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June 22, 2004
PY-CEI/NRR-2807L

United States Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Perry Nuclear Power Plant
Docket No. 50-440
License Amendment Request Pursuant to 10CFR50.90: Revision of the Minimum Critical Power Ratio Safety Limit

Ladies and Gentlemen:

By letter PY-CEI/NRR-2753L, dated April 5, 2004, the Nuclear Regulatory Commission (NRC) was requested to review and approve a license amendment for the Perry Nuclear Power Plant (PNPP). The proposed amendment would modify the existing Minimum Critical Power Ratio (MCPR) Safety Limit contained in Technical Specification 2.1.1.2. Attachment 5 of that letter contained a non-proprietary version of the Global Nuclear Fuels (GNF) report, which supported the license amendment request. However, some wording in this non-proprietary GNF report suggested the report might contain some proprietary information. This letter is re-transmitting Attachment 5 of letter PY-CEI/NRR-2753L with additional redaction to eliminate the potential concern of a non-proprietary report containing proprietry information.

Please remove and destroy the original Attachment 5 of letter PY-CEI/NRR-2753L and replace it with the revised Attachment 5 enclosed with this letter.

There are no regulatory commitments included in this letter or its attachments. If you have questions or require additional information, please contact Mr. Vernon K. Higaki, Manager - Regulatory Affairs, at (440) 280-5294.

Very truly yours,

Enclosure: Revised Attachment 5 for letter PY-CEI/NRR-2753L

cc: NRC Project Manager
NRC Resident Inspector
NRC Region III
State of Ohio

A001

Attachment 5 follows this page, and contains **Non-Proprietary Information.**

Attachment Additional Information Regarding the Cycle Specific SLMCPR for Perry Unit 1 Cycle 10 September 25, 2003

This document contains information of Global Nuclear Fuel (GNF) and is furnished in confidence solely for the purpose or purposes stated in the transmittal letter. No other use, direct or indirect, of the document or the information it contains is authorized.

Proprietary information of Global Nuclear Fuel is indicated by enclosing it in double brackets, e.g., [[proprietary information [3]]]. A "[[" marking at the beginning of a table, figure, or paragraph closed with a "]]" marking at the end of the table, figure or paragraph is used to indicate that the entire content between the double brackets is proprietary. In each case, the superscript notation {3} refers to Paragraph (3) of the enclosed affidavit, which provides the basis for the proprietary determination. Specific information that is not so marked is not GNF proprietary.

References

[1] Letter, Frank Akstulewicz (NRC) to Glen A. Watford (GE), "Acceptance for Referencing of Licensing Topical Reports NEDC-32601P, *Methodology and Uncertainties for Safety Limit MCPR Evaluations*; NEDC-32694P, *Power Distribution Uncertainties for Safety Limit MCPR Evaluation*; and Amendment 25 to NEDE-24011-P-A on Cycle Specific Safety Limit MCPR," (TAC Nos. M97490, M99069 and M97491), March 11, 1999.

[2] Letter, Thomas H. Essig (NRC) to Glen A. Watford (GE), "Acceptance for Referencing of Licensing Topical Report NEDC-32505P, Revision 1, *R-Factor Calculation Method for GE11, GE12 and GE13 Fuel*," (TAC Nos. M99070 and M95081), January 11, 1999.

[3] *General Electric BWR Thermal Analysis Basis (GETAB): Data, Correlation and Design Application*, NEDO-10958-A, January 1977.

[4] Letter, Glen A. Watford (GNF-A) to U. S. Nuclear Regulatory Commission Document Control Desk with attention to R. Pulsifer (NRC), "Confirmation of 10x10 Fuel Design Applicability to Improved SLMCPR, Power Distribution and R-Factor Methodologies", FLN-2001-016, September 24, 2001.

[5] Letter, Glen A. Watford (GNF-A) to U. S. Nuclear Regulatory Commission Document Control Desk with attention to J. Donoghue (NRC), "Confirmation of the Applicability of the GEXL14 Correlation and Associated R-Factor Methodology for Calculating SLMCPR Values in Cores Containing GE14 Fuel", FLN-2001-017, October 1, 2001.

[6] *General Electric Standard Application for Reactor Fuel*, NEDE-24011-P-A-14, June 2000; and the U.S. Supplement, NEDE-24011-P-A-14-US, June 2000

Comparison of Perry Unit 1 SLMCPR Values for Cycles 10 and 9

Table 1 summarizes the relevant input parameters and results of the SLMCPR determination for the Perry Unit 1 Cycle 10 and 9 cores. The SLMCPR evaluations were performed using NRC approved methods and uncertainties[1]. These evaluations yield different calculated SLMCPR values because

different inputs were used. The quantities that have been shown to have some impact on the determination of the safety limit MCPR (SLMCPR) are provided.

