banks shall be withdrawn to a position greater than or equal to 225 steps.

<sup>1</sup>Applicable for full-power T-average of 586.4°F to 587.4°F.

COLR for VEGP UNIT 1 CYCLE 14

2.5 Control Bank Insertion Limits (Specification 3.1.6)

2.5.1 The control banks shall be limited in physical insertion as shown in Figure 3.

2.6 Heat Flux Hot Channel Factor -  $F_Q(Z)$  (Specification 3.2.1)

$$2.6.1 \quad F_Q(Z) \leq \frac{F_Q^{RTP}}{P} * K(Z) \quad \text{for } P > 0.5$$

$$F_Q(Z) \leq \frac{F_Q^{RTP}}{0.5} * K(Z) \quad \text{for } P \leq 0.5$$

$$\text{where: } P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$$

$$2.6.2 \quad F_Q^{RTP} = 2.50$$

2.6.3  $K(Z)$  is provided in Figure 4.

$$2.6.4 \quad F_Q(Z) \leq \frac{F_Q^{RTP} * K(Z)}{P * W(Z)} \quad \text{for } P > 0.5$$

$$F_Q(Z) \leq \frac{F_Q^{RTP} * K(Z)}{0.5 * W(Z)} \quad \text{for } P \leq 0.5$$

2.6.5  $W(Z)$  values are provided in Figures 6 through 9.

2.6.6 The  $F_Q(Z)$  penalty factors are provided in Table 1.

## COLR for VEGP UNIT 1 CYCLE 14

### 2.7 Nuclear Enthalpy Rise Hot Channel Factor - $F_{\Delta H}^N$ (Specification 3.2.2)

$$2.7.1 \quad F_{\Delta H}^N \leq F_{\Delta H}^{RTP} * (1 + PF_{\Delta H} * (1 - P))$$

$$\text{where: } P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$$

$$2.7.2 \quad F_{\Delta H}^{RTP} = 1.65$$

$$2.7.3 \quad PF_{\Delta H} = 0.3$$

### 2.8 Axial Flux Difference (Specification 3.2.3)

2.8.1 The Axial Flux Difference (AFD) acceptable operation limits are provided in Figure 5.

### 2.9 Boron Concentration (Specification 3.9.1)

2.9.1 The boron concentration shall be greater than or equal to 1900 ppm.<sup>1</sup>

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<sup>1</sup>This concentration bounds the condition of  $k_{\text{eff}} \leq 0.95$  (all rods in less the most reactive rod) and subcriticality (all rods out) over the entire cycle. This concentration includes additional boron to address uncertainties and B<sup>10</sup> depletion.

COLR for VEGP UNIT 1 CYCLE 14

TABLE 1

$F_Q(Z)$  PENALTY FACTOR

Cycle Burnup (MWD/MTU)	$F_Q(Z)$ Penalty Factor
6124	1.020
6338	1.021
7831	1.021
8044	1.020

Notes:

1. The Penalty Factor, to be applied to  $F_Q(Z)$  in accordance with SR 3.2.1.2, is the maximum factor by which  $F_Q(Z)$  is expected to increase over a 39 EFPD interval (surveillance interval of 31 EFPD plus the maximum allowable extension not to exceed 25% of the surveillance interval per SR 3.0.2) starting from the burnup at which the  $F_Q(Z)$  was determined.
2. Linear interpolation is adequate for intermediate cycle burnups.
3. For all cycle burnups outside the range of the table, a penalty factor of 1.020 shall be used.



COLR for VEGP UNIT 1 CYCLE 14

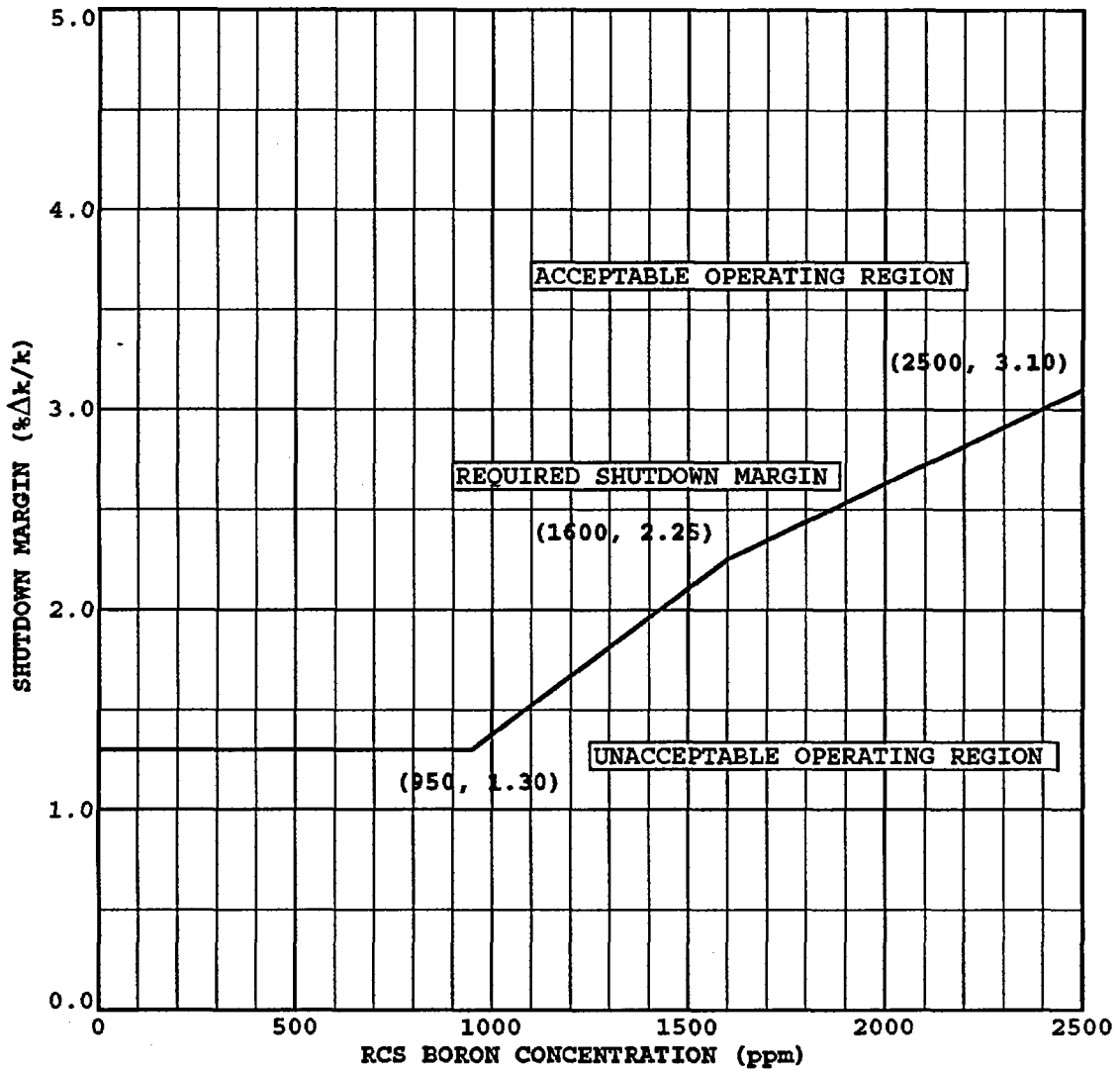


FIGURE 1

REQUIRED SHUTDOWN MARGIN FOR MODES 3 AND 4 (FOUR LOOPS FILLED AND VENTED AND AT LEAST ONE REACTOR COOLANT PUMP RUNNING)

COLR for VEGP UNIT 1 CYCLE 14

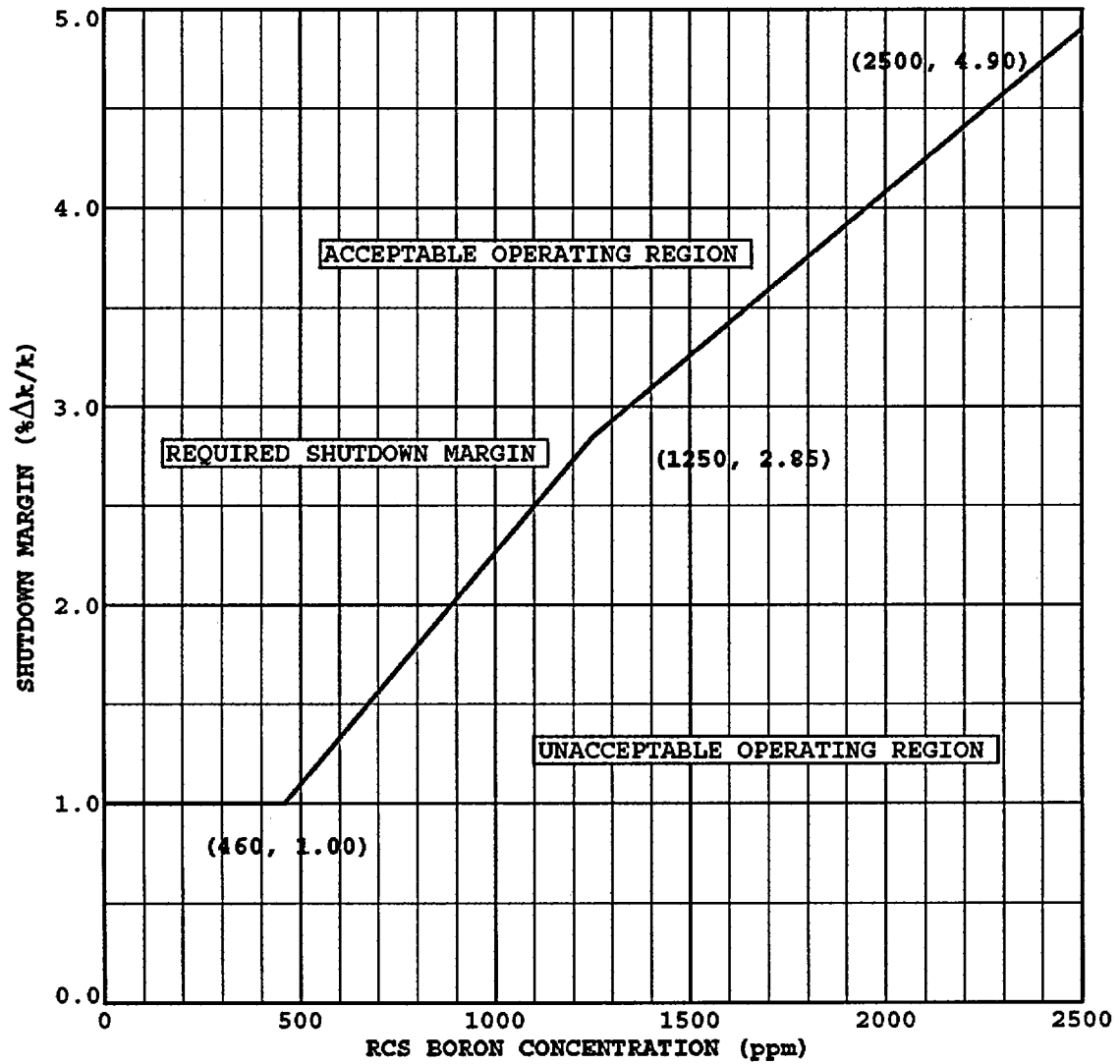
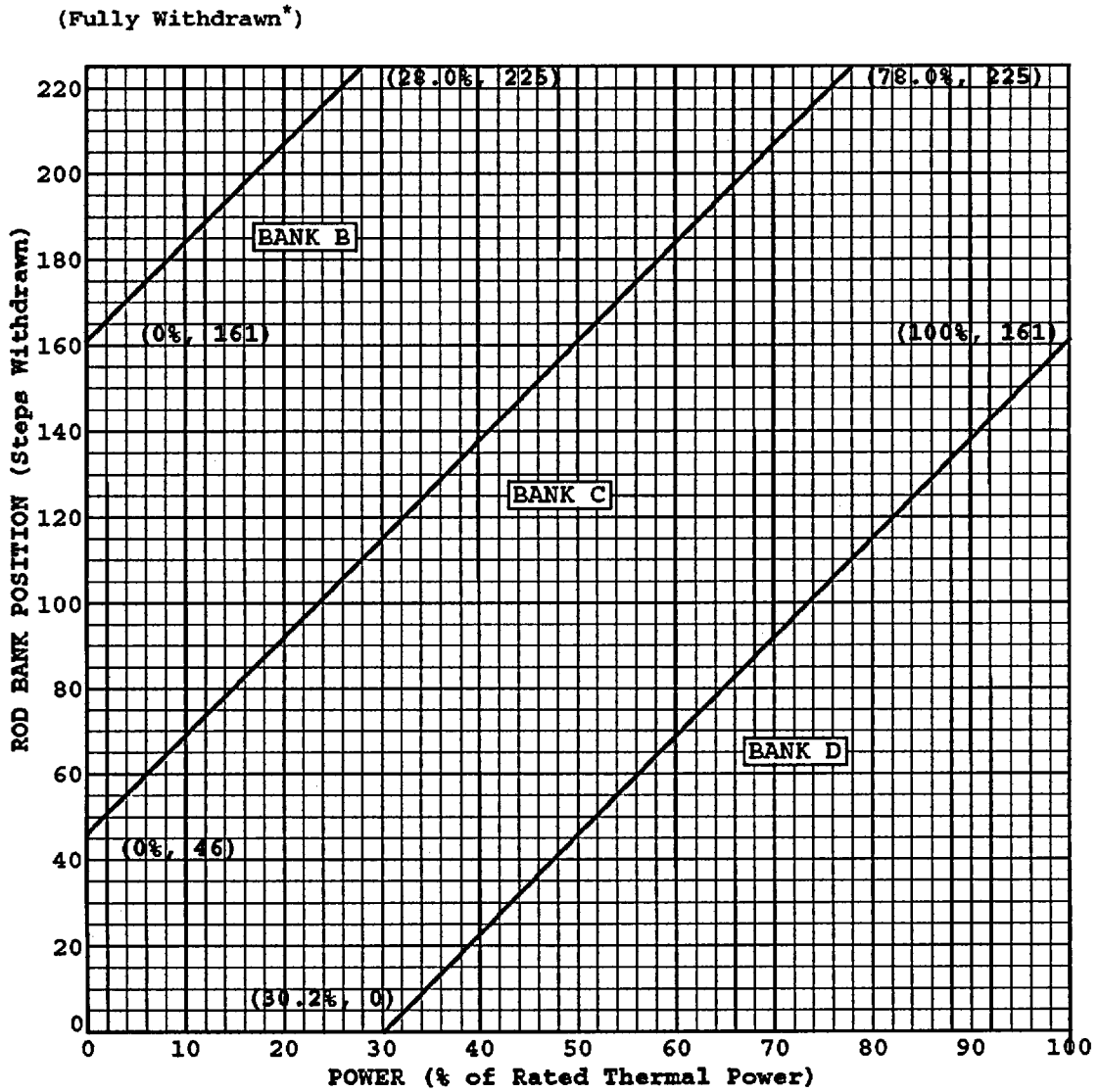


