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FPL Energy
Point Beach Nuclear Plant

April 24, 2008

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

Point Beach Nuclear Plant Unit 2
Docket No. 50-301
License No. DPR-27

Unit 2 Cycle 30 (U2C30) Core Operating Limits Report

In accordance with the requirements of Point Beach Nuclear Plant (PBNP) Technical Specification 5.6.4, "Core Operating Limits Report (COLR)," FPL Energy Point Beach, LLC, is submitting the Core Operating Limits Report for PBNP Unit 2 Cycle 30 (U2C30).

The PBNP U2C30 COLR was issued on April 19, 2008.

This letter contains no new commitments and no revisions to existing commitments.

Very truly yours,

FPL Energy Point Beach, LLC

James H. McCarthy
Site Vice President

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Point Beach Nuclear Plant, USNRC
Resident Inspector, Point Beach Nuclear Plant, USNRC
PSCW

ENCLOSURE

CORE OPERATING LIMITS REPORT
POINT BEACH NUCLEAR PLANT, UNIT 2 CYCLE 30 (U2C30)

TRM 2.1

CORE OPERATING LIMITS REPORT (COLR)

UNIT 2 CYCLE 30

REVISION 10

1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report (COLR) for Point Beach Nuclear Plant has been prepared in accordance with the requirements of Technical Specification (TS) 5.6.4.

A cross-reference between the COLR sections and the PBNP Technical Specifications affected by this report is given below:

COLR Section	PBNP TS	Description
2.1	2.1.1	Reactor Core Safety Limits
2.2	3.1.1	Shutdown Margin
	3.1.4	Rod Group Alignment Limits
	3.1.5	Shutdown Bank Insertion Limits
	3.1.6	Control Bank Insertion Limits
	3.1.8	Physics Test Exceptions
2.3	3.1.3	Moderator Temperature Coefficient
2.4	3.1.5	Shutdown Bank Insertion Limit
2.5	3.1.6	Control Bank Insertion Limits
2.6	3.2.1	Nuclear Heat Flux Hot Channel Factor ($F_Q(Z)$)
2.7	3.2.2	Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$)
2.8	3.2.3	Axial Flux Difference (AFD)
2.9	3.3.1	Overtemperature ΔT Setpoint
2.10	3.3.1	Overpower ΔT Setpoint
2.11	3.4.1	RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits
2.12	3.9.1	Refueling Boron Concentration
Figure 1	2.1.1	Reactor Core Safety Limits Curve
Figure 2	3.1.1	Required Shutdown Margin
Figure 3	3.1.6	Control Bank Insertion Limits
Figure 4	3.2.1	Hot Channel Factor Normalized Operating Envelope (K(Z)) for 422V+ Fuel
Figure 5	3.2.1	RAOC Summary of W(Z) with HFP AFD Band of -8/+9% (Top 15% and Bottom 12% Excluded)
Figure 6	3.2.3	Flux Difference Operating Envelope

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 5.6.4.

2.1 Reactor Core Safety Limits (TS 2.1.1)

The combination of THERMAL POWER, Reactor Coolant System (RCS) highest loop average temperature, and pressurizer pressure shall not exceed the limits specified in Figure 1.

Applicability: MODES 1 and 2

2.2 Shutdown Margin (TS 3.1.1 and referenced in TS 3.1.4, 3.1.5, 3.1.6, and 3.1.8)

2.2.1 SDM shall be within the limits provided in Figure 2.

Applicability: MODES 1, 2, and 3

2.2.2 SDM shall be $\geq$1% Δk/k.

Applicability: MODES 4 and 5

2.3 Moderator Temperature Coefficient (TS 3.1.3)

2.3.1 The upper MTC limits shall be maintained within the limits.

2.3.2 The maximum upper MTC limits shall be:

$\leq$5 pcm/°F for power levels $\leq$70% RTP
$\leq$0 pcm/°F for power levels >70% RTP

Applicability: MODE 1 and MODE 2 with k_{eff} $\geq$1.0.

2.4 Shutdown Bank Insertion Limit (TS 3.1.5)

NOTE: This limit is not applicable while performing SR 3.1.4.2.

2.4.1 Each shutdown bank shall be fully withdrawn.

2.4.2 Fully withdrawn is defined as $\geq$225 steps.

Applicability: MODES 1 and 2

2.5 Control Bank Insertion Limits (TS 3.1.6)

NOTE: This limit is not applicable while performing SR 3.1.4.2.

