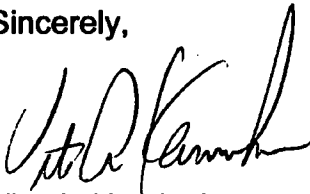


Vito A. Kaminskas
Vice President440-280-5382
Fax: 440-280-8029April 24, 2013
L-13-153ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001SUBJECT:
Perry Nuclear Power Plant
Docket No. 50-440, License No. NPF-58
Core Operating Limits Report for Cycle 15

Enclosed please find Revision 21 of the Perry Nuclear Power Plant Core Operating Limits Report, for Cycle 15. This report is submitted in accordance with Technical Specification 5.6.5, "Core Operating Limits Report (COLR)."

There are no regulatory commitments contained in this submittal. If there are any questions or if additional information is required, please contact Mr. Thomas A. Lentz, Manager – Fleet Licensing, at (330) 315-6810.

Sincerely,



Vito A. Kaminskas

Enclosure:
Core Operating Limits Report for the Perry Nuclear Power Plant Unit 1
Cycle 15 (Reload 14)cc: NRC Region III Administrator
NRC Resident Inspector
NRC Project Manager

ENCLOSURE TO L-13-153

**Core Operating Limits Report for the Perry Nuclear Power Plant Unit 1
Cycle 15 (Reload 14)**

(21 pages follow)

PERRY NUCLEAR POWER PLANT		Procedure Number: PDB-F0001	
Title: Core Operating Limits Report for the Perry Nuclear Power Plant Unit 1 Cycle 15 (Reload 14)	Use Category: In-Field Reference		
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CORE OPERATING LIMITS REPORT FOR THE PERRY NUCLEAR POWER PLANT UNIT 1 CYCLE 15 (RELOAD 14)

Functional Location (J11)

Plant Data Book

Effective Date: 4-15-13

Preparer: Pat Curran / 3-4-13
Date

Approver: Paul Bordley / 3-6-13
Date

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1.0 INTRODUCTION

This Core Operating Limits Report (COLR) for the Perry Nuclear Power Plant (PNPP) Unit 1 Cycle 15 is prepared in accordance with the requirements of PNPP Technical Specification Administrative Control 5.6.5. The core operating limits presented herein were determined using NRC-approved methods (Reference 1 and Reference 2). The core operating limits for the Global Nuclear Fuel (GNF) fuel in PNPP Unit 1 for Cycle 15 are documented in References 3, 4, 5, and 14 and summarized herein for the following PNPP Unit 1 Technical Specifications:

1. Average Planar Linear Heat Generation Rate (APLHGR) Limits for each fuel/lattice type, including the power and flow dependent MAPFAC curves with the single loop MAPLHGR reduction factor. (Technical Specification 3.2.1)
2. Minimum Critical Power Ratio Operating Limit including the power and flow dependent MCPR curves for Two Loop Operation and Single Loop Operation. (Technical Specification 3.2.2)

Additional power dependent MCPR curves for Two Loop Operation and Single Loop Operation are provided for operation with one pressure regulator out of service.
3. Linear Heat Generation Rate (LHGR) Limits for each fuel/lattice type, including the power and flow dependent MAPFAC curves with the single loop MAPLHGR reduction factor. (Technical Specification 3.2.3)
4. The simulated thermal power time constant. (Technical Specification 3.3.1.1, SR 3.3.1.1.14)
5. Oscillation Power Range Monitor (OPRM) Instrumentation. (Technical Specification 3.3.1.3)

Calculation FM-075, Support for the Core Operating Limits Report details the development of the various graphs contained within this COLR.

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2.0 REFERENCES

2.1 Discretionary

None

2.2 Obligations

1. General Electric Standard Application for Reactor Fuel, NEDE-24011-P-A-19, May 2012; and the US Supplement, NEDE-24011-P-A-19-US, May 2012
2. Reactor Stability Detect and Suppress Solutions Licensing Basis Methodology for Reload Applications, Licensing Topical Report, NEDO-32465-A, August 1996
3. Supplemental Reload Licensing Report for Perry 1 Reload 14 Cycle 15, GNF Document 0000-0140-7070-SRLR, Rev 0, December 2012
4. Fuel Bundle Information Report for Perry 1 Reload 14 Cycle 15, GNF Document 0000-0140-7070-FBIR, Rev 0, December 2012
5. Calculation FM-012, Revision 4, Addendum 2, OPRM Device Settings and Setpoints
6. Technical Specification 2.1.1.2, Safety Limit MCPR, Amendment No. 155
7. Technical Specification 3.2.1, Average Planar Linear Heat Generation Rate, Amendment No. 112
8. Technical Specification 3.2.2, Minimum Critical Power Ratio, Amendment No. 112
9. Technical Specification 3.2.3, Linear Heat Generation Rate, Amendment No. 112
10. Technical Specification 3.3.1.1, Reactor Protection System Instrumentation (SR 3.3.1.1.14), Amendment No. 115

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11. Technical Specification 3.3.1.3, OPRM Instrumentation (SR 3.3.1.3.3), Amendment 138
12. Technical Specification 5.6.5, Core Operating Limits Report, Amendment No. 136
13. Neutron Monitoring System Design Specification, 22A3739, Revision 6
14. Calculation FM-075, Support For Core Operating Limits Report, Revision 0, Addendum 1
15. FTI-B0012, Single Loop Operation

Commitments addressed in this document:

None

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3.0 AVERAGE PLANAR LINEAR HEAT GENERATION RATE (T.S. 3.2.1)

ALL AVERAGE PLANAR LINEAR HEAT GENERATION

RATES (APLHGRs) shall not exceed the result obtained from multiplying the applicable MAPLHGR limit, Figure 3.2.1-1, by the smaller of either the flow dependent MAPLHGR factor (MAPFAC_f), Figure 3.2.1-2 or the power dependent MAPLHGR factor (MAPFAC_p) Figure 3.2.1-3.

MAPLHGR Limits and MAPFAC_f and MAPFAC_p are defined in Reference 3.

