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SOUTHERN COMPANY
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January 31, 2006

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

Vogtle Electric Generating Plant
Unit 1 Cycle 13 Core Operating Limits Report

Ladies and Gentlemen:

Pursuant to the reporting requirements of Vogtle Electric Generating Plant (VEGP) Technical Specification 5.6.5 Southern Nuclear Operating Company (SNC) is submitting Revision 2 of the Unit 1 Cycle 13 Core Operating Limits Report (COLR).

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

Sincerely,

Don E. Grissette

DEG/RJF/daj

Enclosure: Unit 1 Cycle 13 Core Operating Limits Report

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

VOGTLE ELECTRIC GENERATING PLANT (VEGP) UNIT 1 CYCLE 13

CORE OPERATING LIMITS REPORT

REVISION 2

January 2006

1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report (COLR) for VEGP UNIT 1 CYCLE 13 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 - $F^N_{\Delta H}$
3.2.3	Axial Flux Difference
3.9.1	Boron Concentration

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 -5.50×10^{-4} $\Delta k/k/^{\circ}F$.[1]

2.3.2 The MTC Surveillance limits are:

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

The 60 ppm/ARO/RTP-MTC should be less negative than -5.35×10^{-4} $\Delta k/k/^{\circ}F$.[1]

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.

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

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

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

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

2.6.3 K(Z) is provided in Figure 4.

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

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

2.6.5 W(Z) values for Set 1 are provided in Figures 7 through 9 and for Set 2 in Figures 10 through 12.

The following W(Z) factors will be valid provided that the measured axial offset (i.e., the axial offset measured by an in-core flux map) is within the range as defined by the validity table below.

Axial Offset Validity for W(Z) Factors

Cycle Burnup (MWD/MTU)	Minimum AO (%)	Maximum AO (%)	Breakpoint AO (%)
8,000	-11.62	-2.6	-7.11
10,000	-13.24	-3.42	-8.33
12,000	-13.74	-3.74	-8.74
14,000	-11.44	-2.37	-6.91
16,000	-7.74	-0.4	-4.07
18,000	-4.79	1.23	-1.78
20,000	-2.78	5.38	1.30
21,000	-1.89	7.42	2.77
22,006	-1.45	8.64	3.60

In general, it is required that Minimum AO < Measured Axial Offset (MAO) < Maximum AO. Otherwise, contact Westinghouse and follow the guidelines provided in Revision 3 of the AO Validity Criteria.

For cycle burnups < 18,000 MWD/MTU,
if MAO is ≥ Breakpoint AO, use W(Z) Set 1.
if MAO is < Breakpoint AO, use W(Z) Set 2.

For cycle burnups ≥ 18,000 and ≤ 22,006 MWD/MTU,
if MAO is ≥ Breakpoint AO, use W(Z) Set 2.
if MAO is < Breakpoint AO, use W(Z) Set 1.

For cycle burnups > 22,006 and ≤ 23,106 MWD/MTU, use the same W(Z) Set as was selected for the last flux map prior to 22,006 MWD/MTU.

Also, linear interpolation should be performed on AO (%) to the burnup of the flux map.

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

2.7 Nuclear Enthalpy Rise Hot Channel Factor - $F^N_{\Delta H}$ (Specification 3.2.2)

2.7.1 $F^N_{\Delta H} \leq F^{RTP}_{\Delta H} * (1 + PF_{\Delta H} * (1 - P))$

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

2.7.2 $F^{RTP}_{\Delta H} = 1.65$

2.7.3 $PF_{\Delta H} = 0.3$

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 1935 ppm.[1]

[1]This concentration bounds the condition of $k_{eff} \leq 0.95$ (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^{10} depletion.

TABLE 1

$F_Q(Z)$ PENALTY FACTOR

Cycle Burnup (MWD/MTU)	$F_Q(Z)$ Penalty Factor
30	1.036
150	1.036
363	1.038
577	1.037
790	1.035
1004	1.031
1217	1.024
1431	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.