The control banks shall be within the insertion, sequence and overlap limits specified in Figure 3.

Applicability: MODE 1 and MODE 2 with $k_{eff} \geq 1.0$

2.6 Nuclear Heat Flux Hot Channel Factor ($F_Q(Z)$) (TS 3.2.1)

The Heat Flux Hot Channel Factor shall be within the following limits:

$F_Q(Z) \leq CF_Q * K(Z) / P$ for $P > 0.5$

$F_Q(Z) \leq CF_Q * K(Z) / 0.5$ for $P \leq 0.5$

Where P is the fraction of Rated Power at which the core is operating.

$F_Q(Z)$ is both:

- Steady State $F_Q^C(Z) = F_Q(Z) * 1.08$
- Transient $F_Q^W(Z) = F_Q^C(Z) * W(Z)$

$CF_Q = 2.60$ (422V+ Fuel)

K(Z) is the function in Figure 4

W(Z) is the function in Figure 5

The following FQ penalty factors are applicable to Cycle 30.

Cycle Burnup (MWD/MTU)	$F^W_Q(Z)$ Penalty Factors
150 to 524	1.0200
525	1.0201
650	1.0212
775	1.0217
900	1.0219
1024	1.0225
1149	1.0221
1274	1.0207
1275 to End-of-Cycle	1.0200

Linear interpolation is adequate for intermediate cycle burnups.

Applicability: MODE 1

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

The Nuclear Enthalpy Rise Hot Channel Factor shall be within the following limit:

2.7.1 $F^N_{\Delta H} < 1.77 \times [1 + 0.3(1-P)]$ (422V+ Fuel)

where: P is the fraction of Rated Power at which the core is operating.

Applicability: MODE 1

2.8 Axial Flux Difference (AFD) (TS 3.2.3)

NOTE: The AFD shall be considered outside limits when two or more OPERABLE excore channels indicate AFD to be outside limits.

The indicated axial flux difference in % flux difference units shall be maintained within the allowed operational space defined by Figure 6.

Applicability: MODE 1 with THERMAL POWER ≥50% RTP

2.9 Overtemperature ΔT Setpoint (TS 3.3.1, Table 3.3.1-1 note 1)

Overtemperature ΔT setpoint parameter values:

ΔT_O	=	indicated ΔT at Rated Power, °F
T	=	average temperature, °F
T′	≤	569.0°F
P′	=	2235 psig
K_1	≤	1.16
K_2	=	0.0149
K_3	=	0.00072
τ_1	=	25 sec
τ_2	=	3 sec
τ_3	=	2 sec for Rosemont or equivalent RTD
	=	0 sec for Sostman or equivalent RTD
τ_4	=	2 sec for Rosemont or equivalent RTD
	=	0 sec for Sostman or equivalent RTD

f(ΔI) is an even function of the indicated difference between top and bottom detectors of the power-range nuclear ion chambers; with gains to be selected based on measured instrument response during plant startup tests, where q_t and q_b are the percent power in the top and bottom halves of the core respectively, and $q_t + q_b$ is total core power in percent of Rated Power, such that:

2.9.1 For $q_t - q_b$ within -12, +5 percent, $f(\Delta I) = 0$.

2.9.2 For each percent that the magnitude of $q_t - q_b$ exceeds +5 percent, the ΔT trip setpoint shall be automatically reduced by an equivalent of 2.12 percent of Rated Power.

2.9.3 For each percent that the magnitude of $q_t - q_b$ exceeds -12 percent, the ΔT trip setpoint shall be automatically reduced by an equivalent of 2.0 percent of Rated Power.

Applicability: MODES 1 and 2

2.10 Overpower ΔT Setpoint (TS 3.3.1, Table 3.3.1-1 note 2)

Overpower ΔT setpoint parameter values:

ΔT_O	=	indicated ΔT at Rated Power, °F
T	=	average temperature, °F
T′	≤	569.0°F
K_4	≤	1.10 of Rated Power
K_5	=	0.0262 for increasing T
K_5	=	0.0 for decreasing T
K_6	=	0.00103 for $T \geq T'$
K_6	=	0.0 for $T < T'$
τ_5	=	10 sec
τ_3	=	2 sec for Rosemont or equivalent RTD
	=	0 sec for Sostman or equivalent RTD
τ_4	=	2 sec for Rosemont or equivalent RTD
	=	0 sec for Sostman or equivalent RTD

Applicability: MODES 1 and 2

2.11 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits (TS 3.4.1)

2.11.1 T_{avg} shall be ≤574°F.

2.11.2 Pressurizer pressure shall be maintained ≥2205 psig during operation.

NOTE: Pressurizer pressure limit does not apply during:

1) THERMAL POWER ramp >5% RTP per minute; or

2) THERMAL POWER step >10% RTP.