FIGURE 2

REQUIRED SHUTDOWN MARGIN FOR MODES 4 AND 5 (MODE 4 WHEN FIGURE 1 NOT APPLICABLE)

COLR for VEGP UNIT 1 CYCLE 14



\*Fully withdrawn shall be the condition where control rods are at a position within the interval  $\geq 225$  and  $\leq 231$  steps withdrawn.

NOTE: The Rod Bank Insertion Limits are based on the control bank withdrawal sequence A, B, C, D and a control bank tip-to-tip distance of 115 steps.

FIGURE 3

ROD BANK INSERTION LIMITS VERSUS % OF RATED THERMAL POWER

COLR for VEGP UNIT 1 CYCLE 14

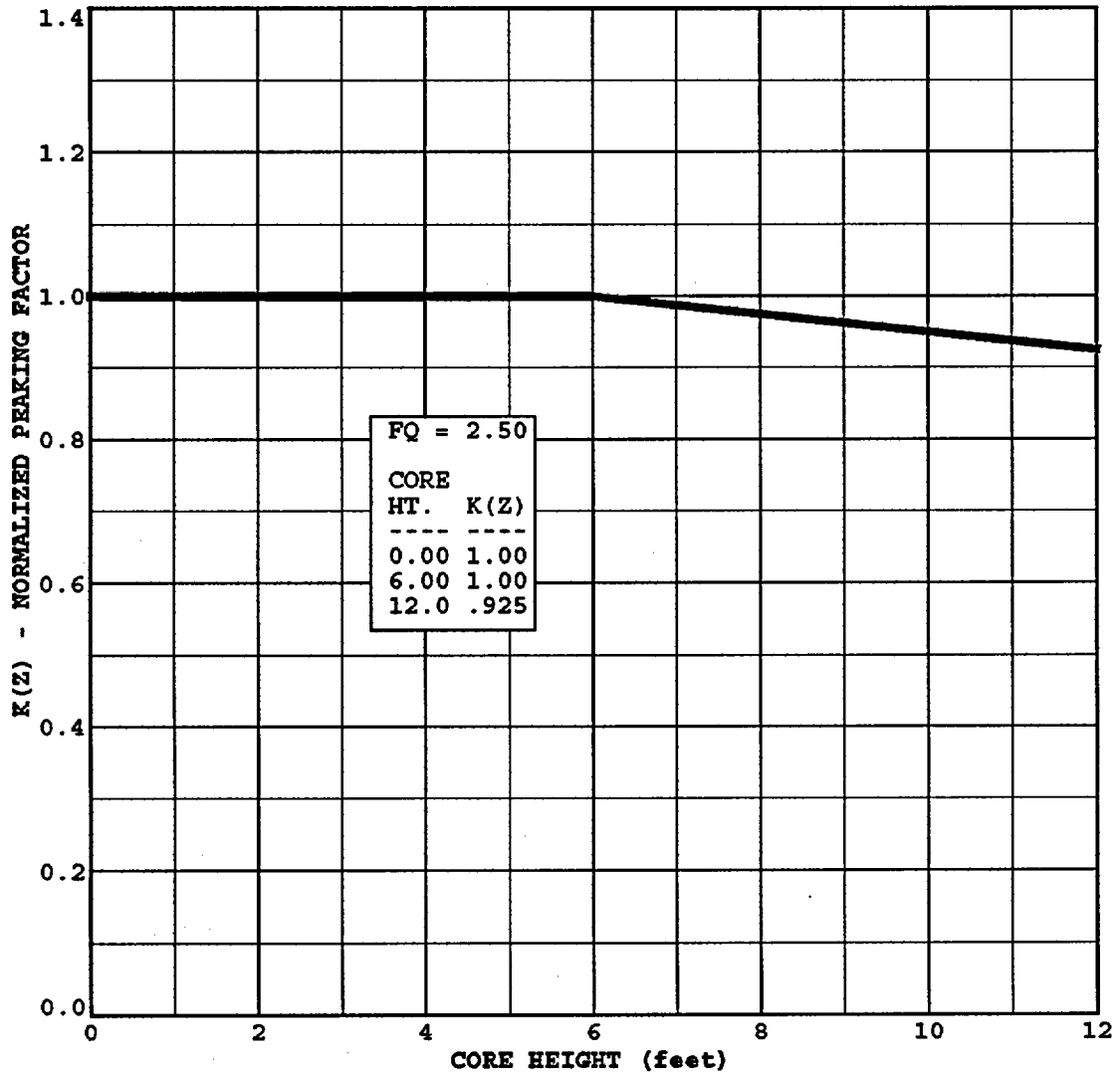


FIGURE 4

K(Z) – NORMALIZED  $F_a(Z)$  AS A FUNCTION OF CORE HEIGHT

COLR for VEGP UNIT 1 CYCLE 14

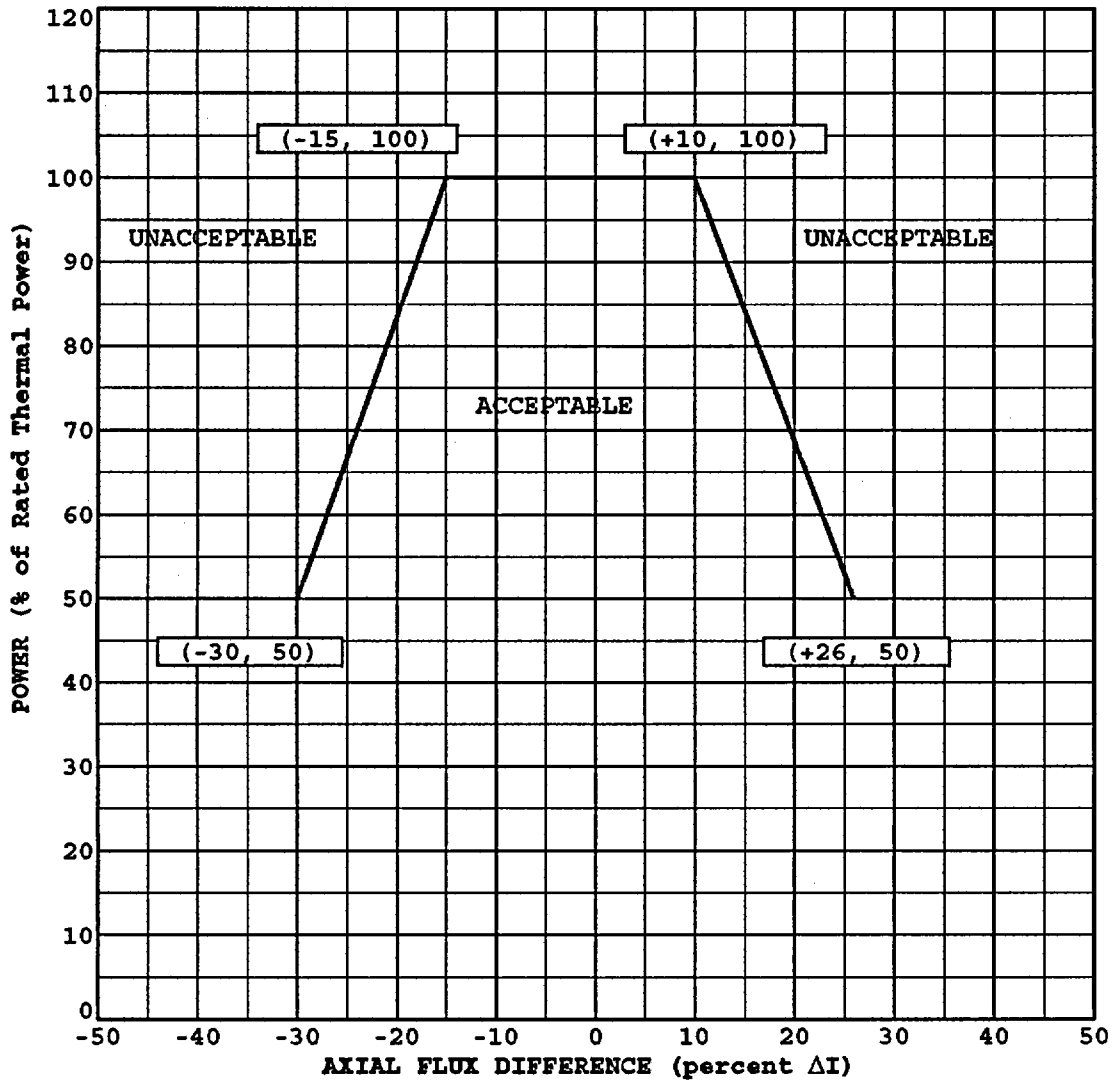
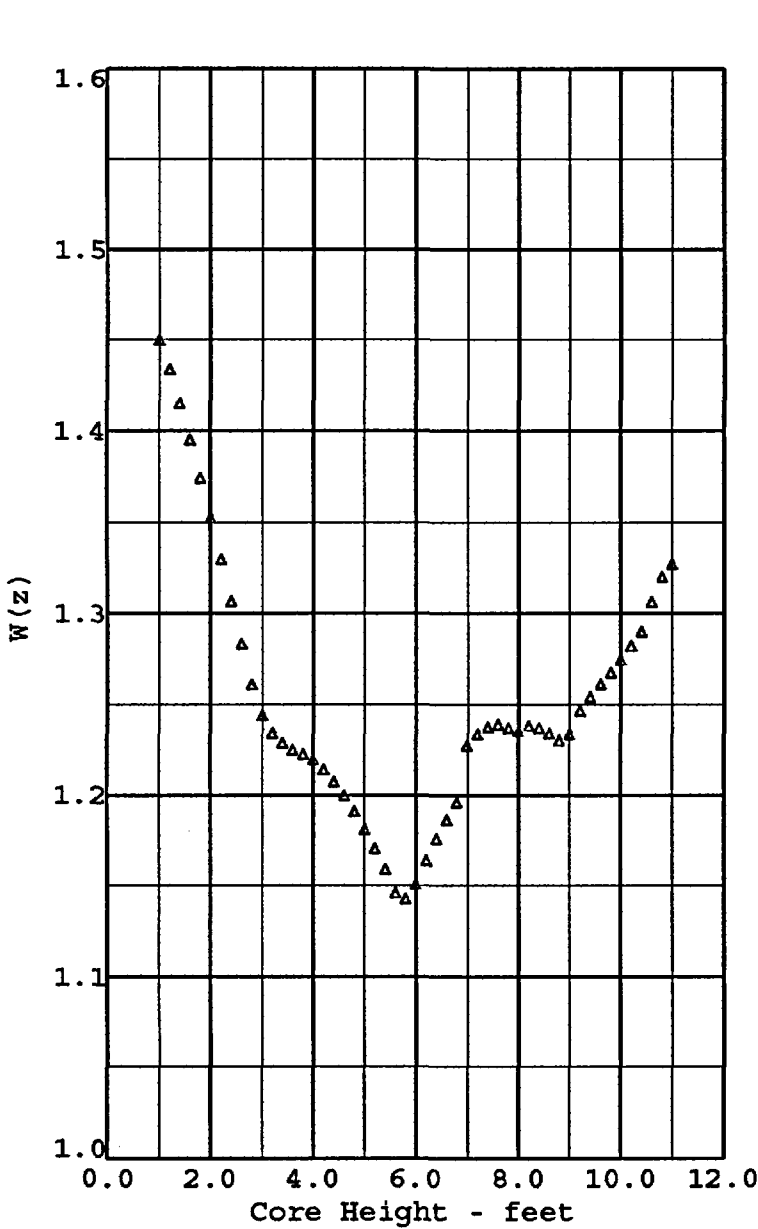


FIGURE 5

AXIAL FLUX DIFFERENCE LIMITS AS A FUNCTION OF % OF RATED THERMAL POWER FOR RAOC

COLR for VEGP UNIT 1 CYCLE 14



This figure is referred to by Specification B3.2.1

These W(Z) values are consistent with Figure 5, and are valid over the HFP  $T_{avg}$  temperature range from 586.4 to 587.4°F.

Axial Point	Elevation (feet)	BOL W(Z)	
*	1	12.00	1.0000
*	2	11.80	1.0000
*	3	11.60	1.0000
*	4	11.40	1.0000
*	5	11.20	1.0000
	6	11.00	1.3272
	7	10.80	1.3199
	8	10.60	1.3063
	9	10.40	1.2899
	10	10.20	1.2821
	11	10.00	1.2744
	12	9.80	1.2675
	13	9.60	1.2611
	14	9.40	1.2541
	15	9.20	1.2464
	16	9.00	1.2336
	17	8.80	1.2300
	18	8.60	1.2339
	19	8.40	1.2370
	20	8.20	1.2380
	21	8.00	1.2353
	22	7.80	1.2368
	23	7.60	1.2389
	24	7.40	1.2373
	25	7.20	1.2335
	26	7.00	1.2275
	27	6.80	1.1956
	28	6.60	1.1862
	29	6.40	1.1756
	30	6.20	1.1638
	31	6.00	1.1507
	32	5.80	1.1426
	33	5.60	1.1458
	34	5.40	1.1590
	35	5.20	1.1704
	36	5.00	1.1809
	37	4.80	1.1908
	38	4.60	1.1996
	39	4.40	1.2073
	40	4.20	1.2141
	41	4.00	1.2197
	42	3.80	1.2227
	43	3.60	1.2249
	44	3.40	1.2289
	45	3.20	1.2341
	46	3.00	1.2440
	47	2.80	1.2610
	48	2.60	1.2834
	49	2.40	1.3067
	50	2.20	1.3297
	51	2.00	1.3523
	52	1.80	1.3742
	53	1.60	1.3952
	54	1.40	1.4151
	55	1.20	1.4337
	56	1.00	1.4500
*	57	0.80	1.0000
*	58	0.60	1.0000
*	59	0.40	1.0000
*	60	0.20	1.0000
*	61	0.00	1.0000