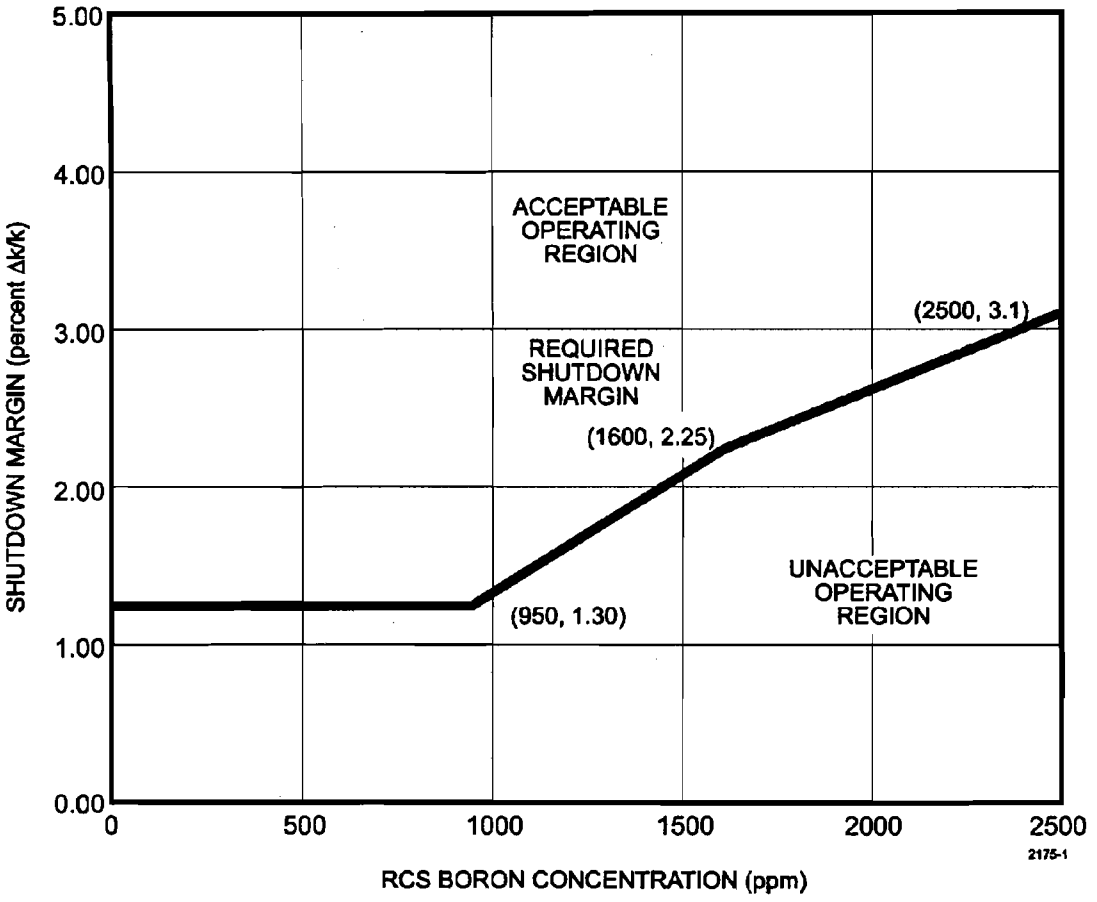


FIGURE 1

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