2.11.3 Reactor Coolant System raw measured Total Flow Rate shall be maintained ≥182,400 gpm.

Applicability: MODE 1

2.12 Refueling Boron Concentration (TS 3.9.1)

Boron concentrations of the Reactor Coolant System, the refueling canal, and the refueling cavity shall be maintained ≥2200 ppm.

Applicability: MODE 6

FIGURE 1
REACTOR CORE SAFETY LIMITS CURVE
(Cores containing 422V+ fuel)

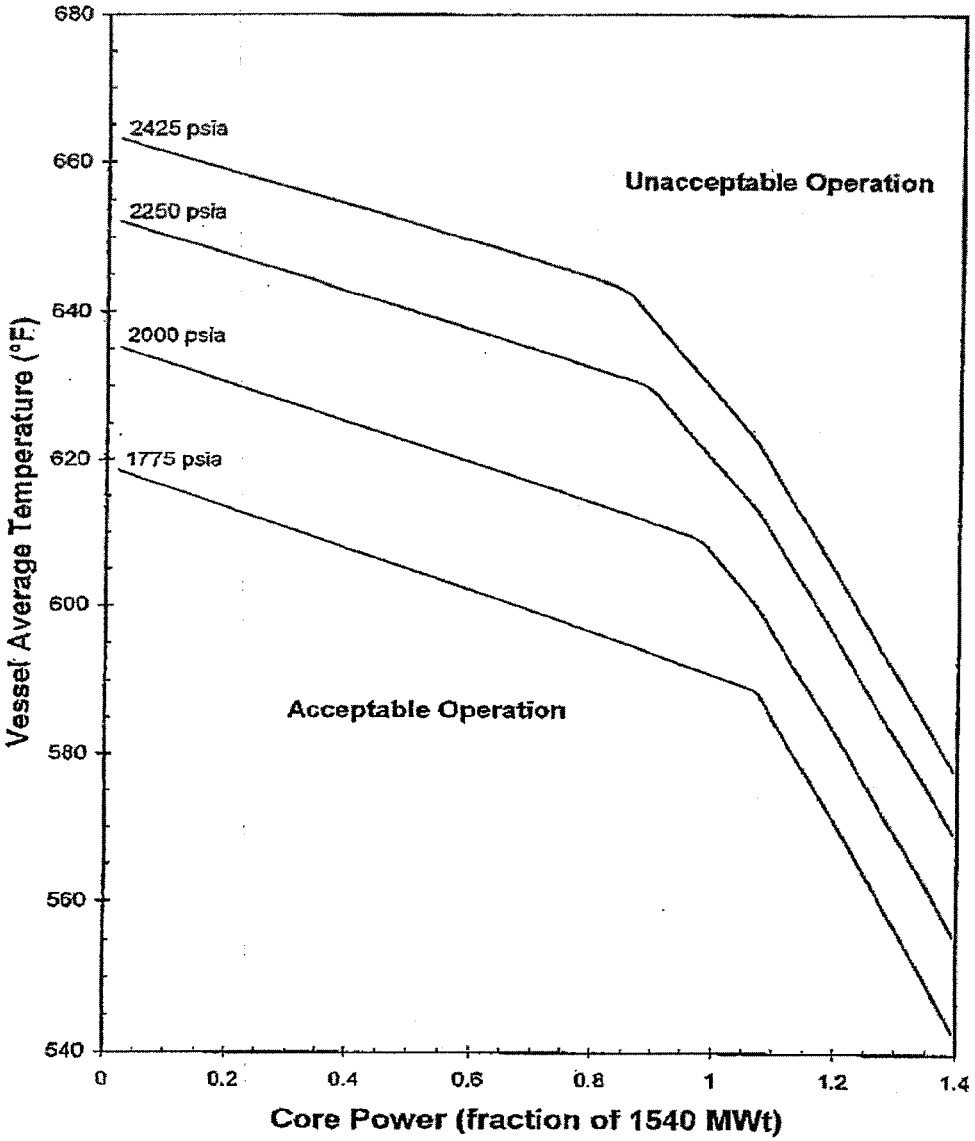


FIGURE 2
REQUIRED SHUTDOWN MARGIN

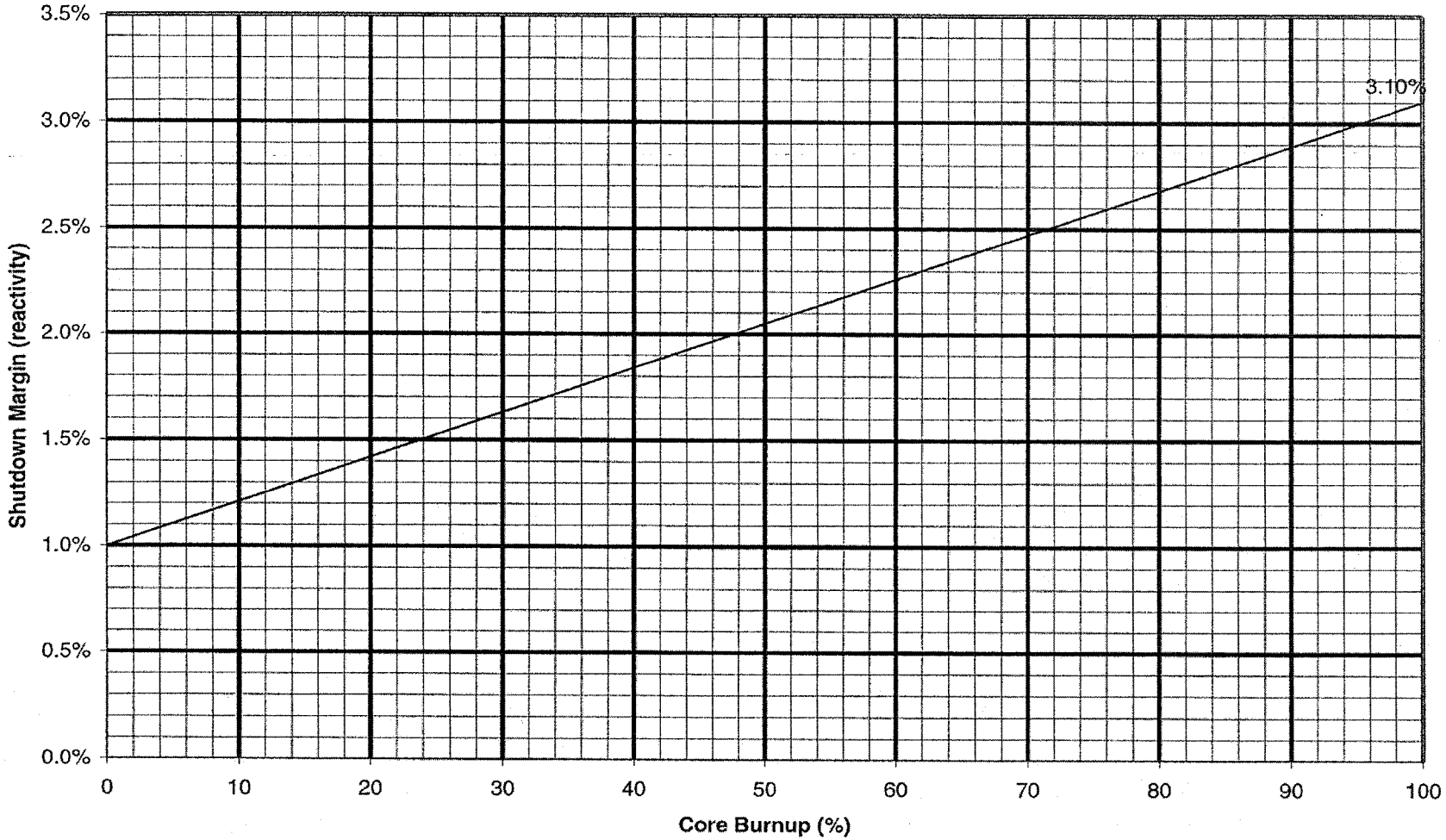
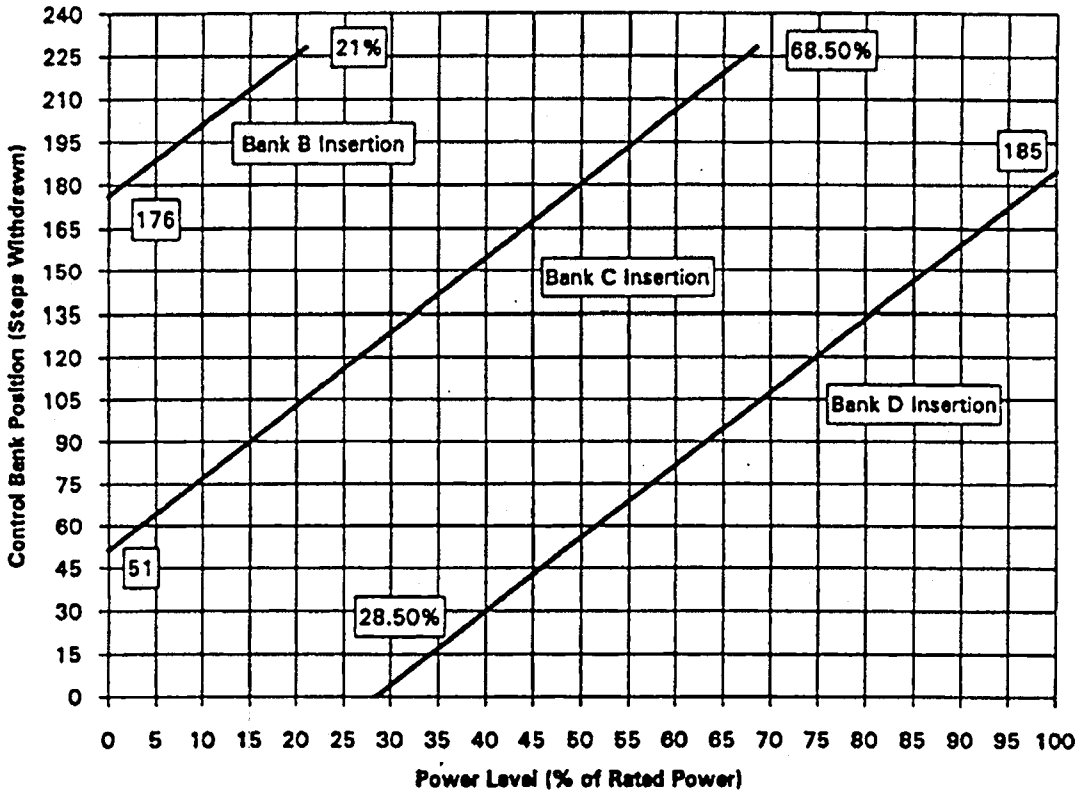


