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Subject: Davis-Besse Nuclear Power Station
Core Operating Limits Report for Cycle 15

Ladies and Gentlemen:

This letter transmits Revision 0 of the Davis-Besse Nuclear Power Station, Unit 1 (DBNPS) Core Operating Limits Report (COLR) for Cycle 15 operation (Enclosure 1). Submittal of this revision is in accordance with DBNPS Technical Specification 6.9.1.7.

Attachment 1, Commitment List, identifies that there are no commitments contained in this letter. If there are any questions or if additional information is required, please contact Mr. Gregory A. Dunn, Manager – FENOC Fleet Licensing, at (330) 315-7243.

Sincerely,

Mark B. Bezilla, Vice President-Nuclear

MKL

Enclosures

cc: Regional Administrator, NRC Region III
NRC/NRR Project Manager
DB-1 Senior Resident Inspector, NRC Region III
Utility Radiological Safety Board

A001

Docket Number 50-346
License Number NPF-3
Serial Number 3252
Enclosure 1

FIRSTENERGY NUCLEAR OPERATING COMPANY

DAVIS-BESSE UNIT 1

CYCLE 15

CORE OPERATING LIMITS REPORT

REVISION 0

(31 pages follow)

FIRSTENERGY NUCLEAR OPERATING COMPANY

DAVIS-BESSE UNIT 1

CYCLE 15

CORE OPERATING LIMITS REPORT

Prepared by Dan B. Kelley 4/15/06
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Reviewed by
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Approved by A.R. Burger per telecon Dan B. Kelley 4/18/06
A.R. Burger

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FIRSTENERGY NUCLEAR OPERATING COMPANY

DAVIS-BESSE UNIT 1

CYCLE 15

CORE OPERATING LIMITS REPORT

1.0 Core Operating Limits

This CORE OPERATING LIMITS REPORT for DB-1 Cycle 15 has been prepared in accordance with the requirements of Technical Specification 6.9.1.7. The Core Operating Limits have been developed using the methodology provided in reference 2.0 (1). The licensed length of Cycle 15 is 711.36 EFPDs (based on a reactor thermal rating of 2772 MWt).

The following cycle-specific core Operating Limits, Protective Limit and Flux -Δ Flux/Flow Reactor Protection System Allowable Values are included in this report:

1) Regulating Group Position Alarm Setpoints (error adjusted Operating Limits) and Xenon reactivity "power level cutoff"

2) Rod program group positions (Control Rod Core locations and group assignments)

3) Axial Power Shaping Rod Alarm Setpoints (error adjusted Operating Limits)

4) AXIAL POWER IMBALANCE Alarm Setpoints (error adjusted Operating Limits)

5) AXIAL POWER IMBALANCE Protective Limits

6) Flux-ΔFlux/Flow (or Power/Imbalance/Flow) Allowable Values

7) QUADRANT POWER TILT limits

8) Negative Moderator Temperature Coefficient limit

9) Nuclear Heat Flux Hot Channel Factor, $F_Q$ and

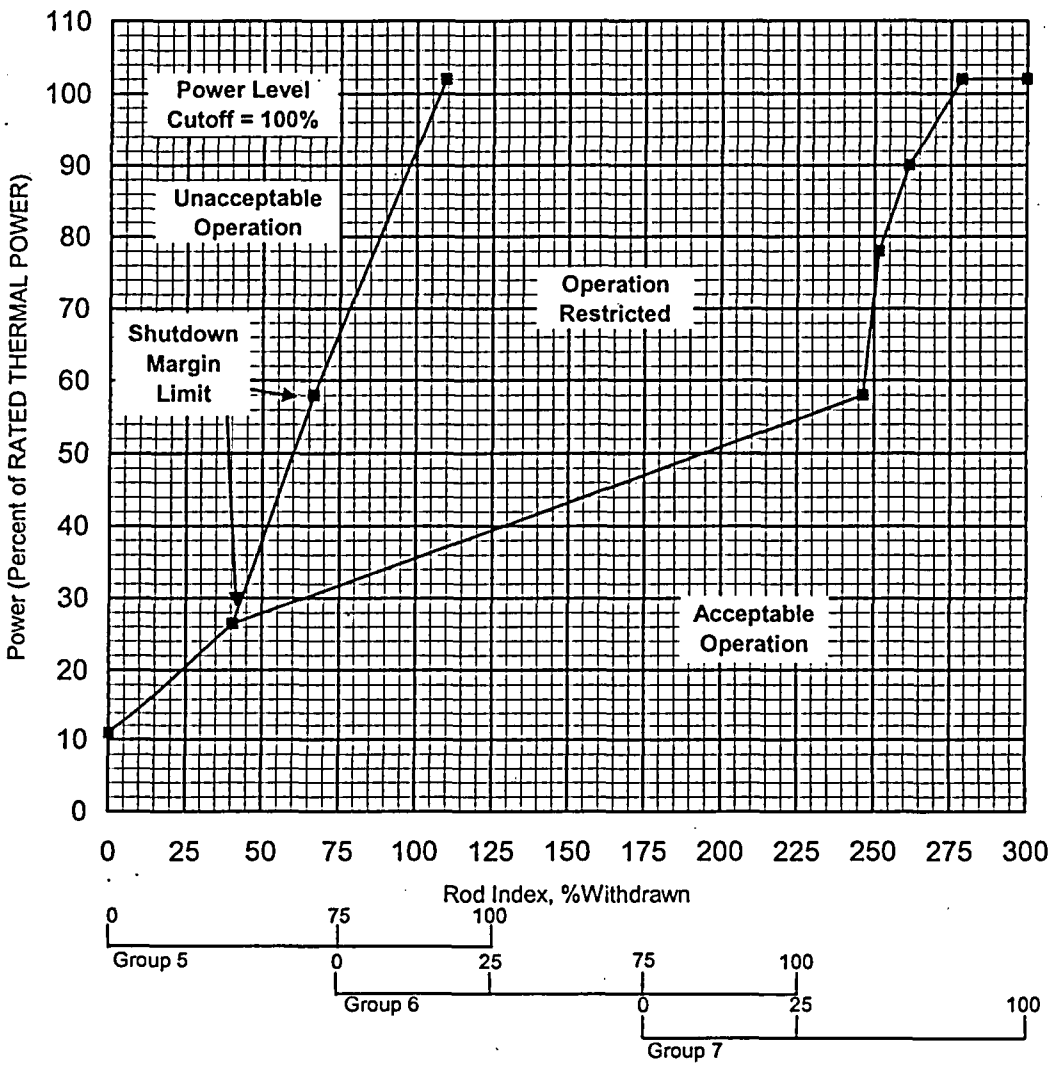
10) Nuclear Enthalpy Rise Hot Channel Factor, $F^N_{\Delta H}$

2.0 References

1) BAW-10179P-A, Rev. 6, "Safety Criteria and Methodology For Acceptable Cycle Reload Analyses", August, 2001.

Figure 1a Regulating Group Position Operating Limits
0 to 300 ±10 EFPD, Four RC Pumps–2772 MWt RTP
Davis-Besse 1, Cycle 15

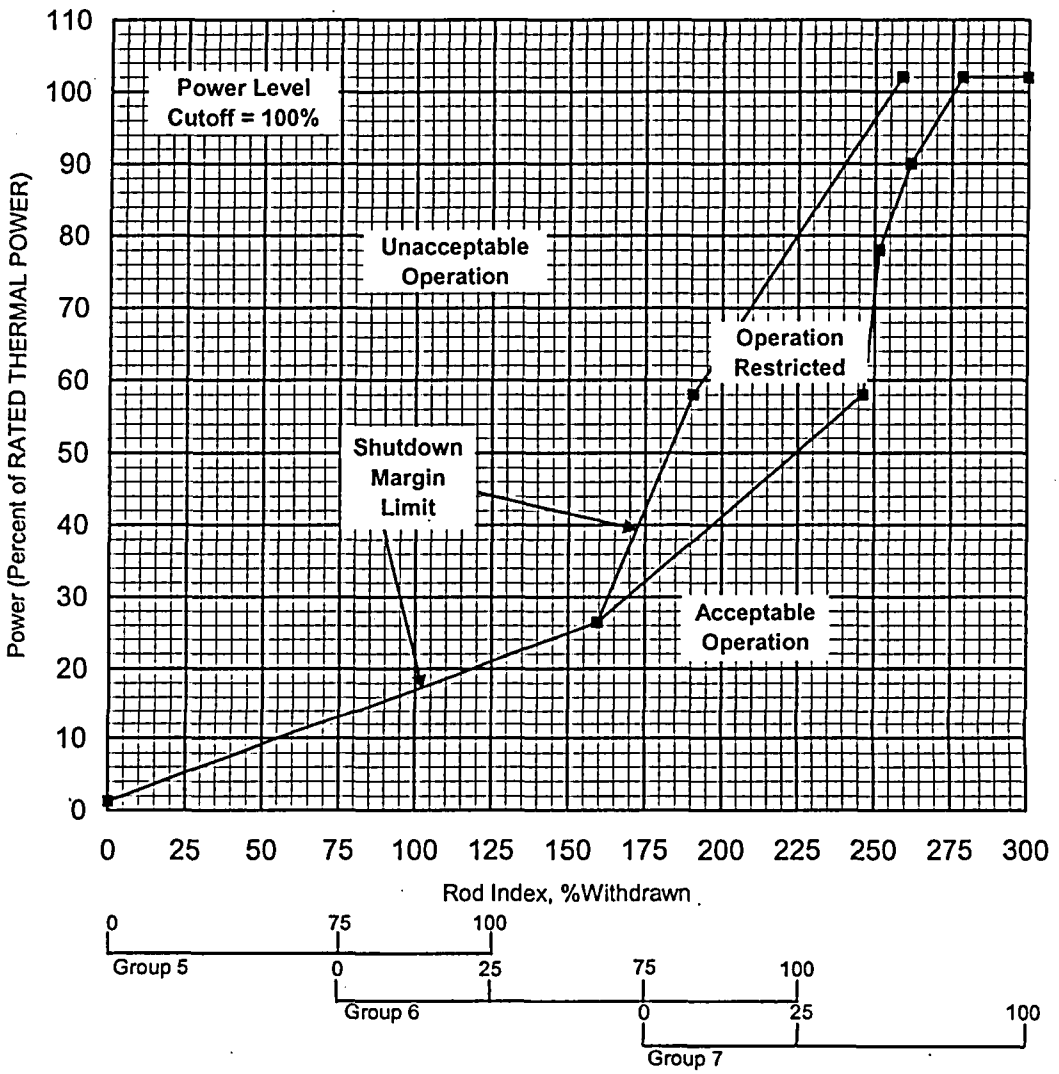
This Figure is referred to by Technical Specifications 3.1.3.6 and 3.1.3.8




Note 1: A Rod Group overlap of 25 +/- 5% between sequential withdrawn groups 5 and 6, and 6 and 7, shall be maintained.
Note 2: Instrument error is accounted for in these Operating Limits.

