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TITLE MCGUIRE UNIT 1 CYCLE 9
CORE OPERATING LIMITS REPORT

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McGuire Nuclear Station COLR

McGuire Unit 1 Cycle 9

Core Operating Limits Report

May 1993

Revision 1

Duke Power Company

NOTE

The contents of this document have been reviewed to verify that no material herein either directly or indirectly changes or affects the results and conclusions presented in the 10CFR50.59 M1C9 Reload Safety Evaluation (calculation file: MCC-1552.08-00-0184).

McGuire 1 Cycle 9 Core Operating Limits Report

REVISION LOG

Revision	Effective Date	Effective Pages
Original Issue	May 24, 1993	Pages 4-8, 10, 12,13, & 15-153
Revision 1	May 27, 1993	Pages 1-3, 3A, 9,11, & 14

McGuire 1 Cycle 9 Core Operating Limits Report

INSERTION SHEET FOR REVISION 1

Remove pages	Insert Rev. 1 pages
Pages 1-3, 9, 11, & 14	Pages 1-3, 3A, 9, 11, & 14

McGuire 1 Cycle 9 Core Operating Limits Report

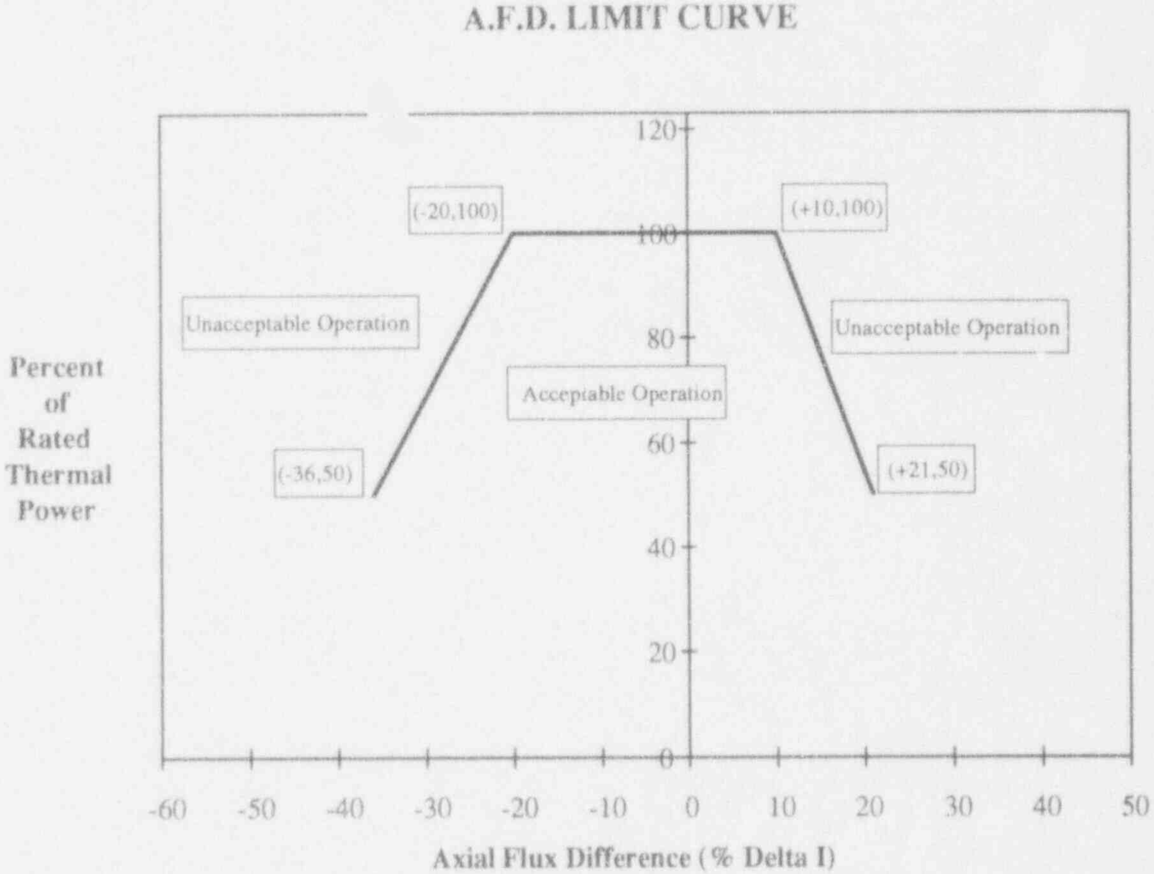

Figure 3

Percent of Rated Thermal Power Versus Axial Flux Difference Limits

NOTE: Compliance with Technical Specification 3.2.2 may require more restrictive AFD limits. Refer to OP/1/A/6100/22 Unit 1 Data Book for details.