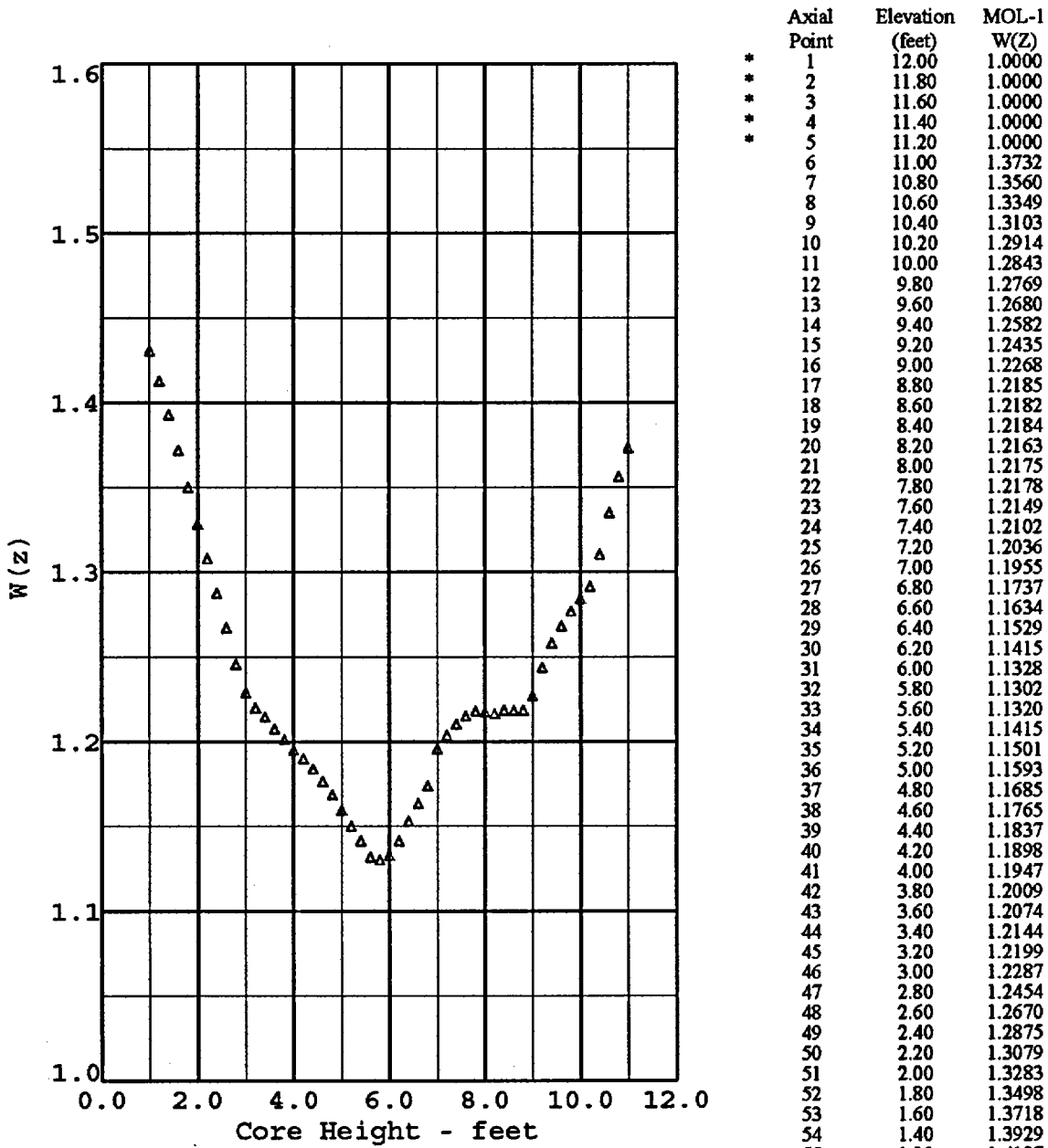
Top and Bottom 5 Axial Points

\* Excluded per Technical Specification Basis B3.2.1

FIGURE 6

RAOC W(Z) AT 150 MWD/MTU

COLR for VEGP UNIT 1 CYCLE 14



This figure is referred to by Specification B3.2.1

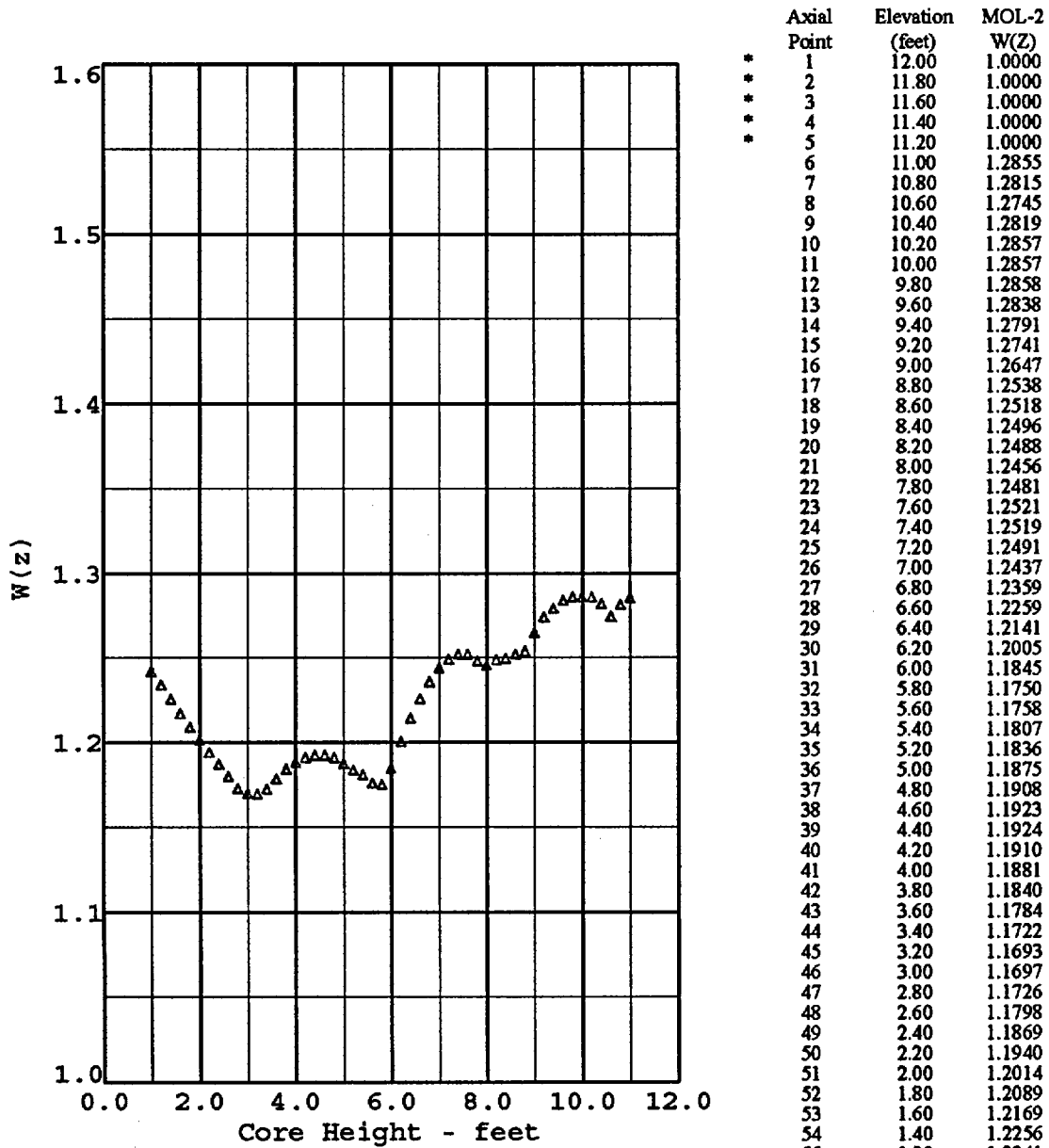
These W(Z) values are consistent with Figure 5, and are valid over the HFP  $T_{avg}$  temperature range from 586.4 to 587.4°F.

Top and Bottom 5 Axial Points  
 \* Excluded per Technical Specification Basis B3.2.1

FIGURE 7

RAOC W(Z) AT 4000 MWD/MTU

COLR for VEGP UNIT 1 CYCLE 14



This figure is referred to by Specification B3.2.1

These W(Z) values are consistent with Figure 5, and are valid over the HFP  $T_{avg}$  temperature range from 586.4 to 587.4°F.

Axial Point	Elevation (feet)	MOL-2 W(Z)
1	12.00	1.0000
2	11.80	1.0000
3	11.60	1.0000
4	11.40	1.0000
5	11.20	1.0000
6	11.00	1.2855
7	10.80	1.2815
8	10.60	1.2745
9	10.40	1.2819
10	10.20	1.2857
11	10.00	1.2857
12	9.80	1.2858
13	9.60	1.2838
14	9.40	1.2791
15	9.20	1.2741
16	9.00	1.2647
17	8.80	1.2538
18	8.60	1.2518
19	8.40	1.2496
20	8.20	1.2488
21	8.00	1.2456
22	7.80	1.2481
23	7.60	1.2521
24	7.40	1.2519
25	7.20	1.2491
26	7.00	1.2437
27	6.80	1.2359
28	6.60	1.2259
29	6.40	1.2141
30	6.20	1.2005
31	6.00	1.1845
32	5.80	1.1750
33	5.60	1.1758
34	5.40	1.1807
35	5.20	1.1836
36	5.00	1.1875
37	4.80	1.1908
38	4.60	1.1923
39	4.40	1.1924
40	4.20	1.1910
41	4.00	1.1881
42	3.80	1.1840
43	3.60	1.1784
44	3.40	1.1722
45	3.20	1.1693
46	3.00	1.1697
47	2.80	1.1726
48	2.60	1.1798
49	2.40	1.1869
50	2.20	1.1940
51	2.00	1.2014
52	1.80	1.2089
53	1.60	1.2169
54	1.40	1.2256
55	1.20	1.2341
56	1.00	1.2419
57	0.80	1.0000
58	0.60	1.0000
59	0.40	1.0000
60	0.20	1.0000
61	0.00	1.0000

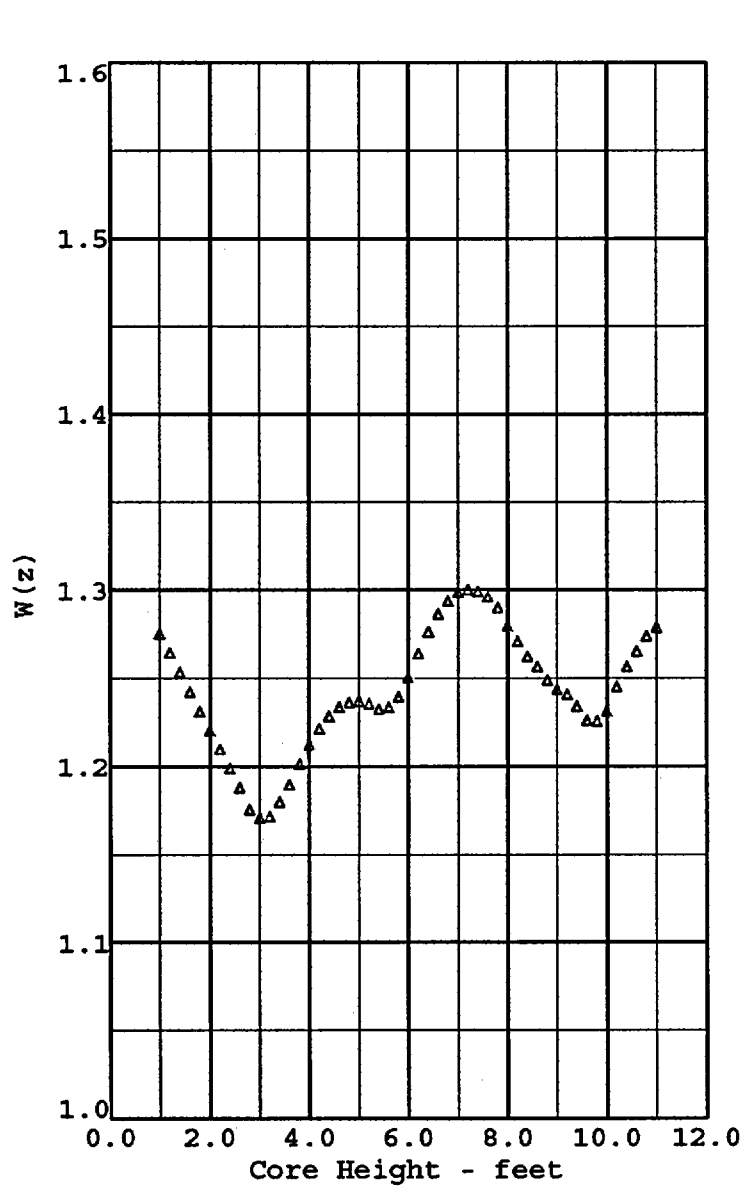
Top and Bottom 5 Axial Points  
 \* Excluded per Technical Specification Basis B3.2.1

FIGURE 8

RAOC W(Z) AT 12,000 MWD/MTU



COLR for VEGP UNIT 1 CYCLE 14



This figure is referred to by Specification B3.2.1

These W(Z) values are consistent with Figure 5, and are valid over the HFP  $T_{avg}$  temperature range from 586.4 to 587.4°F.

Axial Point	Elevation (feet)	EOL W(Z)	
*	1	12.00	1.0000
*	2	11.80	1.0000
*	3	11.60	1.0000
*	4	11.40	1.0000
*	5	11.20	1.0000
	6	11.00	1.2788
	7	10.80	1.2740
	8	10.60	1.2655