Figure 1b Regulating Group Position Operating Limits
After 300 ±10 EFPD, Four RC Pumps –2772 MWt RTP
Davis-Besse 1, Cycle 15

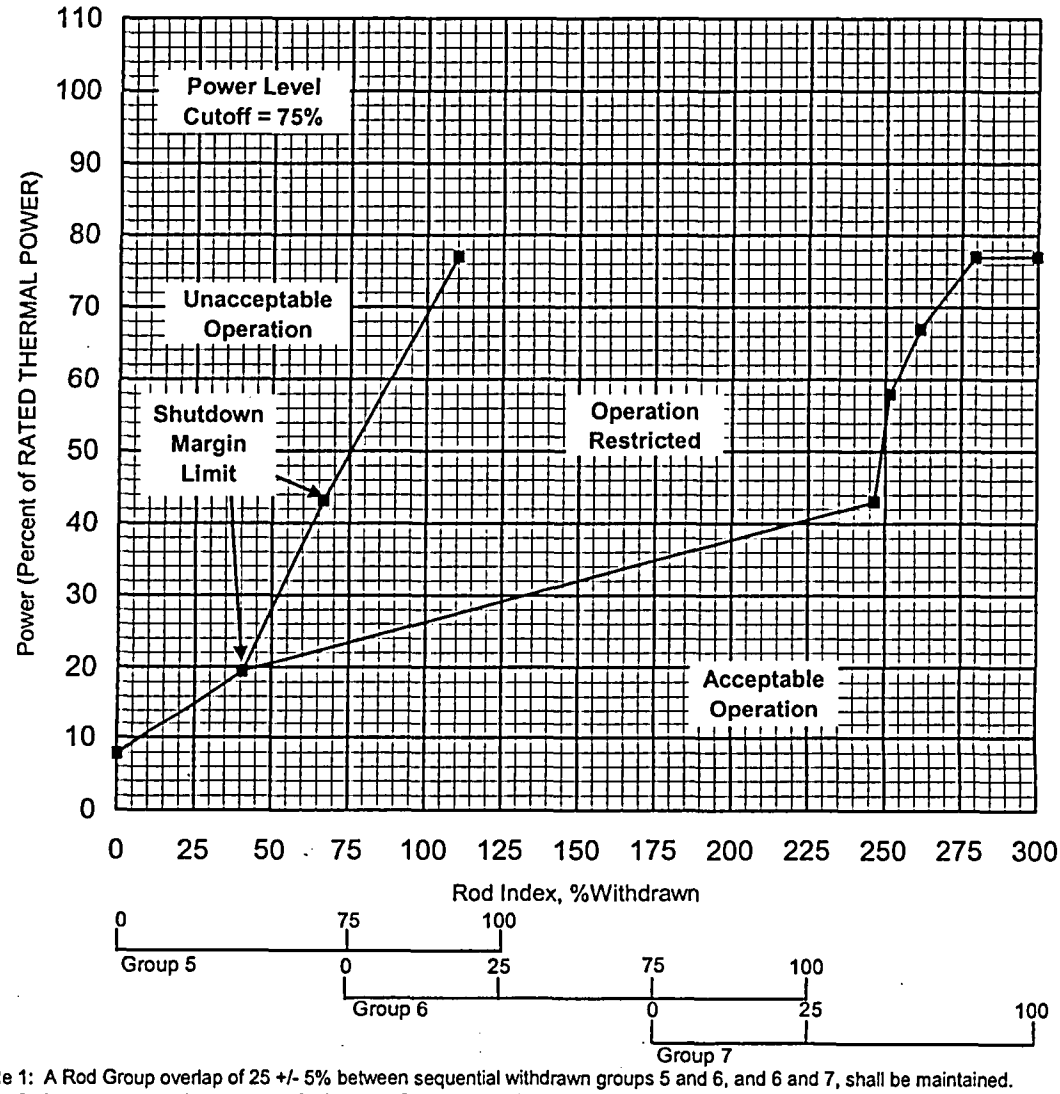
This Figure is referred to by Technical Specifications 3.1.3.6 and 3.1.3.8




Note 1: A Rod Group overlap of 25 ±5% between sequential withdrawn groups 5 and 6, and 6 and 7, shall be maintained.
Note 2: Instrument error is accounted for in these Operating Limits.

Figure 1c Regulating Group Position Operating Limits
0 to 300 ±10 EFPD, Three RC Pumps–2772 MWt RTP
Davis-Besse 1, Cycle 15

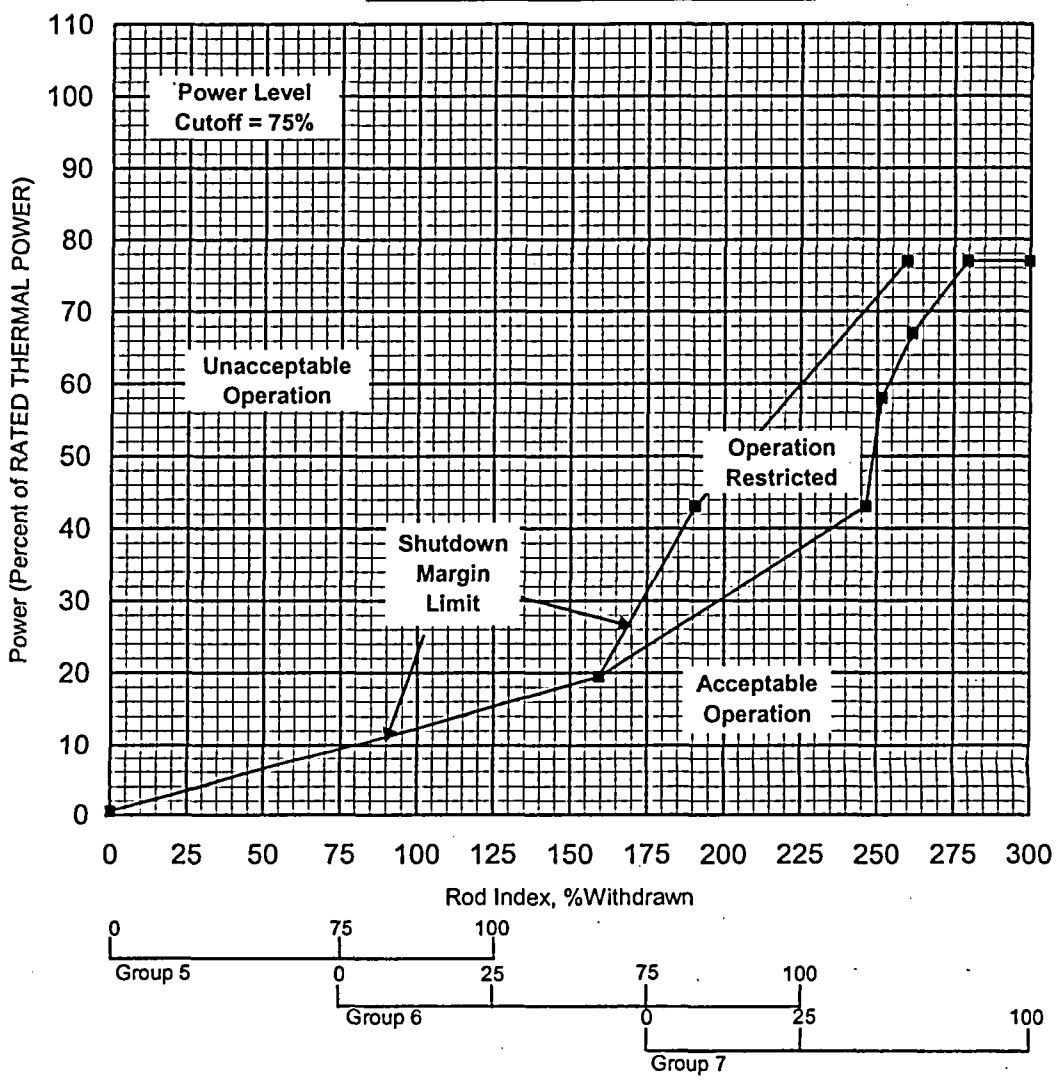
This Figure is referred to by Technical Specifications 3.1.3.6 and 3.1.3.8




Note 1: A Rod Group overlap of 25 +/- 5% between sequential withdrawn groups 5 and 6, and 6 and 7, shall be maintained.
Note 2: Instrument error is accounted for in these Operating Limits.

Figure 1d Regulating Group Position Operating Limits
After 300 ±10 EFPD, Three RC Pumps –2772 MWt RTP
Davis-Besse 1, Cycle 15

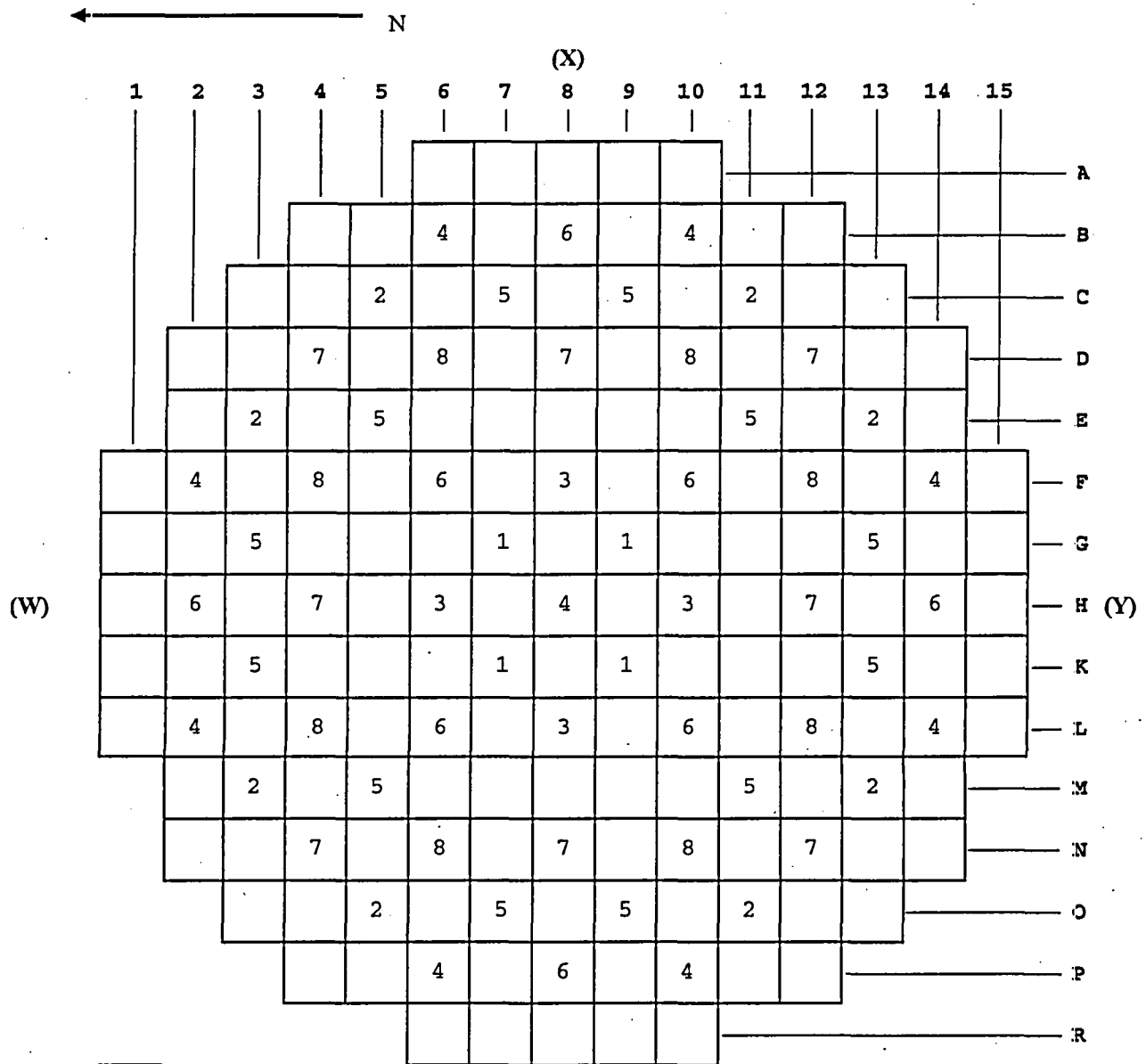
This Figure is referred to by Technical Specifications 3.1.3.6 and 3.1.3.8




Note 1: A Rod Group overlap of 25 ±5% between sequential withdrawn groups 5 and 6, and 6 and 7, shall be maintained.
Note 2: Instrument error is accounted for in these Operating Limits.