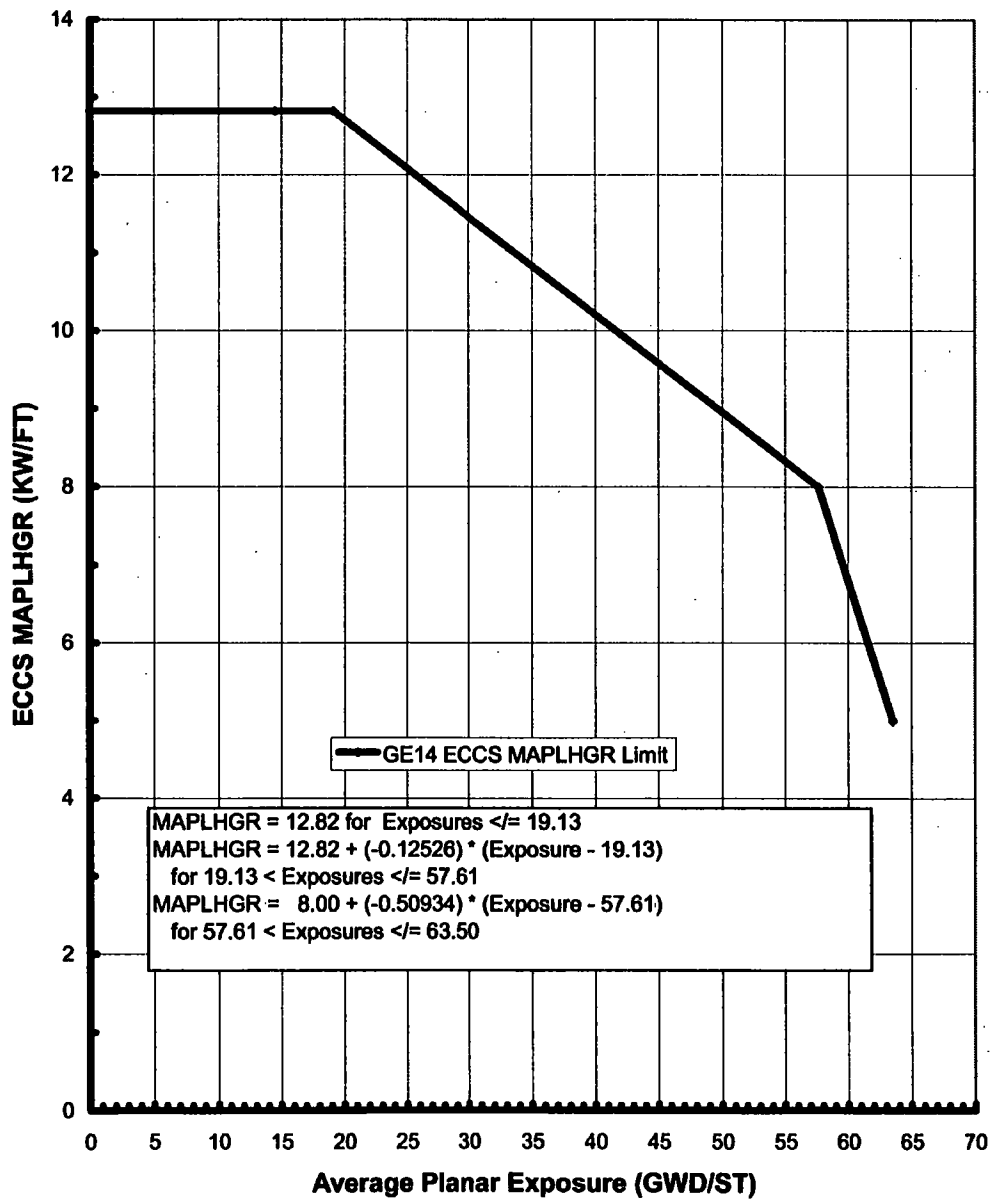
For Two Loop Operation, MAPFAC_f and MAPFAC_p shall not exceed 1.0.

For Single Loop Operation, MAPFAC_f and MAPFAC_p shall not exceed 0.8.

The Single Loop Operation limits take effect when reset for single loop operation per LCO 3.4.1, "Recirculation Loops Operating". This is consistent with note "(b)" to Table 3.3.1.1-1 of the Technical Specifications. Use FTI-B0012 Single Loop Operation to implement the revised MAPLHGR Limits.

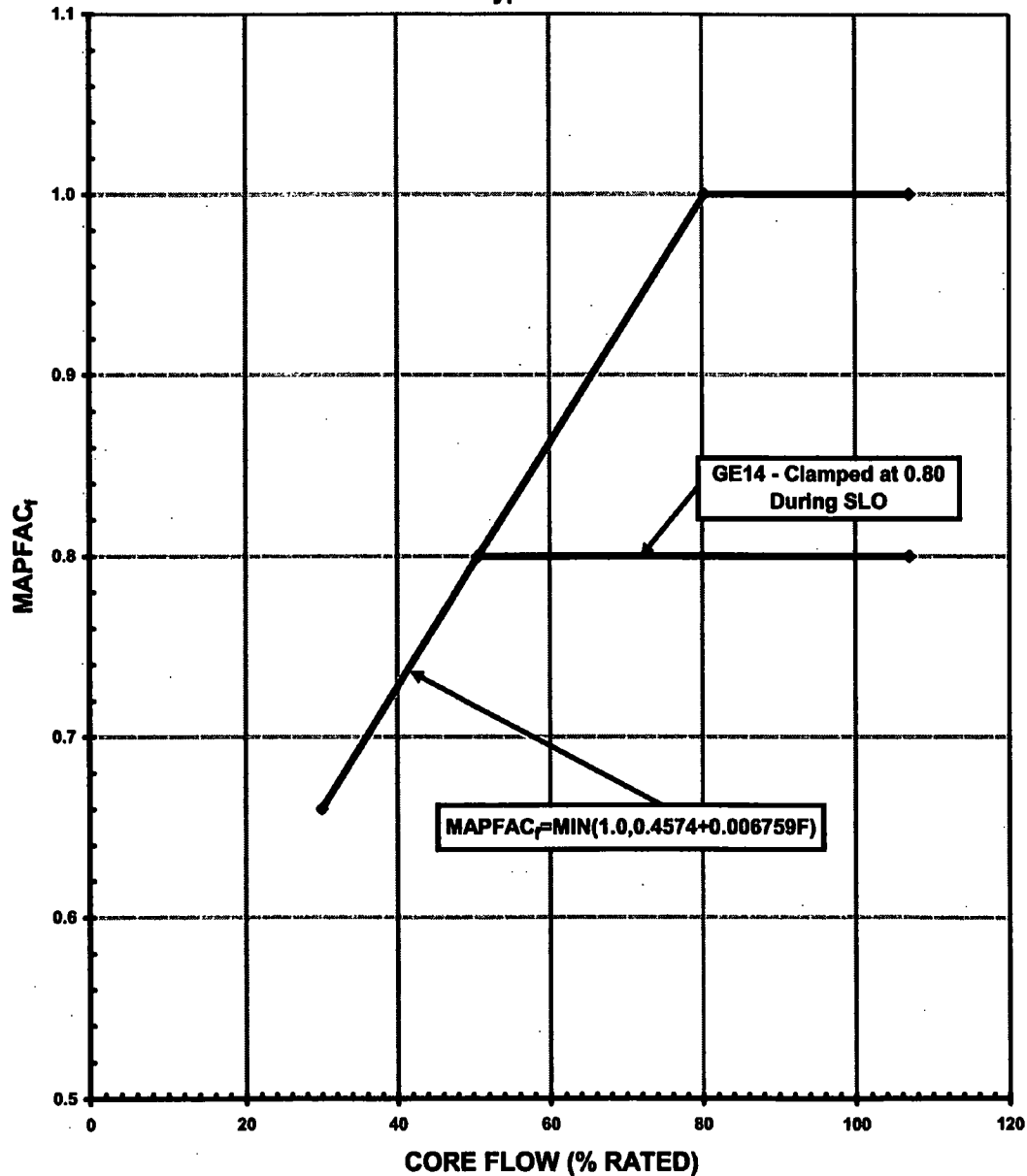
PERRY NUCLEAR POWER PLANT		Procedure Number: PDB-F0001	
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**Figure 3.2.1-1
MAPLHGR Versus Average Planar Exposure
Fuel Type GE14**