	9	10.40	1.2565
	10	10.20	1.2452
	11	10.00	1.2313
	12	9.80	1.2257
	13	9.60	1.2261
	14	9.40	1.2342
	15	9.20	1.2409
	16	9.00	1.2436
	17	8.80	1.2491
	18	8.60	1.2566
	19	8.40	1.2623
	20	8.20	1.2708
	21	8.00	1.2797
	22	7.80	1.2899
	23	7.60	1.2960
	24	7.40	1.2990
	25	7.20	1.3002
	26	7.00	1.2985
	27	6.80	1.2938
	28	6.60	1.2864
	29	6.40	1.2764
	30	6.20	1.2641
	31	6.00	1.2503
	32	5.80	1.2395
	33	5.60	1.2336
	34	5.40	1.2325
	35	5.20	1.2356
	36	5.00	1.2372
	37	4.80	1.2363
	38	4.60	1.2335
	39	4.40	1.2285
	40	4.20	1.2214
	41	4.00	1.2122
	42	3.80	1.2013
	43	3.60	1.1896
	44	3.40	1.1799
	45	3.20	1.1715
	46	3.00	1.1705
	47	2.80	1.1754
	48	2.60	1.1879
	49	2.40	1.1988
	50	2.20	1.2096
	51	2.00	1.2204
	52	1.80	1.2313
	53	1.60	1.2423
	54	1.40	1.2535
	55	1.20	1.2646
	56	1.00	1.2752
*	57	0.80	1.0000
*	58	0.60	1.0000
*	59	0.40	1.0000
*	60	0.20	1.0000
*	61	0.00	1.0000

Top and Bottom 5 Axial Points  
 \* Excluded per Technical Specification Basis B3.2.1

FIGURE 9

RAOC W(Z) AT 18,000 MWD/MTU

**Enclosure 2**

**Vogtle Electric Generating Plant  
Revision 1 of the Unit 2 Cycle 12 Core Operating Limits Report (COLR)**

**VOGTLE ELECTRIC GENERATING PLANT (VEGP) UNIT 2 CYCLE 12**

**CORE OPERATING LIMITS REPORT**

**REVISION 1**

**October 2006**

## COLR for VEGP UNIT 2 CYCLE 12

### 1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report (COLR) for VEGP UNIT 2 CYCLE 12 has been prepared in accordance with the requirements of Technical Specification 5.6.5.

The Technical Requirement affected by this report is listed below:

13.1.1 SHUTDOWN MARGIN - MODES 1 and 2

The Technical Specifications affected by this report are listed below:

3.1.1 SHUTDOWN MARGIN - MODES 3, 4 and 5

3.1.3 Moderator Temperature Coefficient

3.1.5 Shutdown Bank Insertion Limits

3.1.6 Control Bank Insertion Limits

3.2.1 Heat Flux Hot Channel Factor -  $F_Q(Z)$

3.2.2 Nuclear Enthalpy Rise Hot Channel Factor –  $F_{\Delta H}^N$

3.2.3 Axial Flux Difference

3.9.1 Boron Concentration

## COLR for VEGP UNIT 2 CYCLE 12

### 2.0 OPERATING LIMITS

The cycle-specific parameter limits for the specifications listed in Section 1.0 are presented in the following subsections. These limits have been developed using NRC-approved methodologies, including those specified in Technical Specification 5.6.5.