Figure 2 Control Rod Core Locations
and Group Assignments
Davis-Besse 1, Cycle 15

This Figure is referred to by Technical Specification 3.1.3.7




X Group Number

| Group | No. of Rods | Function | Group | No. of Rods | Function |
|---|---|---|---|---|---|
| 1 | 4 | Safety | 5 | 12 | Control |
| 2 | 8 | Safety | 6 | 8 | Control |
| 3 | 4 | Safety | 7 | 8 | Control |
| 4 | 9 | Safety | 8 | 8 | APSRs |
| | | | Total | 61 | |

Figure 3 APSR Position Operating Limits—2772 MWt RTP

**This Figure is referred to by Technical Specification 3.1.3.9**

**Before APSR Pull: 0 EFPD to 620 ± 10 EFPD,**
**Three or Four RC pumps operation***

**Lower Limit: 0 %WD**

**Upper Limit: 100 %WD**

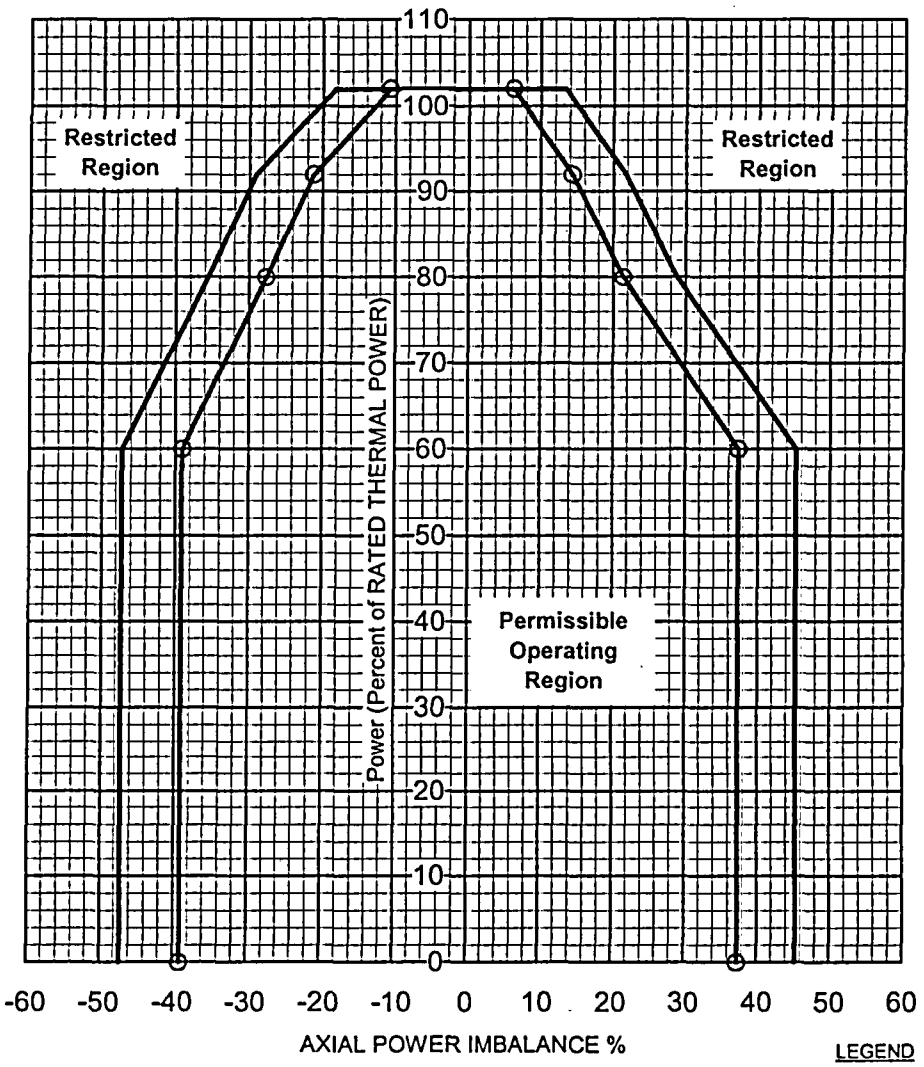
**After APSR Pull: 620 ± 10 EFPD to End-of-Cycle**
**Three or Four RC pumps operation***

**Insertion Prohibited (maintain ≥ 99%WD)**

*** Power restricted to 77% for 3-pump operation.**

Figure 4a AXIAL POWER IMBALANCE Operating Limits
0 to 300 ±10 EFPD, Four RC Pumps--2772 MWt RTP
Davis-Besse 1, Cycle 15

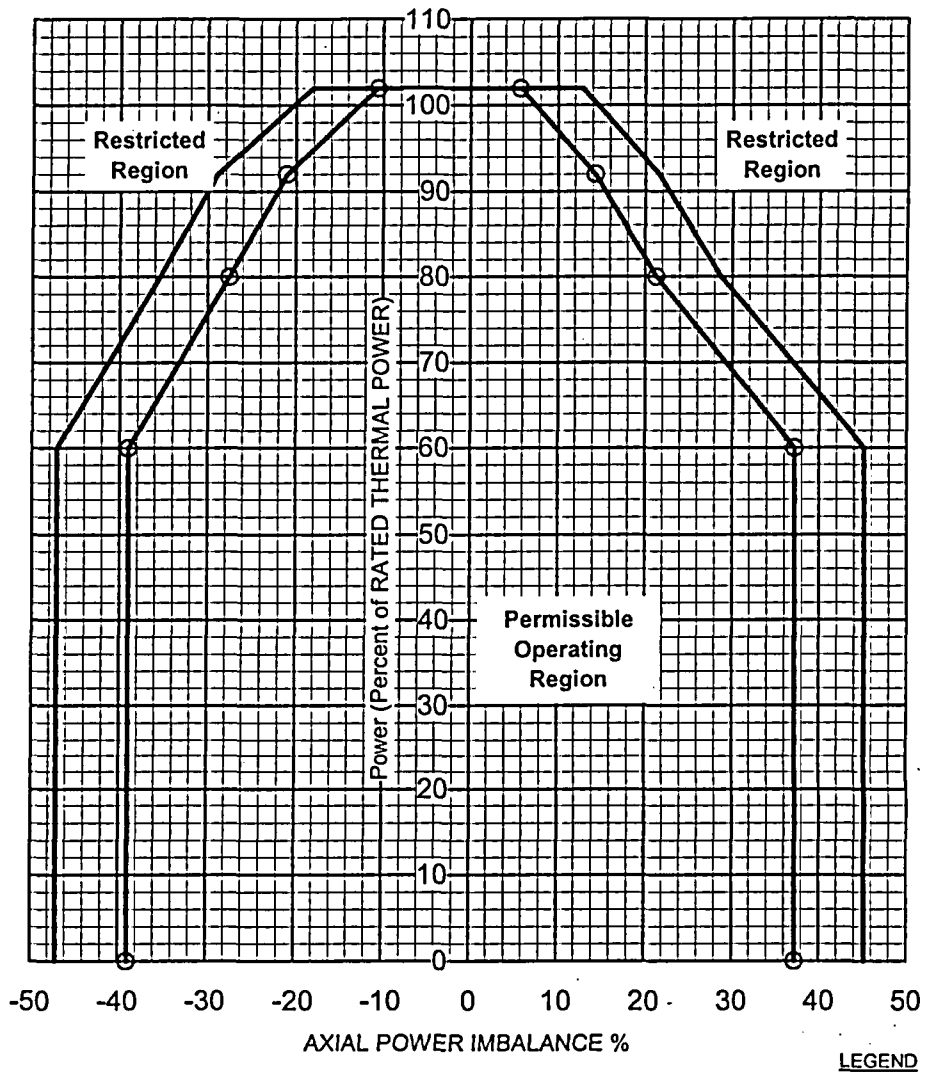
This Figure is referred to by
Technical Specification 3.2.1




Note 1: Instrument error is accounted for in these Operating Limits.

Figure 4b AXIAL POWER IMBALANCE Operating Limits
300 ±10 to 600 ±10 EFPD, Four RC Pumps–2772 MWt RTP
Davis-Besse 1, Cycle 15

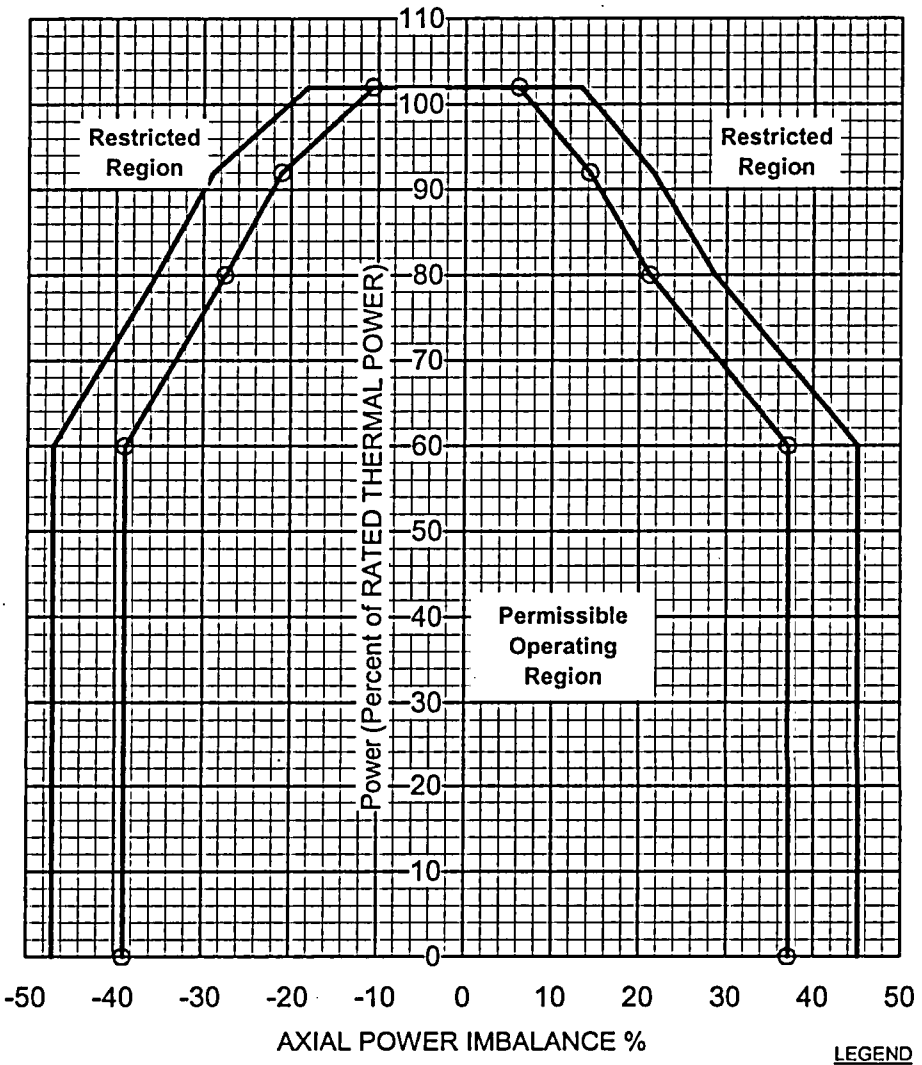
This Figure is referred to by
Technical Specification 3.2.1




Note 1: Instrument error is accounted for in these Operating Limits.