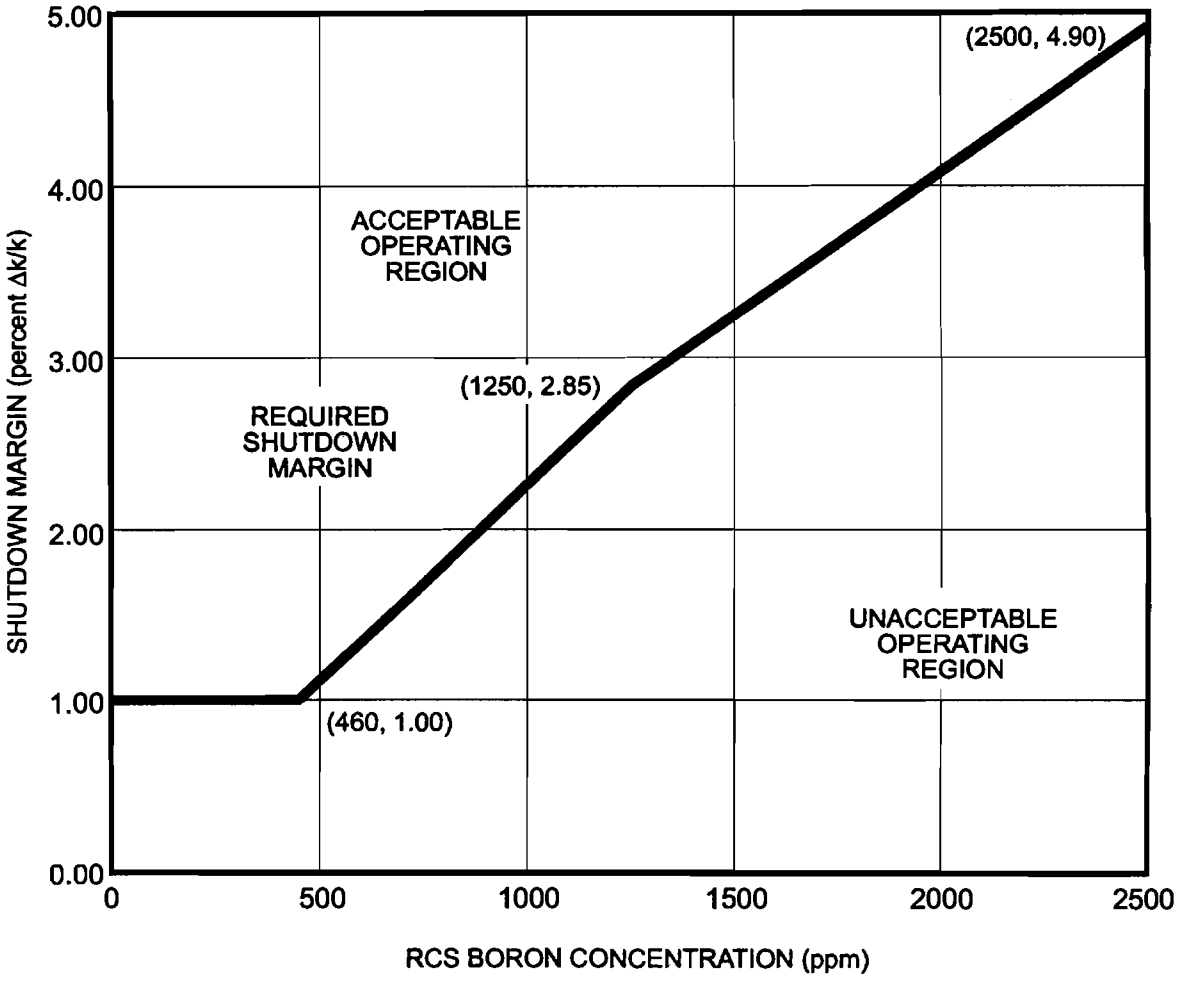
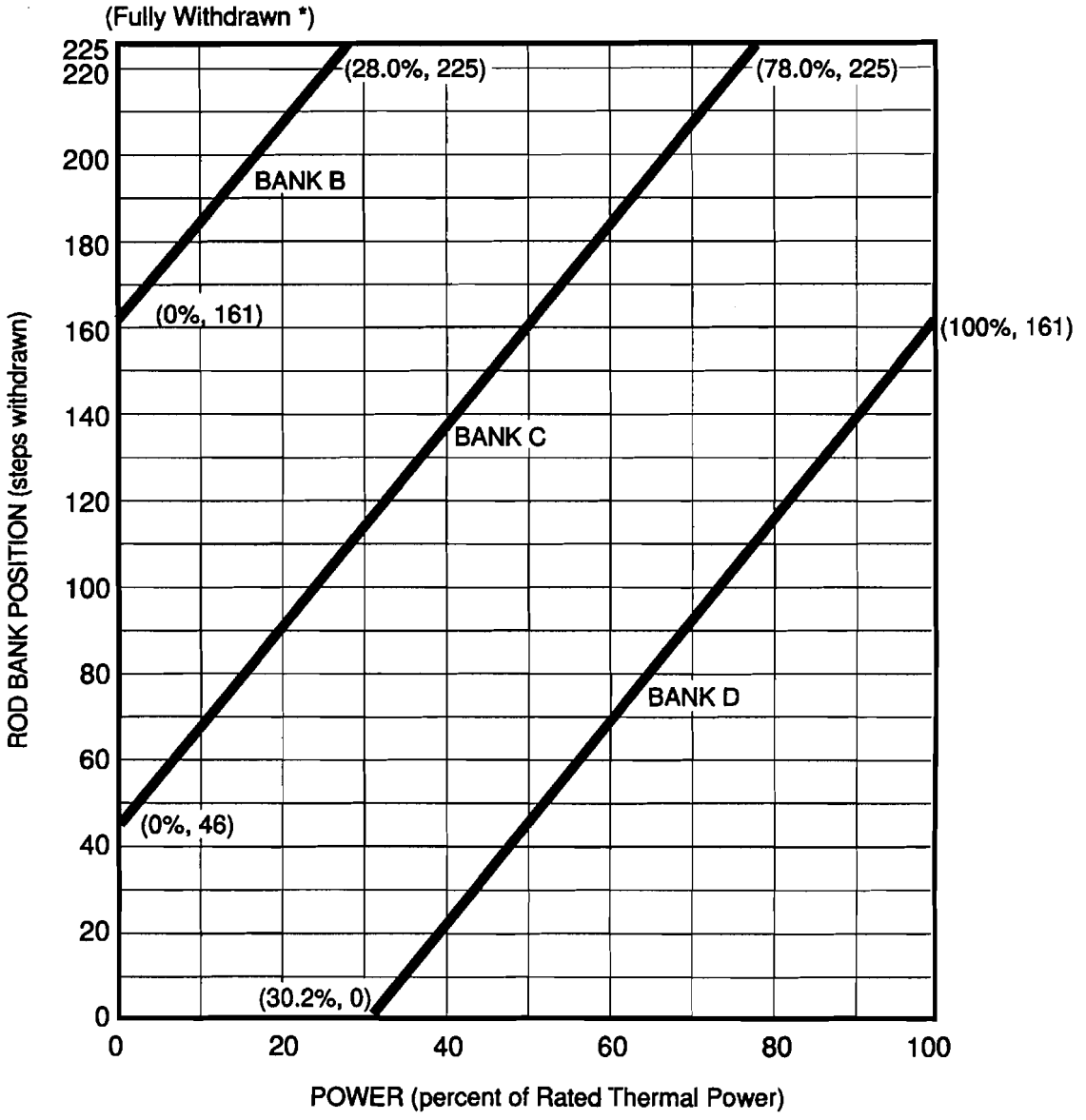


