



Entergy Nuclear Operations, Inc.
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043

October 9, 2007

Technical Specification 5.6.5

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

Palisades Nuclear Plant
Docket 50-255
License No. DPR-20

Core Operating Limits Report – Revision 15

Dear Sir or Madam:

Entergy Nuclear Operations, Inc. is providing revision 15 of the Palisades Nuclear Plant (PNP) Core Operating Limits Report (COLR). This report is submitted in accordance with the requirements of PNP Technical Specification 5.6.5.d. Enclosure 1 contains a summary of changes from the previous revision. Enclosure 2 contains revision 15 of the COLR.

Summary of Commitments

This letter contains no new commitments and no revisions to existing commitments.

A handwritten signature in black ink, appearing to read "C. Schwarz", is written over the printed name.

Christopher J. Schwarz
Site Vice President
Palisades Nuclear Plant

CC Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC

**ENCLOSURE 1
PALISADES CORE OPERATING LIMITS REPORT
REVISION 15**

SUMMARY OF CHANGES

Section 2.4, "Total Radial Peaking Factor" is revised to include a requirement to evaluate pin power/burnup of the core design against certain criteria. This change satisfies a commitment made in a September 21, 2007, letter from Entergy Nuclear Operations Inc. (ENO) to the Nuclear Regulatory Commission. ENO made the commitment in support of a license amendment request to implement a full-scope alternative source term methodology at Palisades Nuclear Plant.

Page one includes an administrative change to reflect the current owner and operator of Palisades Nuclear Plant (Entergy Nuclear Palisades, LLC, and Entergy Nuclear Operations, Inc., respectively).

ENCLOSURE 2

**PALISADES CORE OPERATING LIMITS REPORT
REVISION 15**

9 Pages Follow

Procedure No COLR
Revision 15
Issued Date 10/09/2007

PALISADES NUCLEAR PLANT

TITLE: CORE OPERATING LIMITS REPORT

J. F. Vessil 10-4-2007
Preparer Date

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Verification Reviewer Date

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Reactor Engineering Supervisor Date

Entergy Nuclear Palisades, LLC
Entergy Nuclear Operations, Inc.
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Core Operating Limits Report

1.0 INTRODUCTION

This Core Operating Limits Report for Palisades has been prepared in accordance with the requirements of Technical Specification 5.6.5. The Technical Specifications Limiting Conditions for Operation (LCOs) affected by this report are listed below:

<u>Section</u>	<u>Title</u>	<u>LCO</u>
2.1	SHUTDOWN MARGIN (SDM)	3.1.1 3.1.6 3.9.1
2.2	Regulating Rod Group Position Limits	3.1.6
2.3	Linear Heat Rate (LHR)	3.2.1
2.4	Total Radial Peaking Factor	3.2.2
2.5	AXIAL SHAPE INDEX (ASI)	3.2.4
2.6	PCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits	3.4.1

2.0 OPERATING LIMITS

The cycle specific parameter limits for the specifications listed in Section 1 are presented in the following subsections. These limits have been developed using the NRC-approved methodologies specified in Section 3.0.

2.1 SHUTDOWN MARGIN (SDM)

- 2.1.1 MODES 1 and 2 (LCO 3.1.6 Regulating Rod Group Position Limits) - The minimum SDM requirement is 2% with the most reactive rod fully withdrawn. The rod insertion limit (PDIL) is discussed in Section 2.2 and shown in Figure 2.2-1.
- 2.1.2 MODES 3, 4 and 5, Loops Filled (LCO 3.1.1 SHUTDOWN MARGIN) - The SDM requirement is $\geq 2\%$ for normal cooldowns and heatups.
- 2.1.3 MODE 5, Loops Not Filled (LCO 3.1.1 SHUTDOWN MARGIN) - The SDM requirement is $\geq 3.5\%$ assuming T_{ave} of 60°F.
- 2.1.4 MODE 6 (LCO 3.9.1 Boron Concentration) - The SDM requirement is specified in the definition of REFUELING BORON CONCENTRATION.

2.2 Regulating Rod Group Position Limits

- a. If the reactor is critical, to implement the limits on SHUTDOWN MARGIN, individual rod worth and hot channel factors, the limits on control rod regulating group insertion shall be established as shown on Figure 2.2-1.
- b. If the reactor is subcritical, the rod position at which criticality could be achieved if the control rods were withdrawn in normal sequence shall not be lower than Group 2 at 72 inches (ie, ~ 45% control rod insertion)
- c. The sequence of withdrawal of the regulating groups shall be 1, 2, 3, 4.
- d. An overlap of control banks in excess of 40% shall not be permitted.

