Entergy Nuclear Northeast
Indian Point Energy Center
450 Broadway, GSB
P.O. Box 249
Buchanan, NY 10511-0249

July 11, 2008

Re: Indian Point Unit 2
Docket No. 50-247
NL-08-114

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: Revised Core Operating Limits Report for Indian Point Unit 2

Dear Sir/Madam:

Please find attached Core Operating Report (COLR) for Indian Point Unit 2 Cycle 19 in accordance with the Indian Point 2 Technical Specifications 5.6.5.d. Enclosure 1 provides the cycle-specific operating limits for the operation of Indian Point Unit 2.

There are no new commitments being made in this submittal. If you have any questions or require additional information, please contact my office at (914) 734-6710.

Sincerely,

Robert W. Walpole
Manager, Licensing
Indian Point Energy Center

Enclosure 1: Indian Point 2 COLR – Cycle 19

cc: Mr. Samuel J. Collins, Regional Administrator, NRC Region I
Mr. John Boska, Senior Project Manager, NRC NRR DORL
NRC Resident Inspector's Office, Indian Point 2

A001
LRR

ENCLOSURE 1 TO NL-08-114

Indian Point 2 Cycle 19 COLR

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
DOCKET NO. 50-247

Entergy
Nuclear Northeast

One Site, One Team, One Fleet
Indian Point Energy Center

Procedure Use Is:

☐ Continuous

☐ Reference

☑ Information

Control Copy: _____

Effective Date: 4/8/08

2-GRAPH-RPC-6, Revision: 12

CORE OPERATING LIMITS REPORT (COLR)

This procedure is excluded from further LI-100 Reviews

Approved By:

Cyndy Dunn 3/28/08

Procedure Sponsor, RPO / Designee Date

Team Staff

Procedure Owner

Indian Point Operations

PARTIAL REVISION

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TS 2.0 Safety Limits (SLs)

NOTE

The Technical Specification references shown next to each Factor OR Limit in this COLR, are there to identify the corresponding sections in the Technical Specifications that refer to the COLR.

The data presented in this report applies to Cycle 19 ONLY and may NOT be used for other cycles of operation. Any technical change to this document requires a Safety Evaluation to be performed in accordance with 10 CFR 50.59.

TS 2.1.1 Reactor Core Safety Limits (SLs)

In MODES 1 and 2, the combination of thermal power level, pressurizer pressure, and highest loop average coolant temperature SHALL not exceed the limits shown in Figure 1. The safety limit is exceeded if the point defined by the combination of Reactor Coolant System average temperature and power level is at any time above the appropriate pressure line.

TS 3.1.1 Shutdown Margin (SDM)

The shutdown margin SHALL be greater than or equal to 1.3% $\Delta k/k$.

TS 3.1.3 Moderator Temperature Coefficient (MTC)

The MTC upper limit SHALL be < 0.0 $\Delta k/k/°F$ at hot zero power.

The MTC lower limit SHALL be less negative than or equal to:

$\geq$ -36.5 pcm/F @ 300 ppm
$\geq$ -43.0 pcm/F @ 60 ppm
$\geq$ -45.5 pcm/F @ 0 ppm

Reference Graph RV-12 for cycle specific predicted MTC.

TS 3.1.5 Shutdown Bank Insertion Limits

The Shutdown Banks SHALL be fully withdrawn when the reactor is in MODE 1 and MODE 2. Shutdown Banks with a group step counter demand position $\geq$ 221 steps are considered fully withdrawn because the bank demand position is above the top of the active fuel.

TS 3.1.6 Control Bank Insertion Limits

The Control Bank Insertion Limits for MODE 1 and MODE 2 with $k_{eff} \geq 1.0$ are as indicated in Figure 2. Control Bank Insertion Limits apply to the step counter demand position.

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

NOTE

K(Z) is the fraction given in Figure 3 AND Z is the core height location of F_Q.