Figure 4c AXIAL POWER IMBALANCE Operating Limits
After 600 ±10 EFPD, Four RC Pumps--2772 MWt RTP
Davis-Besse 1, Cycle 15

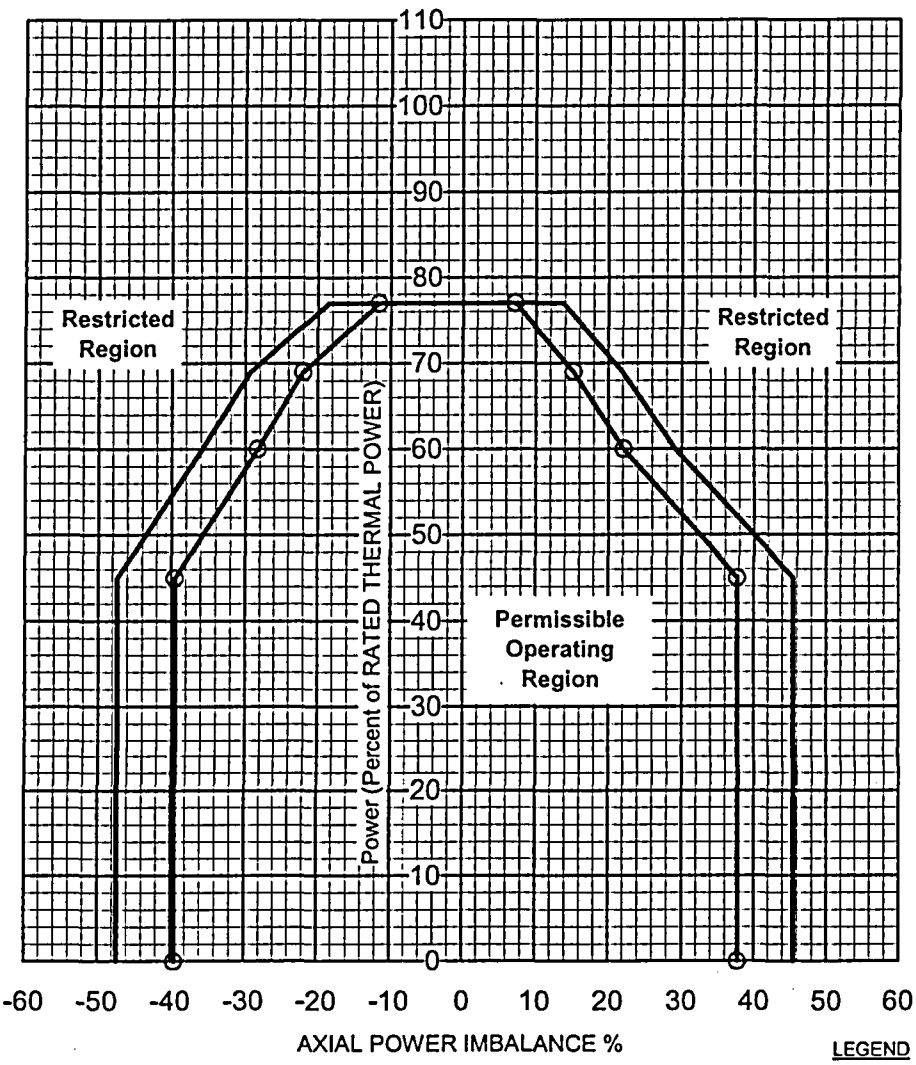
This Figure is referred to by
Technical Specification 3.2.1




Note 1: Instrument error is accounted for in these Operating Limits.

Figure 4d AXIAL POWER IMBALANCE Operating Limits
0 to 300 ±10 EFPD, Three RC Pumps–2772 MWt RTP
Davis-Besse 1, Cycle 15

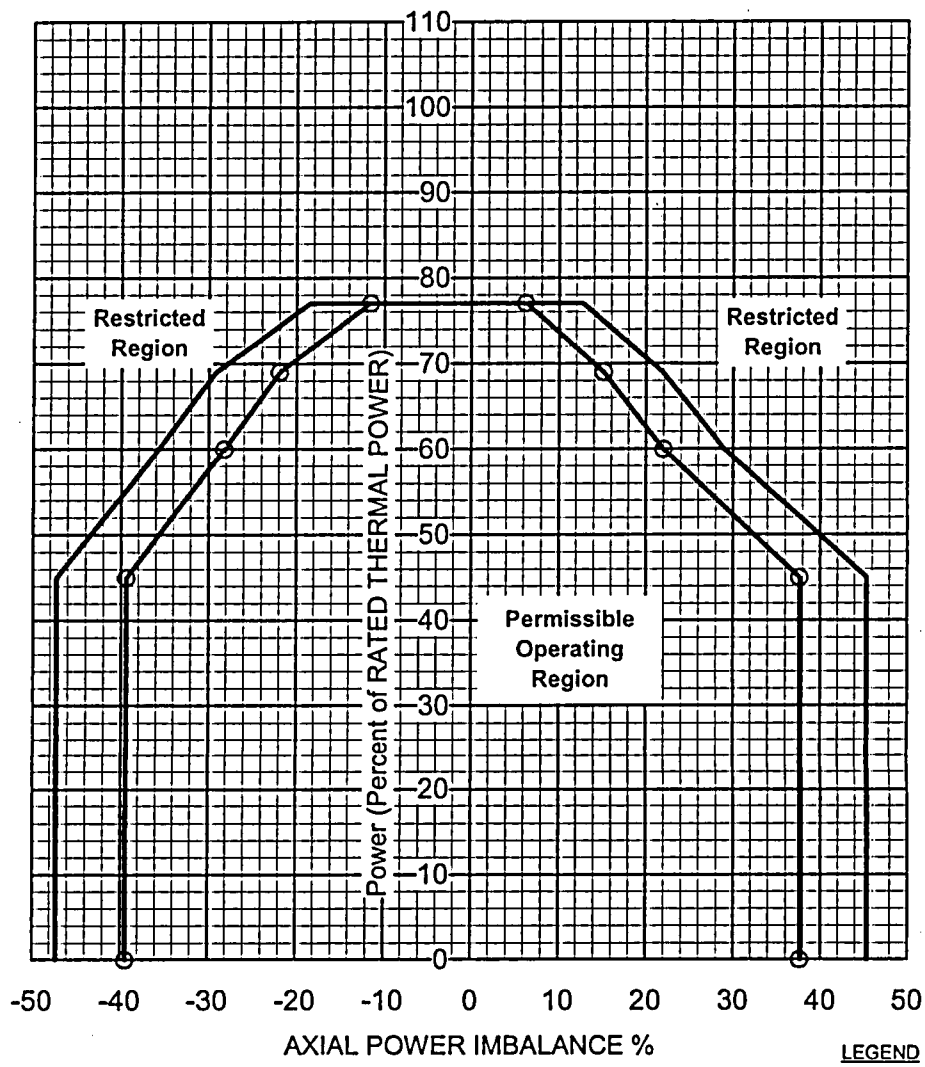
This Figure is referred to by
Technical Specification 3.2.1




Note 1: Instrument error is accounted for in these Operating Limits.

Figure 4e AXIAL POWER IMBALANCE Operating Limits
300 ±10 to 600 ±10 EFPD, Three RC Pumps--2772 MWt RTP
Davis-Besse 1, Cycle 15

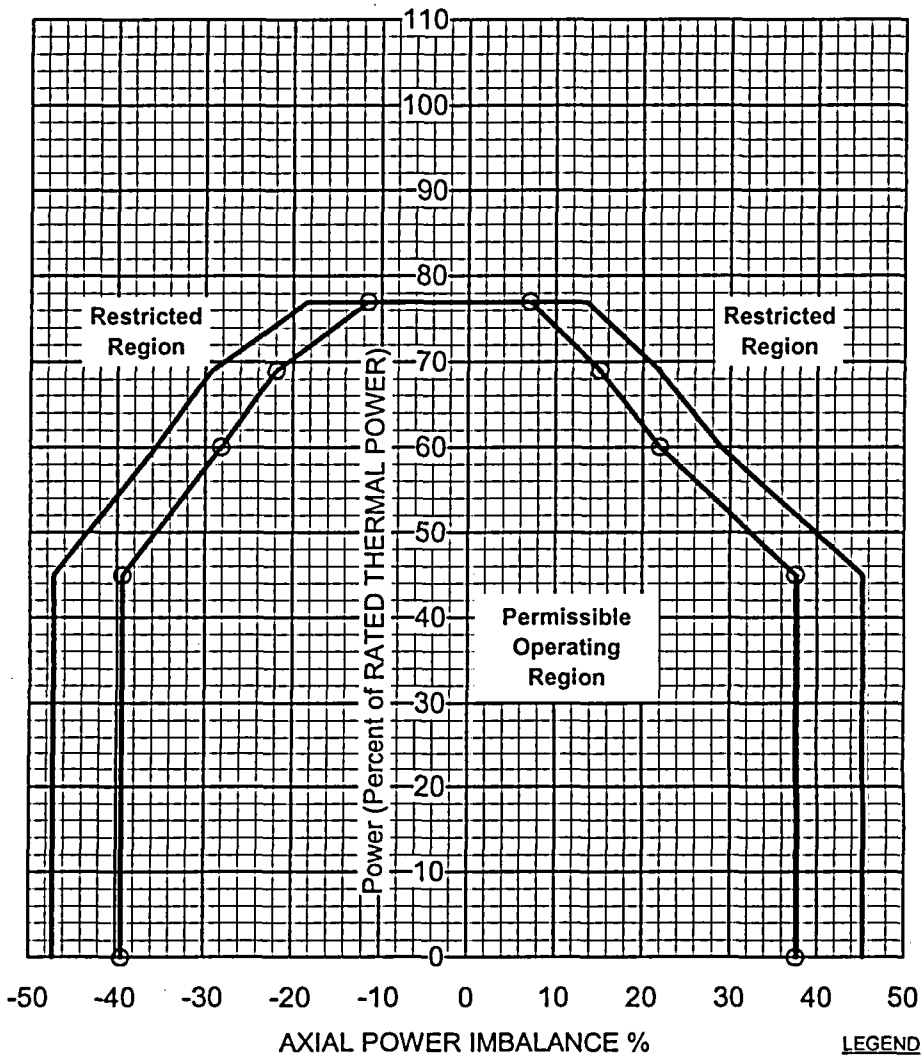
This Figure is referred to by
Technical Specification 3.2.1




Note 1: Instrument error is accounted for in these Operating Limits.