FIGURE 3
CONTROL BANK INSERTION LIMITS



NOTE: The "fully withdrawn" parking position range ≥ 225 steps can be used without violating this Figure.

FIGURE 4
HOT CHANNEL FACTOR NORMALIZED OPERATING ENVELOPE (K(Z))
FOR 422V+ FUEL

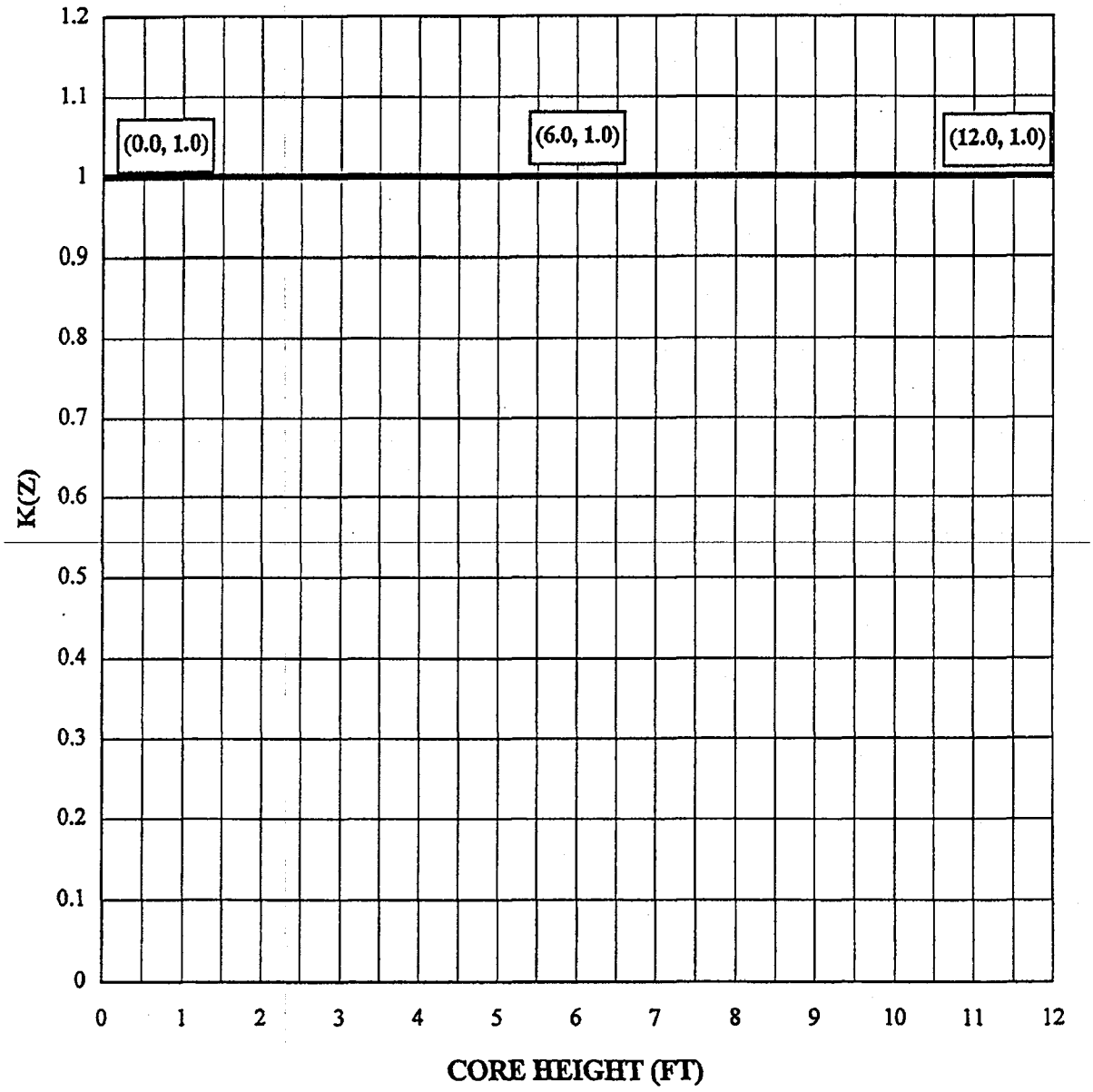


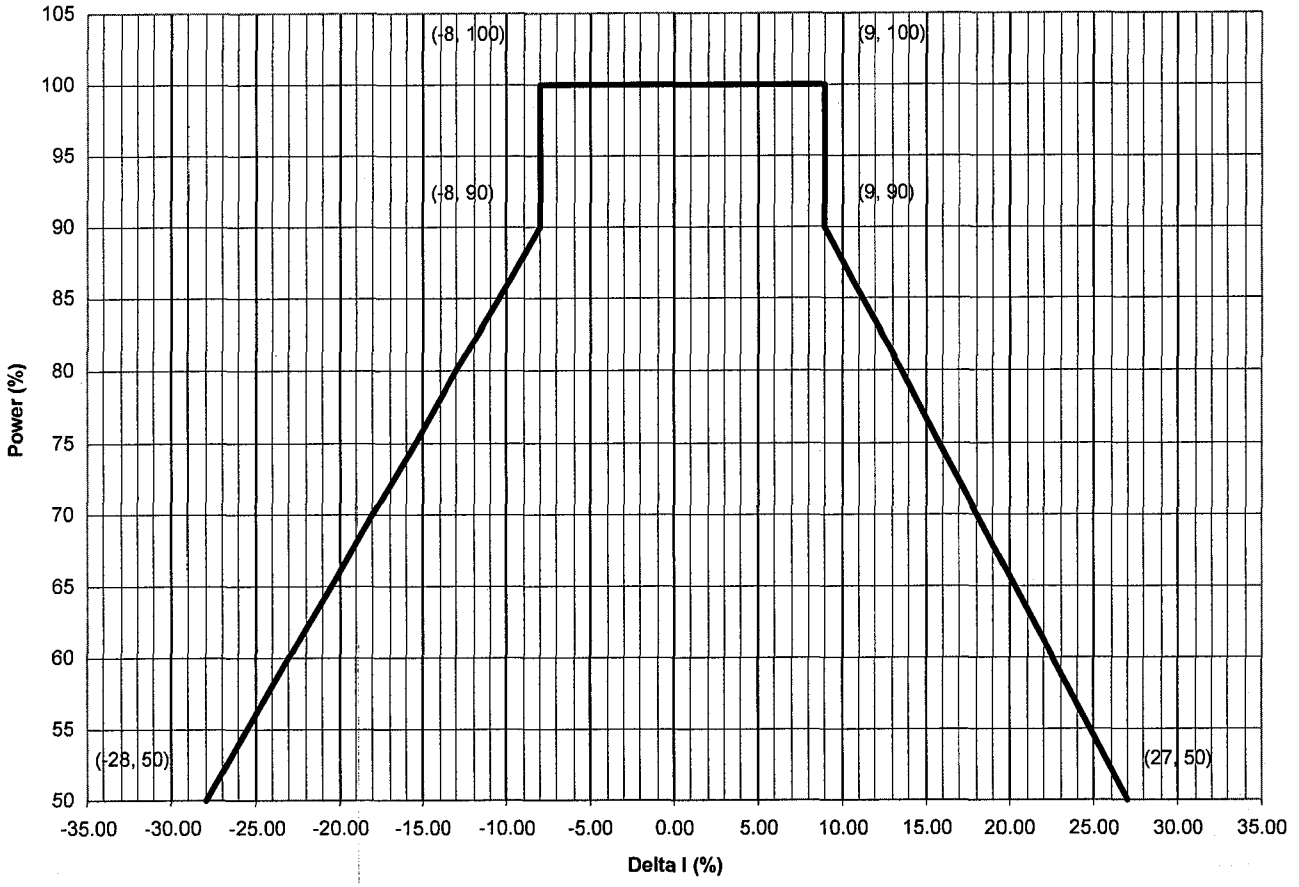
FIGURE 5
RAOC Summary of W(Z) with HFP AFD Band of –8/+9 %
(Top 15% and Bottom 12% Excluded)

