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Nuclear Generation Group

September 30, 2008

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: **R.E. Ginna Nuclear Power Plant**
Docket No. 50-244

Transmittal of Core Operating Limits Report (COLR)

In accordance with the R.E. Ginna Nuclear Power Plant Improved Technical Specification 5.6.5.d, which requires the submittal of revisions to the COLR, the attached report is hereby submitted. If you should have any questions regarding this submittal, please contact David Wilson at (585) 771-5219.

Very truly yours,

Joseph E. Pacher

Enclosure

cc: S. J. Collins, NRC
D. V. Pickett, NRC
Resident Inspector, NRC

A001
NRR

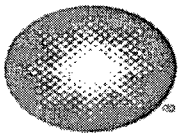
10002021

bcc: D. Skolnik

COMMITMENTS IDENTIFIED IN THIS CORRESPONDENCE:

- None
-

UFSAR/TSB Revision Required? No



Constellation Energy®
R.E. Ginna Nuclear Power Plant

R.E. Ginna Nuclear Power Plant

Core Operating Limits Report
COLR

Cycle 34

Revision 2

Responsible Manager: _____
Richard Everett

Effective Date: 9/24/2008
9/24/2008

Controlled Copy No. _____

Record Cat.# 4.43.2

1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report (COLR) for the R.E. Ginna Nuclear Power Plant has been prepared in accordance with the requirements of Technical Specification 5.6.5.

The Technical Specifications affected by this report are listed below:

2.1 Safety Limits (SLs)

3.1.1 SHUTDOWN MARGIN (SDM)

3.1.3 MODERATOR TEMPERATURE COEFFICIENT (MTC)

3.1.5 Shutdown Bank Insertion Limit

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 (AFD)

3.3.1 Reactor Trip System (RTS)

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

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 the NRC-approved methodologies specified in Technical Specification 5.6.5. All items that appear in capitalized type are defined in Technical Specification 1.1, Definitions.

2.1 SAFETY LIMITS (SLs)[1]

(2.1)

2.1.1 In MODES 1 and 2, the combination of THERMAL POWER, Reactor Coolant System (RCS) average temperature, and pressurizer pressure shall not exceed the SLs specified in Figure COLR - 1.

2.2 SHUTDOWN MARGIN[1]

(LCO 3.1.1)

2.2.1 The SHUTDOWN MARGIN in MODE 2 with $K_{eff} < 1.0$ and MODES 3 and 4 shall be greater than or equal to the limits specified in Figure COLR - 2 for the number of reactor coolant pumps in operation.

2.2.2 The SHUTDOWN MARGIN in MODE 4 when both reactor coolant pumps are not in operation and in MODE 5 shall be greater than or equal to the one loop operation curve of Figure COLR - 2.

2.2.3 The SHUTDOWN MARGIN required in LCO 3.1.4, LCO 3.1.5, LCO 3.1.6, LCO 3.1.8, and LCO 3.4.5 shall be greater than the limits specified in Figure COLR - 2 for the number of reactor coolant pumps in operation.

2.3 MODERATOR TEMPERATURE COEFFICIENT[1]

(LCO 3.1.3)

2.3.1 The Moderator Temperature Coefficient (MTC) limits are:

The BOL ARO/HZP - MTC shall be equal to or less positive than +5.0 pcm/°F for power levels below 70% RTP and less than or equal to 0 pcm/°F for power levels at or above 70% RTP.

The EOL ARO/RTP - MTC shall be less negative than –44.6 pcm/°F.

where:

ARO stands for All Rods Out

BOL stands for Beginning of Cycle Life

EOL stands for End of Cycle Life

HZP stands for Hot Zero Power

RTP stands for RATED THERMAL POWER

2.4 Shutdown Bank Insertion Limit[1]

(LCO 3.1.5)

2.4.1 The shutdown bank shall be fully withdrawn which is defined as ≥ 220 steps.

2.5 Control Bank Insertion Limits[1]

(LCO 3.1.6)

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

2.5.2 The control rod banks shall be withdrawn maintaining a nominal 130 step tip-to-tip distance while moving in overlap through the active core region. The minimum allowable tip-to-tip distance shall never be less than 121 steps between two banks moving in the active core region.