In comparing the Perry Unit 1 Cycle 10 and Cycle 9 SLMCPR values it is important to note the impact of the differences in the core and bundle designs. These differences are summarized in Table 1.

In general, the calculated safety limit is dominated by two key parameters: (1) flatness of the core bundle-by-bundle MCPR distributions and (2) flatness of the bundle pin-by-pin power/R-factor distributions. Greater flatness in either parameter yields more rods susceptible to boiling transition and thus a higher calculated SLMCPR.

[[[3]]]

The uncontrolled bundle pin-by-pin power distributions were compared between the Perry Unit 1 Cycle 10 bundles and the Cycle 9 bundles. Pin-by-pin power distributions are characterized in terms of R-factors using the NRC approved methodology[2]. For the Perry Unit 1 Cycle 10 limiting case analyzed at EOC, [[[3]]] the Perry Unit 1 Cycle 10 bundles are more peaked than the bundles used for the Cycle 9 SLMCPR analysis.

These calculations use the GEXL14 correlation for GE14 fuel. The potential impact of a bias on the calculated SLMCPR due to a GE14 top-peaked (or outlet-peaked) or a GE14 double-humped axial power shape was considered. For this plant and cycle, no top-peaked or double-humped axial power shapes were present. The GE12 fuel does not contribute to bundles in boiling transition; therefore, no evaluations were necessary regarding this fuel.

The cycle management core loading pattern for Perry Cycle 10 did not meet the "Acceptable Deviation from Reference Core Design" criteria specified in GESTARII[6] Subsection 3.4.2 (i.e. Perry did not achieve the minimum N-1 exposure window and the cycle management core loading pattern replaced some bundles with higher reactive bundles). Hence, a re-examination of the parameters that determine the operating limits was performed as specified in GESTARII Subsection 3.4.3 for the cycle management core loading pattern. Figure 2 contains this cycle management core loading pattern, which the Perry Cycle 10 SLMCPR data presented here is based on.

Summary

[[[3]]] have been used to compare quantities that impact the calculated SLMCPR value. Based on these comparisons, the conclusion is reached that the Perry Unit 1 Cycle 10 core/cycle has a slightly flatter core MCPR distribution [[[3]]] than what was used to perform the Cycle 9 SLMCPR evaluation; and the Perry Unit 1 Cycle 10 core/cycle has a more peaked in-bundle power distributions [[[3]]] than what was used to perform the Cycle 9 SLMCPR evaluation.

The calculated 1.08 Monte Carlo SLMCPR for Perry Unit 1 Cycle 10 is consistent with what one would expect [[[3]]] the 1.08 SLMCPR value is appropriate.

Based on all of the facts, observations and arguments presented above, it is concluded that the calculated SLMCPR value of 1.08 for the Perry Unit 1 Cycle 10 core is appropriate. It is reasonable that this value is smaller than the 1.10 value calculated for the previous cycle.

Attachment Additional Information Regarding the September 25, 2003
Cycle Specific SLMCPR for Perry Unit 1 Cycle 10

For single loop operations (SLO) the calculated safety limit MCPR for the limiting case is 1.10 as determined by specific calculations for Perry Unit 1 Cycle 10.

Supporting Information

The following information is provided in response to NRC questions on similar submittals regarding changes in Technical Specification values of SLMCPR. NRC questions pertaining to how GE14 applications satisfy the conditions of the NRC SER[1] have been addressed in Reference [4]. Other generically applicable questions related to application of the GEXL14 correlation and the applicable range for the R-factor methodology are addressed in Reference [5]. Only those items that require a Perry Unit 1/cycle specific response are presented below since all the others are contained in the references that have already been provided to the NRC.

The core loading information for Perry Unit 1 Cycles 9 and 10 is provided in Figures 1 and 2, respectively. The impact of the fuel loading pattern differences on the calculated SLMCPR is correlated to the values of [[[3]]]

The power and non-power distribution uncertainties that are used in the analyses are indicated in Table 1. The referenced document numbers have previously been reviewed and approved by the NRC.