Height (feet)	W(Z)			
	150 MWD/MTU	2000 MWD/MTU	4000 MWD/MTU	14000 MWD/MTU
0.0	1.0000	1.0000	1.0000	1.0000
0.2	1.0000	1.0000	1.0000	1.0000
0.4	1.0000	1.0000	1.0000	1.0000
0.6	1.0000	1.0000	1.0000	1.0000
0.8	1.0000	1.0000	1.0000	1.0000
1.0	1.0000	1.0000	1.0000	1.0000
1.2	1.0000	1.0000	1.0000	1.0000
1.4	1.0000	1.0000	1.0000	1.0000
1.6	1.2369	1.1756	1.1668	1.1645
1.8	1.2211	1.1630	1.1574	1.1539
2.0	1.2042	1.1491	1.1472	1.1425
2.2	1.1866	1.1363	1.1365	1.1307
2.4	1.1689	1.1264	1.1257	1.1190
2.6	1.1512	1.1183	1.1149	1.1072
2.8	1.1334	1.1103	1.1043	1.0949
3.0	1.1254	1.1020	1.0950	1.0898
3.2	1.1227	1.0987	1.0918	1.0894
3.4	1.1198	1.0972	1.0906	1.0888
3.6	1.1180	1.0953	1.0889	1.0880
3.8	1.1156	1.0928	1.0868	1.0900
4.0	1.1129	1.0900	1.0844	1.0929
4.2	1.1098	1.0870	1.0813	1.0953
4.4	1.1063	1.0858	1.0796	1.0975
4.6	1.1024	1.0881	1.0825	1.0992
4.8	1.0980	1.0900	1.0851	1.1003
5.0	1.0938	1.0914	1.0871	1.1020
5.2	1.0937	1.0925	1.0889	1.1040
5.4	1.0985	1.0940	1.0910	1.1072
5.6	1.1026	1.0976	1.0947	1.1151
5.8	1.1070	1.1033	1.1004	1.1275
6.0	1.1139	1.1091	1.1096	1.1406
6.2	1.1214	1.1195	1.1199	1.1528
6.4	1.1298	1.1330	1.1291	1.1638
6.6	1.1383	1.1456	1.1377	1.1740
6.8	1.1460	1.1572	1.1454	1.1828

FIGURE 5 (con't)
RAOC Summary of W(Z) with HFP AFD Band of –8/+9 %
(Top 15% and Bottom 12% Excluded)