FIGURE 2

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 ≥225 and ≤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

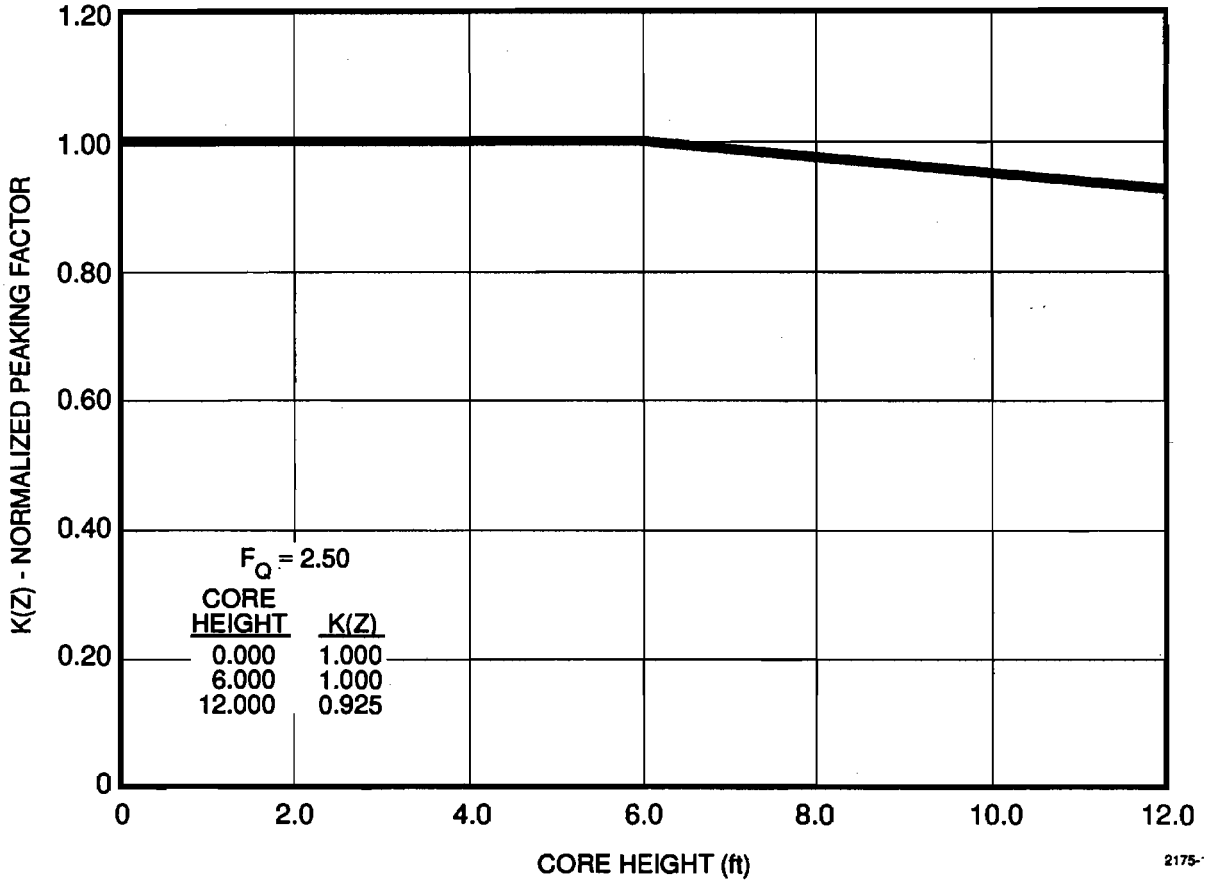


FIGURE 4

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

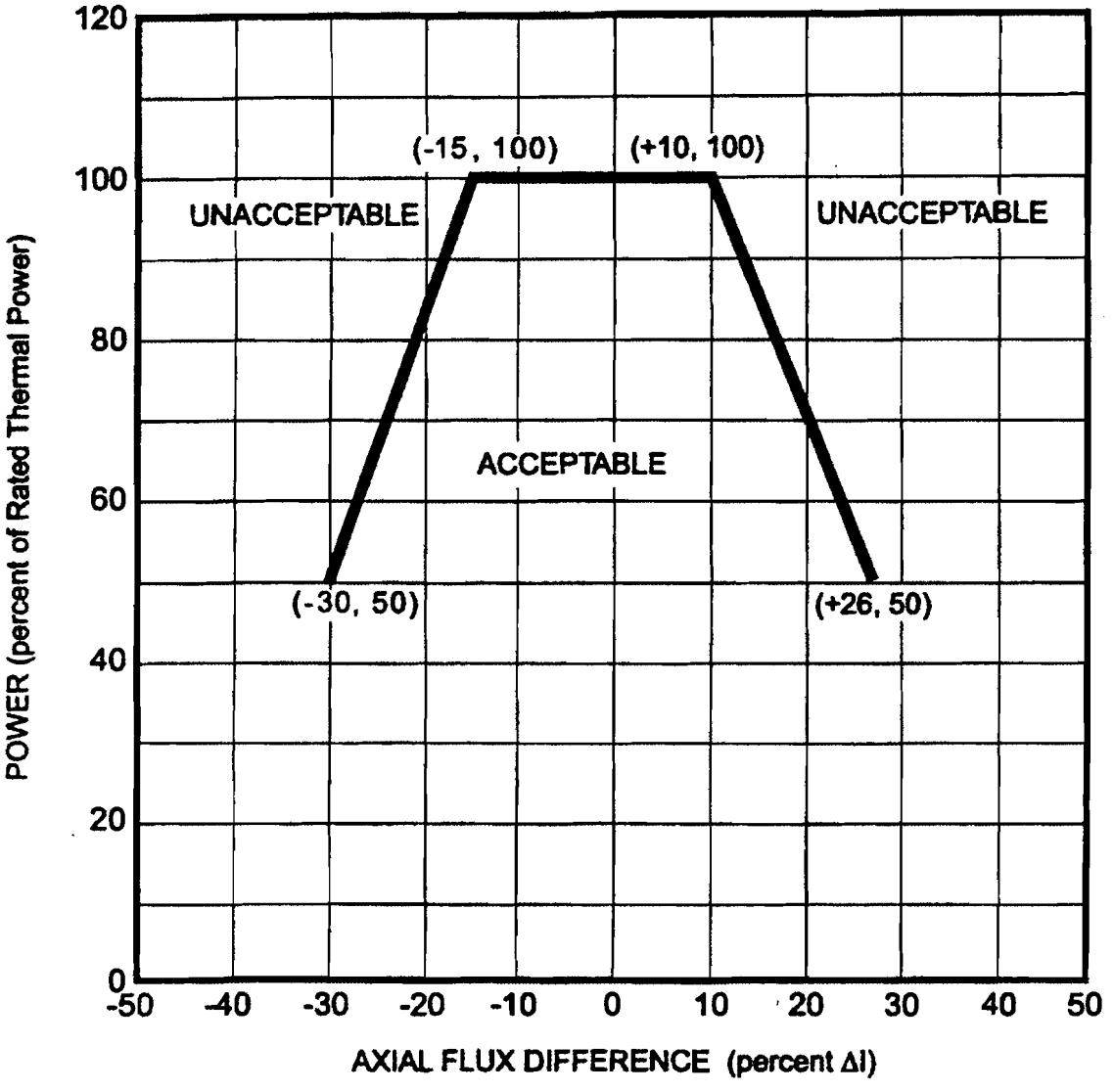
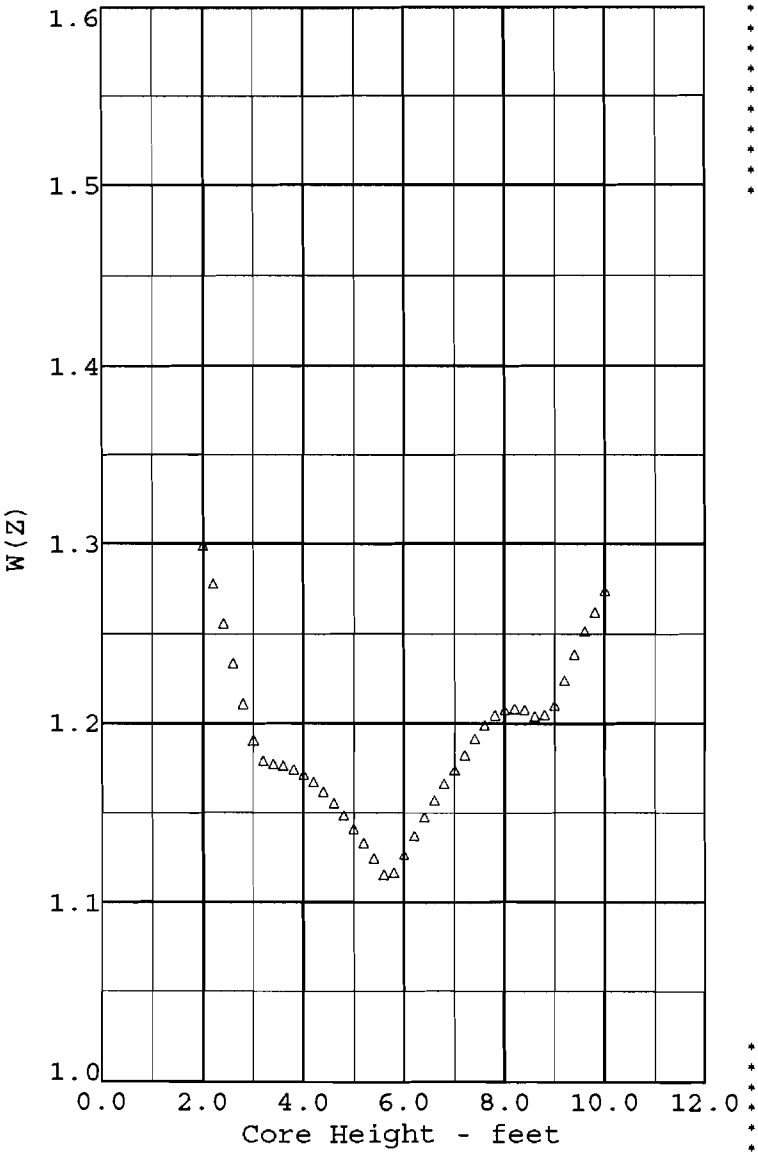


FIGURE 5

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

This data is intentionally deleted.