2.6 Heat Flux Hot Channel Factor ($F_Q(Z)$)[2]

(LCO 3.2.1)

2.6.1 $F_Q(Z) \leq CFQ * K(Z) / P$ for $P > 0.5$

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

where:

CFQ is the $F_Q(Z)$ limit

P = THERMAL POWER / RATED THERMAL POWER

Z is the height of the core

2.6.2 CFQ = 2.60

2.6.3 K(Z) is provided in Figure COLR - 4

2.6.4 W(Z) values are provided in Table COLR - 1.

2.6.5 The $F_Q(Z)$ penalty factors are provided in Table COLR - 2.

2.7 Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$)[1]

(LCO 3.2.2)

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

where:

$F^{RTP}_{\Delta H}$= 1.72 for 422 V+ fuel and 1.248 for OFA fuel,

$PF_{\Delta H}$ = 0.3, and

P = THERMAL POWER / RATED THERMAL POWER

2.8 AXIAL FLUX DIFFERENCE[3]

(LCO 3.2.3)

2.8.1 The AFD acceptable operation limits are provided in Figure COLR - 5.

2.9 Reactor Trip System (RTS) Setpoints[5]

(LCO 3.3.1)

2.9.1 Overtemperature ΔT Setpoint Parameter Values

Parameter	Value
Overtemperature ΔT reactor trip setpoint	$K_1 \leq 1.19$
Overtemperature ΔT reactor trip depressurization setpoint penalty coefficient	$K_2 \geq 0.00093$/psi
Overtemperature ΔT reactor trip heatup setpoint coefficient	$K_3 \geq 0.0185$/°F penalty
Measured lead time constant	$\tau_1 \geq 25$ seconds
Measured lag time constant	$\tau_2 \leq 5$ seconds
$f_1(\Delta I)$ constants	$-3.08 \{14\% + (q_t - q_b)\}$ when $q_t - q_b$ is $< -14\%$ RTP
	0% RTP when $-14\\% \text{ RTP} \leq q_t - q_b$ is $\leq +6\%$ RTP
	$2.27 \{(q_t - q_b) - 6\%\}$ when $q_t - q_b$ is $> 6\%$ RTP

2.9.2 Overpower ΔT Setpoint Parameter Values

Parameter	Value
Overpower ΔT reactor trip setpoint	$K_4 \leq 1.077$
Overpower ΔT reactor trip heatup setpoint penalty coefficient	$K_5 = 0$/°F for $T < T'$ ≥ 0.0014/°F for $T \geq T'$
Overpower ΔT reactor trip thermal time delay setpoint penalty	$K_6 \geq 0.00$/°F for increasing T $= 0.00$/°F for decreasingT
Measured impulse/lag time constant	$\tau_3 = 0$ seconds
$f_2(\Delta I) = 0.0\%$ RTP for all ΔI	

2.10 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits[4]

(LCO 3.4.1)

2.10.1 The pressurizer pressure shall be ≥ 2205 psig.

2.10.2 The RCS average temperature shall be ≤ 577.5 °F.

2.10.3 The RCS total flow rate shall be ≥ 177,300 gpm (includes 4% minimum flow uncertainty per Revised Thermal Design Methodology).

2.11 Boron Concentration[1]

(LCO 3.9.1)

2.11.1 The boron concentrations of the hydraulically coupled Reactor Coolant System, the refueling canal, and the refueling cavity shall be ≥ 2500 ppm. Boron concentration based on All Rods in less the highest worth rod with a K-effective of 0.95. A 100 ppm Factor of Safety has been included in this parameter.

3.0 REFERENCES

1. WCAP-9272-P-A, Westinghouse Reload Safety Evaluation Methodology, July 1985.

2. WCAP-10054-P-A and WCAP-10081-A, "Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code," August 1985.

3. WCAP-10054-P-A, Addendum 2, Revision 1, "Addendum to the Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code: Safety Injection into the Broken Loop and COSI Condensation Model", Thompson, C.M., et. al., July 1997.