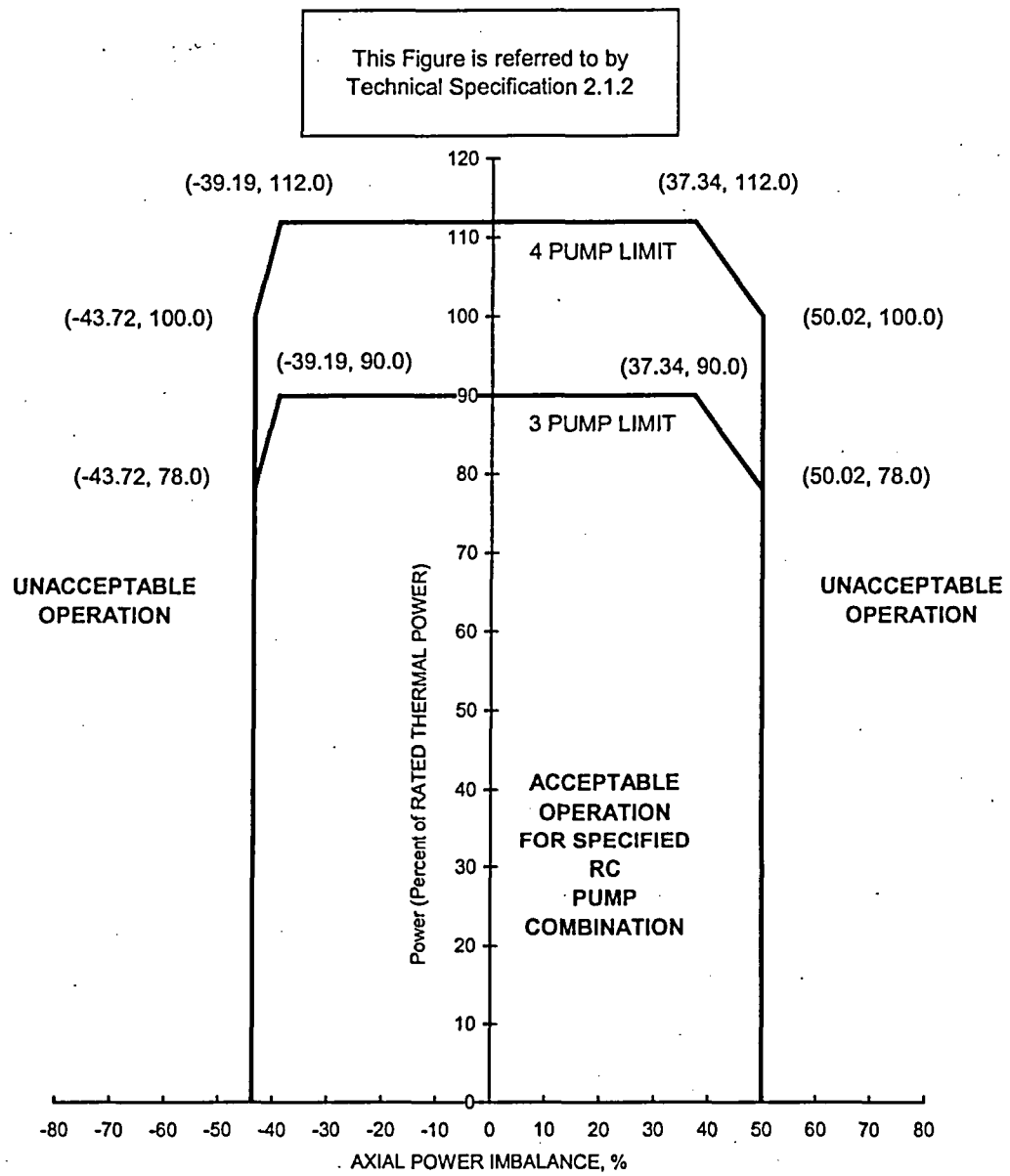
Figure 4f AXIAL POWER IMBALANCE Operating Limits
After 600 ±10 EFPD, Three RC Pumps–2772 MWt RTP
Davis-Besse 1, Cycle 15

This Figure is referred to by
Technical Specification 3.2.1




Note 1: Instrument error is accounted for in these Operating Limits.

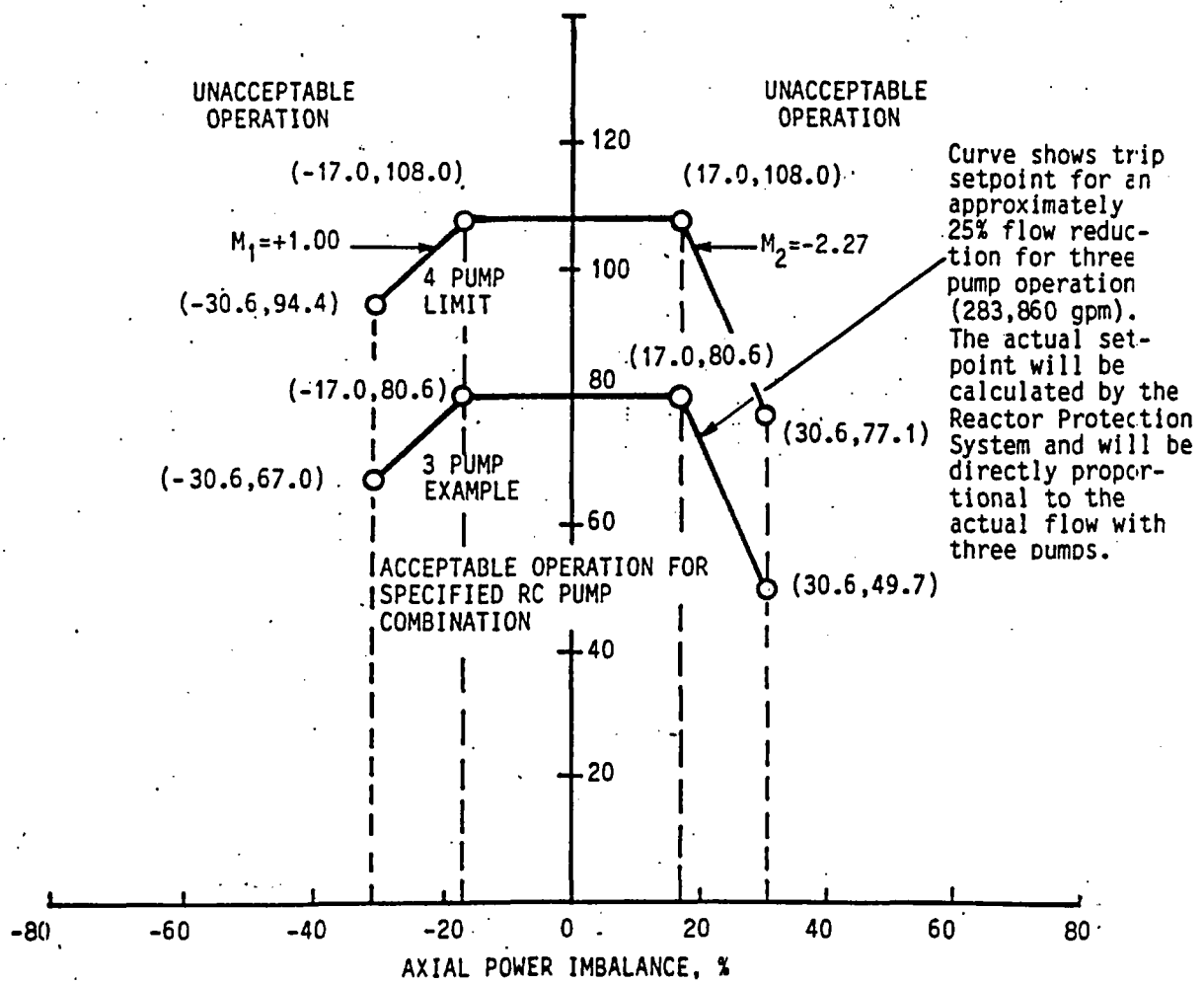
Figure 5 AXIAL POWER IMBALANCE Protective Limits
2772 MWt RTP




| Pumps Operating | Reactor Coolant Flow, gpm | Required Measured Flow to Ensure Compliance, gpm |
|---|---|---|
| 4 | 380,000 | 389,500 |
| 3 | 283,860 | 290,957 |

**Figure 6** **Flux–ΔFlux/Flow (or Power/Imbalance/Flow) Allowable Values**

This Figure is referred to by Technical Specification 2.2.1



## Table 1 QUADRANT POWER TILT Limits

**2772 MWt RTP**

This Table is referred to by Technical Specification 3.2.4

| QUADRANT POWER TILT as measured by: | From 0 EFPD to EOC-15 | | | |
|---|---|---|---|---|
| | Steady-state Limit for THERMAL POWER ≤ 60% (%) | Steady-state Limit for THERMAL POWER > 60% (%) | Transient Limit (%) | Maximum Limit (%) |
| Symmetric Incore Detector System | 7.90 | 4.31 | 10.03 | 20.00 |

## Table 2 Negative Moderator Temperature Coefficient Limit

This Table is referred to by Technical Specification 3.1.1.3c

Negative Moderator Temperature Coefficient Limit (@ RATED THERMAL POWER) $-3.71 \times 10^{-4}$ $\Delta k/k/°F$

## Table 3 Power To Melt Limits

This Table is referred to by Technical Specification Bases B2.1

| | Batch 9J | Batch 14A1 | Batch 15 | Batch 16 | Batch 17 |
|---|---|---|---|---|---|
| Fuel Assembly Type | Mark-B8A | Mark-B10M | Mark-B10K | Mark-B12 | Mark-B-HTP |
| Minimum linear heat rate to melt, kW/ft | 20.5 | 22.3<br>(20.8)[a] | 22.1<br>(21.1)[b]<br>(19.3)[c] | 22.1<br>(20.3)[d]<br>(19.3)[e] | 22.1<br>(20.1)[f]<br>(19.1)[g] |

(a) Limit for 3 wt% $Gd_2O_3$ rods – Batch 14A1
(b) Limit for 2 wt% $Gd_2O_3$ rods – Batch 15
(c) Limit for 8 wt% $Gd_2O_3$ rods – Batch 15
(d) Limit for 4 wt% $Gd_2O_3$ rods – Batch 16
(e) Limit for 8 wt% $Gd_2O_3$ rods – Batch 16
(f) Limit for 4 wt% $Gd_2O_3$ rods – Batch 17
(g) Limit for 8 wt% $Gd_2O_3$ rods – Batch 17

## Table 4a Nuclear Heat Flux Hot Channel Factor - $F_Q$ (NAS)

**2772 MWt RTP**

This Table is referred to by Technical Specification 3.2.2

Heat Flux Hot Channel Factor $F_Q$

$F_Q$ shall be limited by the following relationships:

$F_Q \leq LHR^{ALLOW}$ (Bu) / [$LHR^{AVG}$ * P] (for $P \leq 1.0$)

$LHR^{ALLOW}$ (Bu): See Tables below

$LHR^{AVG}$ = 6.3095 kW/ft for Mark-B8A fuel

$LHR^{AVG}$ = 6.4201 kW/ft for Mark-B10M fuel

$LHR^{AVG}$ = 6.3183 kW/ft for Mark-B10K fuel

$LHR^{AVG}$ = 6.3183 kW/ft for Mark-B12 fuel

$LHR^{AVG}$ = 6.3294 kW/ft for Mark-B-HTP fuel

P = ratio of THERMAL POWER / RATED THERMAL POWER

Bu = Fuel Burnup (MWd/mtU)

Batch 9J (Mark-B8A) – $UO_2$ Fuel $LHR^{ALLOW}$ kW/ft [(a)]

| Axial Segment | 0 MWd/mtU | 24,500 MWd/mtU | 52,000 MWd/mtU | 60,000 MWd/mtU |
|---|---|---|---|---|
| 1 | 16.1 | 16.1 | 12.0 | 10.2 |
| 2 | 15.8 | 15.8 | 12.0 | 10.2 |
| 3 | 15.0 | 15.0 | 12.0 | 10.2 |
| 4 | 15.0 | 15.0 | 12.0 | 10.2 |
| 5 | 15.4 | 15.4 | 12.0 | 10.2 |
| 6 | 15.4 | 15.4 | 12.0 | 10.2 |
| 7 | 14.6 | 14.6 | 12.0 | 10.2 |
| 8 | 14.3 | 14.3 | 12.0 | 10.2 |

Batch 14A1 (Mark-B10M) – $UO_2$ Fuel $LHR^{ALLOW}$ kW/ft [(a)]

| Axial Segment | 0 MWd/mtU | 35,000 MWd/mtU | 62,000 MWd/mtU |
|---|---|---|---|
| 1 | 17.6 | 16.8 | 12.8 |
| 2 | 17.5 | 16.7 | 12.8 |
| 3 | 17.0 | 15.6 | 12.8 |
| 4 | 16.6 | 15.3 | 12.8 |
| 5 | 16.0 | 15.3 | 12.8 |
| 6 | 15.3 | 15.3 | 12.8 |
| 7 | 14.7 | 14.7 | 12.8 |
| 8 | 14.5 | 14.5 | 12.8 |

[(a)] Linear interpolation for allowable LHR between specified burnup points is valid for these tables.