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2.5.5 $[F_Q^L(X,Y,Z)]^{RPS} = F_Q^D(X,Y,Z) \times M_C(X,Y,Z)/(UMT \times MT \times TILT))$

where $[F_Q^L(X,Y,Z)]^{RPS}$ = cycle dependent maximum allowable design peaking factor which ensures that the centerline fuel melt limit will be preserved for operation within the LCO limits. $[F_Q^L(X,Y,Z)]^{RPS}$ includes allowances for calculational and measurement uncertainties.

$F_Q^D(X,Y,Z)$ = the design power distributions for F_Q. $F_Q^D(X,Y,Z)$ is provided in Table 1 for normal operating conditions and in Table 2 for power escalation during startup operations.

$M_C(X,Y,Z)$ = the margin remaining to the CFM limit in core location X,Y,Z from the transient power distribution. $M_C(X,Y,Z)$ calculations parallel the $M_Q(X,Y,Z)$ calculations described in DPC-NE-2011PA, except that the LOCA limit is replaced with the CFM limit. $M_C(X,Y,Z)$ is provided in Table 3 for normal operating conditions and in Table 4 for power escalation during startup operations.

UMT = Measurement Uncertainty (UMT = 1.05).

MT = Engineering Hot Channel Factor (MT = 1.03).

TILT = Peaking penalty that accounts for allowable quadrant power tilt ratio of 1.02. (TILT = 1.035)

NOTE: $[F_Q^L(X,Y,Z)]^{RPS}$ is the parameter identified as $F_Q^{MAX}(X,Y,Z)$ in DPC-NE-2011PA.

2.5.6 KSLOPE = 0.0725

where KSLOPE = Adjustment to the K_1 value from OTΔT required to compensate for each 1% that $[F_Q^L(X,Y,Z)]^{RPS}$ exceeds its limit.

2.6 Nuclear Enthalpy Rise Hot Channel Factor, $F_{\Delta H}(X,Y,Z)$ (Specification 3/4.2.3)

$$[F_{\Delta H}(X,Y)]^{LCO} = MARP(X,Y) \times [1.0 + (1/RRH) \times (1.0 - P)]$$

2.6.1 McGuire 1 Cycle 9 Operating Limit Maximum Allowable Radial Peaks, (MARP(X,Y)), are provided in Table 7.

The following parameters are required for core monitoring per the Surveillance Requirements of Specification 3/4.2.3:

$$[F^{L}_{\Delta H}(X,Y)]^{SURV} = F^{D}_{\Delta H}(X,Y) \times M_{\Delta H}(X,Y)/(UMR \times TILT),$$

as identified in DPC-NE-2011PA.

where

UMR = Uncertainty value for measured radial peaks, (UMR = 1.04).
TILT = Factor to account for a peaking increase due to the allowed quadrant tilt ratio of 1.02. (TILT = 1.035).

2.6.2 $F^{D}_{\Delta H}(X,Y)$ = the design power distribution for $F_{\Delta H}$. $F^{D}_{\Delta H}(X,Y)$ is provided in Table 5 for normal operating conditions and in Table 6 for power escalation during startup operations..

2.6.3 $M_{\Delta H}(X,Y)$ = the margin remaining in core location X,Y to the DNB limit from the transient power distribution. $M_{\Delta H}(X,Y)$ is provided in Table 5 for normal operating conditions and in Table 6 for power escalation during startup operations..

2.6.4 RRH = 3.34 when $0.0 < P \leq 1.0$,

where RRH = Thermal Power reduction required to compensate for each 1% that $F_{\Delta H}(X,Y)$ exceeds its limit.

$$P = \frac{\text{Thermal Power}}{\text{Rated Thermal Power}}$$

2.6.5 TRH = 0.04

where TRH = Reduction in OTΔT K_1 setpoint required to compensate for each 1% that $F_{\Delta H}(X,Y)$ exceeds its limit.