4. WCAP-11145-P-A, "Westinghouse Small Break LOCA ECCS Evaluation Model Generic Study with the NOTRUMP Code", Rupprecht, S. D., et. al., October 1986.

5. WCAP-10079-P-A, "NOTRUMP - A Nodal Transient Small Break and General Network Code", Meyer, P. E., August 1985.

6. WCAP-16009-P-A, "Realistic Large-Break LOCA Evaluation Methodology Using the Automated Statistical Treatment of Uncertainty Method (ASTRUM)", January 2005.

7. WCAP-12610-P-A, "VANTAGE + Fuel Assembly Reference Core Report," April 1995.

8. WCAP-10216-P-A, Revision 1A (Proprietary), Relaxation of Constant Axial Offset Control F_Q - Surveillance Technical Specification, February 1994.

9. WCAP-11397-P-A, "Revised Thermal Design Procedure", April 1989.

10. WCAP-14710-P-A, "1-D Heat Conduction Model for Annular Fuel Pellets," Shimeck, D. J., May 1998.

11. WCAP-8745, "Design Basis for the Thermal Overpower Delta T and Thermal Overtemperature Delta T Trip Functions", March 1977.

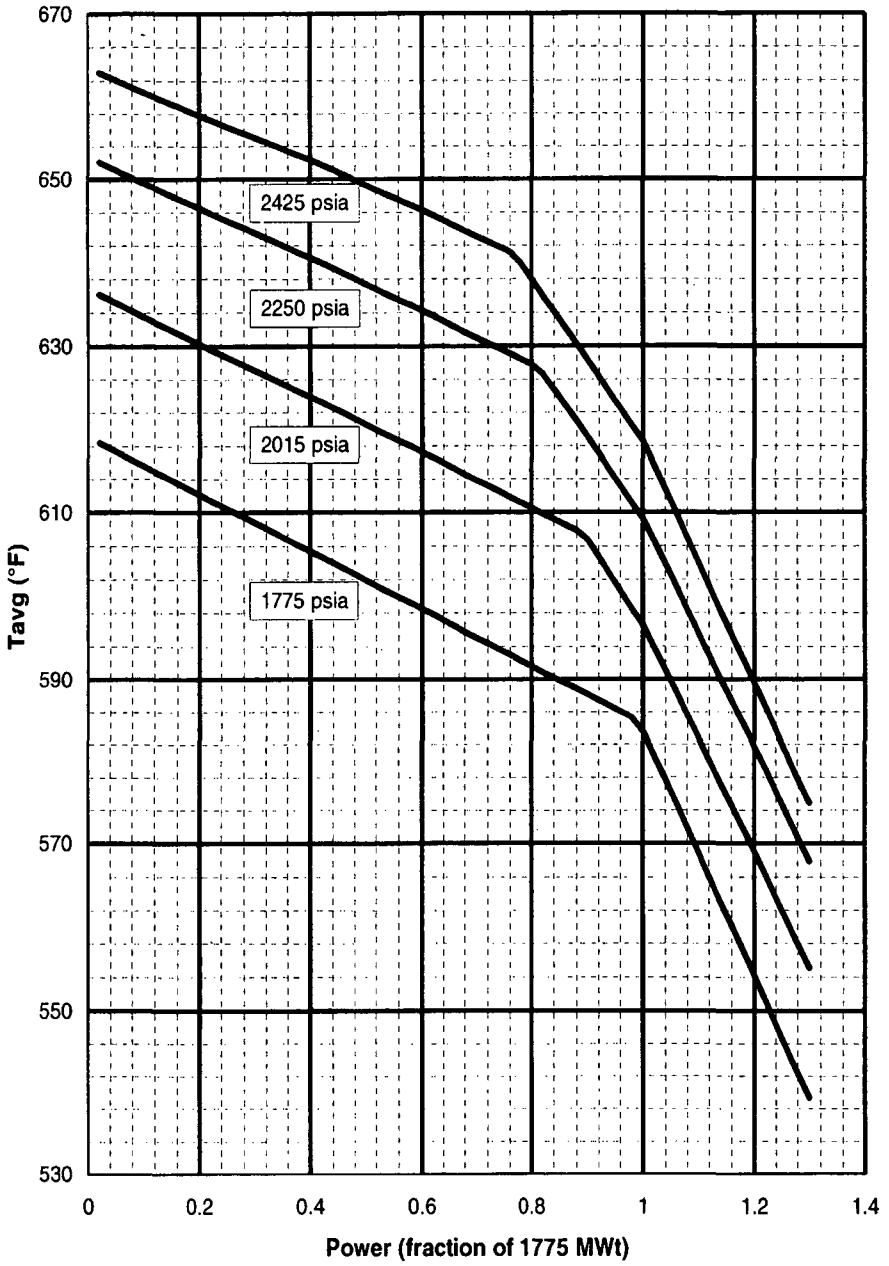


Figure COLR - 1
Reactor Safety Limits

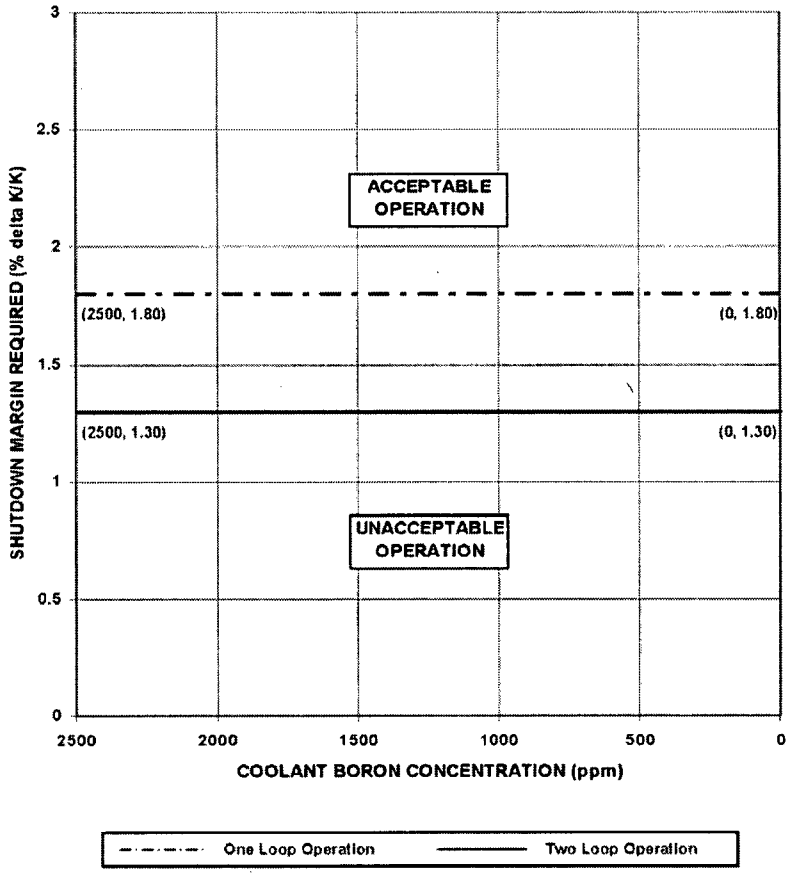
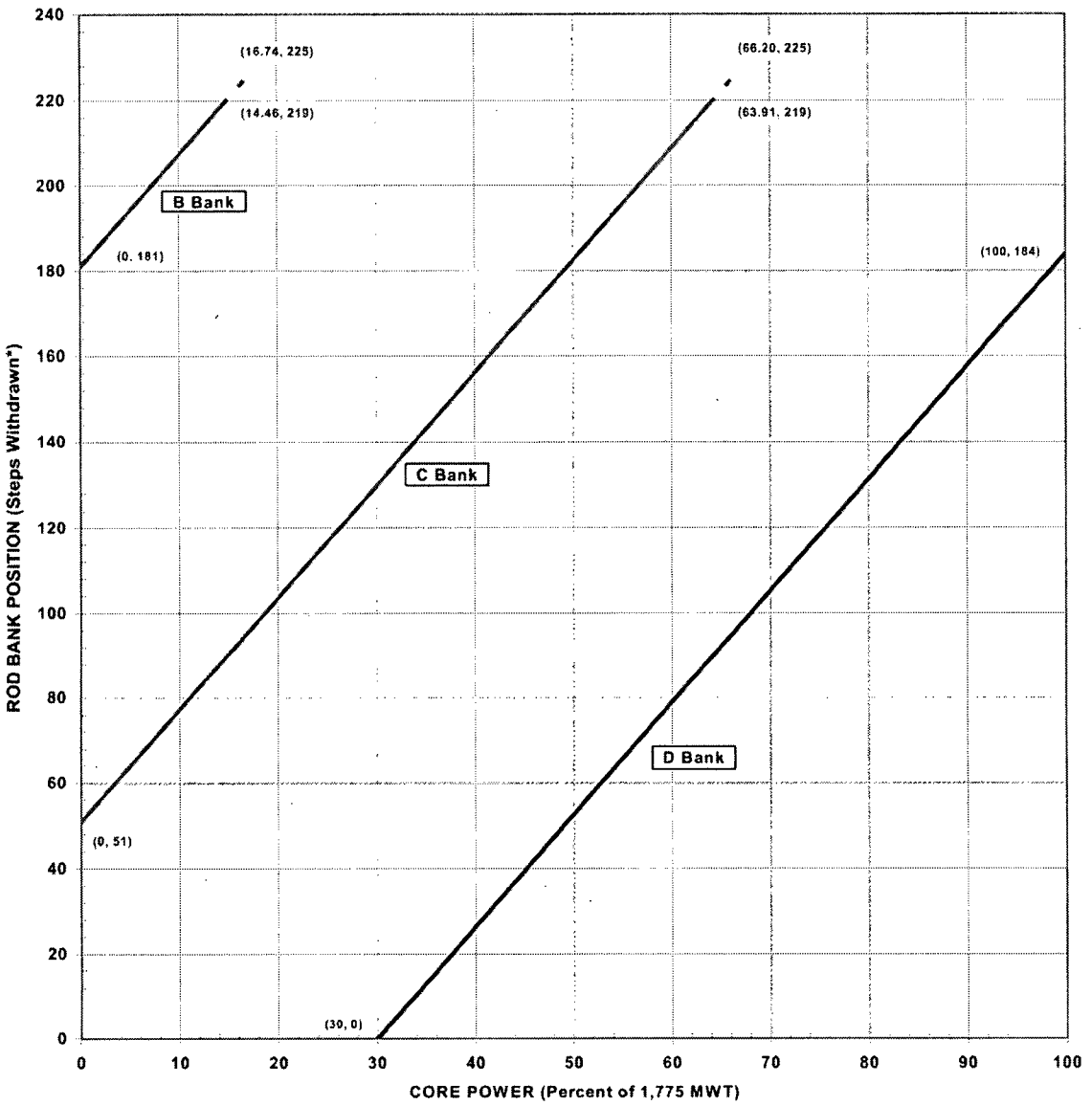


