


2CORE OPERATING LIMITS REPORT
TITLE: COLR FOR DIABLO CANYON UNIT 2 CYCLE 4APPROVED 

DATE

4-25-90
EFFECTIVE DATE

**** PROCEDURE CLASSIFICATION - QUALITY RELATED ****
**** THIS PROCEDURE CONTAINS GRAPHICS. REFER TO CONTROLLED HARD COPY. ****

1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report (COLR) for Diablo Canyon Unit 2 Cycle 4 has been prepared in accordance with the requirements of Technical Specification 6.9.1.8.

The Technical Specifications affected by this report are listed below:

3/4.1.3.5	Shutdown Rod Insertion Limit
3/4.1.3.6	Control Rod Insertion Limits
3/4.2.1	Axial Flux Difference
3/4.2.2	Heat Flux Hot Channel Factor - $F_Q(z)$ (Surveillance Requirements only)

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 the NRC-approved methodologies specified in Technical Specification 6.9.1.8.

2.1 Shutdown Rod Insertion Limit (Specification 3/4.1.3.5)

2.1.1 The shutdown rods shall be withdrawn to at least 225 steps.

2.2 Control Rod Insertion Limits (Specification 3/4.1.3.6)

2.2.1 The control rod banks shall be limited in physical insertion as shown in Figure 1.

2.3 Axial Flux Difference (Specification 3/4.2.1)

2.3.1 The AXIAL FLUX DIFFERENCE (AFD) Limits for Unit 2 Cycle 4 are provided in Figure 2.

2.4 Heat Flux Hot Channel Factor - $F_0(z)$ (Specification 3/4.2.2)

2.4.1 The $W(z)$ curves for Relaxed Axial Offset Control (RAOC) operation, provided in Figures 3 through 5 for Unit 2, Cycle 4, are sufficient to determine the RAOC $W(z)$ versus core height for Cycle 4 burnups through the end of full power reactivity plus a power coastdown of up to 1000 MWD/MTU.

3.0 FIGURES

- 3.1 Figure 1 - Rod Bank Insertion Limits Versus Thermal Power
- 3.2 Figure 2 - AFD Limits as a Function of Rated Thermal Power
- 3.3 Figure 3 - $W(z)$ at 150 MWD//MTU as a Function of Core Height
- 3.4 Figure 4 - $W(z)$ at 8000 MWD/MTU as a Function of Core Height
- 3.5 Figure 5 - $W(z)$ at 18000 MWD/MTU as a Function of Core Height

4.0 RECORD OF REVIEWS

- 4.1 Prepared by: Michael L. O'Connell
- 4.2 Sponsored by: Michael L. O'Connell
- 4.3 Independent Technical Review by: Jacqueline R. Hinds
- 4.4 Cross-Discipline Review by: Peter G. Sarafian