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



	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	1.0000
*	7	10.80	1.0000
*	8	10.60	1.0000
*	9	10.40	1.0000
*	10	10.20	1.0000
	11	10.00	1.2738
	12	9.80	1.2620
	13	9.60	1.2512
	14	9.40	1.2382
	15	9.20	1.2238
	16	9.00	1.2098
	17	8.80	1.2045
	18	8.60	1.2037
	19	8.40	1.2074
	20	8.20	1.2080
	21	8.00	1.2073
	22	7.80	1.2044
	23	7.60	1.1987
	24	7.40	1.1910
	25	7.20	1.1821
	26	7.00	1.1739
	27	6.80	1.1662
	28	6.60	1.1572
	29	6.40	1.1475
	30	6.20	1.1370
	31	6.00	1.1264
	32	5.80	1.1167
	33	5.60	1.1153
	34	5.40	1.1245
	35	5.20	1.1330
	36	5.00	1.1408
	37	4.80	1.1482
	38	4.60	1.1552
	39	4.40	1.1616
	40	4.20	1.1669
	41	4.00	1.1710
	42	3.80	1.1740
	43	3.60	1.1760
	44	3.40	1.1770
	45	3.20	1.1787
	46	3.00	1.1904
	47	2.80	1.2108
	48	2.60	1.2335
	49	2.40	1.2556
	50	2.20	1.2776
	51	2.00	1.2991
*	52	1.80	1.0000
*	53	1.60	1.0000
*	54	1.40	1.0000
*	55	1.20	1.0000
*	56	1.00	1.0000
*	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

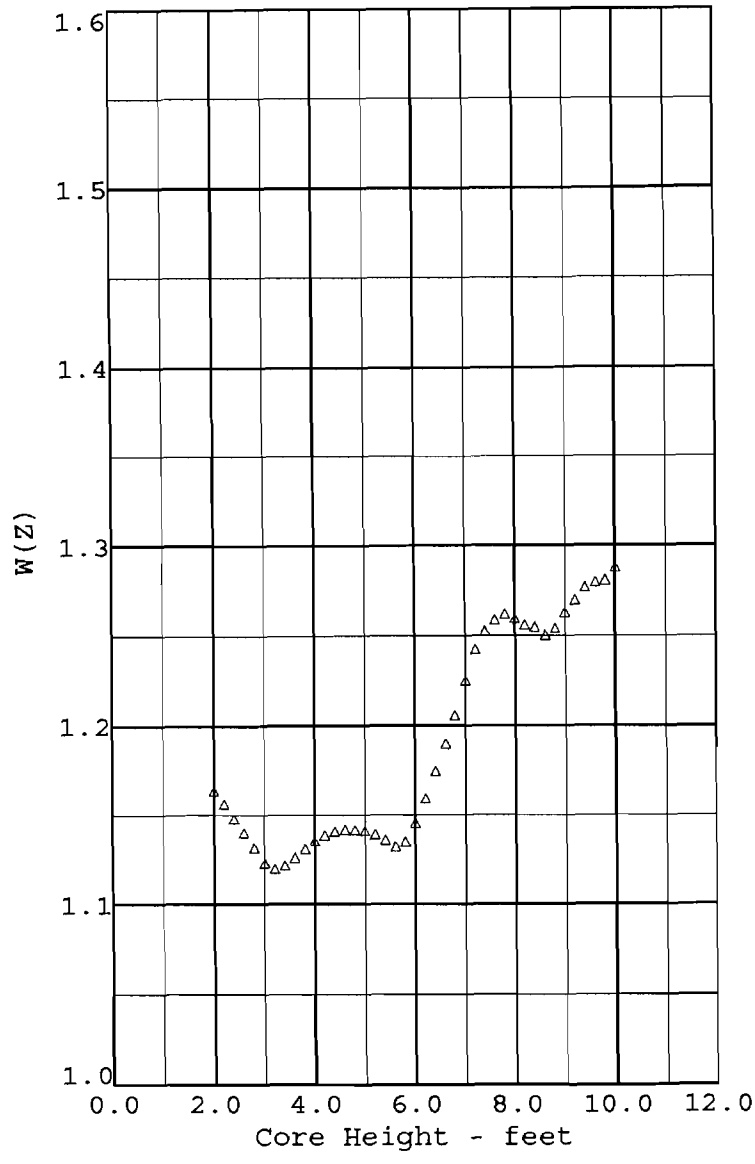
These W(Z) values are consistent with Figure 5, and are valid over the HFP T_{avg} temperature range from 586.4 to 587.4°F.

See COLR Section 2.6.5 for AO Validity Rules.

* Top and Bottom 15% Excluded per Technical Specification B3.2.1

FIGURE 7

RAOC W(Z) AT 4,000 MWD/MTU (SET 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.