#### 2.1 SHUTDOWN MARGIN - MODES 1 AND 2 (Technical Requirement 13.1.1)

2.1.1 The SHUTDOWN MARGIN shall be greater than or equal to 1.30 percent  $\Delta k/k$ .

#### 2.2 SHUTDOWN MARGIN - MODES 3, 4 AND 5 (Specification 3.1.1)

2.2.1 The SHUTDOWN MARGIN shall be greater than or equal to the limits shown in Figures 1 and 2.

#### 2.3 Moderator Temperature Coefficient (Specification 3.1.3)

2.3.1 The Moderator Temperature Coefficient (MTC) limits are:

The BOL/ARO/HZP - MTC shall be less positive than  $+0.7 \times 10^{-4} \Delta k/k/^\circ F$  for power levels up to 70% RTP with a linear ramp to 0  $\Delta k/k/^\circ F$  at 100% RTP.

The EOL/ARO/RTP-MTC shall be less negative than  $-5.50 \times 10^{-4} \Delta k/k/^\circ F$ .<sup>1</sup>

2.3.2 The MTC Surveillance limits are:

The 300 ppm/ARO/RTP-MTC should be less negative than or equal to  $-4.75 \times 10^{-4} \Delta k/k/^\circ F$ .<sup>1</sup>

The 60 ppm/ARO/RTP-MTC should be less negative than  $-5.35 \times 10^{-4} \Delta k/k/^\circ F$ .<sup>1</sup>

where: BOL stands for Beginning of Cycle Life  
ARO stands for All Rods Out  
HZP stands for Hot Zero THERMAL POWER  
EOL stands for End of Cycle Life  
RTP stands for RATED THERMAL POWER

#### 2.4 Shutdown Bank Insertion Limits (Specification 3.1.5)

2.4.1 The shutdown banks shall be withdrawn to a position greater than or equal to 225 steps.

#### 2.5 Control Bank Insertion Limits (Specification 3.1.6)

2.5.1 The control banks shall be limited in physical insertion as shown in Figure 3.

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<sup>1</sup> Applicable for full-power T-average of 586.4°F to 587.4°F.

2.6 Heat Flux Hot Channel Factor -  $F_Q(Z)$  (Specification 3.2.1)

$$2.6.1 \quad F_Q(Z) \leq \frac{F_Q^{RTP}}{P} * K(Z) \text{ for } P > 0.5$$

$$F_Q(Z) \leq \frac{F_Q^{RTP}}{0.5} * K(Z) \text{ for } P \leq 0.5$$

$$\text{where: } P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$$

$$2.6.2 \quad F_Q^{RTP} = 2.50$$

2.6.3  $K(Z)$  is provided in Figure 4.

$$2.6.4 \quad F_Q(Z) \leq \frac{F_Q^{RTP} * K(Z)}{P * W(Z)} \text{ for } P > 0.5$$

$$F_Q(Z) \leq \frac{F_Q^{RTP} * K(Z)}{0.5 * W(Z)} \text{ for } P \leq 0.5$$

2.6.5  $W(Z)$  values are provided in Figures 6 through 9.

2.6.6 The  $F_Q(Z)$  penalty factors are provided in Table 1.

## COLR for VEGP UNIT 2 CYCLE 12

### 2.7 Nuclear Enthalpy Rise Hot Channel Factor - $F_{\Delta H}^N$ (Specification 3.2.2)

$$2.7.1 \quad F_{\Delta H}^N \leq F_{\Delta H}^{RTP} * (1 + PF_{\Delta H} * (1-P))$$

$$\text{where: } P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$$

$$2.7.2 \quad F_{\Delta H}^{RTP} = 1.65$$

$$2.7.3 \quad PF_{\Delta H} = 0.3$$

### 2.8 Axial Flux Difference (Specification 3.2.3)

2.8.1 The Axial Flux Difference (AFD) Acceptable Operation Limits are provided in Figure 5.

### 2.9 Boron Concentration (Specification 3.9.1)

2.9.1 The boron concentration shall be greater than or equal to 1950 ppm.<sup>1</sup>

<sup>1</sup>This concentration bounds the condition of  $k_{\text{eff}} \leq 0.95$  (all rods in less the most reactive rod) and subcriticality (all rods out) over the entire cycle. This concentration includes additional boron to address uncertainties and B<sup>10</sup> depletion.

COLR for VEGP UNIT 2 CYCLE 12

TABLE 1

$F_Q(Z)$  PENALTY FACTOR

<u>Cycle Burnup (MWD/MTU)</u>	<u><math>F_Q(Z)</math> Penalty Factor</u>
5061	1.020
5275	1.022
5488	1.021
5702	1.020

Notes:

1. The Penalty Factor, to be applied to  $F_Q(Z)$  in accordance with SR 3.2.1.2, is the maximum factor by which  $F_Q(Z)$  is expected to increase over a 39 EFPD interval (surveillance interval of 31 EFPD plus the maximum allowable extension not to exceed 25% of the surveillance interval per SR 3.0.2) starting from the burnup at which the  $F_Q(Z)$  was determined.
2. Linear interpolation is adequate for intermediate cycle burnups.
3. For all cycle burnups outside the range of the table, a penalty factor of 1.020 shall be used.



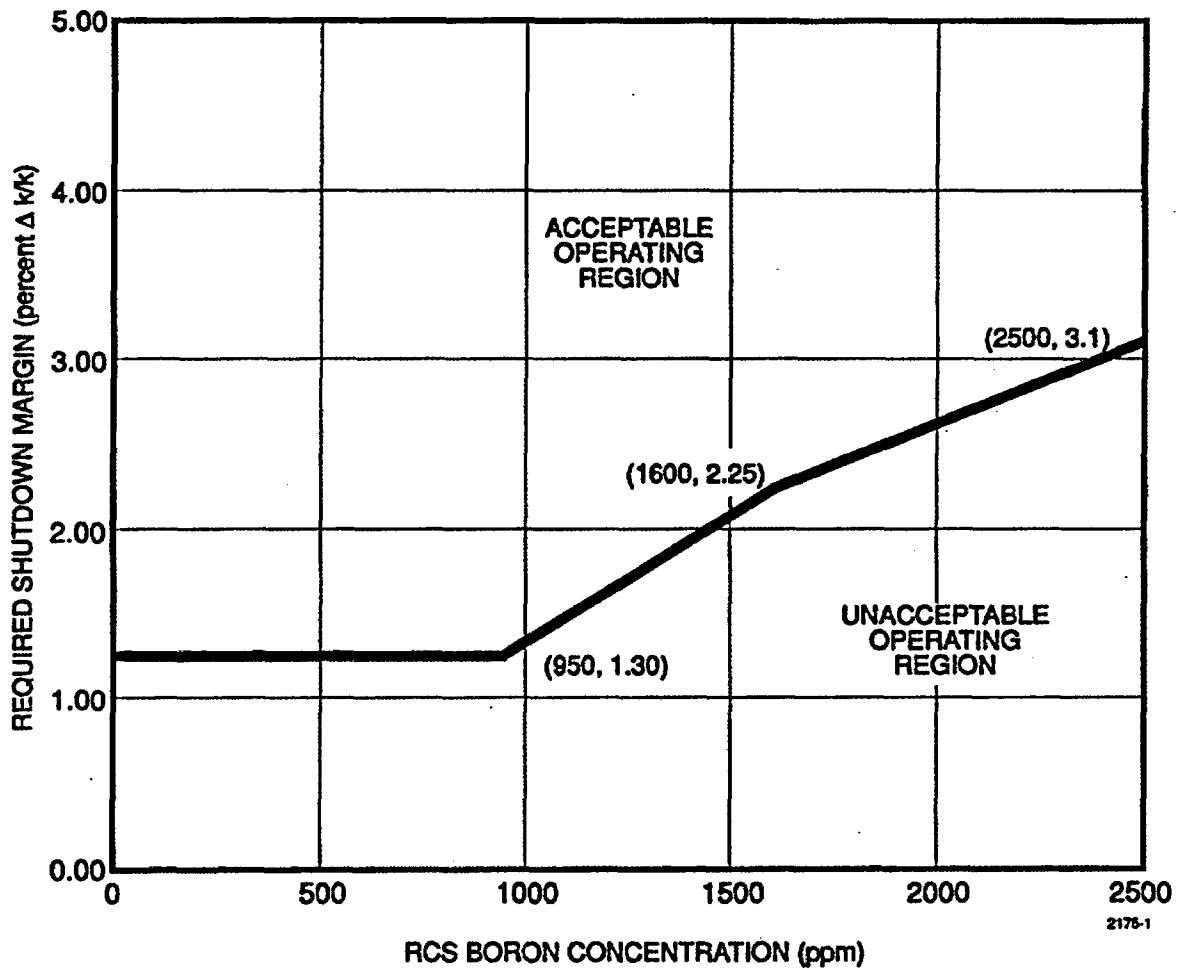


FIGURE 1

REQUIRED SHUTDOWN MARGIN FOR MODES 3 AND 4 (FOUR LOOPS FILLED AND VENTED AND AT LEAST ONE REACTOR COOLANT PUMP RUNNING)