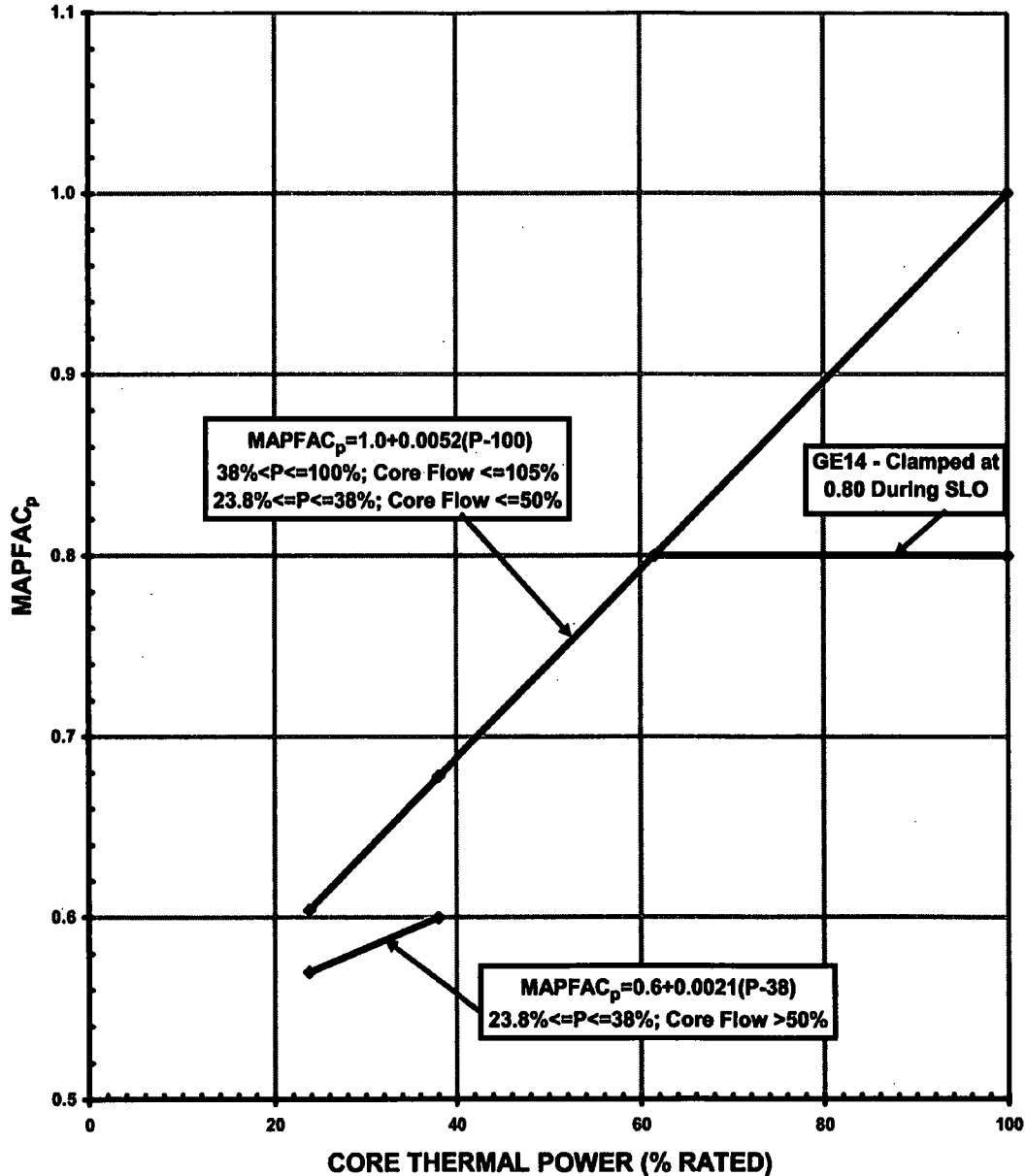
PERRY NUCLEAR POWER PLANT		Procedure Number: PDB-F0001	
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Figure 3.2.1-2
Flow Dependent MAPLHGR Factor (MAPFAC_f)
Fuel Type GE14



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Figure 3.2.1-3
Power Dependent MAPLHGR Factor (MAPFAC_p)
Fuel Type GE14



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4.0 MINIMUM CRITICAL POWER RATIO (T.S. 3.2.2)

The MINIMUM CRITICAL POWER RATIO (MCPR) shall be equal to or greater than the higher of the flow dependent MCPR ($MCPR_f$) and power dependent MCPR ($MCPR_p$) limits at the indicated core flow and THERMAL POWER.

The MCPR Safety Limit for Cycle 15 for Two Loop Operation is 1.10 and the MCPR Safety Limit for Single Loop Operation is 1.11 <TECHNICAL SPECIFICATIONS 2.1.1.2> (Reference 3 and 8). The change in Safety Limit from Two Loop Operations to Single Loop Operations is accomplished by increasing the Cycle 15 $MCPR_f$ and $MCPR_p$ limits by 0.01. 3DMONICORE PANACEA Version 11 uses this approach to calculate Single Loop Operation Limits.

The Single Loop Operation limits take effect when reset for single loop operation per LCO 3.4.1, "Recirculation Loops Operating". This is consistent with note "(b)" to Table 3.3.1.1-1 of the Technical Specifications. Use FTI-B0012 Single Loop Operation to implement the revised MCPR Limits.

During Two Loop Operation, the resulting limit from $MCPR_f$ and $MCPR_p$ shall not be less than the OLMCPR of 1.34. During Single Loop Operation, the resulting limit from $MCPR_f$ and $MCPR_p$ shall not be less than the OLMCPR of 1.35.

For Cycle 15 no change to MCPR limits is required for planned reduction of feedwater temperature to as low as 325.5°F. Final feedwater temperature may be reduced to 255.5°F after all control rods are withdrawn at the end of cycle if the OPRMs are OPERABLE.

Planned reduction of rated feedwater temperature from nominal rated feedwater temperature is not permitted during plant operation with the reactor recirculation system in Single Loop Operation.

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The 3DMONICORE Computer software should automatically shift between 2 LOOP ON and ONE LOOP ON modes of operation on transfer to Single Loop Operations. As such the Safety Limit change should occur automatically. The guidance in FTI-B0012 can be used to verify proper functioning of the 3DMONICORE System. If the 3DMONICORE System is not functioning properly, FTI-B0012 will implement administrative limits until such time as 3DMONICORE is properly calculating MCPR values.