IF $P > .5$, $F_Q(Z) \leq (2.50 / P) \times K(Z)$

IF $P \leq .5$, $F_Q(Z) \leq (5.00) \times K(Z)$

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

NOTE

P is the fraction of Rated Thermal Power (RTP) at which the core is operating.

$F^N_{\Delta H} \leq 1.70 \{ 1 + 0.3 (1 - P) \}$

TS 3.2.3 Axial Flux Difference (AFD) (Constant Axial Offset Control (CAOC) Methodology)

The Indicated limit is the Target Band; i.e., the Target ± 5%

The AFD SHALL be maintained within the ACCEPTABLE OPERATION portion of Figure 4, as required by TS 3.2.3.

TS 3.3.1 RPS Instrumentation

1. Overtemperature ΔT — Allowable Value as referenced in Technical Specifications Table 3.3.1-1, Function 5, Note 1.
   REFER TO Attachment 1

2. Overpower ΔT — Allowable Value as referenced in Technical Specifications Table 3.3.1-1, Function 6, Note 2.
   REFER TO Attachment 1

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

The following DNB related parameters are applicable in MODE 1:

a. Reactor Coolant System average $T_{AVG} \leq 568.1°F$ and highest loop $T_{AVG} \leq 571.1°F$
b. Pressurizer Pressure $\geq$ 2216 psia
c. Reactor Coolant System Total Flow Rate $\geq$ 348,300 gpm

TS 3.9.1 Refueling Boron Concentration

When required by Technical Specification 3.9.1, the minimum boron concentration in the RCS, Refuel Canal, and Reactor Cavity SHALL be the more restrictive of either $\geq$ 2050 ppm or that which is sufficient to provide a shutdown margin $\geq$ 5% $\Delta k/k$.

Attachment 1
(Page 1 of 2)

Overtemperature ΔT

The Overtemperature ΔT Function Allowable Value SHALL NOT exceed the following:

Note: For limitations on the maximum trip Setpoint see Technical Specification 3.3.1.

$$\Delta T \leq \Delta T_0 \left\{ K_1 - K_2 \frac{(1+\tau_1 s)}{(1+\tau_2 s)} [T - T'] + K_3 (P - P') - f_1(\Delta I) \right\}$$

Where: ΔT is measured RCS ΔT, °F (measured by hot leg and cold leg RTDs).
ΔT_0 is the loop specific indicated ΔT at RTP, °F.
s is the Laplace transform operator, sec^{-1}.
T is the measured RCS average temperature, °F.
T′ is the loop specific indicated TAVG at RTP, °F.

P is the measured pressurizer pressure, psig
P′ is the nominal RCS operating pressure, ≥ 2235 psig

K1 ≤ 1.22	K2 ≥ 0.020/°F	K3 ≥ 0.00070/psig
τ_1 ≥ 25 sec	τ_2 ≤ 3 sec	

$f_1(\Delta I)$ = -1.97 {30 + (qt - qb)} when qt - qb ≤ - 30% RTP
0% of RTP when -30% RTP < qt - qb ≤ 7% RTP
2.25 {(qt - qb) - 7} when qt - qb > 7% RTP

Where qt and qb are percent RTP in the upper and lower halves of the core, respectively, and qt + qb is the total THERMAL POWER in percent RTP.

Attachment 1
(Page 2 of 2)

Overpower ΔT

The Overpower ΔT Function Allowable Value SHALL NOT exceed the following:

Note: For limitations on the maximum trip Setpoint see Technical Specification 3.3.1.

$$\Delta T \leq \Delta T_0 \left\{ K_4 - K_5 \frac{\tau_3 s}{(1+\tau_3 s)} T - K_6 (T - T'') - f_2(\Delta I) \right\}$$

Where: ΔT is measured RCS ΔT, °F.

ΔT_0 is the loop specific indicated ΔT at RTP, °F.

s is the Laplace transform operator, sec^{-1}.

T is the measured RCS average temperature, °F.

T″ is the loop specific indicated T_{AVG} at RTP, °F.