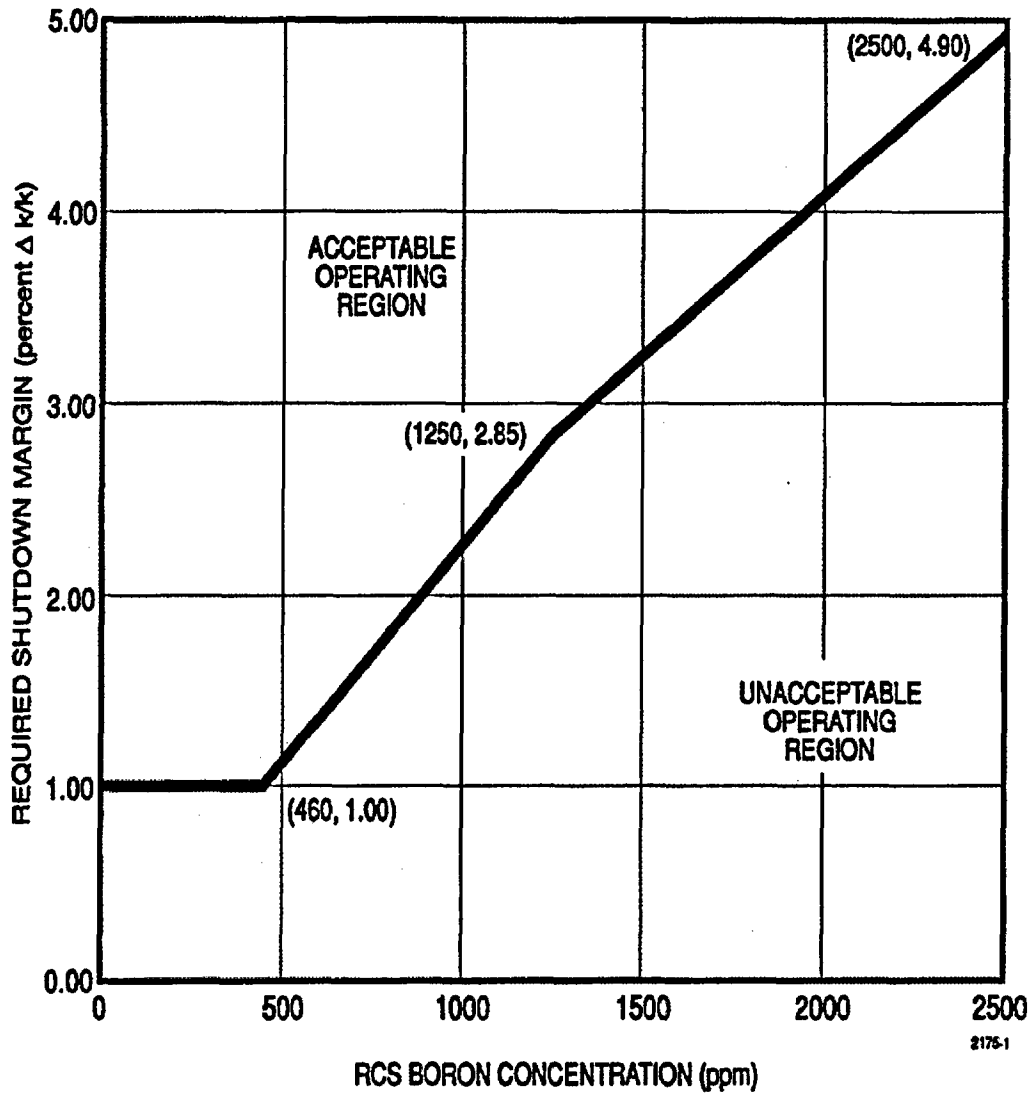
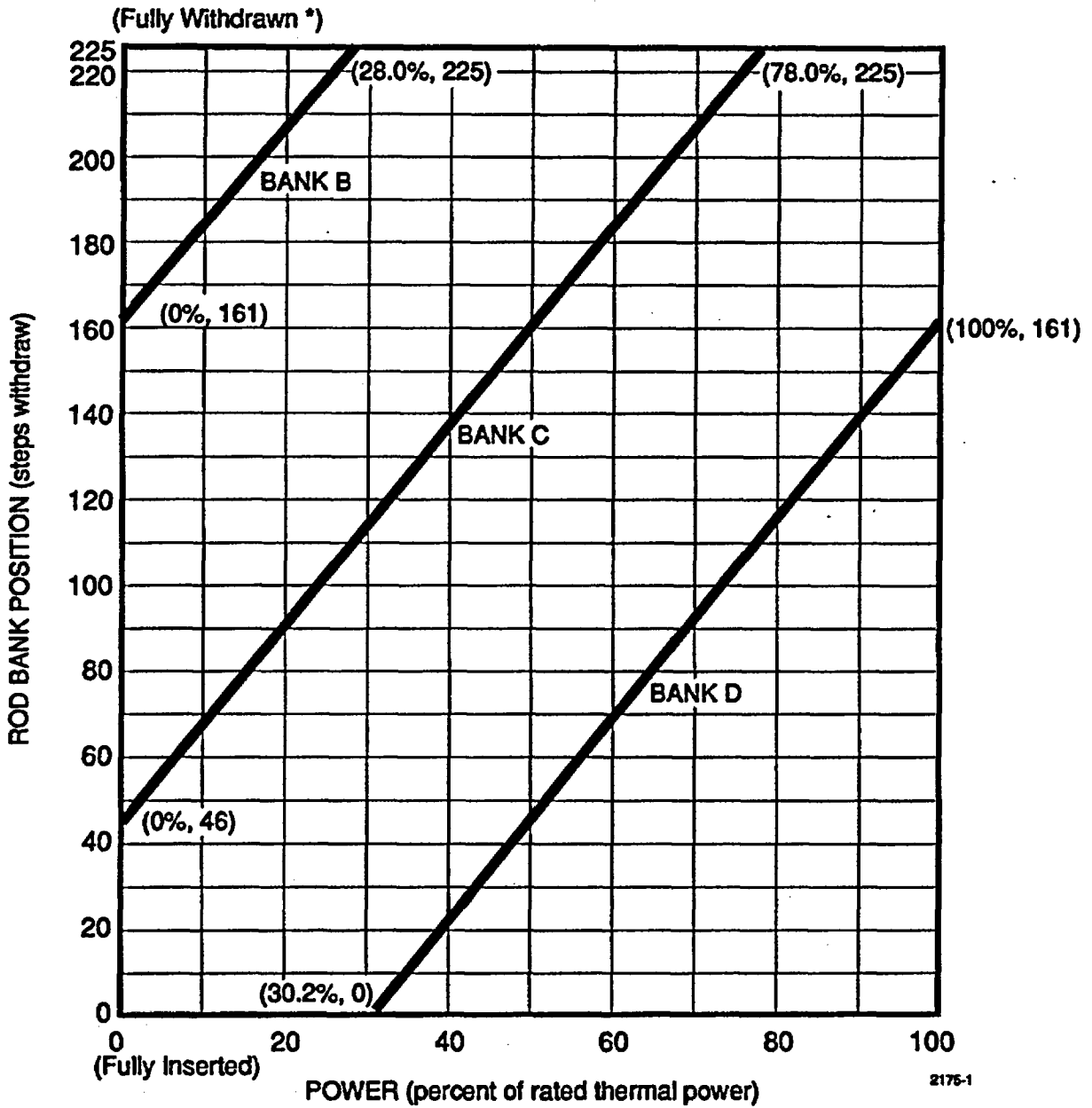


FIGURE 2

REQUIRED SHUTDOWN MARGIN FOR MODES 4 AND 5 (MODE 4 WHEN FIGURE 1 NOT APPLICABLE)



\* Fully withdrawn shall be the condition where control rods are at a position within the interval  $\geq 225$  and  $\leq 231$  steps withdrawn.

Note: The Rod Bank Insertion Limits are based on the control bank withdrawal sequence A, B, C, D and a control bank tip-to-tip distance of 115 steps.