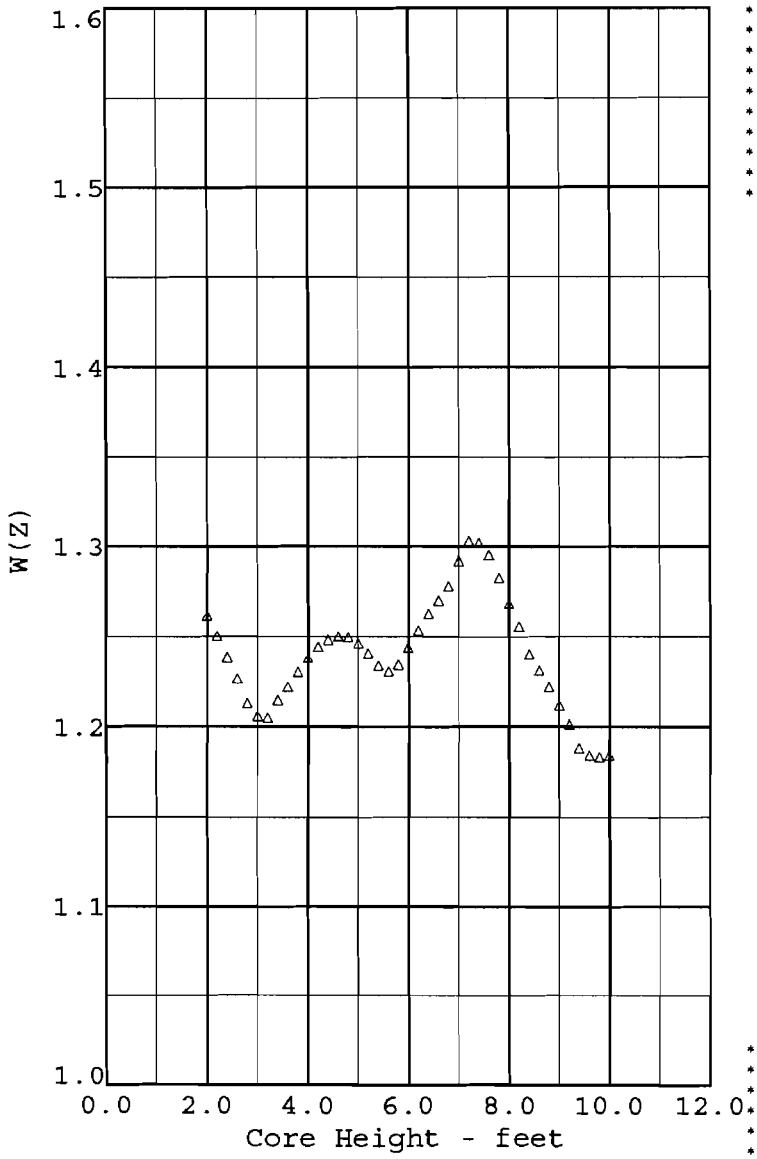
See COLR Section 2.6.5 for AO Validity Rules.

	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	1.0000
*	7	10.80	1.0000
*	8	10.60	1.0000
*	9	10.40	1.0000
*	10	10.20	1.0000
	11	10.00	1.2878
	12	9.80	1.2806
	13	9.60	1.2794
	14	9.40	1.2766
	15	9.20	1.2695
	16	9.00	1.2628
	17	8.80	1.2539
	18	8.60	1.2502
	19	8.40	1.2547
	20	8.20	1.2557
	21	8.00	1.2595
	22	7.80	1.2619
	23	7.60	1.2587
	24	7.40	1.2525
	25	7.20	1.2422
	26	7.00	1.2248
	27	6.80	1.2057
	28	6.60	1.1898
	29	6.40	1.1743
	30	6.20	1.1591
	31	6.00	1.1454
	32	5.80	1.1349
	33	5.60	1.1322
	34	5.40	1.1359
	35	5.20	1.1390
	36	5.00	1.1409
	37	4.80	1.1414
	38	4.60	1.1416
	39	4.40	1.1407
	40	4.20	1.1385
	41	4.00	1.1353
	42	3.80	1.1309
	43	3.60	1.1259
	44	3.40	1.1216
	45	3.20	1.1196
	46	3.00	1.1230
	47	2.80	1.1314
	48	2.60	1.1399
	49	2.40	1.1481
	50	2.20	1.1560
	51	2.00	1.1634
*	52	1.80	1.0000
*	53	1.60	1.0000
*	54	1.40	1.0000
*	55	1.20	1.0000
*	56	1.00	1.0000
*	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 15% Excluded per Technical Specification B3.2.1

FIGURE 8

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

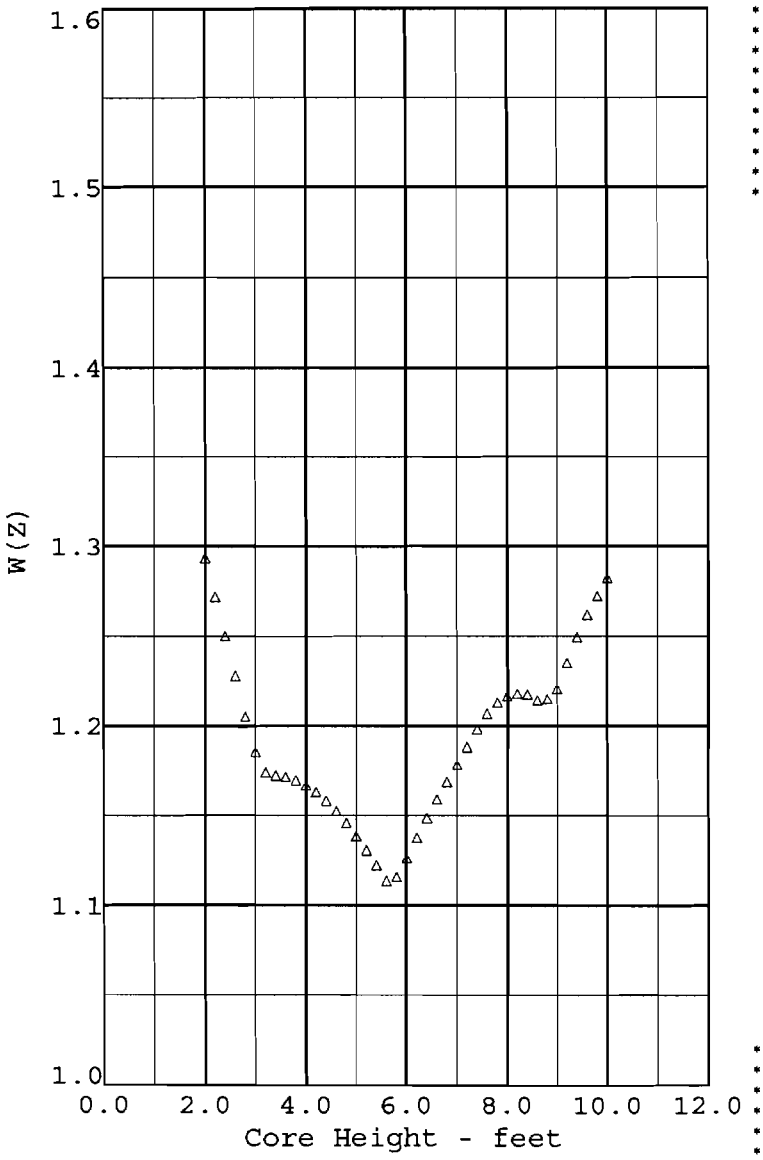
See COLR Section 2.6.5 for AO Validity Rules.