220 TO BE DEFINED AS 220 TO 230 STEPS WITHDRAWN

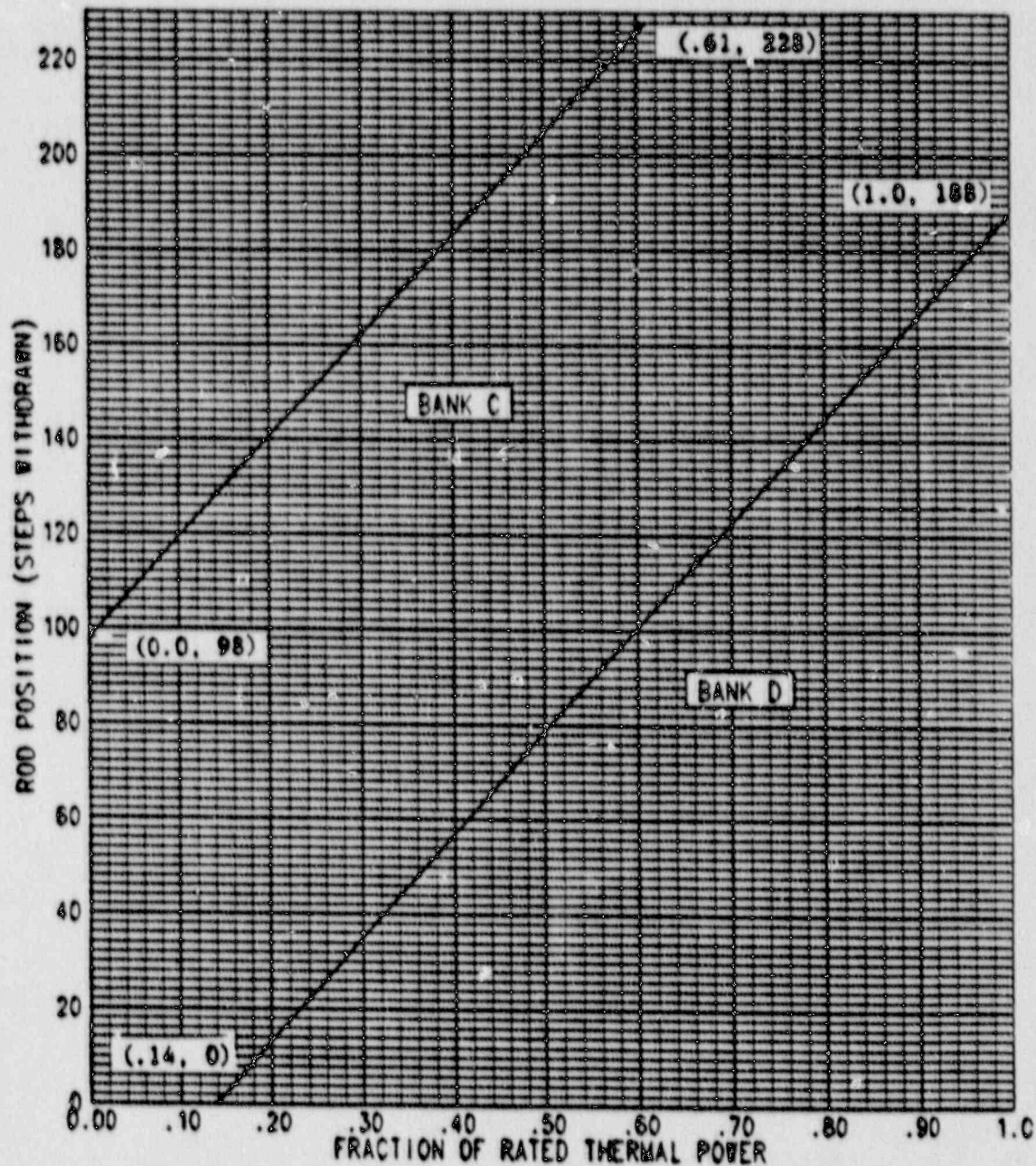


Figure 1

Rod Bank Insertion