The $MCPR_f$ and $MCPR_p$ Limits are based on whether the plant is operating in Two Loop or Single Loop Operations and whether Two Pressure Regulators or One Pressure Regulator is in service. Select $MCPR_f$ / $MCPR_p$ Limit Curves based on plant conditions:

$MCPR_f$

Figure 3.2.2-1, $MCPR_f$ – Two Loop Operations
Figure 3.2.2-2, $MCPR_f$ – Single Loop Operations

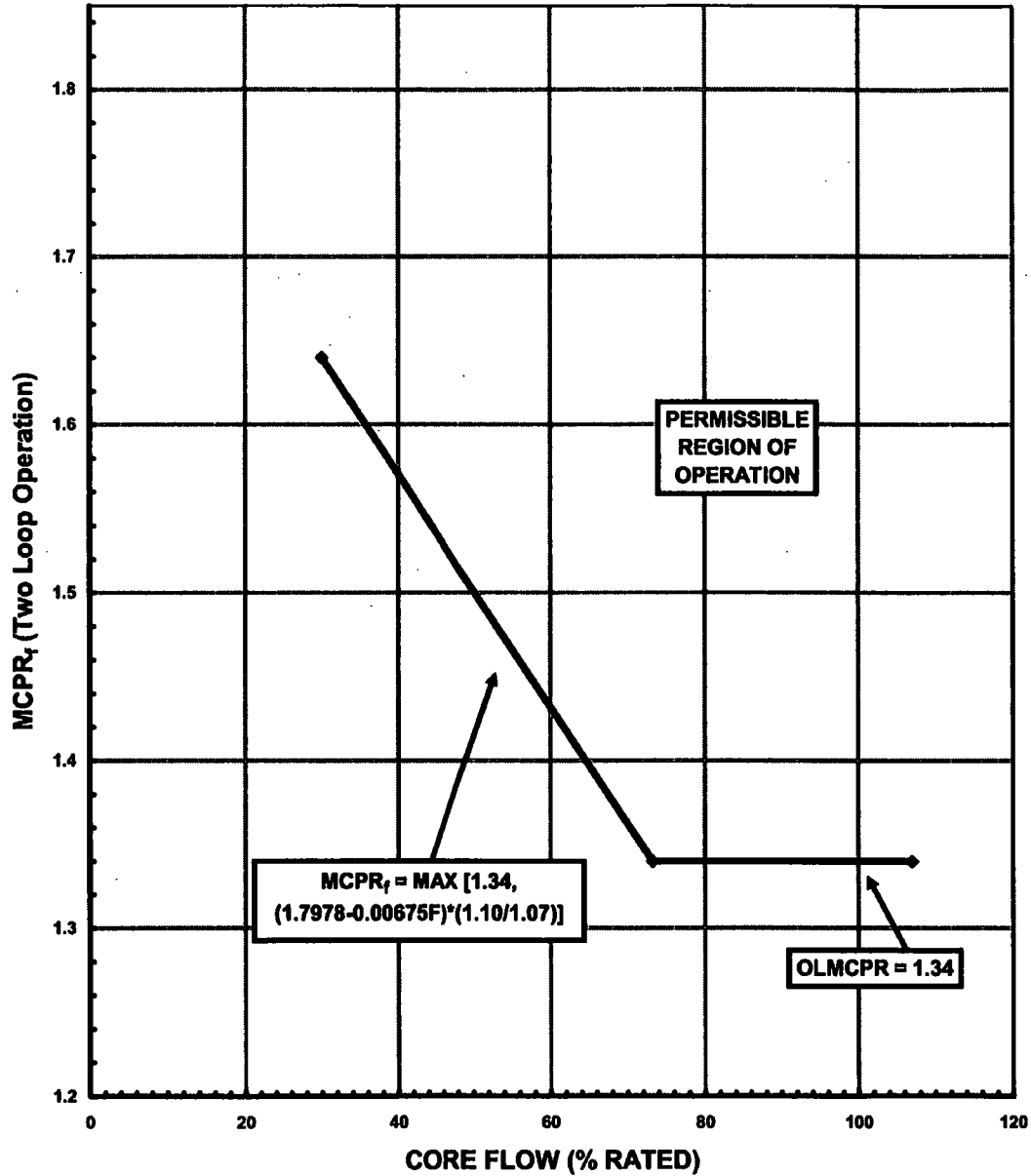
$MCPR_p$

Figure 3.2.2-3, $MCPR_p$ – Two Loop Operations
Figure 3.2.2-4, $MCPR_p$ – Single Loop Operations
Figure 3.2.2-5, $MCPR_p$ – Two Loop Operations / Pressure Regulator Out of Service
Figure 3.2.2-6, $MCPR_p$ – Single Loop Operations / Pressure Regulator Out of Service
Figure 3.2.2-7 Maximum Fraction Limiting Critical Power Ratio Limit (MFLCPR) With One Pressure Regulator Out Of Service

The 3DMONICORE Software will not automatically shift to the Pressure Regulator Out of Service Thermal Limits. The 3DMONICORE databank will be manually changed using a software change request. Until such time as 3DMONICORE databank is updated for the Pressure Regulator Out of Service Thermal Limits, an MFLCPR Administrative Limit will be issued to Operations. Figure 3.2.2-7 can be used as a guide in establishing the MFLCPR Administrative Limit. The graph is the ratio of $MCPR_p$ to $MCPR_p$ – Pressure Regulator Out Of Service.

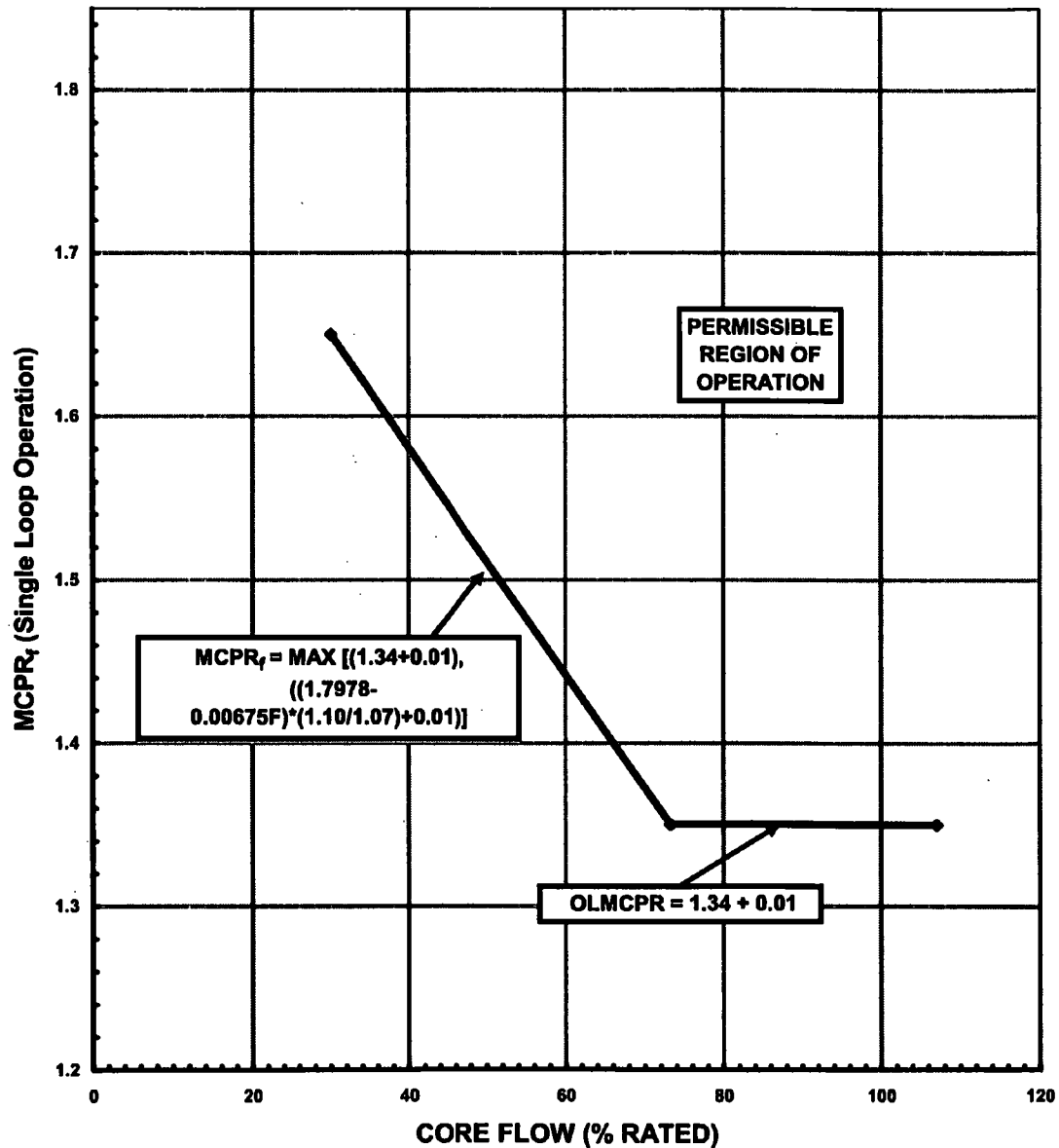
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Figure 3.2.2-1
Flow Dependent MCPR ($MCPR_f$) - Two Loop Operation
Fuel Type GE14