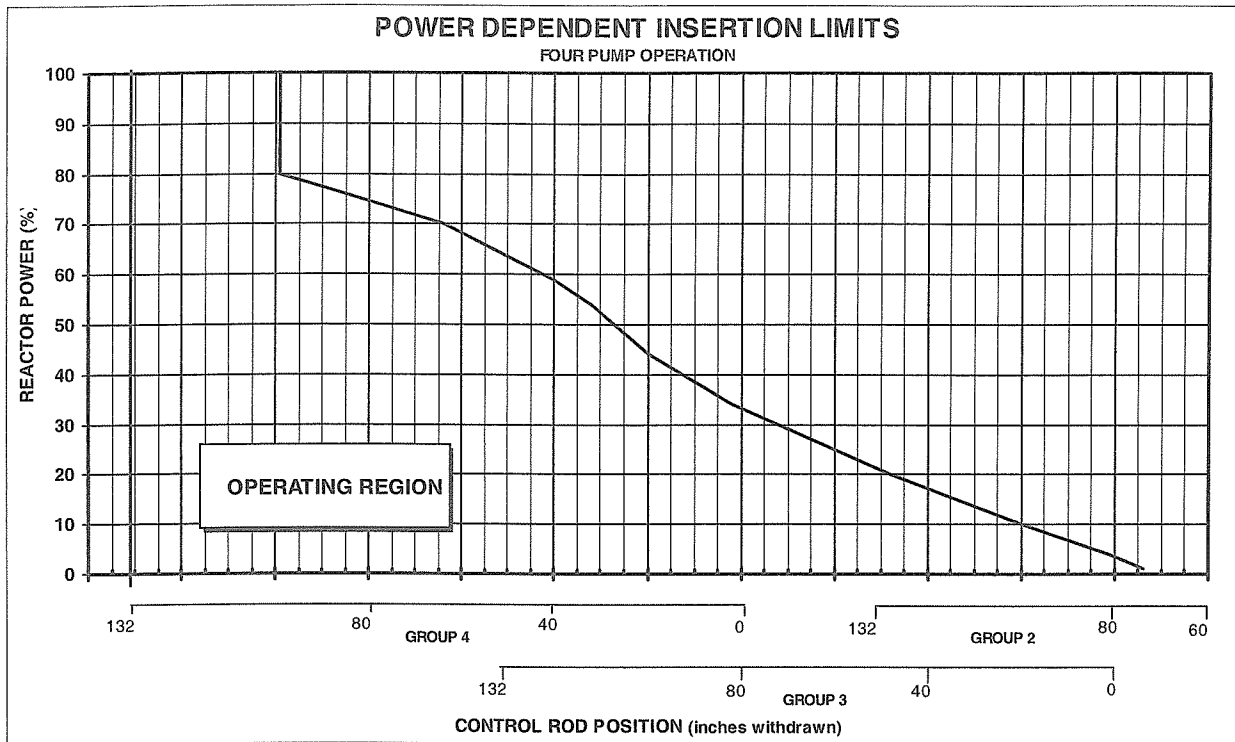


Figure 2.2-1 Regulating Rod Group Position Limits

NOTE: A regulating rod is considered fully withdrawn at ≥ 128 inches.

2.3 Linear Heat Rate (LHR)

The LHR in the peak powered fuel rod shall not exceed the following:

$$\text{LHR} \leq \text{LHR}_{\text{TS}} \times F_A(z)$$

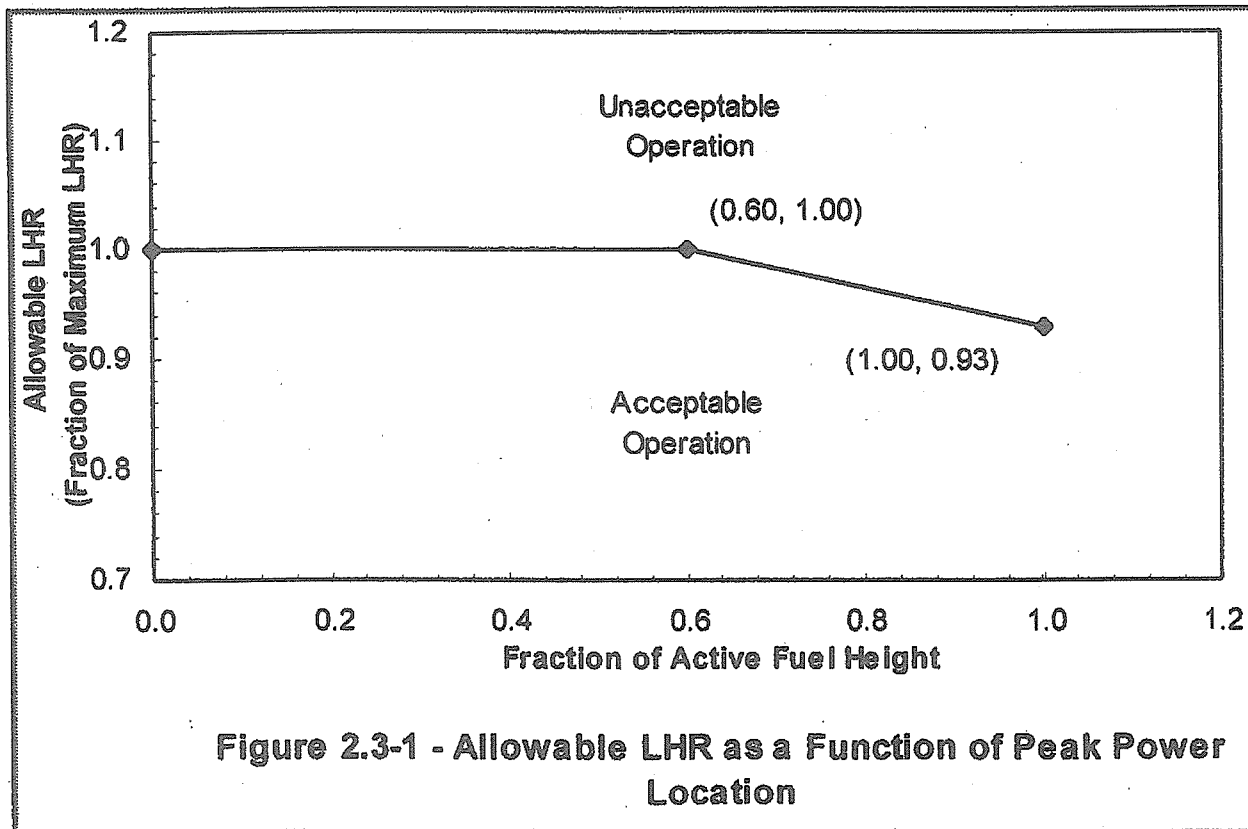
Where:

- LHR_{TS} = Maximum allowable LHR shown in Table 2.3-1.
 $F_A(z)$ = Allowable LHR as a function of peak power location shown in Figure 2.3-1.

Table 2.3-1 - Linear Heat Rate Limit

Peak Rod	15.28 (kW/ft)
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To ensure that the design margin of safety is maintained, the determination of both the incore alarm setpoints and the Allowable Power Level takes into account the local LHR measurement uncertainty factors given in Table 2.4-2, an engineering uncertainty factor and a thermal power measurement uncertainty factor (values given in Technical Specification Basis B 3.2.1).



2.4 Total Radial Peaking Factor

The radial peaking factor shall not exceed the following:

for $P \geq 0.5$

$$F_r \leq F_r^{TS} \times [1.0 + 0.3 \times (1 - P)]$$

and for $P < 0.5$,

$$F_r \leq F_r^{TS} \times 1.15$$

Where:

F_r = Measured F_r^T ,

F_r^{TS} = Peaking Factor Limits (Table 2.4-1),

P = Fraction of rated power.

Table 2.4-1 - Peaking Factor Limits, F_r^{TS}

All Fuel Types
2.04

To ensure that the design margin of safety is maintained, the determination of radial peaking factors takes into account the appropriate measurement uncertainty factors given in Table 2.4-2.