Limits Versus Thermal Power

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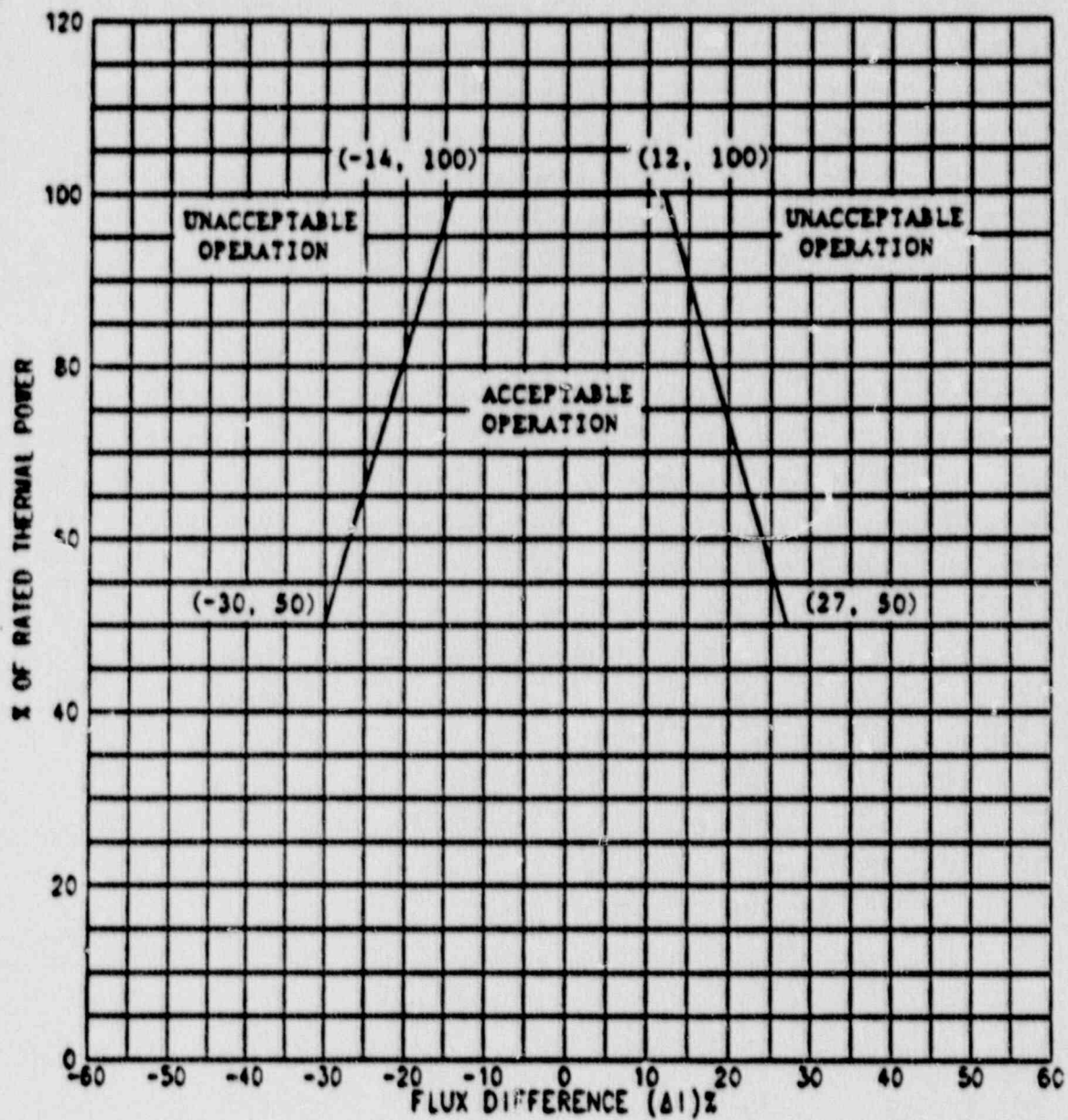