FIGURE 3

ROD BANK INSERTION LIMITS VERSUS % OF RATED THERMAL POWER

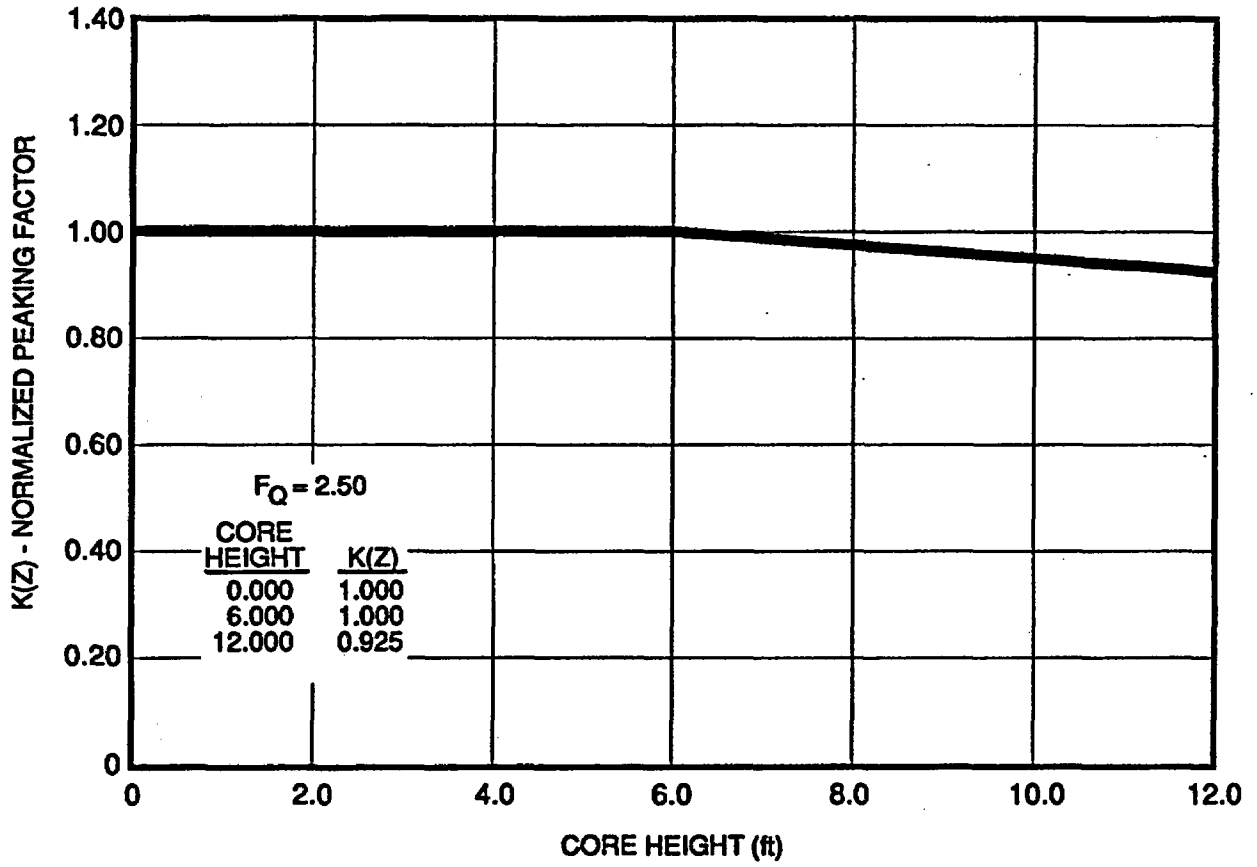


FIGURE 4

K(Z) - NORMALIZED  $F_Q$  (Z) AS A FUNCTION OF CORE HEIGHT

COLR for VEGP UNIT 2 CYCLE 12

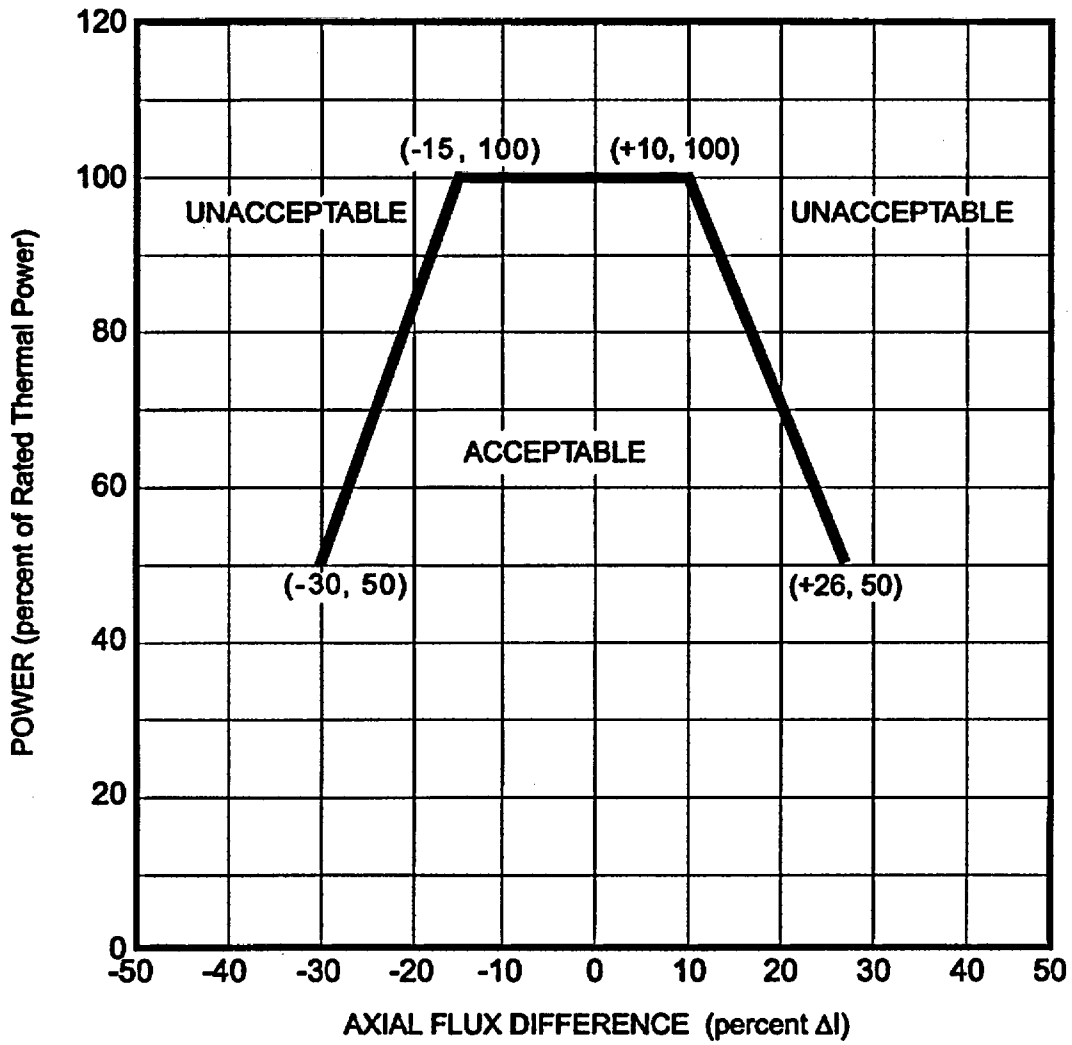
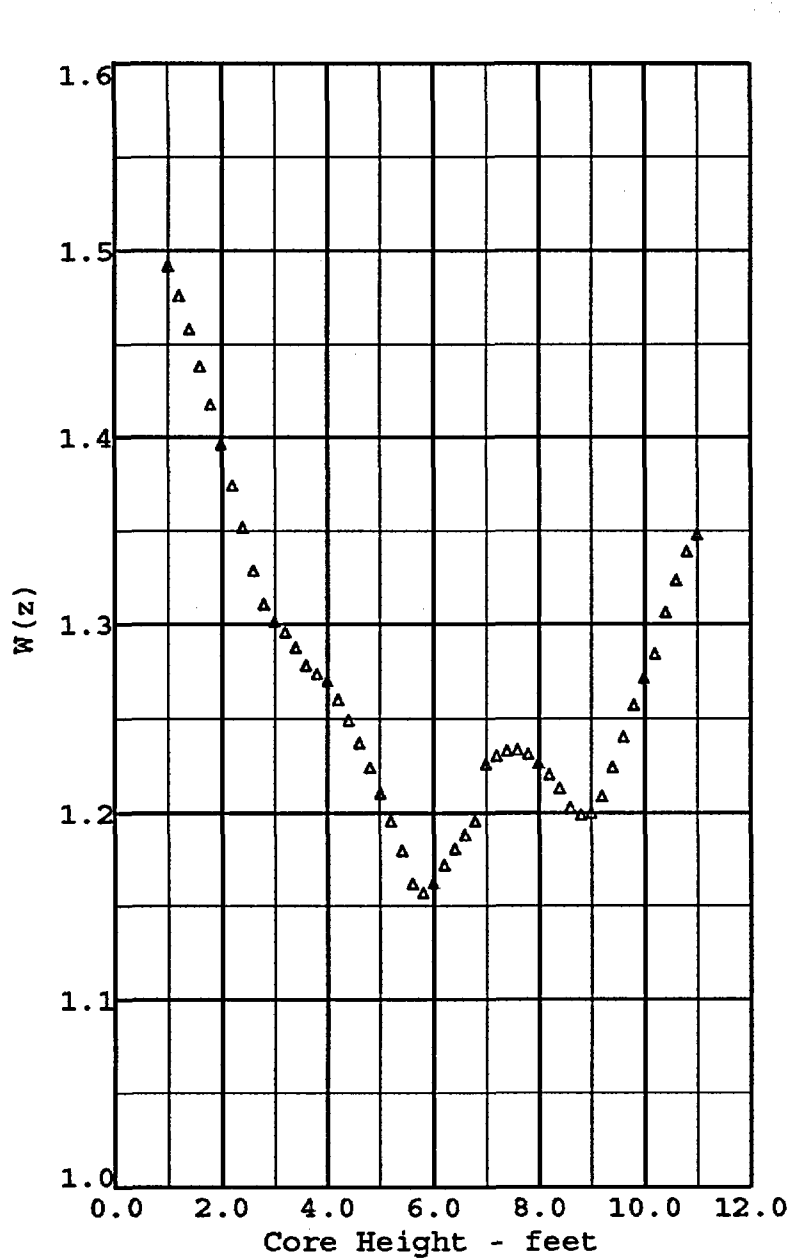


FIGURE 5

AXIAL FLUX DIFFERENCE LIMITS AS A FUNCTION OF % OF RATED THERMAL POWER FOR RAOC

COLR for VEGP UNIT 2 CYCLE 12



Axial Point	Elevation (feet)	BOL W(Z)	
*	1	12.00	1.0000
*	2	11.80	1.0000
*	3	11.60	1.0000
*	4	11.40	1.0000
*	5	11.20	1.0000
	6	11.00	1.3478
	7	10.80	1.3386
	8	10.60	1.3232
	9	10.40	1.3063
	10	10.20	1.2842
	11	10.00	1.2714
	12	9.80	1.2570
	13	9.60	1.2402
	14	9.40	1.2242
	15	9.20	1.2087
	16	9.00	1.1997
	17	8.80	1.1987
	18	8.60	1.2027
	19	8.40	1.2132
	20	8.20	1.2203
	21	8.00	1.2264
	22	7.80	1.2313
	23	7.60	1.2334
	24	7.40	1.2329
	25	7.20	1.2304
	26	7.00	1.2257
	27	6.80	1.1952
	28	6.60	1.1880
	29	6.40	1.1807
	30	6.20	1.1720
	31	6.00	1.1622
	32	5.80	1.1571
	33	5.60	1.1620
	34	5.40	1.1798
	35	5.20	1.1954
	36	5.00	1.2100
	37	4.80	1.2240
	38	4.60	1.2371
	39	4.40	1.2491
	40	4.20	1.2600
	41	4.00	1.2700
	42	3.80	1.2735
	43	3.60	1.2781
	44	3.40	1.2875
	45	3.20	1.2957
	46	3.00	1.3013
	47	2.80	1.3106
	48	2.60	1.3284
	49	2.40	1.3516
	50	2.20	1.3742
	51	2.00	1.3960
	52	1.80	1.4174
	53	1.60	1.4380
	54	1.40	1.4576
	55	1.20	1.4757
	56	1.00	1.4917
*	57	0.80	1.0000
*	58	0.60	1.0000
*	59	0.40	1.0000
*	60	0.20	1.0000
*	61	0.00	1.0000

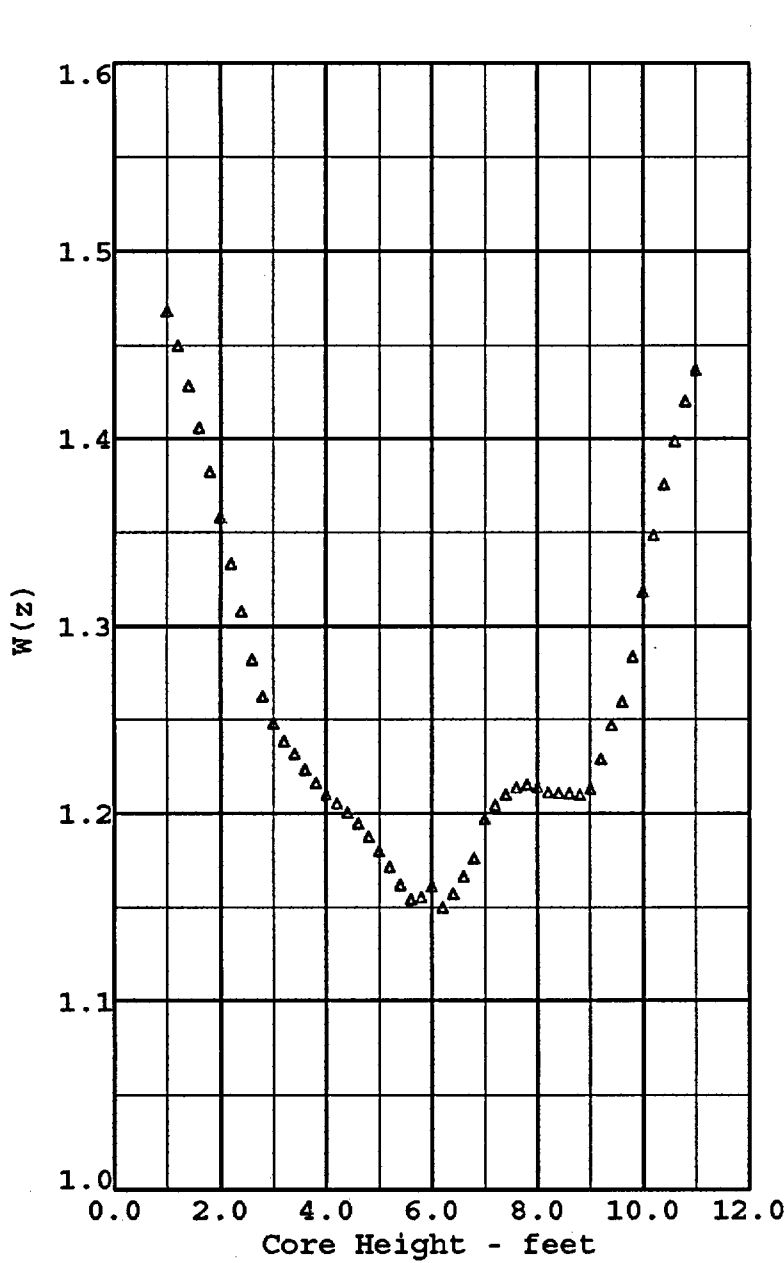
Top and Bottom 5 Axial Points  
 \* Excluded per Technical Specification B3.2.1

This figure is referred to by Specification B3.2.1.

These W(Z) values are consistent with Figure 5, and are valid over the HFP  $T_{avg}$  temperature range from 586.4 to 587.4°F.