$K_4 \leq 1.074$ $K_5 \geq 0.0188$/°F for increasing T_{AVG} 0/°F for decreasing T_{AVG} $K_6 \geq 0.0015$/°F when $T > T''$ 0/°F when $T \leq T''$

$\tau_3 \geq 10$ sec

$f_2(\Delta I) = 0$

Figure 1
Reactor Core Safety Limit – Four Loops in Operation
(Page 1 of 1)

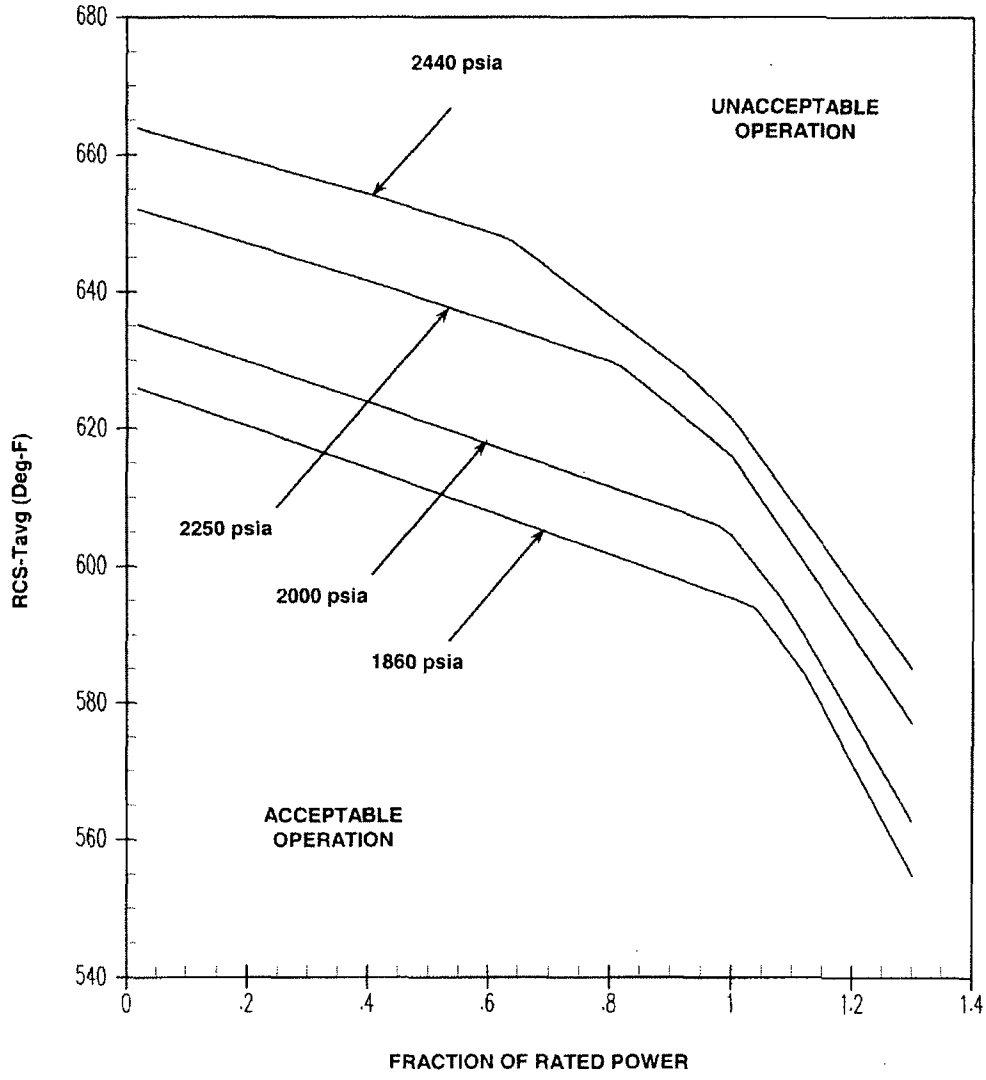

Figure 2
Rod Bank Insertion Limits
(Four Loop Operation)
100 Step Overlap
(Page 1 of 1)