Figure 2

AFD Limits as a function of Rated Thermal Power

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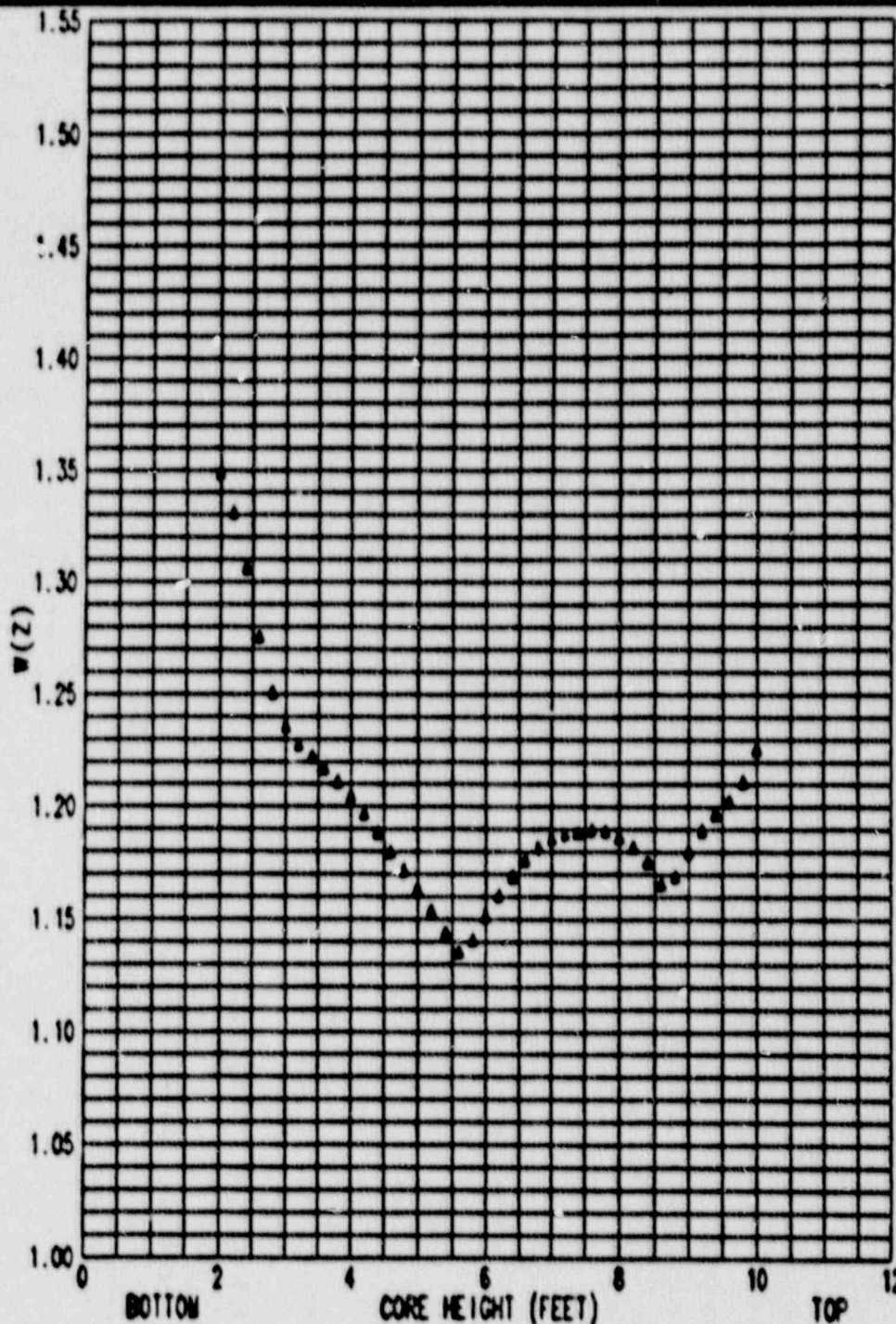


Figure 3

$W(z)$ at 150 MWD/MTU as a Function of Core Height

Height (Feet)	BDL $W(z)$
0.0000	1.0000
0.2000	1.0000
0.4000	1.0000
0.6000	1.0000
0.8000	1.0000
1.0000	1.0000
1.2000	1.0000
1.4000	1.0000
1.6000	1.0000
1.8000	1.0000
2.0000	1.0000
2.2000	1.0000
2.4000	1.0000
2.6000	1.0000
2.8000	1.0000
3.0000	1.0000
3.2000	1.0000
3.4000	1.0000
3.6000	1.0000
3.8000	1.0000
4.0000	1.0000
4.2000	1.0000
4.4000	1.0000
4.6000	1.0000
4.8000	1.0000
5.0000	1.0000
5.2000	1.0000
5.4000	1.0000
5.6000	1.0000
5.8000	1.0000
6.0000	1.0000
6.2000	1.0000
6.4000	1.0000
6.6000	1.0000
6.8000	1.0000
7.0000	1.0000
7.2000	1.0000
7.4000	1.0000
7.6000	1.0000
7.8000	1.0000
8.0000	1.0000
8.2000	1.0000
8.4000	1.0000
8.6000	1.0000
8.8000	1.0000
9.0000	1.0000
9.2000	1.0000
9.4000	1.0000
9.6000	1.0000
9.8000	1.0000
10.0000	1.0000
10.2000	1.0000
10.4000	1.0000
10.6000	1.0000
10.8000	1.0000
11.0000	1.0000
11.2000	1.0000
11.4000	1.0000
11.6000	1.0000
11.8000	1.0000
12.0000	1.0000