Table 4a , (Continued)

Batch 15A,B,C2 (Mark-B10K) – $UO_2$ Fuel $LHR^{ALLOW}$ kW/ft [a]

| Axial Segment | 0 MWd/mtU | 35,000 MWd/mtU | 58,000 MWd/mtU | 59,000 MWd/mtU | 60,000 MWd/mtU | 62,000 MWd/mtU |
|---|---|---|---|---|---|---|
| 1 | 17.6 | 16.8 | 14.7 | 14.4 | 14.1 | 13.5 |
| 2 | 17.5 | 16.7 | 14.7 | 14.4 | 14.1 | 13.5 |
| 3 | 17.0 | 15.6 | 14.6 | 14.4 | 14.1 | 13.5 |
| 4 | 16.6 | 15.3 | 14.4 | 14.4 | 14.1 | 13.5 |
| 5 | 16.0 | 15.3 | 14.2 | 14.1 | 14.1 | 13.5 |
| 6 | 15.3 | 15.3 | 13.7 | 13.7 | 13.6 | 13.5 |
| 7 | 14.7 | 14.7 | 13.2 | 13.1 | 13.1 | 13.0 |
| 8 | 14.5 | 14.5 | 13.0 | 12.9 | 12.9 | 12.8 |

Batch 16A-E (Mark-B12) – $UO_2$ Fuel $LHR^{ALLOW}$ kW/ft [a]

| Axial Segment | 0 MWd/mtU | 35,000 MWd/mtU | 58,000 MWd/mtU | 59,000 MWd/mtU | 60,000 MWd/mtU | 62,000 MWd/mtU |
|---|---|---|---|---|---|---|
| 1 | 17.6 | 16.8 | 14.7 | 14.4 | 14.1 | 13.5 |
| 2 | 17.5 | 16.7 | 14.7 | 14.4 | 14.1 | 13.5 |
| 3 | 17.0 | 15.6 | 14.6 | 14.4 | 14.1 | 13.5 |
| 4 | 16.6 | 15.3 | 14.4 | 14.4 | 14.1 | 13.5 |
| 5 | 16.0 | 15.3 | 14.2 | 14.1 | 14.1 | 13.5 |
| 6 | 15.3 | 15.3 | 13.7 | 13.7 | 13.6 | 13.5 |
| 7 | 14.7 | 14.7 | 13.2 | 13.1 | 13.1 | 13.0 |
| 8 | 14.5 | 14.5 | 13.0 | 12.9 | 12.9 | 12.8 |

Batch 17A-E (Mark-B-HTP) – $UO_2$ Fuel $LHR^{ALLOW}$ kW/ft [a]

| Axial Segment | 0 MWd/mtU | 40,000 MWd/mtU |
|---|---|---|
| 1 | 17.6 | 17.2 |
| 2 | 17.5 | 17.1 |
| 3 | 17.1 | 16.7 |
| 4 | 17.0 | 16.7 |
| 5 | 16.5 | 16.2 |
| 6 | 15.9 | 15.8 |
| 7 | 15.3 | 15.2 |
| 8 | 15.1 | 15.0 |

[a] Linear interpolation for allowable LHR between specified burnup points is valid for these tables.

## Table 4b Nuclear Heat Flux Hot Channel Factor - $F_Q$ (FIDMS)

**2772 MWt RTP**

This Table is referred to by Technical Specification 3.2.2

Heat Flux Hot Channel Factor $F_Q$

$F_Q$ shall be limited by the following relationships:

$F_Q \leq LHR^{ALLOW}(Bu) / [LHR^{AVG} * P]$ (for $P \leq 1.0$)

$LHR^{ALLOW}$ (Bu): See the Tables below

$LHR^{AVG}$ = 6.3095 kW/ft for Mark-B8A fuel

$LHR^{AVG}$ = 6.4201 kW/ft for Mark-B10M fuel

$LHR^{AVG}$ = 6.3183 kW/ft for Mark-B10K fuel

$LHR^{AVG}$ = 6.3183 kW/ft for Mark-B12 fuel

$LHR^{AVG}$ = 6.3294 kW/ft for Mark-B-HTP fuel

P = ratio of THERMAL POWER / RATED THERMAL POWER

Bu = Fuel Burnup (MWd/mtU)

Batch 9J (Mark-B8A) – $UO_2$ Fuel $LHR^{ALLOW}$ kW/ft [a]

| Core Elevation (ft) | 0 MWd/mtU | 24,500 MWd/mtU | 52,000 MWd/mtU | 60,000 MWd/mtU |
|---|---|---|---|---|
| 0.000 | 16.3 | 16.3 | 12.0 | 10.2 |
| 2.506 | 15.9 | 15.9 | 12.0 | 10.2 |
| 4.264 | 15.1 | 15.1 | 12.0 | 10.2 |
| 6.021 | 15.5 | 15.5 | 12.0 | 10.2 |
| 7.779 | 16.0 | 16.0 | 12.0 | 10.2 |
| 9.536 | 15.4 | 15.4 | 12.0 | 10.2 |
| 12.000 | 14.3 | 14.3 | 12.0 | 10.2 |

Batch 14A1 (Mark-B10M) – $UO_2$ Fuel $LHR^{ALLOW}$ kW/ft [a]

| Core Elevation (ft) | 0 MWd/mtU | 35,000 MWd/mtU | 62,000 MWd/mtU |
|---|---|---|---|
| 0.000 | 17.6 | 16.8 | 12.8 |
| 2.506 | 17.6 | 16.8 | 12.8 |
| 4.264 | 17.1 | 15.7 | 12.8 |
| 6.021 | 16.6 | 15.3 | 12.8 |
| 7.779 | 16.0 | 15.8 | 12.8 |
| 9.536 | 15.3 | 15.3 | 12.8 |
| 12.000 | 14.5 | 14.5 | 12.8 |

[a] Linear interpolation for allowable LHR between specified burnup points is valid for these tables.

Table 4b, (Continued)

Batch 15A,B,C2 (Mark-B10K) – $UO_2$ Fuel $LHR^{ALLOW}$ kW/ft [a]

| Core Elevation (ft) | 0 MWd/mtU | 35,000 MWd/mtU | 58,000 MWd/mtU | 59,000 MWd/mtU | 60,000 MWd/mtU | 62,000 MWd/mtU |
|---|---|---|---|---|---|---|
| 0.000 | 17.6 | 16.8 | 14.7 | 14.4 | 14.1 | 13.5 |
| 2.506 | 17.6 | 16.8 | 14.7 | 14.4 | 14.1 | 13.5 |
| 4.264 | 17.1 | 15.7 | 14.7 | 14.4 | 14.1 | 13.5 |
| 6.021 | 16.6 | 15.3 | 14.4 | 14.4 | 14.1 | 13.5 |
| 7.779 | 16.0 | 15.8 | 14.2 | 14.1 | 14.1 | 13.5 |
| 9.536 | 15.3 | 15.3 | 13.7 | 13.7 | 13.6 | 13.5 |
| 12.000 | 14.5 | 14.5 | 13.0 | 12.9 | 12.9 | 12.8 |

Batch 16A-E (Mark-B12) – $UO_2$ Fuel $LHR^{ALLOW}$ kW/ft [a]

| Core Elevation (ft) | 0 MWd/mtU | 35,000 MWd/mtU | 58,000 MWd/mtU | 59,000 MWd/mtU | 60,000 MWd/mtU | 62,000 MWd/mtU |
|---|---|---|---|---|---|---|
| 0.000 | 17.6 | 16.8 | 14.7 | 14.4 | 14.1 | 13.5 |
| 2.506 | 17.6 | 16.8 | 14.7 | 14.4 | 14.1 | 13.5 |
| 4.264 | 17.1 | 15.7 | 14.7 | 14.4 | 14.1 | 13.5 |
| 6.021 | 16.6 | 15.3 | 14.4 | 14.4 | 14.1 | 13.5 |
| 7.779 | 16.0 | 15.8 | 14.2 | 14.1 | 14.1 | 13.5 |
| 9.536 | 15.3 | 15.3 | 13.7 | 13.7 | 13.6 | 13.5 |
| 12.000 | 14.5 | 14.5 | 13.0 | 12.9 | 12.9 | 12.8 |

Batch 17A-E (Mark-B-HTP) – $UO_2$ Fuel $LHR^{ALLOW}$ kW/ft [a]

| Core Elevation | 0 MWd/mtU | 40,000 MWd/mtU |
|---|---|---|
| 0.000 | 17.6 | 17.2 |
| 2.506 | 17.6 | 17.2 |
| 4.264 | 17.2 | 16.8 |
| 6.021 | 17.0 | 16.7 |
| 7.779 | 16.5 | 16.2 |
| 9.536 | 15.9 | 15.8 |
| 12.000 | 15.1 | 15.0 |

[a] Linear interpolation for allowable LHR between specified burnup points is valid for these tables.