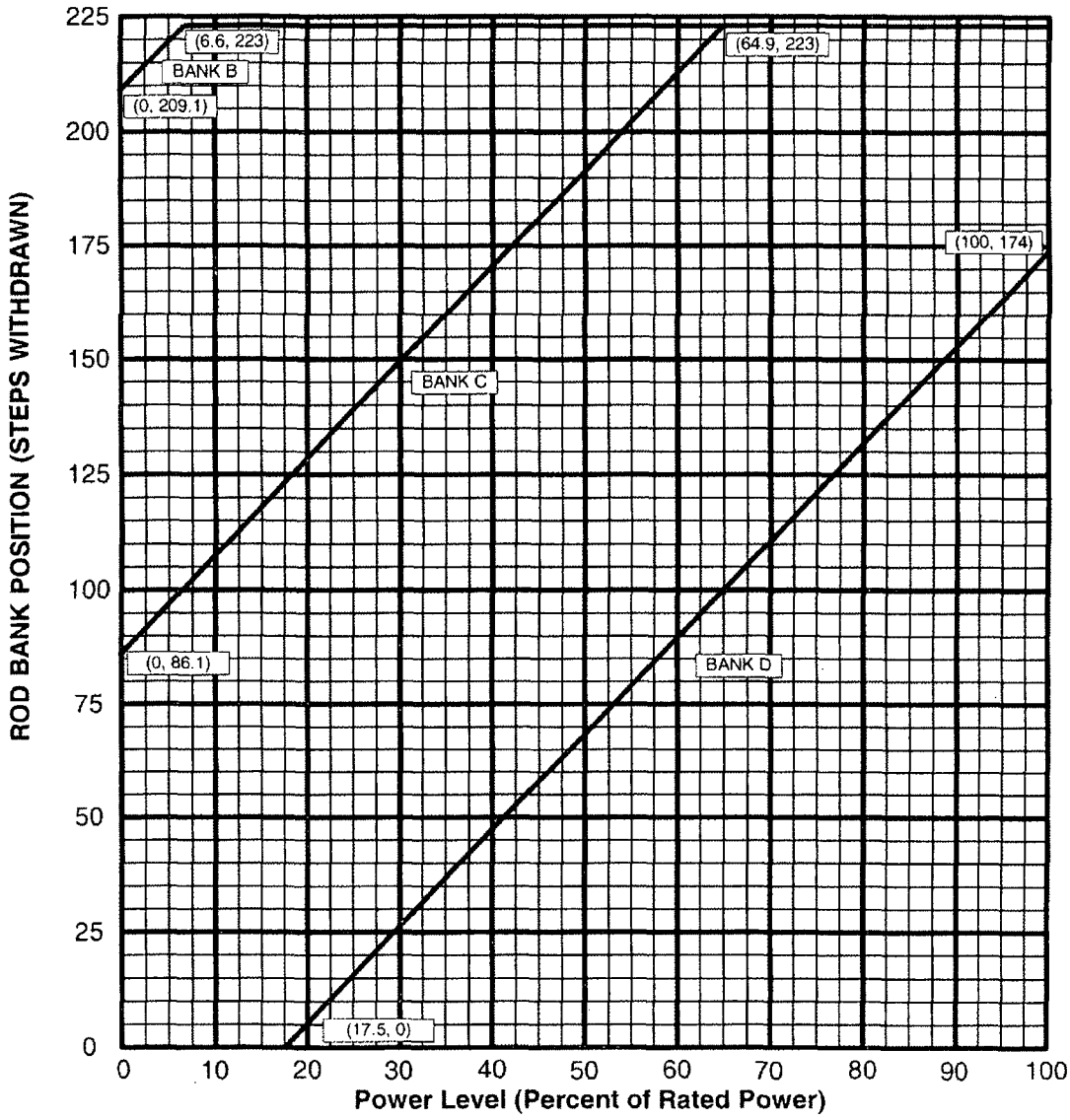

Figure 3
Hot Channel Factor Normalized Operating Envelope
(For S. G. Tube Plugging up to 10%)
(Page 1 of 1)