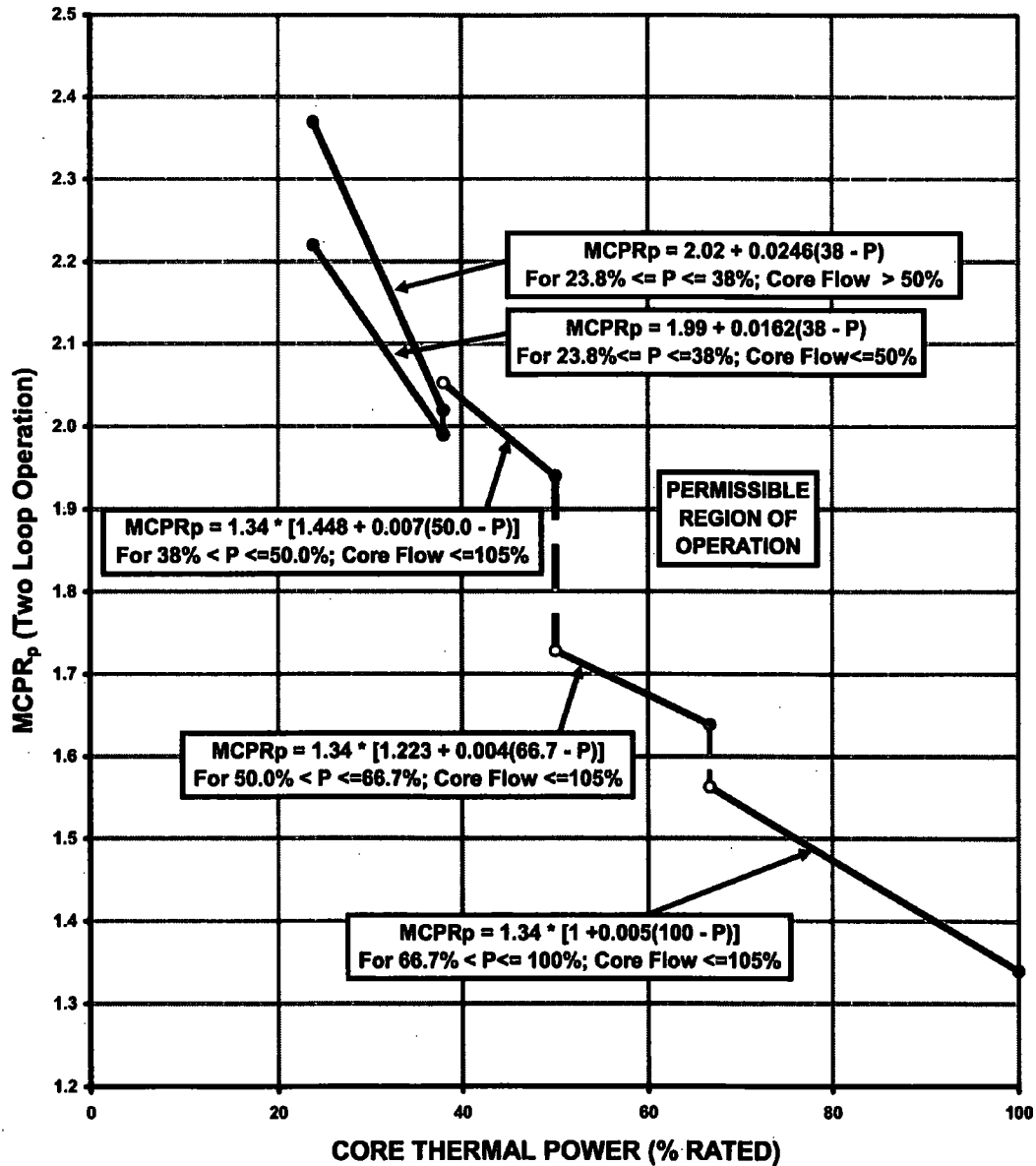
PERRY NUCLEAR POWER PLANT		Procedure Number: PDB-F0001	
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Figure 3.2.2-2
Flow Dependent MCPR (MCPR_f) - Single Loop Operation
Fuel Type GE14