	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	1.0000
*	7	10.80	1.0000
*	8	10.60	1.0000
*	9	10.40	1.0000
*	10	10.20	1.0000
	11	10.00	1.1841
	12	9.80	1.1831
	13	9.60	1.1840
	14	9.40	1.1882
	15	9.20	1.2013
	16	9.00	1.2119
	17	8.80	1.2221
	18	8.60	1.2311
	19	8.40	1.2404
	20	8.20	1.2557
	21	8.00	1.2683
	22	7.80	1.2826
	23	7.60	1.2950
	24	7.40	1.3019
	25	7.20	1.3027
	26	7.00	1.2917
	27	6.80	1.2778
	28	6.60	1.2700
	29	6.40	1.2625
	30	6.20	1.2534
	31	6.00	1.2439
	32	5.80	1.2346
	33	5.60	1.2306
	34	5.40	1.2338
	35	5.20	1.2407
	36	5.00	1.2464
	37	4.80	1.2498
	38	4.60	1.2502
	39	4.40	1.2483
	40	4.20	1.2443
	41	4.00	1.2384
	42	3.80	1.2305
	43	3.60	1.2221
	44	3.40	1.2147
	45	3.20	1.2051
	46	3.00	1.2059
	47	2.80	1.2133
	48	2.60	1.2268
	49	2.40	1.2385
	50	2.20	1.2502
	51	2.00	1.2616
*	52	1.80	1.0000
*	53	1.60	1.0000
*	54	1.40	1.0000
*	55	1.20	1.0000
*	56	1.00	1.0000
*	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 15% Excluded per Technical Specification B3.2.1

FIGURE 9

RAOC W(Z) AT 20,000 MWD/MTU (SET 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.

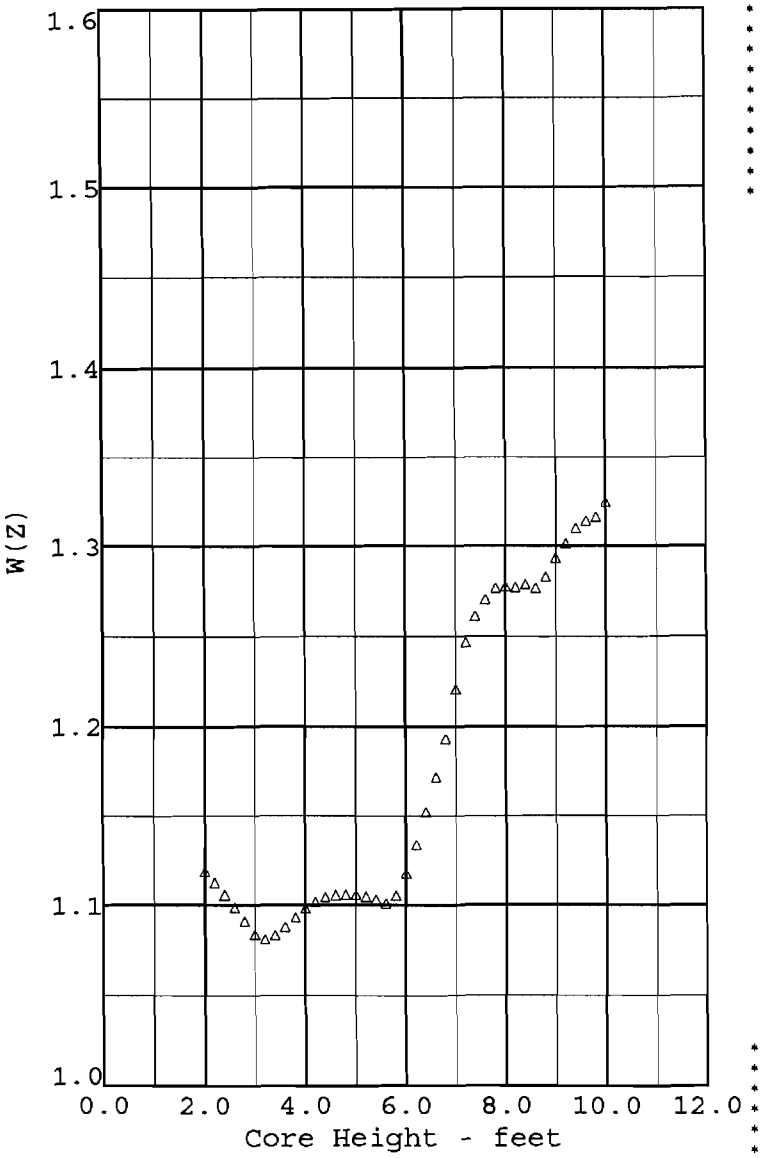
See COLR Section 2.6.5 for AO Validity Rules.

	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	1.0000
*	7	10.80	1.0000
*	8	10.60	1.0000
*	9	10.40	1.0000
*	10	10.20	1.0000
	11	10.00	1.2821
	12	9.80	1.2720
	13	9.60	1.2619
	14	9.40	1.2491
	15	9.20	1.2349
	16	9.00	1.2205
	17	8.80	1.2149
	18	8.60	1.2140
	19	8.40	1.2176
	20	8.20	1.2178
	21	8.00	1.2164
	22	7.80	1.2128
	23	7.60	1.2064
	24	7.40	1.1979
	25	7.20	1.1881
	26	7.00	1.1781
	27	6.80	1.1686
	28	6.60	1.1588
	29	6.40	1.1485
	30	6.20	1.1374
	31	6.00	1.1261
	32	5.80	1.1156
	33	5.60	1.1136
	34	5.40	1.1223
	35	5.20	1.1304
	36	5.00	1.1382
	37	4.80	1.1456
	38	4.60	1.1522
	39	4.40	1.1580
	40	4.20	1.1629
	41	4.00	1.1666
	42	3.80	1.1694
	43	3.60	1.1713
	44	3.40	1.1722
	45	3.20	1.1738
	46	3.00	1.1850
	47	2.80	1.2050
	48	2.60	1.2277
	49	2.40	1.2498
	50	2.20	1.2718
	51	2.00	1.2931
*	52	1.80	1.0000
*	53	1.60	1.0000
*	54	1.40	1.0000
*	55	1.20	1.0000
*	56	1.00	1.0000
*	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 15% Excluded per Technical Specification B3.2.1

FIGURE 10

RAOC W(Z) AT 4,000 MWD/MTU (SET 2)



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.