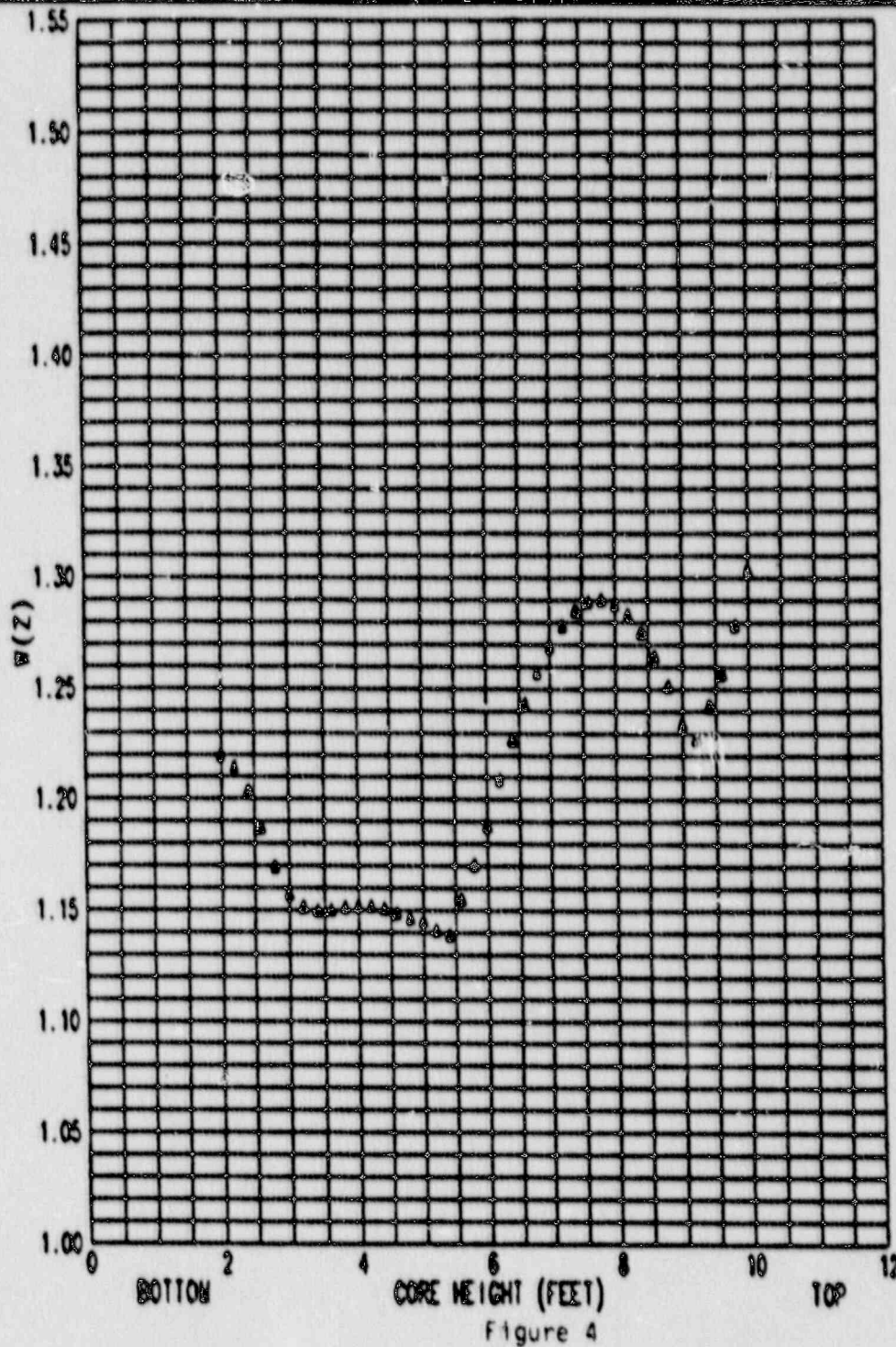
* Top and Bottom 15%
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Technical
Specification
4.2.2.1.2.0