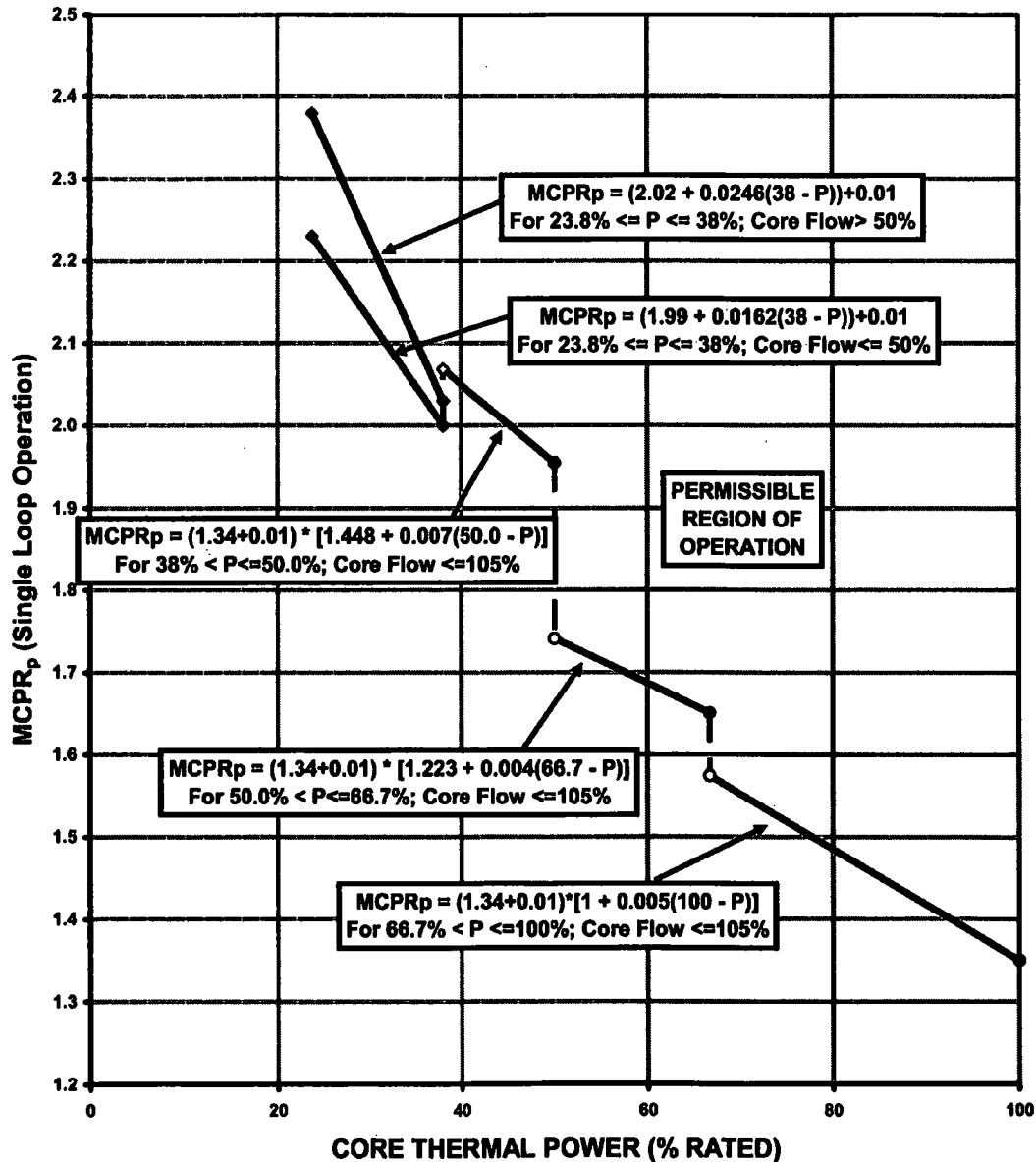
PERRY NUCLEAR POWER PLANT	Procedure Number: PDB-F0001	
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Figure 3.2.2-3
Power Dependent MCPR Limit ($MCPR_p$) - Two Loop Operation
Fuel Type GE14



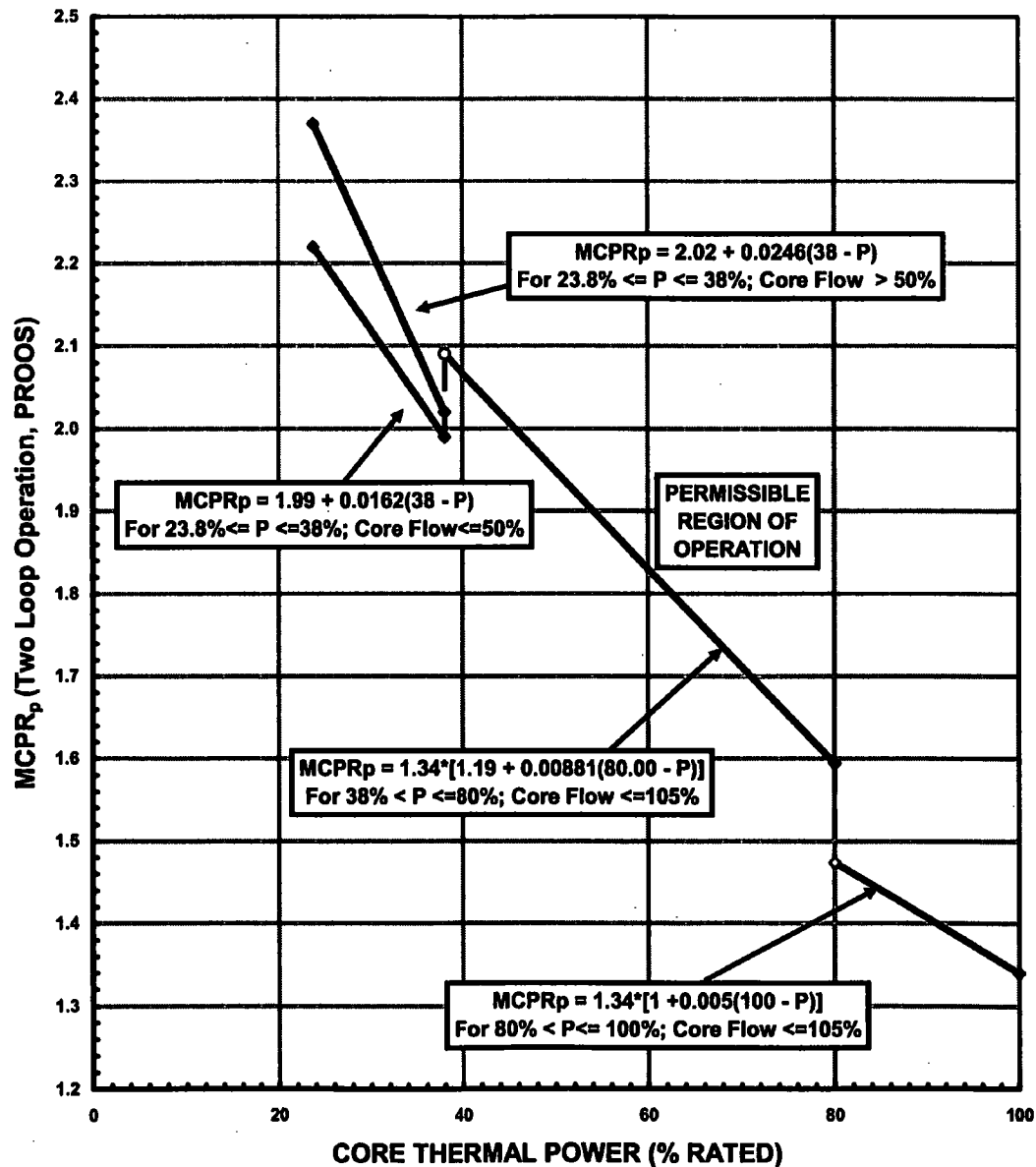
PERRY NUCLEAR POWER PLANT		Procedure Number: PDB-F0001	
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Figure 3.2.2-4
Power Dependent MCPR Limit (MCPR_p) - Single Loop Operation
Fuel Type GE14