**FIGURE 6**  
**RAOC W (Z) AT 150 MWD/MTU**

COLR for VEGP UNIT 2 CYCLE 12



Axial Point	Elevation (feet)	MOL-1 W(Z)
* 1	12.00	1.0000
* 2	11.80	1.0000
* 3	11.60	1.0000
* 4	11.40	1.0000
* 5	11.20	1.0000
6	11.00	1.4367
7	10.80	1.4202
8	10.60	1.3988
9	10.40	1.3756
10	10.20	1.3483
11	10.00	1.3181
12	9.80	1.2837
13	9.60	1.2596
14	9.40	1.2470
15	9.20	1.2290
16	9.00	1.2129
17	8.80	1.2098
18	8.60	1.2105
19	8.40	1.2107
20	8.20	1.2111
21	8.00	1.2139
22	7.80	1.2151
23	7.60	1.2135
24	7.40	1.2098
25	7.20	1.2042
26	7.00	1.1968
27	6.80	1.1760
28	6.60	1.1662
29	6.40	1.1570
30	6.20	1.1496
31	6.00	1.1610
32	5.80	1.1552
33	5.60	1.1540
34	5.40	1.1619
35	5.20	1.1712
36	5.00	1.1798
37	4.80	1.1876
38	4.60	1.1945
39	4.40	1.2005
40	4.20	1.2054
41	4.00	1.2097
42	3.80	1.2162
43	3.60	1.2235
44	3.40	1.2318
45	3.20	1.2385
46	3.00	1.2481
47	2.80	1.2623
48	2.60	1.2822
49	2.40	1.3079
50	2.20	1.3332
51	2.00	1.3580
52	1.80	1.3824
53	1.60	1.4059
54	1.40	1.4284
55	1.20	1.4496
56	1.00	1.4682
* 57	0.80	1.0000
* 58	0.60	1.0000
* 59	0.40	1.0000
* 60	0.20	1.0000
* 61	0.00	1.0000

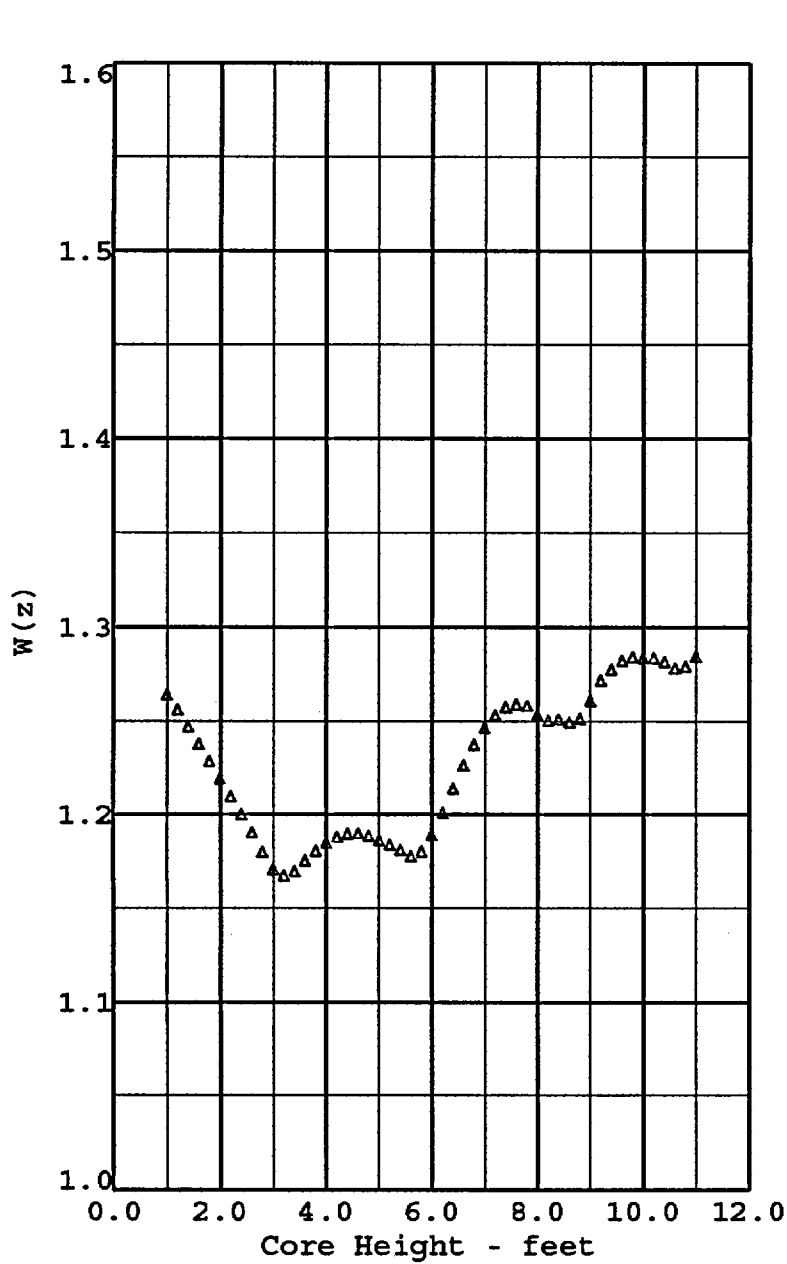
This figure is referred to by Specification B3.2.1

These W(Z) values are consistent with Figure 5, and are valid over the HFP  $T_{avg}$  temperature range from 586.4 to 587.4°F.

\* Top and Bottom 5 Axial Points  
 \* Excluded per Technical Specification B3.2.1

**FIGURE 7**  
**RAOC W (Z) AT 4000 MWD/MTU**

COLR for VEGP UNIT 2 CYCLE 12



This figure is referred to by Specification B3.2.1

These W(Z) values are consistent with Figure 5, and are valid over the HFP  $T_{avg}$  temperature range from 536.4 to 537.4°F.

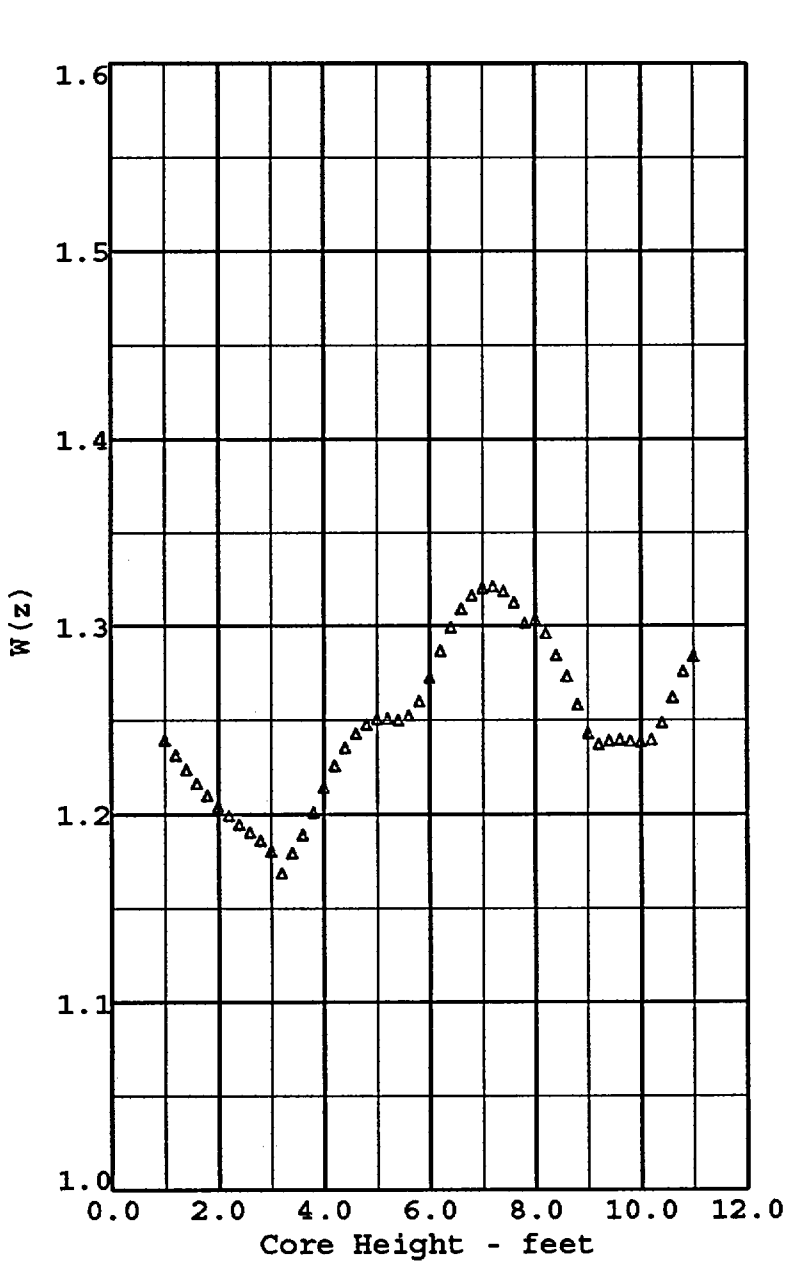
Axial Point	Elevation (feet)	MOL-2 W(Z)
* 1	12.00	1.0000
* 2	11.80	1.0000
* 3	11.60	1.0000
* 4	11.40	1.0000
* 5	11.20	1.0000
6	11.00	1.2843
7	10.80	1.2791
8	10.60	1.2781
9	10.40	1.2816
10	10.20	1.2836
11	10.00	1.2836
12	9.80	1.2841
13	9.60	1.2821
14	9.40	1.2773
15	9.20	1.2716
16	9.00	1.2606
17	8.80	1.2511
18	8.60	1.2490
19	8.40	1.2508
20	8.20	1.2501
21	8.00	1.2532
22	7.80	1.2580
23	7.60	1.2589
24	7.40	1.2573
25	7.20	1.2530
26	7.00	1.2462
27	6.80	1.2371
28	6.60	1.2261
29	6.40	1.2136
30	6.20	1.2008
31	6.00	1.1889
32	5.80	1.1801
33	5.60	1.1776
34	5.40	1.1809
35	5.20	1.1836
36	5.00	1.1861
37	4.80	1.1884
38	4.60	1.1897
39	4.40	1.1894
40	4.20	1.1878
41	4.00	1.1848
42	3.80	1.1805
43	3.60	1.1751
44	3.40	1.1694
45	3.20	1.1671
46	3.00	1.1704
47	2.80	1.1799
48	2.60	1.1902
49	2.40	1.2000
50	2.20	1.2095
51	2.00	1.2190
52	1.80	1.2284
53	1.60	1.2376
54	1.40	1.2468
55	1.20	1.2557
56	1.00	1.2638
* 57	0.80	1.0000
* 58	0.60	1.0000
* 59	0.40	1.0000
* 60	0.20	1.0000
* 61	0.00	1.0000

Top and Bottom 5 Axial Points  
 \* Excluded per Technical Specification B3.2.1

FIGURE 8  
 RAOC W (Z) AT 12000 MWD/MTU



COLR for VEGP UNIT 2 CYCLE 12



This figure is referred to by Specification B3.2.1

These W(Z) values are consistent with Figure 5, and are valid over the HFP  $T_{avg}$  temperature range from 586.4 to 587.4°F.

Axial Point	Elevation (feet)	EOL W(Z)
* 1	12.00	1.0000
* 2	11.80	1.0000
* 3	11.60	1.0000
* 4	11.40	1.0000
* 5	11.20	1.0000
6	11.00	1.2837
7	10.80	1.2756
8	10.60	1.2620
9	10.40	1.2486
10	10.20	1.2395
11	10.00	1.2384
12	9.80	1.2387
13	9.60	1.2395
14	9.40	1.2389
15	9.20	1.2371
16	9.00	1.2428
17	8.80	1.2579
18	8.60	1.2731
19	8.40	1.2844
20	8.20	1.2959
21	8.00	1.3034
22	7.80	1.3014
23	7.60	1.3125
24	7.40	1.3185
25	7.20	1.3211
26	7.00	1.3202
27	6.80	1.3161
28	6.60	1.3090
29	6.40	1.2992
30	6.20	1.2867
31	6.00	1.2724
32	5.80	1.2599
33	5.60	1.2522
34	5.40	1.2499
35	5.20	1.2507
36	5.00	1.2503
37	4.80	1.2476
38	4.60	1.2426
39	4.40	1.2353
40	4.20	1.2258
41	4.00	1.2141
42	3.80	1.2009
43	3.60	1.1889
44	3.40	1.1791
45	3.20	1.1685
46	3.00	1.1803
47	2.80	1.1859
48	2.60	1.1903
49	2.40	1.1946
50	2.20	1.1993
51	2.00	1.2042
52	1.80	1.2099
53	1.60	1.2163
54	1.40	1.2235
55	1.20	1.2314
56	1.00	1.2394
* 57	0.80	1.0000
* 58	0.60	1.0000
* 59	0.40	1.0000
* 60	0.20	1.0000
* 61	0.00	1.0000

Top and Bottom 5 Axial Points  
 \* Excluded per Technical Specification B3.2.1

FIGURE 9  
 RAOC W (Z) AT 20000 MWD/MTU