Figure COLR - 2
REQUIRED SHUTDOWN MARGIN



* The top of the active fuel corresponds to 219. The ARO parking position may be any position above the corresponding top of active fuel for each respective bank. The control rod tip-to-tip distance is defined as 130 steps while rods are moving in overlap. The bank positions are given as follows:

- **Bank D: (184/70) * (P-100) + 184** **(for $30 \leq P \leq 100$)**
- **Bank C: (184/70) * (P-100) + 184 + 130** **(for $0 \leq P \leq 66.20$)**
- **Bank B: (184/70) * (P-100) + 184 + 130 + 130** **(for $0 \leq P \leq 16.74$)**

Where P is defined as the core power (in percent).

Figure COLR-3
CONTROL BANK INSERTION LIMITS

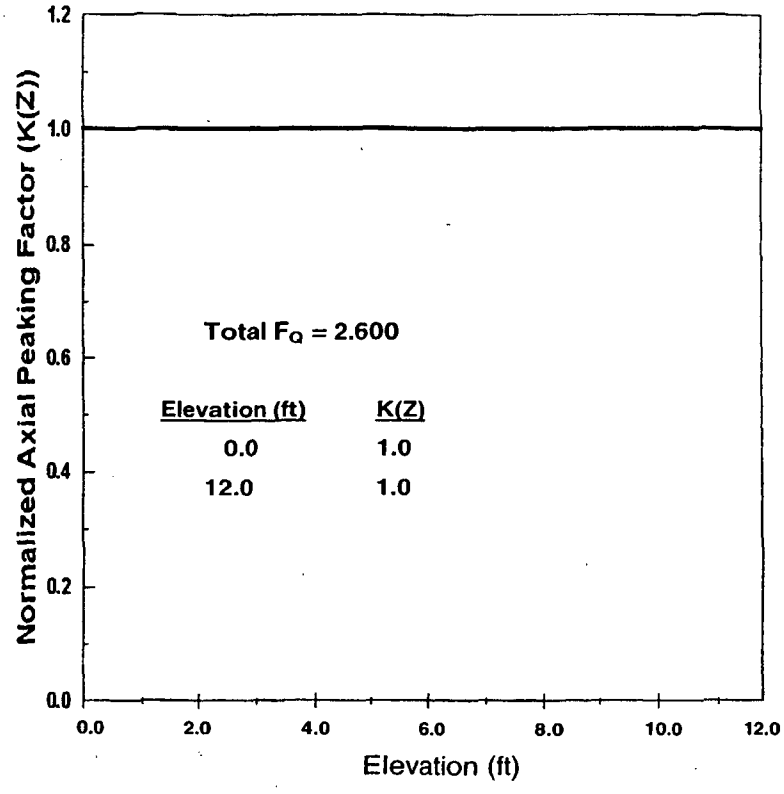


Figure COLR - 4
K(Z) - NORMALIZED $F_Q(Z)$ AS A FUNCTION OF CORE HEIGHT

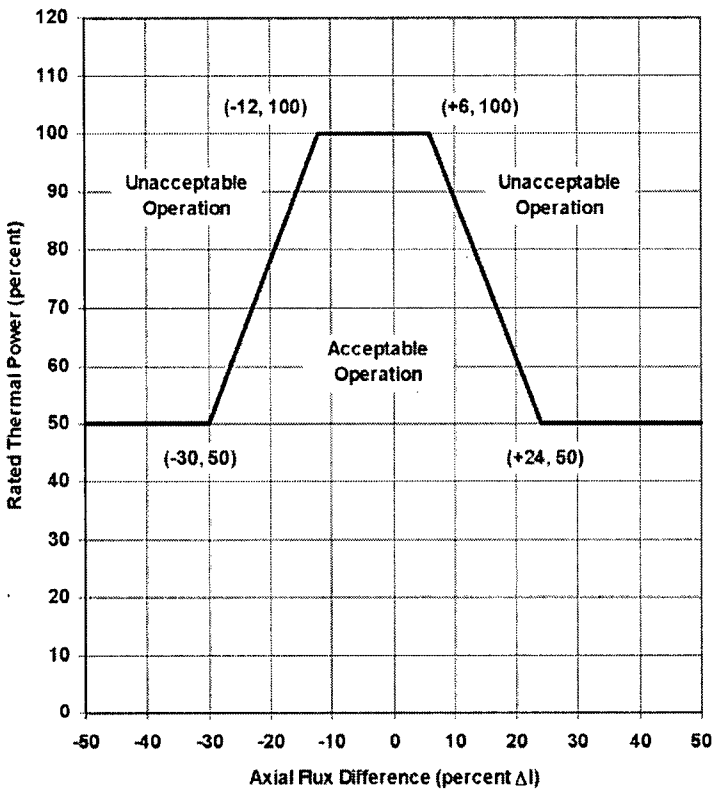


Figure COLR - 5
AXIAL FLUX DIFFERENCE ACCEPTABLE OPERATION LIMITS AS A FUNCTION OF RATED THERMAL POWER

Table COLR - 1

RAOC Summary of W(Z) with HFP %AFD Band of -12/+6%
(TOP 8% and BOTTOM 8% EXCLUDED)