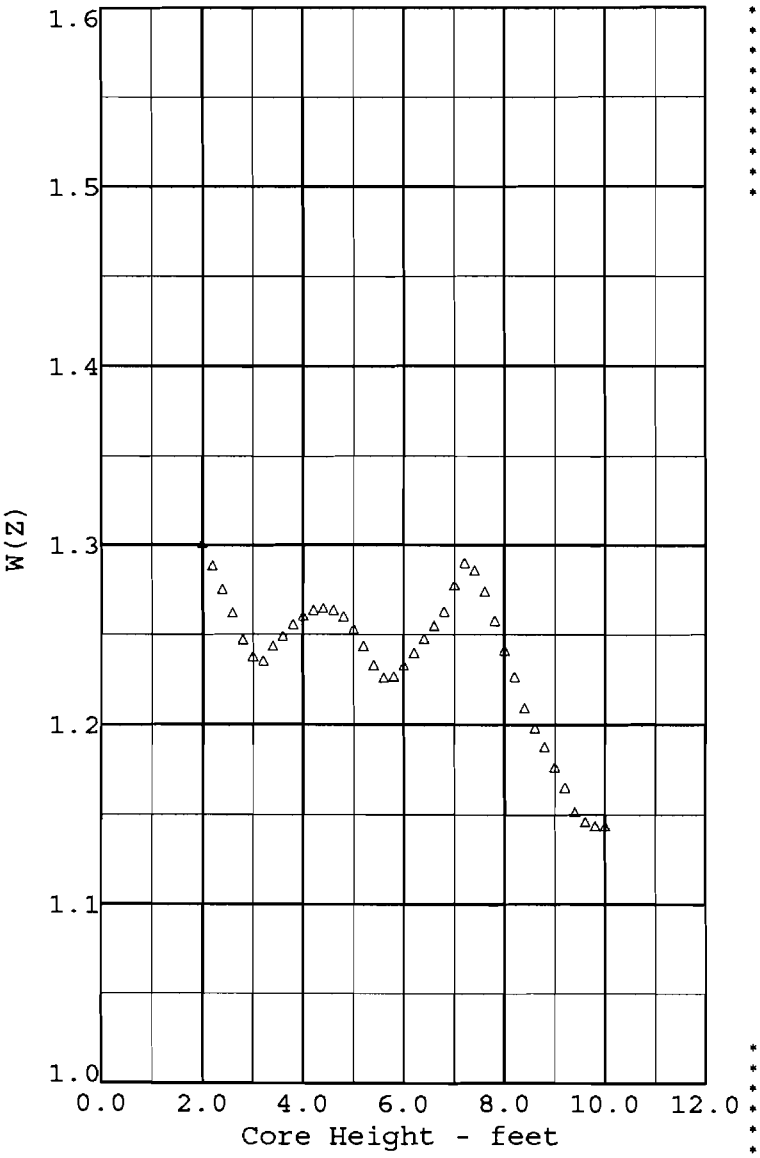
See COLR Section 2.6.5 for AO Validity Rules.

	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	1.0000
*	7	10.80	1.0000
*	8	10.60	1.0000
*	9	10.40	1.0000
*	10	10.20	1.0000
	11	10.00	1.3245
	12	9.80	1.3164
	13	9.60	1.3141
	14	9.40	1.3099
	15	9.20	1.3014
	16	9.00	1.2931
	17	8.80	1.2824
	18	8.60	1.2764
	19	8.40	1.2784
	20	8.20	1.2767
	21	8.00	1.2773
	22	7.80	1.2764
	23	7.60	1.2701
	24	7.40	1.2610
	25	7.20	1.2463
	26	7.00	1.2204
	27	6.80	1.1929
	28	6.60	1.1717
	29	6.40	1.1522
	30	6.20	1.1335
	31	6.00	1.1178
	32	5.80	1.1053
	33	5.60	1.1009
	34	5.40	1.1029
	35	5.20	1.1046
	36	5.00	1.1058
	37	4.80	1.1057
	38	4.60	1.1055
	39	4.40	1.1043
	40	4.20	1.1018
	41	4.00	1.0980
	42	3.80	1.0929
	43	3.60	1.0877
	44	3.40	1.0830
	45	3.20	1.0807
	46	3.00	1.0833
	47	2.80	1.0908
	48	2.60	1.0983
	49	2.40	1.1055
	50	2.20	1.1123
	51	2.00	1.1186
*	52	1.80	1.0000
*	53	1.60	1.0000
*	54	1.40	1.0000
*	55	1.20	1.0000
*	56	1.00	1.0000
*	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 15% Excluded per Technical Specification B3.2.1

FIGURE 11

RAOC W(Z) AT 12,000 MWD/MTU (SET 2)



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.

See COLR Section 2.6.5 for AO Validity Rules.

	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	1.0000
*	7	10.80	1.0000
*	8	10.60	1.0000
*	9	10.40	1.0000
*	10	10.20	1.0000
	11	10.00	1.1436
	12	9.80	1.1438
	13	9.60	1.1460
	14	9.40	1.1513
	15	9.20	1.1653
	16	9.00	1.1766
	17	8.80	1.1876
	18	8.60	1.1982
	19	8.40	1.2094
	20	8.20	1.2266
	21	8.00	1.2414
	22	7.80	1.2577
	23	7.60	1.2741
	24	7.40	1.2857
	25	7.20	1.2899
	26	7.00	1.2776
	27	6.80	1.2625
	28	6.60	1.2547
	29	6.40	1.2477
	30	6.20	1.2397
	31	6.00	1.2331
	32	5.80	1.2268
	33	5.60	1.2261
	34	5.40	1.2330
	35	5.20	1.2435
	36	5.00	1.2529
	37	4.80	1.2600
	38	4.60	1.2636
	39	4.40	1.2647
	40	4.20	1.2635
	41	4.00	1.2605
	42	3.80	1.2553
	43	3.60	1.2490
	44	3.40	1.2434
	45	3.20	1.2355
	46	3.00	1.2378
	47	2.80	1.2470
	48	2.60	1.2620
	49	2.40	1.2751
	50	2.20	1.2882
	51	2.00	1.3010
*	52	1.80	1.0000
*	53	1.60	1.0000
*	54	1.40	1.0000
*	55	1.20	1.0000
*	56	1.00	1.0000
*	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 15% Excluded per Technical Specification B3.2.1

FIGURE 12

RAOC W(Z) AT 20,000 MWD/MTU (SET 2)