DIABLO CANYON POWER PLANT

TITLE: COLR FOR DIABLO CANYON UNIT 2 CYCLE 4

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W(z) at 8000 MWD/MTU as a Function of Core Height

Height (Feet)	W(z)
1.0	1.00
1.1	1.00
1.2	1.00
1.3	1.00
1.4	1.00
1.5	1.00
1.6	1.00
1.7	1.00
1.8	1.00
1.9	1.00
2.0	1.00
2.1	1.00
2.2	1.00
2.3	1.00
2.4	1.00
2.5	1.00
2.6	1.00
2.7	1.00
2.8	1.00
2.9	1.00
3.0	1.00
3.1	1.00
3.2	1.00
3.3	1.00
3.4	1.00
3.5	1.00
3.6	1.00
3.7	1.00
3.8	1.00
3.9	1.00
4.0	1.00
4.1	1.00
4.2	1.00
4.3	1.00
4.4	1.00
4.5	1.00
4.6	1.00
4.7	1.00
4.8	1.00
4.9	1.00
5.0	1.00
5.1	1.00
5.2	1.00
5.3	1.00
5.4	1.00
5.5	1.00
5.6	1.00
5.7	1.00
5.8	1.00
5.9	1.00
6.0	1.00
6.1	1.00
6.2	1.00
6.3	1.00
6.4	1.00
6.5	1.00
6.6	1.00
6.7	1.00
6.8	1.00
6.9	1.00
7.0	1.00
7.1	1.00
7.2	1.00
7.3	1.00
7.4	1.00
7.5	1.00
7.6	1.00
7.7	1.00
7.8	1.00
7.9	1.00
8.0	1.00
8.1	1.00
8.2	1.00
8.3	1.00
8.4	1.00
8.5	1.00
8.6	1.00
8.7	1.00
8.8	1.00
8.9	1.00
9.0	1.00
9.1	1.00
9.2	1.00
9.3	1.00
9.4	1.00
9.5	1.00
9.6	1.00
9.7	1.00
9.8	1.00
9.9	1.00
10.0	1.00
10.1	1.00
10.2	1.00
10.3	1.00
10.4	1.00
10.5	1.00
10.6	1.00
10.7	1.00
10.8	1.00
10.9	1.00
11.0	1.00
11.1	1.00
11.2	1.00
11.3	1.00
11.4	1.00
11.5	1.00
11.6	1.00
11.7	1.00
11.8	1.00
11.9	1.00
12.0	1.00