Table 4b, (Continued)

Batch 14A1 (Mark B10M)– 3 wt% $Gd_2O_3$ Fuel $LHR^{ALLOW}$ kW/ft [a]

| Core Elevation (ft) | 0 MWd/mtU | 35,000 MWd/mtU | 62,000 MWd/mtU |
|---|---|---|---|
| 0.000 | 16.1 | 15.4 | 11.8 |
| 2.506 | 16.1 | 15.4 | 11.8 |
| 4.264 | 15.7 | 14.4 | 11.8 |
| 6.021 | 15.2 | 14.0 | 11.8 |
| 7.779 | 14.7 | 14.5 | 11.8 |
| 9.536 | 14.0 | 14.0 | 11.8 |
| 12.000 | 13.3 | 13.3 | 11.8 |

Batch 15 (Mark-B10K) – 2 wt% $Gd_2O_3$ Fuel $LHR^{ALLOW}$ kW/ft [a]

| Core Elevation (ft) | 0 MWd/mtU | 35,000 MWd/mtU | 58,000 MWd/mtU | 59,000 MWd/mtU | 60,000 MWd/mtU | 62,000 MWd/mtU |
|---|---|---|---|---|---|---|
| 0.000 | 16.5 | 15.7 | 13.9 | 13.6 | 13.3 | 12.8 |
| 2.506 | 16.5 | 15.7 | 13.9 | 13.6 | 13.3 | 12.8 |
| 4.264 | 16.0 | 14.7 | 13.9 | 13.6 | 13.3 | 12.8 |
| 6.021 | 15.5 | 14.3 | 13.6 | 13.6 | 13.3 | 12.8 |
| 7.779 | 15.0 | 14.8 | 13.4 | 13.3 | 13.3 | 12.8 |
| 9.536 | 14.3 | 14.3 | 13.0 | 12.9 | 12.9 | 12.8 |
| 12.000 | 13.6 | 13.6 | 12.4 | 12.3 | 12.3 | 12.2 |

Batch 15 (Mark-B10K)– 8 wt% $Gd_2O_3$ Fuel $LHR^{ALLOW}$ kW/ft [a]

| Core Elevation (ft) | 0 MWd/mtU | 35,000 MWd/mtU | 58,000 MWd/mtU | 59,000 MWd/mtU | 60,000 MWd/mtU | 62,000 MWd/mtU |
|---|---|---|---|---|---|---|
| 0.000 | 14.9 | 14.2 | 12.4 | 12.1 | 11.9 | 11.4 |
| 2.506 | 14.9 | 14.2 | 12.4 | 12.1 | 11.9 | 11.4 |
| 4.264 | 14.5 | 13.3 | 12.4 | 12.1 | 11.9 | 11.4 |
| 6.021 | 14.0 | 12.9 | 12.2 | 12.2 | 11.9 | 11.4 |
| 7.779 | 13.5 | 13.4 | 12.0 | 11.9 | 11.9 | 11.4 |
| 9.536 | 12.9 | 12.9 | 11.6 | 11.5 | 11.5 | 11.4 |
| 12.000 | 12.2 | 12.2 | 11.0 | 10.9 | 10.9 | 10.8 |

[a] Linear interpolation for allowable LHR between specified burnup points is valid for these tables.

Table 4b. (Continued)

Batch 16 (Mark-B12)– 4 wt% $Gd_2O_3$ Fuel $LHR^{ALLOW}$ kW/ft [(a)]

| Core Elevation (ft) | 0 MWd/mtU | 35,000 MWd/mtU | 58,000 MWd/mtU | 59,000 MWd/mtU | 60,000 MWd/mtU | 62,000 MWd/mtU |
|---|---|---|---|---|---|---|
| 0.000 | 15.8 | 15.1 | 13.3 | 13.0 | 12.7 | 12.2 |
| 2.506 | 15.8 | 15.1 | 13.3 | 13.0 | 12.7 | 12.2 |
| 4.264 | 15.3 | 14.1 | 13.3 | 13.0 | 12.7 | 12.2 |
| 6.021 | 14.9 | 13.7 | 13.0 | 13.0 | 12.7 | 12.2 |
| 7.779 | 14.3 | 14.2 | 12.9 | 12.8 | 12.8 | 12.2 |
| 9.536 | 13.7 | 13.7 | 12.4 | 12.3 | 12.3 | 12.2 |
| 12.000 | 13.0 | 13.0 | 11.8 | 11.7 | 11.7 | 11.6 |

Batch 16 (Mark-B12)– 8 wt% $Gd_2O_3$ Fuel $LHR^{ALLOW}$ kW/ft [(a)]

| Core Elevation (ft) | 0 MWd/mtU | 35,000 MWd/mtU | 58,000 MWd/mtU | 59,000 MWd/mtU | 60,000 MWd/mtU | 62,000 MWd/mtU |
|---|---|---|---|---|---|---|
| 0.000 | 14.9 | 14.2 | 12.4 | 12.1 | 11.9 | 11.4 |
| 2.506 | 14.9 | 14.2 | 12.4 | 12.1 | 11.9 | 11.4 |
| 4.264 | 14.5 | 13.3 | 12.4 | 12.1 | 11.9 | 11.4 |
| 6.021 | 14.0 | 12.9 | 12.2 | 12.2 | 11.9 | 11.4 |
| 7.779 | 13.5 | 13.4 | 12.0 | 11.9 | 11.9 | 11.4 |
| 9.536 | 12.9 | 12.9 | 11.6 | 11.5 | 11.5 | 11.4 |
| 12.000 | 12.2 | 12.2 | 11.0 | 10.9 | 10.9 | 10.8 |

Batch 17 (Mark-B-HTP)– 4 wt% $Gd_2O_3$ Fuel $LHR^{ALLOW}$ kW/ft [(a)]

| Core Elevation | 0 MWd/mtU | 40,000 MWd/mtU |
|---|---|---|
| 0.000 | 15.8 | 15.7 |
| 2.506 | 15.8 | 15.7 |
| 4.264 | 15.4 | 15.2 |
| 6.021 | 15.2 | 15.1 |
| 7.779 | 14.8 | 14.7 |
| 9.536 | 14.2 | 14.3 |
| 12.000 | 13.5 | 13.6 |

[(a)] Linear interpolation for allowable LHR between specified burnup points is valid for these tables.

Table 4b, (Continued)

Batch 17 (Mark-B-HTP)– 8 wt% $Gd_2O_3$ Fuel $LHR^{ALLOW}$ kW/ft [(a)]

| Core Elevation (ft) | 0 MWd/mtU | 40,000 MWd/mtU |
|---|---|---|
| 0.000 | 14.9 | 14.9 |
| 2.506 | 14.9 | 14.9 |
| 4.264 | 14.5 | 14.6 |
| 6.021 | 14.4 | 14.5 |
| 7.779 | 13.9 | 14.0 |
| 9.536 | 13.4 | 13.7 |
| 12.000 | 12.7 | 13.0 |

(a) Linear interpolation for allowable LHR between specified burnup points is valid for these tables.

Table 5 Nuclear Enthalpy Rise Hot Channel Factor - $F^N_{\Delta H}$

This Table is referred
to by Technical Specification 3.2.3

Enthalpy Rise Hot Channel Factor $F^N_{\Delta H}$

$F^N_{\Delta H} \leq MARP\ [1 + 0.3\ (1 - P/P_m)]$

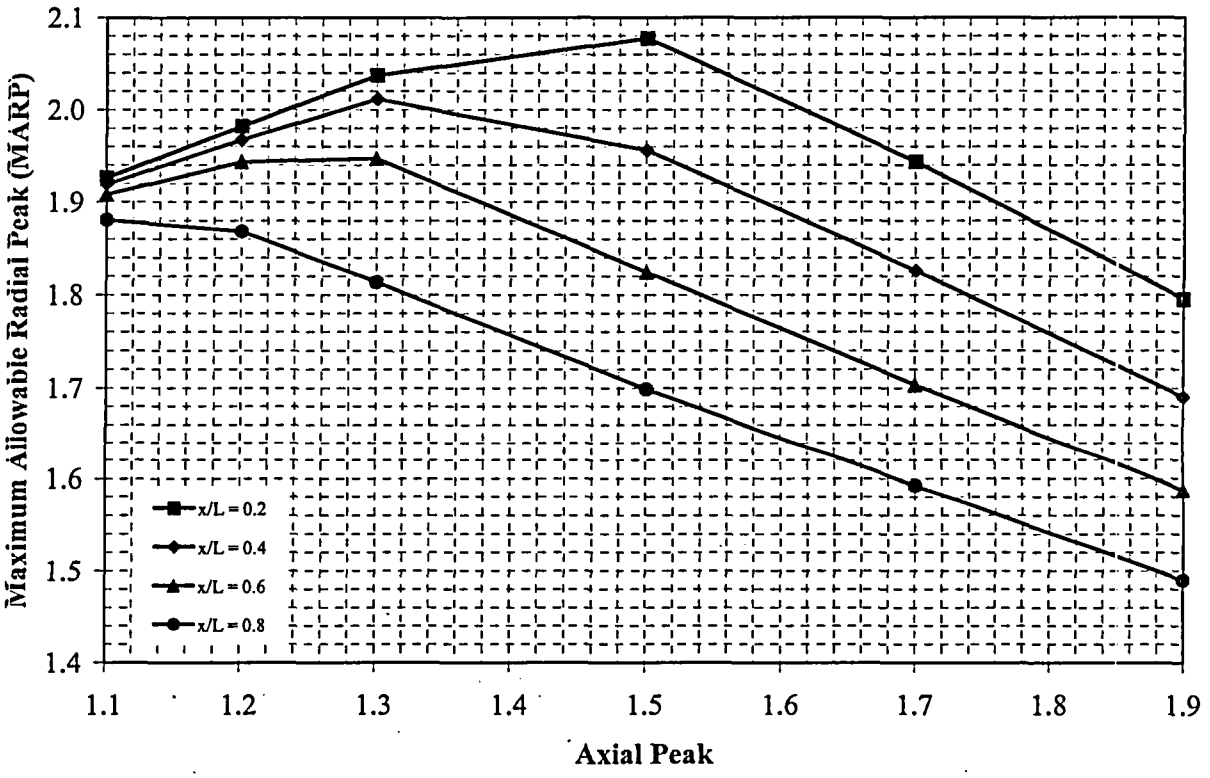
MARP = Maximum Allowable Radial Peak, see MARP Figures and data Tables

P = THERMAL POWER / RATED THERMAL POWER and $P \leq 1.0$

$P_m = 1.0$ for 4-RCP operation

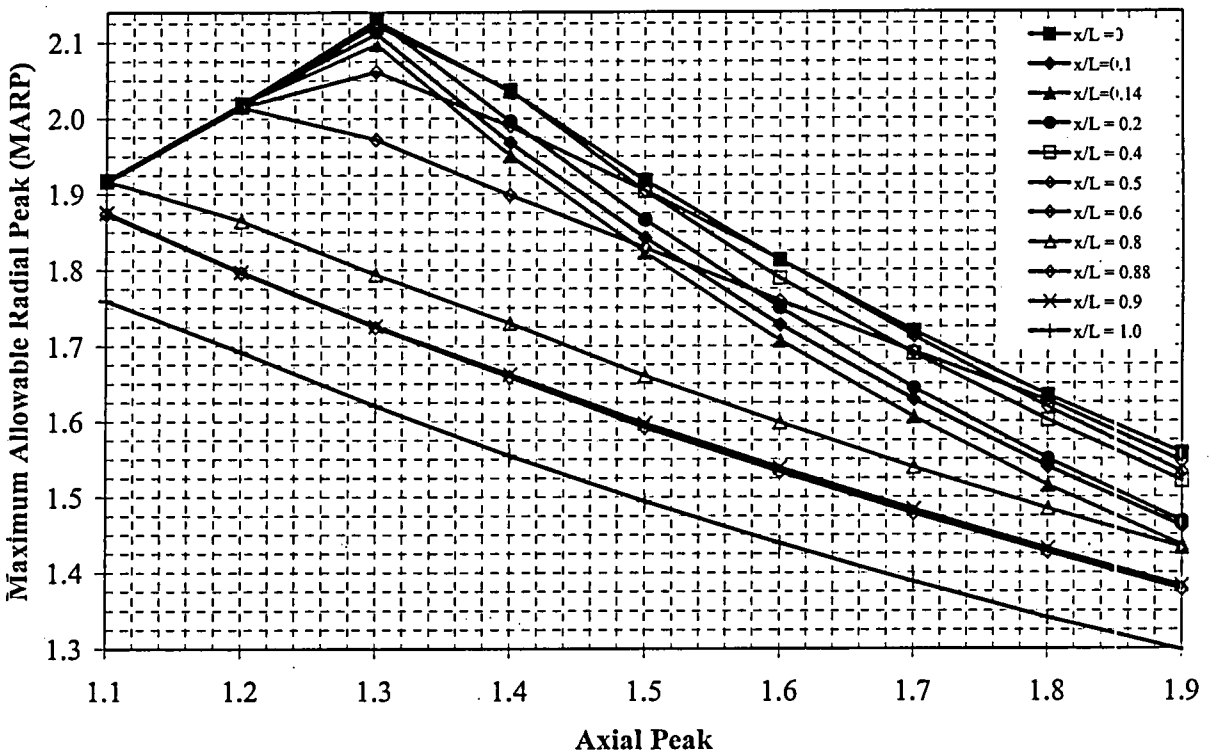
$P_m = 0.75$ for 3-RCP operation

Figure 7 Maximum Allowable Radial Peak for $F^N_{\Delta H}$ in Mark-B Fuel Assemblies




* This figure is applicable to all Mark-B fuel in the core. Linear interpolation and extrapolation above x/L of 0.8 are acceptable. For axial heights < x/L of 0.2, the value at x/L 0.2 will be used.