Height (feet)	150 MWD/MTU	2000 MWD/MTU	10000 MWD/MTU	16000 MWD/MTU
(Bottom) 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	1.4874	1.4391	1.2871	1.2820
1.2	1.4744	1.4263	1.2795	1.2744
1.4	1.4551	1.4077	1.2671	1.2619
1.6	1.4330	1.3865	1.2526	1.2475
1.8	1.4090	1.3637	1.2368	1.2318
2.0	1.3830	1.3391	1.2196	1.2150
2.2	1.3557	1.3136	1.2016	1.1979
2.4	1.3283	1.2876	1.1830	1.1805
2.6	1.2987	1.2613	1.1647	1.1634
2.8	1.2718	1.2379	1.1491	1.1460
3.0	1.2599	1.2229	1.1388	1.1289
3.2	1.2512	1.2110	1.1326	1.1246
3.4	1.2408	1.2005	1.1277	1.1240
3.6	1.2306	1.1917	1.1222	1.1235
3.8	1.2227	1.1817	1.1177	1.1242
4.0	1.2150	1.1750	1.1153	1.1268

Table COLR - 1 (Continued)

RAOC Summary of W(Z) with HFP %AFD Band of -12/+6%
(TOP 8% and BOTTOM 8% EXCLUDED)

Height (feet)	150 MWD/MTU	2000 MWD/MTU	10000 MWD/MTU	16000 MWD/MTU
4.2	1.2066	1.1711	1.1144	1.1301
4.4	1.1978	1.1662	1.1140	1.1331
4.6	1.1884	1.1607	1.1131	1.1353
4.8	1.1781	1.1544	1.1116	1.1364
5.0	1.1670	1.1472	1.1106	1.1366
5.2	1.1553	1.1394	1.1109	1.1359
5.4	1.1429	1.1313	1.1106	1.1334
5.6	1.1302	1.1212	1.1116	1.1336
5.8	1.1199	1.1124	1.1177	1.1401
6.0	1.1177	1.1131	1.1249	1.1505
6.2	1.1184	1.1147	1.1342	1.1605
6.4	1.1210	1.1165	1.1441	1.1688
6.6	1.1221	1.1190	1.1525	1.1759
6.8	1.1221	1.1208	1.1597	1.1816
7.0	1.1212	1.1216	1.1656	1.1857
7.2	1.1190	1.1212	1.1701	1.1883
7.4	1.1156	1.1196	1.1731	1.1890
7.6	1.1109	1.1169	1.1744	1.1879
7.8	1.1049	1.1126	1.1740	1.1848
8.0	1.0975	1.1078	1.1718	1.1797
8.2	1.0886	1.1042	1.1676	1.1724
8.4	1.0789	1.1001	1.1618	1.1636

Table COLR - 1 (Continued)

RAOC Summary of W(Z) with HFP %AFD Band of -12/+6%
(TOP 8% and BOTTOM 8% EXCLUDED)

Height (feet)	150 MWD/MTU	2000 MWD/MTU	10000 MWD/MTU	16000 MWD/MTU
8.6	1.0654	1.0934	1.1526	1.1504
8.8	1.0536	1.0876	1.1433	1.1397
9.0	1.0590	1.0902	1.1439	1.1486
9.2	1.0676	1.0936	1.1478	1.1602
9.4	1.0791	1.0998	1.1652	1.1728
9.6	1.0921	1.1127	1.1986	1.1846
9.8	1.1044	1.1314	1.2297	1.1941
10.0	1.1116	1.1457	1.2586	1.2106
10.2	1.1181	1.1561	1.2868	1.2329
10.4	1.1322	1.1677	1.3126	1.2540
10.6	1.1519	1.1745	1.3336	1.2773
10.8	1.1705	1.1900	1.3524	1.3001
11.0	1.1718	1.2015	1.3543	1.3052
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 (Top)	1.0000	1.0000	1.0000	1.0000

Table COLR - 2

Penalty factor for increasing F_Q

Cycle Burnup, MWD/MTU	Penalty Factor (%)	Penalty Multiplier
All	2.00	1.0200

END NOTES

1. (Limits generated using Reference 1)
2. (Limits generated using References 1 through 7 and 10)
3. (Limits generated using References 1 and 8)
4. (Limits generated using Reference 9)
5. (Limits generated using Reference 11)