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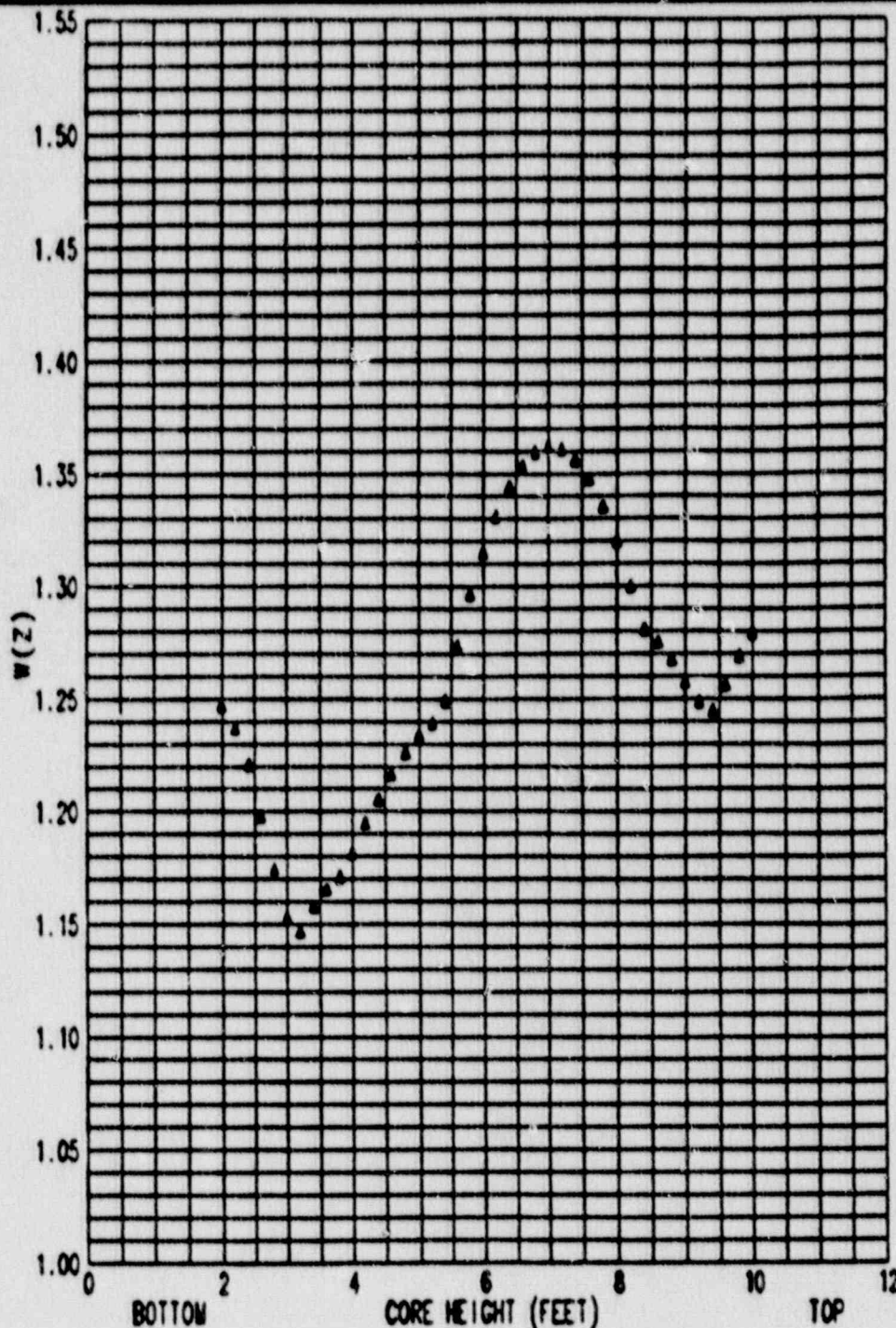


Figure 5

$W(z)$ at 18000 MWD/MTU as a Function of Core Height

Height (Feet)	EDL $W(z)$
0.0000	1.0000
0.2000	1.0000
0.4000	1.0000
0.6000	1.0000
0.8000	1.0000
1.0000	1.0000
1.2000	1.0000
1.4000	1.0000
1.6000	1.0000
1.8000	1.0000
2.0000	1.0000
2.2000	1.2474
2.4000	1.2374
2.6000	1.2208
2.8000	1.1883
3.0000	1.1744
3.2000	1.1530
3.4000	1.1488
3.6000	1.1578
3.8000	1.1656
4.0000	1.1712
4.2000	1.1818
4.4000	1.1948
4.6000	1.2084
4.8000	1.22185
5.0000	1.22283
5.2000	1.22338
5.4000	1.22384
5.6000	1.22484
5.8000	1.22738
6.0000	1.22888
6.2000	1.23182
6.4000	1.2313
6.6000	1.2441
6.8000	1.2538
7.0000	1.2587
7.2000	1.2622
7.4000	1.2611
7.6000	1.2583
7.8000	1.2478
8.0000	1.2355
8.2000	1.2200
8.4000	1.2001
8.6000	1.2808
8.8000	1.2754
9.0000	1.2678
9.2000	1.2578
9.4000	1.2488
9.6000	1.2447
9.8000	1.2384
10.0000	1.2281
10.2000	1.2185
10.4000	1.0000
10.6000	1.0000
10.8000	1.0000
11.0000	1.0000
11.2000	1.0000
11.4000	1.0000
11.6000	1.0000
11.8000	1.0000
12.0000	1.0000

* Top and Bottom 15%
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Technical
Specification
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