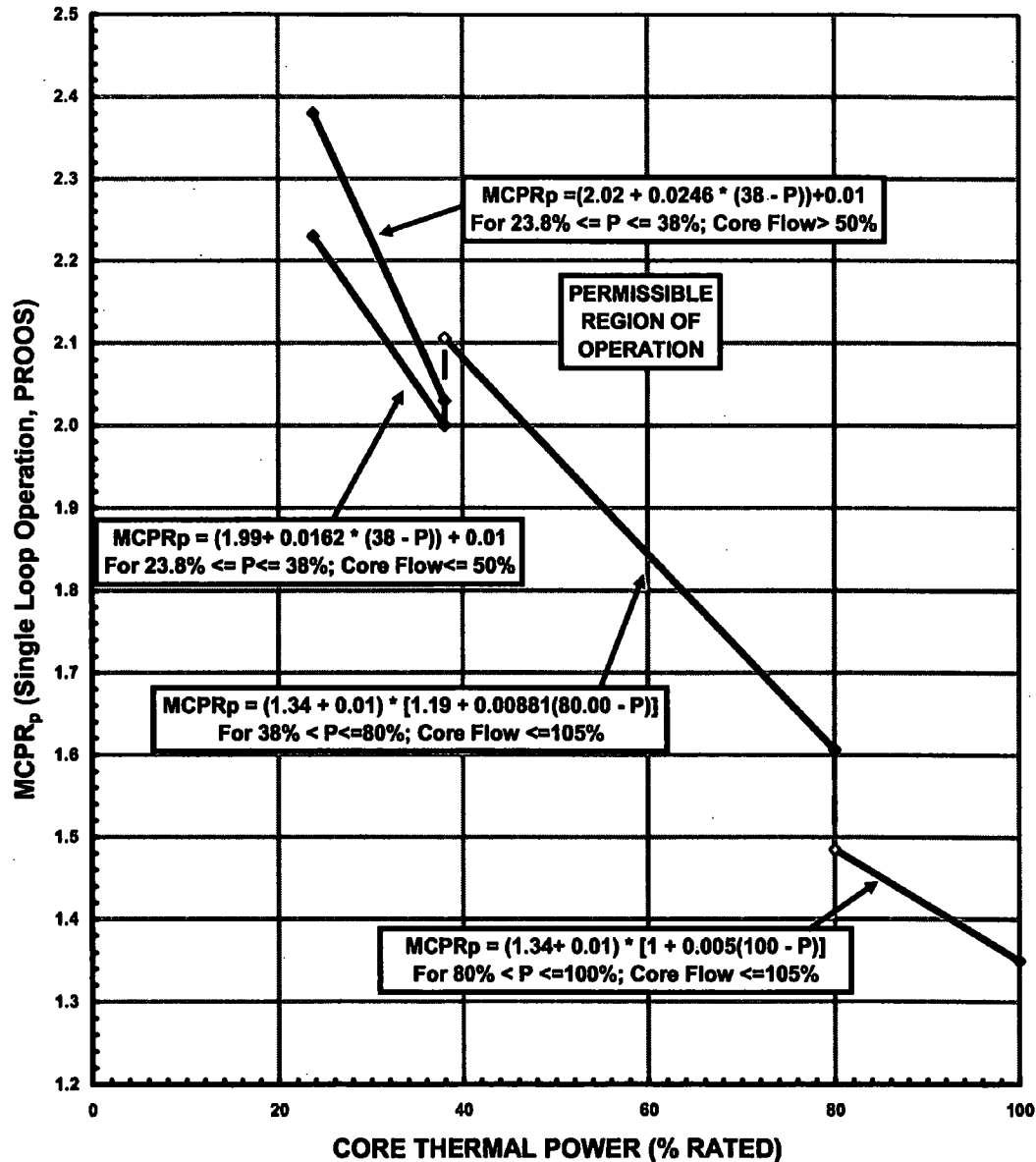
PERRY NUCLEAR POWER PLANT	Procedure Number: PDB-F0001	
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Figure 3.2.2-5
Power Dependent MCPR Limit (MCPR_p) - Two Loop Operation
Pressure Regulator Out Of Service / Fuel Type GE14



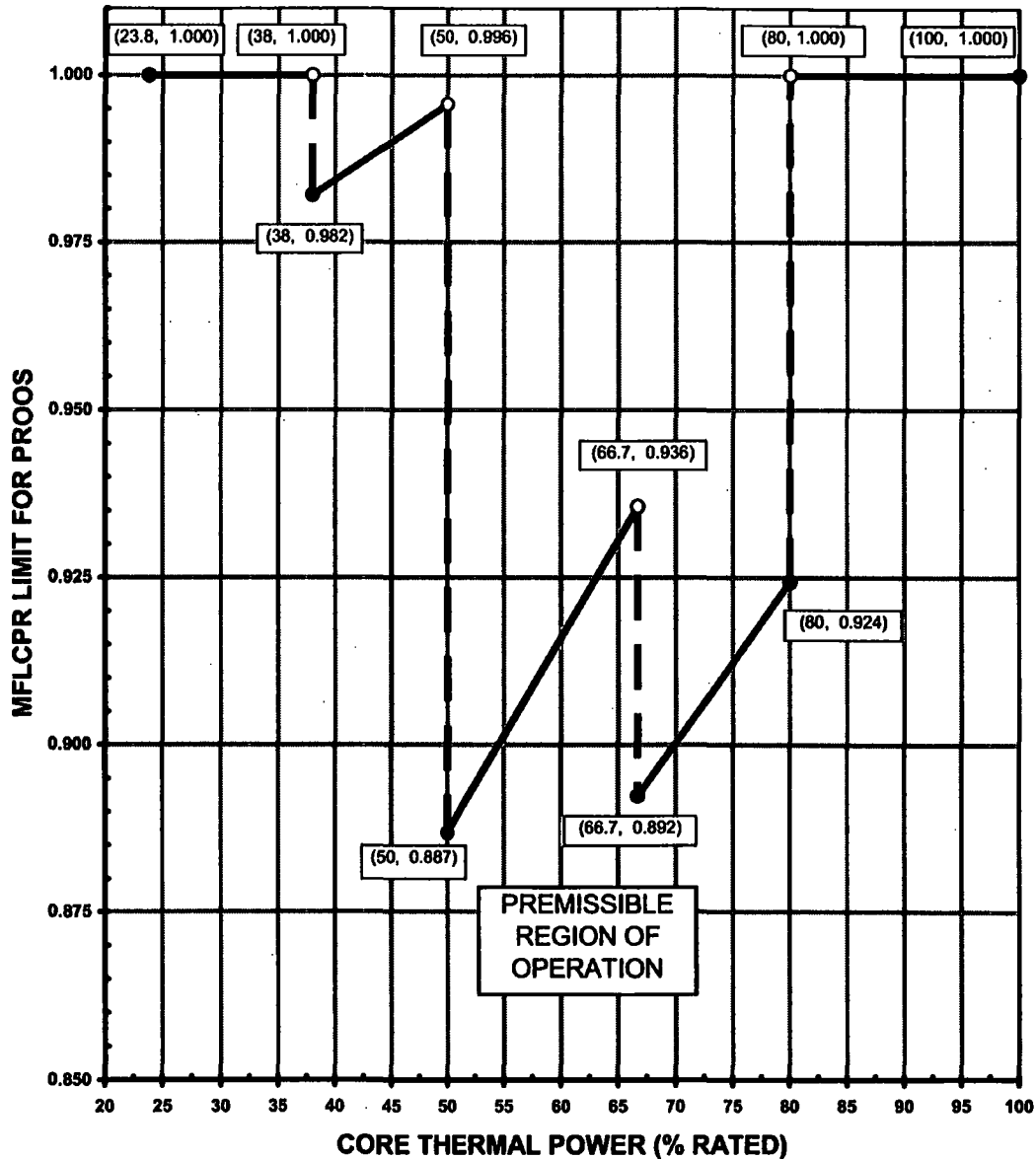
PERRY NUCLEAR POWER PLANT		Procedure Number: PDB-F0001	
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Figure 3.2.2-6
Power Dependent MCPR Limit ($MCPR_p$) - Single Loop Operation
Pressure Regulator Out Of Service / Fuel Type GE14