Figure 8 Maximum Allowable Radial Peak for $F^N_{\Delta H}$ in Mark-BHTP Fuel Assemblies




* This figure is applicable to all Mark-B-HTP fuel in the core. Linear interpolation is acceptable. The MARP values are based on an active fuel height of 142.75 inches.

Table 6 Maximum Allowable Radial Peak for $F^N_{\Delta H}$ in Mark-B Fuel Assemblies

| Axial Peak | x/L | Axial Height (inches) | MAP Limit | MARP Limit |
|---|---|---|---|---|
| 1.1 | 0.2 | 28.12 | 2.0415 | 1.9264 |
| | 0.4 | 56.24 | 2.0345 | 1.9198 |
| | 0.6 | 84.36 | 2.0221 | 1.9081 |
| | 0.8 | 112.48 | 1.9934 | 1.8810 |
| 1.2 | 0.2 | 28.12 | 2.2918 | 1.9824 |
| | 0.4 | 56.24 | 2.2749 | 1.9678 |
| | 0.6 | 84.36 | 2.2470 | 1.9437 |
| | 0.8 | 112.48 | 2.1601 | 1.8685 |
| 1.3 | 0.2 | 28.12 | 2.5521 | 2.0378 |
| | 0.4 | 56.24 | 2.5197 | 2.0119 |
| | 0.6 | 84.36 | 2.4387 | 1.9472 |
| | 0.8 | 112.48 | 2.2719 | 1.8140 |
| 1.5 | 0.2 | 28.12 | 3.0022 | 2.0775 |
| | 0.4 | 56.24 | 2.8272 | 1.9564 |
| | 0.6 | 84.36 | 2.6367 | 1.8246 |
| | 0.8 | 112.48 | 2.4553 | 1.6991 |
| 1.7 | 0.2 | 28.12 | 3.1839 | 1.9441 |
| | 0.4 | 56.24 | 2.9911 | 1.8263 |
| | 0.6 | 84.36 | 2.7902 | 1.7037 |
| | 0.8 | 112.48 | 2.6084 | 1.5927 |
| 1.9 | 0.2 | 28.12 | 3.2865 | 1.7955 |
| | 0.4 | 56.24 | 3.0945 | 1.6906 |
| | 0.6 | 84.36 | 2.9062 | 1.5877 |
| | 0.8 | 112.48 | 2.7279 | 1.4903 |

## Table 7 Maximum Allowable Radial Peak for $F^N_{\Delta H}$ in Mark-BHTP Fuel Assemblies

| Axial Peak | x/L | Axial Height (inches) | MAP Limit | MARP Limit | Axial Peak | x/L | Axial Height (inches) | MAP Limit | MARP Limit |
|---|---|---|---|---|---|---|---|---|---|
| | 0.0 | 0.000 | 2.03286 | 1.91828 | | 0.0 | 0.000 | 2.79510 | 1.81332 |
| | 0.1 | 14.275 | 2.03375 | 1.91912 | | 0.1 | 14.275 | 2.66285 | 1.72752 |
| | 0.14 | 19.985 | 2.03379 | 1.91916 | | 0.14 | 19.985 | 2.63106 | 1.70690 |
| | 0.2 | 28.550 | 2.03355 | 1.91893 | | 0.2 | 28.550 | 2.69787 | 1.75024 |
| | 0.4 | 57.100 | 2.03179 | 1.91727 | | 0.4 | 57.100 | 2.75779 | 1.78912 |
| 1.1 | 0.5 | 71.375 | 2.03107 | 1.91659 | 1.6 | 0.5 | 71.375 | 2.79658 | 1.81428 |
| | 0.6 | 85.650 | 2.03099 | 1.91652 | | 0.6 | 85.650 | 2.71189 | 1.75934 |
| | 0.8 | 114.200 | 2.03178 | 1.91726 | | 0.8 | 114.200 | 2.46394 | 1.59848 |
| | 0.88 | 125.620 | 1.98623 | 1.87428 | | 0.88 | 125.620 | 2.36299 | 1.53299 |
| | 0.9 | 128.475 | 1.98774 | 1.87570 | | 0.9 | 128.475 | 2.37234 | 1.53906 |
| | 1.0 | 142.750 | 1.86518 | 1.76005 | | 1.0 | 142.750 | 2.21845 | 1.43922 |
| | 0.0 | 0.000 | 2.33414 | 2.01903 | | 0.0 | 0.000 | 2.81571 | 1.71924 |
| | 0.1 | 14.275 | 2.33416 | 2.01905 | | 0.1 | 14.275 | 2.66718 | 1.62855 |
| | 0.14 | 19.985 | 2.33413 | 2.01902 | | 0.14 | 19.985 | 2.63022 | 1.60598 |
| | 0.2 | 28.550 | 2.33248 | 2.01760 | | 0.2 | 28.550 | 2.69195 | 1.64367 |
| | 0.4 | 57.100 | 2.33024 | 2.01566 | | 0.4 | 57.100 | 2.76735 | 1.68971 |
| 1.2 | 0.5 | 71.375 | 2.32955 | 2.01506 | 1.7 | 0.5 | 71.375 | 2.80468 | 1.71250 |
| | 0.6 | 85.650 | 2.32916 | 2.01472 | | 0.6 | 85.650 | 2.77165 | 1.69234 |
| | 0.8 | 114.200 | 2.15618 | 1.86510 | | 0.8 | 114.200 | 2.52074 | 1.53913 |
| | 0.88 | 125.620 | 2.07666 | 1.79631 | | 0.88 | 125.620 | 2.42051 | 1.47793 |
| | 0.9 | 128.475 | 2.07869 | 1.79807 | | 0.9 | 128.475 | 2.43041 | 1.48398 |
| | 1.0 | 142.750 | 1.95649 | 1.69236 | | 1.0 | 142.750 | 2.27373 | 1.38831 |
| | 0.0 | 0.000 | 2.66591 | 2.12863 | | 0.0 | 0.000 | 2.83401 | 1.63428 |
| | 0.1 | 14.275 | 2.64485 | 2.11181 | | 0.1 | 14.275 | 2.66992 | 1.53965 |
| | 0.14 | 19.985 | 2.62777 | 2.09817 | | 0.14 | 19.985 | 2.62789 | 1.51542 |
| | 0.2 | 28.550 | 2.66761 | 2.12998 | | 0.2 | 28.550 | 2.68772 | 1.54992 |
| | 0.4 | 57.100 | 2.65903 | 2.12313 | | 0.4 | 57.100 | 2.7774 | 1.60163 |
| 1.3 | 0.5 | 71.375 | 2.58224 | 2.06182 | 1.8 | 0.5 | 71.375 | 2.80694 | 1.61867 |
| | 0.6 | 85.650 | 2.46978 | 1.97202 | | 0.6 | 85.650 | 2.82218 | 1.62746 |
| | 0.8 | 114.200 | 2.24712 | 1.79424 | | 0.8 | 114.200 | 2.57398 | 1.48433 |
| | 0.88 | 125.620 | 2.15963 | 1.72438 | | 0.88 | 125.620 | 2.47403 | 1.42669 |
| | 0.9 | 128.475 | 2.16184 | 1.72615 | | 0.9 | 128.475 | 2.48254 | 1.43160 |
| | 1.0 | 142.750 | 2.02976 | 1.62069 | | 1.0 | 142.750 | 2.32589 | 1.34126 |
| | 0.0 | 0.000 | 2.74599 | 2.03596 | | 0.0 | 0.000 | 2.85122 | 1.55767 |
| | 0.1 | 14.275 | 2.65413 | 1.96785 | | 0.1 | 14.275 | 2.67423 | 1.46097 |
| | 0.14 | 19.985 | 2.63176 | 1.95126 | | 0.14 | 19.985 | 2.62778 | 1.43560 |
| | 0.2 | 28.550 | 2.69213 | 1.99602 | | 0.2 | 28.550 | 2.68609 | 1.46745 |
| | 0.4 | 57.100 | 2.74771 | 2.03723 | | 0.4 | 57.100 | 2.78418 | 1.52104 |
| 1.4 | 0.5 | 71.375 | 2.68391 | 1.98993 | 1.9 | 0.5 | 71.375 | 2.80567 | 1.53278 |
| | 0.6 | 85.650 | 2.56032 | 1.89829 | | 0.6 | 85.650 | 2.83113 | 1.54669 |
| | 0.8 | 114.200 | 2.33307 | 1.72980 | | 0.8 | 114.200 | 2.62225 | 1.43258 |
| | 0.88 | 125.620 | 2.23716 | 1.65869 | | 0.88 | 125.620 | 2.52166 | 1.37762 |
| | 0.9 | 128.475 | 2.24237 | 1.66256 | | 0.9 | 128.475 | 2.53147 | 1.38298 |
| | 1.0 | 142.750 | 2.09699 | 1.55477 | | 1.0 | 142.750 | 2.37605 | 1.29807 |
| | 0.0 | 0.000 | 2.77184 | 1.91811 | | | | | |
| | 0.1 | 14.275 | 2.66225 | 1.84228 | | | | | |
| | 0.14 | 19.985 | 2.63504 | 1.82345 | | | | | |
| | 0.2 | 28.550 | 2.69706 | 1.86637 | | | | | |
| | 0.4 | 57.100 | 2.75139 | 1.90396 | | | | | |
| 1.5 | 0.5 | 71.375 | 2.75241 | 1.90467 | | | | | |
| | 0.6 | 85.650 | 2.64282 | 1.82883 | | | | | |
| | 0.8 | 114.200 | 2.39919 | 1.66024 | | | | | |
| | 0.88 | 125.620 | 2.30027 | 1.59179 | | | | | |
| | 0.9 | 128.475 | 2.30907 | 1.59788 | | | | | |
| | 1.0 | 142.750 | 2.15988 | 1.49464 | | | | | |

Docket Number 50-346
License Number NPF-3
Serial Number 3252
Attachment 1

## COMMITMENT LIST

The following list identifies those actions committed to by the Davis-Besse Nuclear Power Station, Unit Number 1, (DBNPS) in this document. Any other actions discussed in the submittal represent intended or planned actions by the DBNPS. They are described only for information and are not regulatory commitments. Please notify Gregory A. Dunn, Manager – FENOC Fleet Licensing (330-315-7243) of any questions regarding this document or associated regulatory commitments.

| COMMITMENTS | DUE DATE |
|---|---|
| None | N/A |