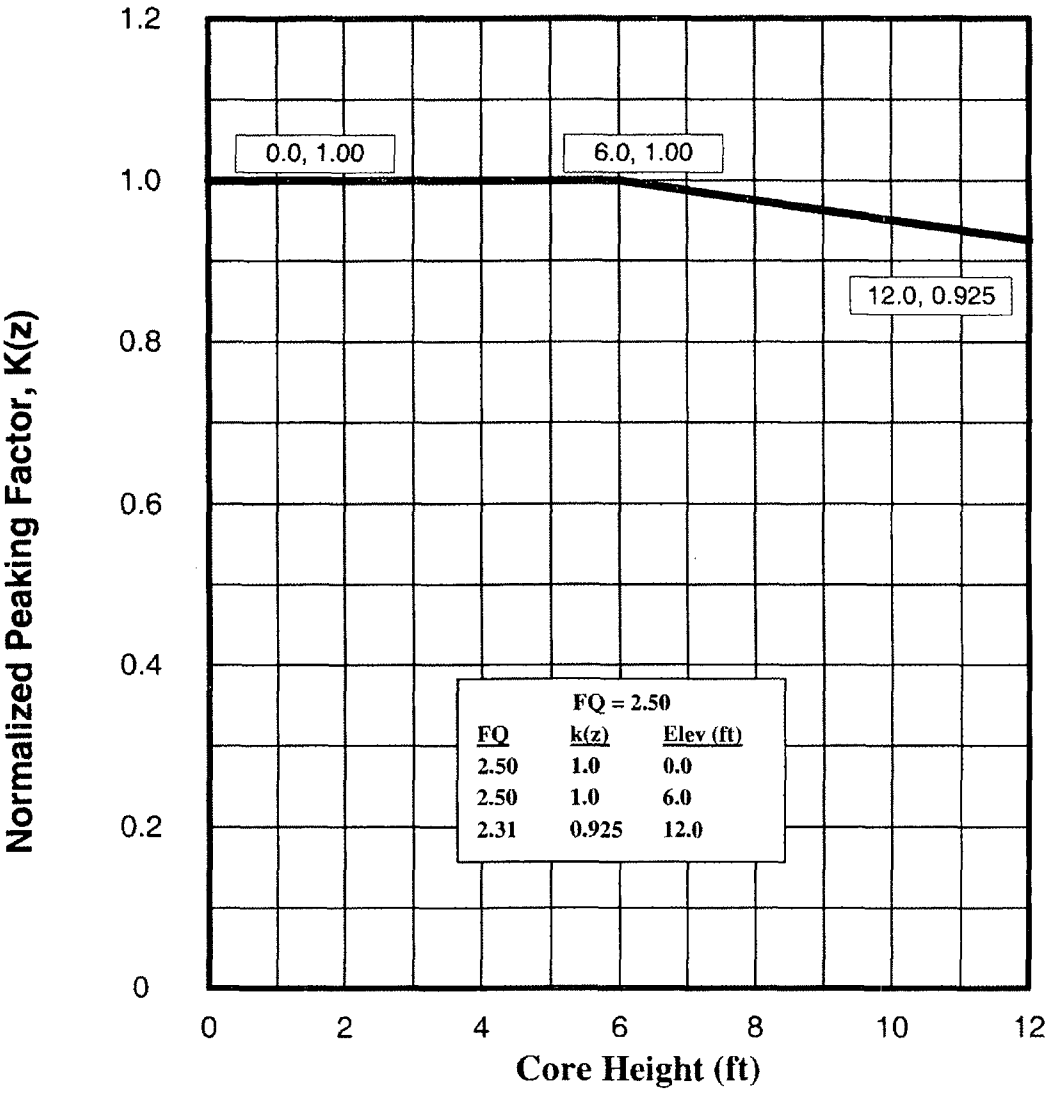
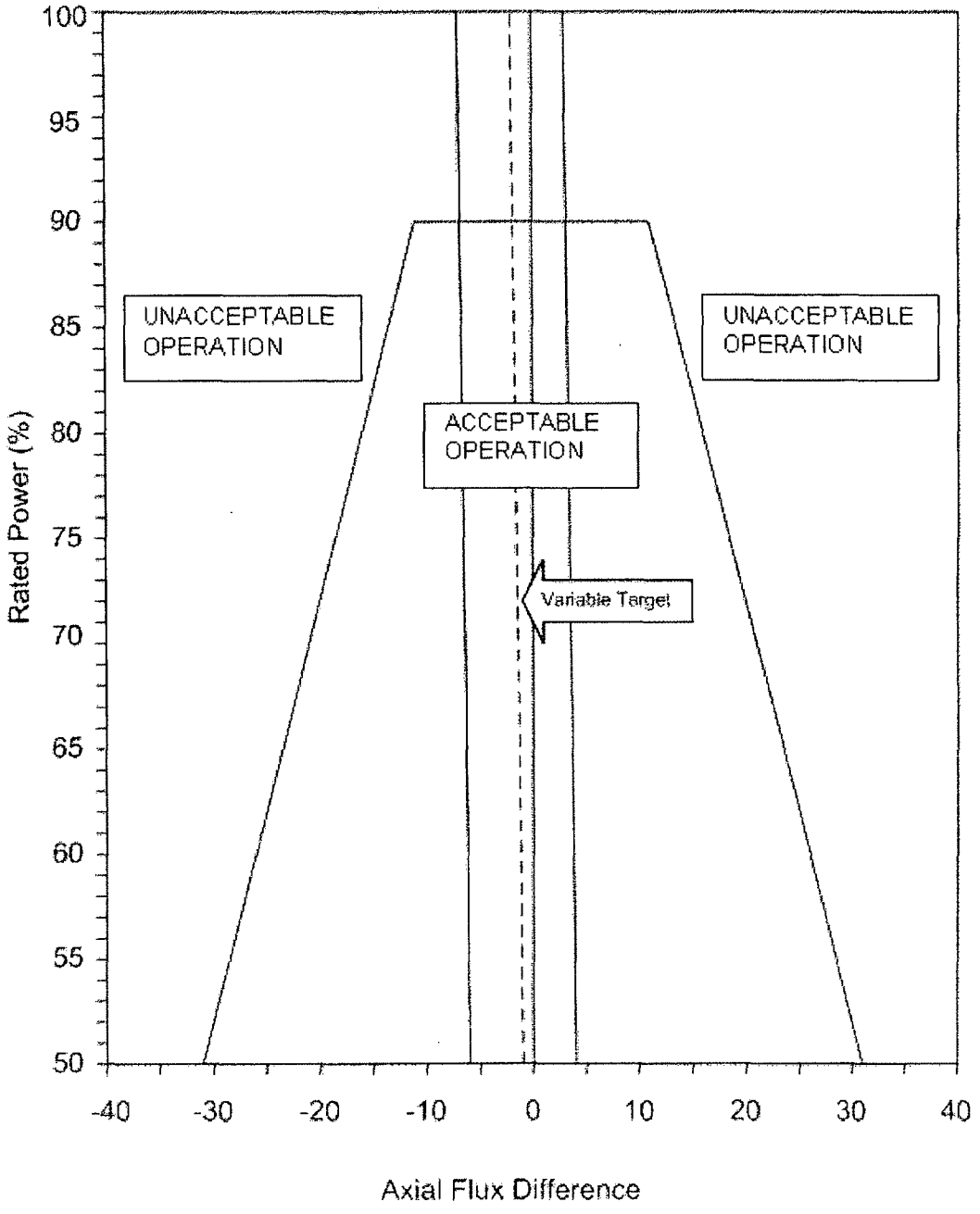
Figure 4
Axial Flux Difference Envelope Limits
(Page 1 of 1)