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Figure 3.2.2-7
Maximum Fraction Limiting Critical Power Ratio Limit (MFLCPR)
With One Pressure Regulator Out Of Service / Fuel Type GE14



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5.0 LINEAR HEAT GENERATION RATE (T.S. 3.2.3)

All LINEAR HEAT GENERATION RATES (LHGRs) shall not exceed the result obtained from multiplying the applicable LHGR limit, Figure 3.2.3-1, by the smaller of either the flow dependent MAPLHGR factor ($MAPFAC_f$), Figure 3.2.1-2 or the power dependent MAPLHGR factor ($MAPFAC_p$) Figure 3.2.1-3.

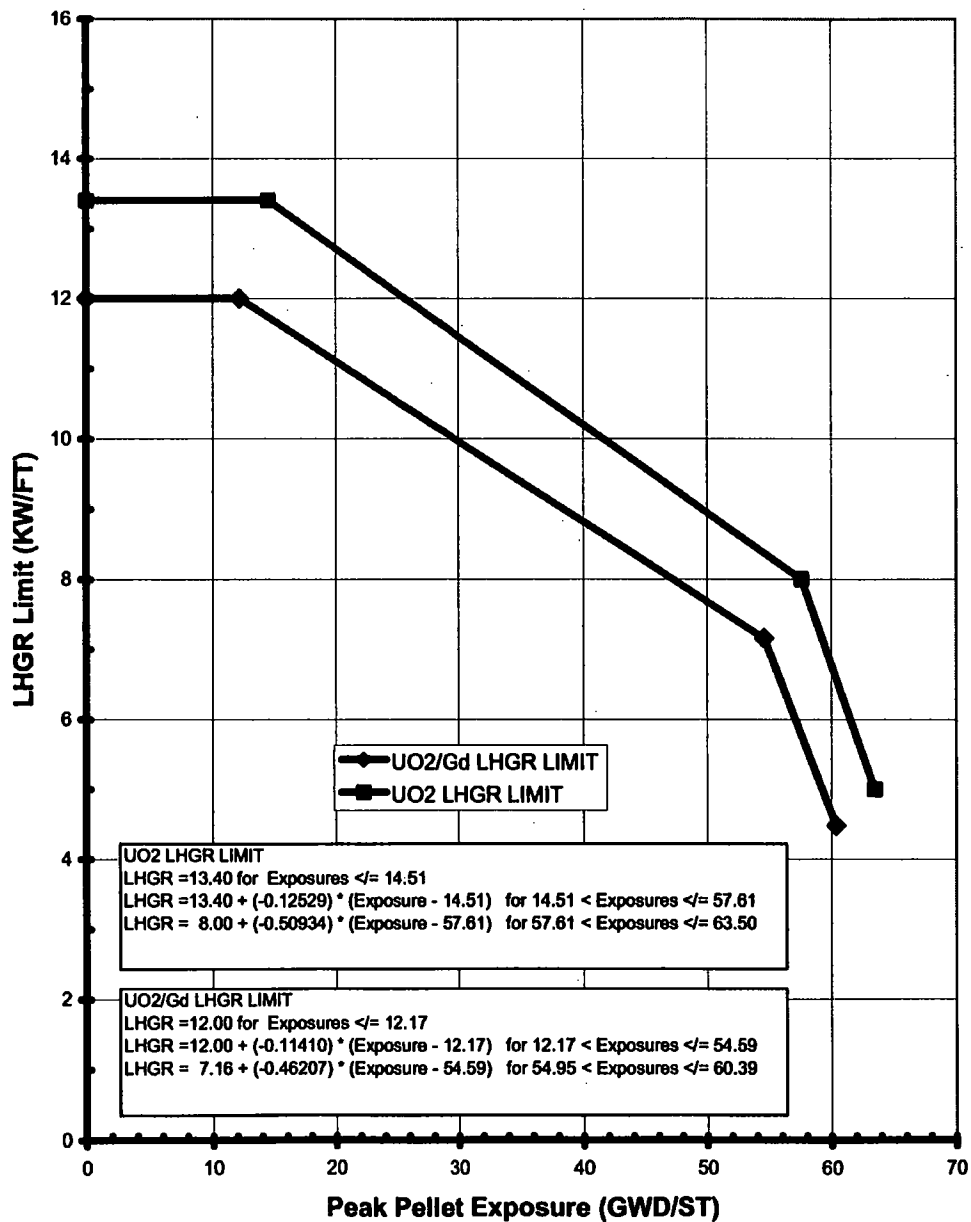
LHGR Limits and $MAPFAC_f$ and $MAPFAC_p$ are defined in References 3 and 4.

For Two Loop Operation, $MAPFAC_f$ and $MAPFAC_p$ shall not exceed 1.0.

For Single Loop Operation, $MAPFAC_f$ and $MAPFAC_p$ shall not exceed 0.8. The Single Loop Operation limits take effect when reset for single loop operation per LCO 3.4.1, "Recirculation Loops Operating". This is consistent with note "(b)" to Table 3.3.1.1-1 of the Technical Specifications. Use FTI-B0012 Single Loop Operation to implement the revised MAPLHGR Limits.

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**Figure 3.2.3-1
LHGR Versus Peak Pellet Exposure
Fuel Type GE14**



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6.0 REACTOR PROTECTION SYSTEM INSTRUMENTATION (T.S. 3.3.1.1)

The simulated thermal power time constant shall be 6 +/-0.6 seconds (Reference 13).

7.0 OSCILLATION POWER RANGE MONITOR (OPRM) INSTRUMENTATION (T.S. 3.3.1.3)

These are the Cycle 15 OPRM setpoints for operable OPRMs.

Current Settings:

1. Confirmation Count Setpoint ($N_p = N_2$): 12
2. Amplitude Setpoint (Sp): 1.10

(Reference 5)

8.0 SCOPE OF REVISION

- Rev. 21 1. Updated for Cycle 15 Operations as defined in References 3 and 4. Note: there were no changes to any limits or setpoints.