Height (feet)	W(Z)			
	150 MWD/MTU	2000 MWD/MTU	4000 MWD/MTU	14000 MWD/MTU
7.0	1.1524	1.1678	1.1520	1.1904
7.2	1.1580	1.1773	1.1578	1.1975
7.4	1.1631	1.1854	1.1634	1.2040
7.6	1.1679	1.1922	1.1681	1.2088
7.8	1.1715	1.1975	1.1716	1.2119
8.0	1.1736	1.2011	1.1737	1.2131
8.2	1.1742	1.2028	1.1742	1.2126
8.4	1.1734	1.2027	1.1731	1.2100
8.6	1.1711	1.2007	1.1703	1.2054
8.8	1.1653	1.1955	1.1689	1.2000
9.0	1.1653	1.1948	1.1726	1.1921
9.2	1.1722	1.1999	1.1856	1.1879
9.4	1.1792	1.2148	1.1999	1.1904
9.6	1.1922	1.2289	1.2163	1.1941
9.8	1.2043	1.2470	1.2325	1.2094
10.0	1.2157	1.2674	1.2478	1.2319
10.2	1.2274	1.2874	1.2612	1.2536
10.4	1.0000	1.0000	1.0000	1.0000
10.6	1.0000	1.0000	1.0000	1.0000
10.8	1.0000	1.0000	1.0000	1.0000
11.0	1.0000	1.0000	1.0000	1.0000
11.2	1.0000	1.0000	1.0000	1.0000
11.4	1.0000	1.0000	1.0000	1.0000
11.6	1.0000	1.0000	1.0000	1.0000
11.8	1.0000	1.0000	1.0000	1.0000
12.0	1.0000	1.0000	1.0000	1.0000

FIGURE 6
FLUX DIFFERENCE OPERATING ENVELOPE



NOTE: This figure represents the Relaxed Axial Offset Control (RAOC) band used in safety analyses, it may be administratively tightened depending on in-core flux map results. Refer to Figure 2 of ROD 1.2 for the administrative limit.

TABLE 1
NRC APPROVED METHODOLOGIES FOR COLR PARAMETERS

COLR Section	Parameter	NRC Approved Methodology
2.1	Reactor Core Safety Limits	WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985
2.2	Shutdown Margin	WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985
2.3	Moderator Temperature Coefficient	WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985
2.4	Shutdown Bank Insertion Limit	WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985
2.5	Control Bank Insertion Limits	WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985
2.6	Nuclear Heat Flux Hot Channel Factor ($F_Q(Z)$)	WCAP-10216-P-A, Revision 1A, "Relaxation of Constant Axial Offset Control," February 1994 WCAP-14449-P-A, "Application of Best Estimate Large Break LOCA Methodology to Westinghouse PWRs with Upper Plenum Injection," Revision 1, October 1999 (cores containing 422V + fuel) WCAP-10924-P-A, "Large Break LOCA Best Estimate Methodology, Volume 2: Application to Two-Loop PWRs Equipped with Upper Plenum Injection," and Addenda, December 1988 (cores not containing 422V + fuel) WCAP-10924-P-A, "LBLOCA Best Estimate Methodology: Model Description and Validation: Model Revisions," Volume 1, Addendum 4, August 1990 (cores not containing 422V + fuel) WCAP-10054-P-A, "Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code," August 1985 WCAP-10054-P-A, "Addendum to the Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code: Safety Injection into the Broken Loop and COSI Condensation Model," Addendum 2, Revision 1, July 1997

TABLE 1
NRC APPROVED METHODOLOGIES FOR COLR PARAMETERS

COLR Section	Parameter	NRC Approved Methodology
2.7	Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$)	WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985
2.8	Axial Flux Difference (AFD)	WCAP-10216-P-A, Revision 1A, "Relaxation of Constant Axial Offset Control," February 1994
2.9	Overtemperature ΔT Setpoint	WCAP-8745-P-A, "Design Bases for the Thermal Overpower ΔT and Thermal Overtemperature ΔT Trip Functions," September 1986
2.10	Overpower ΔT Setpoint	WCAP-8745-P-A, "Design Bases for the Thermal Overpower ΔT and Thermal Overtemperature ΔT Trip Functions," September 1986
2.11	RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits	WCAP-11397-P-A, "Revised Thermal Design Procedure," April 1989, for those events analyzed using RTDP WCAP-14787-P, Rev. 2, "Westinghouse Revised Thermal Design Procedure Instrument Uncertainty Methodology for Wisconsin Electric Power Company Point Beach Units 1 & 2 (Fuel Upgrade & Uprate to 1656 MWt-NSSS Power with Feedwater Venturis, or 1679 MWt-NSSS Power with LEFM on Feedwater Header)", October 2002. WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985 for those events not utilizing RTDP
2.12	Refueling Boron Concentration	WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985