To ensure that the design margin of safety is maintained with respect to the alternative source term radiological consequence analysis assumptions as restricted by footnote 11 of Table 3 of Regulatory Guide 1.183, an evaluation shall be performed on the pin power/burnup of the core design against the following criteria:

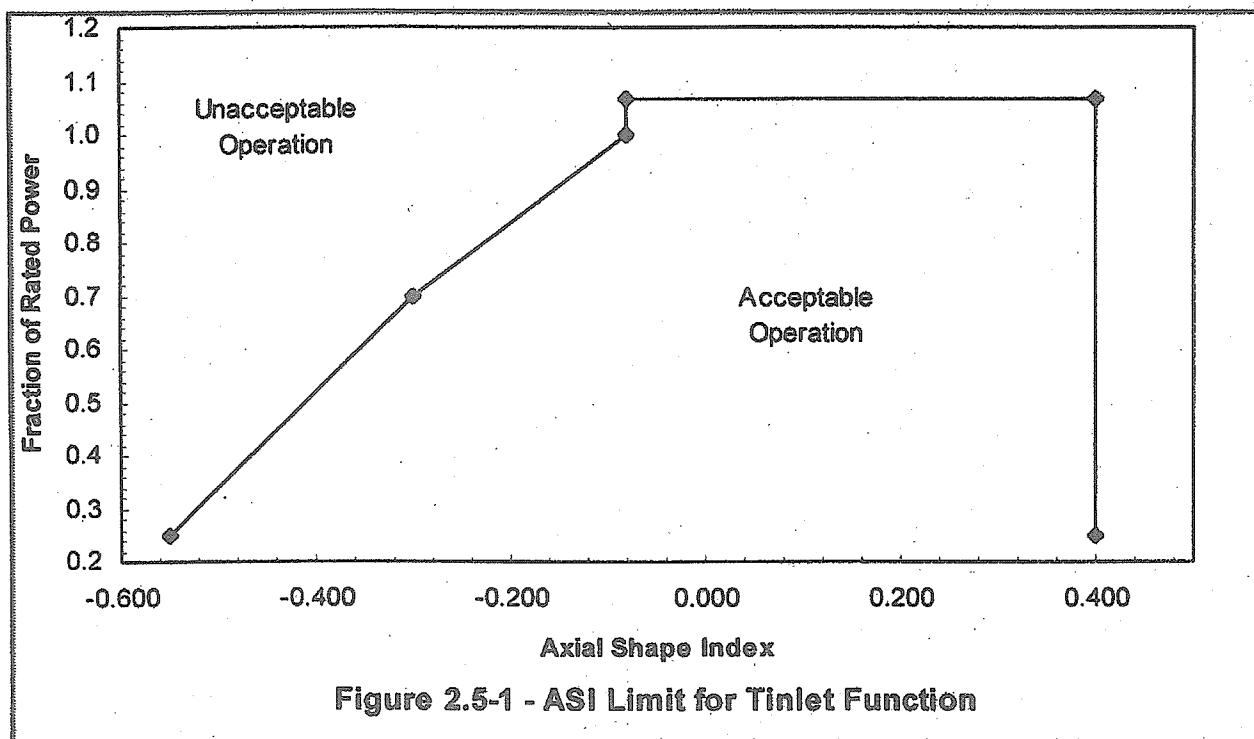
- Fewer than 21 rods in any one assembly violate the “54/6.3” criterion.
- Fewer than 20 assemblies in any core design contain at least one rod that violates the “54/6.3” criterion.
- All rods that violate the “54/6.3” criterion have a rod average linear heat generation rate of less than 6.7 kW/ft.
- All rods that violate the “54/6.3” criterion have a rod burnup of less than 58.5 GWD/MTU.
- In any assembly containing any rods that violate the “54/6.3” criterion there are at least four times as many rods that have total radial peaking factor of less than $\frac{3}{4}$ of the total radial peaking factor limit of 2.04.

TABLE 2.4-2 POWER DISTRIBUTION MEASUREMENT UNCERTAINTY FACTORS

	LHR	F_r^1
Measurement Uncertainty	0.0500	0.0425

2.5 AXIAL SHAPE INDEX (ASI)

The ASI limit for the T_{inlet} function is shown in Figure 2.5-1.



Break Points:

-0.550,	0.250
-0.300,	0.700
-0.080,	1.000
-0.080,	1.065
+0.400,	1.065
+0.400,	0.250

2.6 PCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits

- a. Pressurizer pressure ≥ 2010 psia and ≤ 2100 psia
- b. PCS cold leg temperature ≤ 544 °F
- c. PCS total flow rate $\geq 352,000$ gpm

3.0 ANALYTICAL METHODS

The analytical methods used to determine the core operating limits are those previously reviewed and approved by the NRC, specifically those described in the Technical Specification Section 5.6.5 list of methodology documents. Specific application of these methodologies to Palisades is described in the cycle's most current safety analysis reports.

The analytical methods used to determine the radial peaking factor measurement uncertainty factors are described in FSAR, Section 3.3.2.5.