Prepared by:

J.E. Fawks
Technical Program Manager
Perry Unit 1 Project

Verified by:

G.M. Baka
Technical Program Manger

Attachment Additional Information Regarding the September 25, 2003
Cycle Specific SLMCPR for Perry Unit 1 Cycle 10

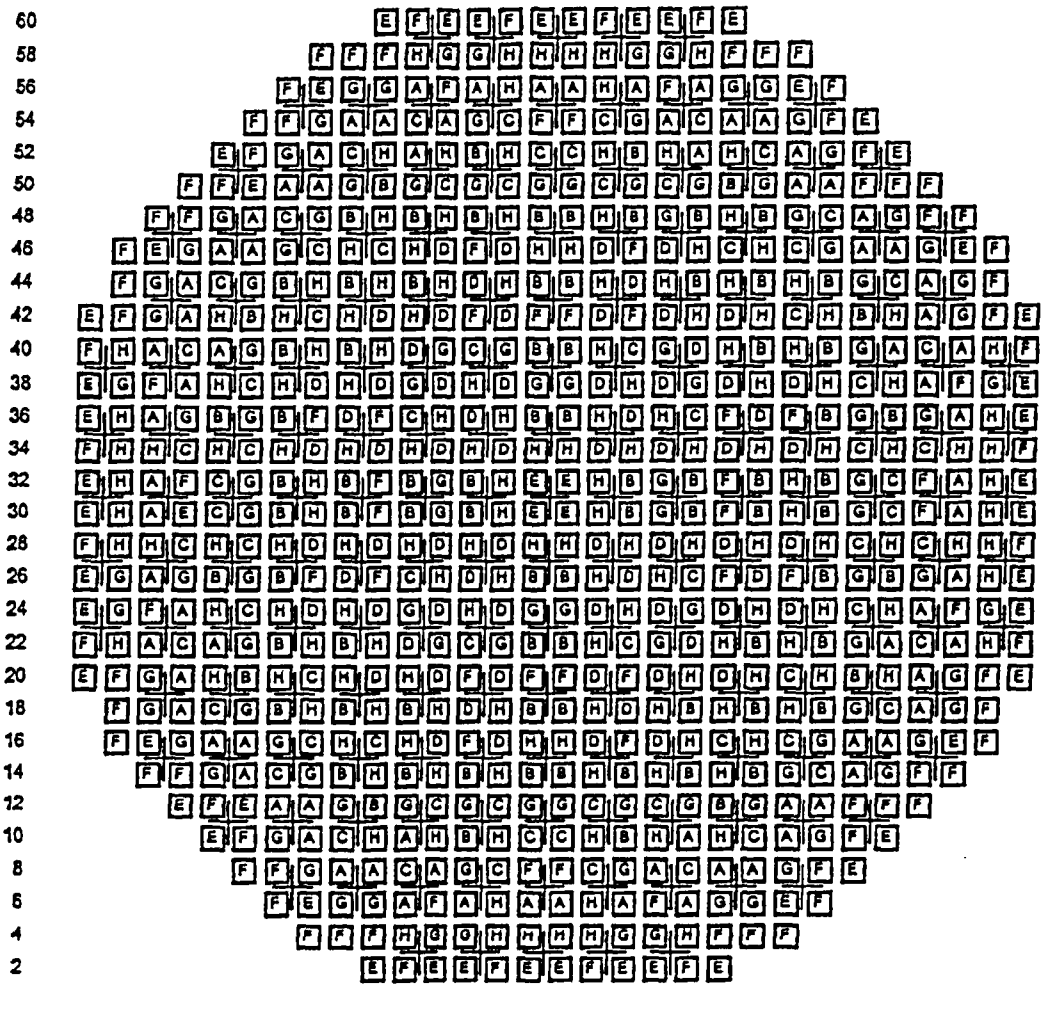
Table 1

Comparison of the Perry Unit 1 Cycle 9 and Cycle 10 SLMCPR

QUANTITY, DESCRIPTION	Perry Unit 1 Cycle 9	Perry Unit 1 Cycle 10
Number of Bundles in Core	748	748
Limiting Cycle Exposure Point	EOC	EOC
Cycle Exposure at Limiting Point [MWd/STU]	14500	13500
Reload Fuel Type	GE14	GE14
Latest Reload Batch Fraction [%]	40.6	37.4
Latest Reload Average Batch Weight % Enrichment	4.16	4.13
Batch Fraction for GE14	40.6%	78.1%
Batch Fraction for GE12	59.4%	21.9%
Batch Fraction for GE11	0.0%	0.0%
Batch Fraction for GE10	0.0%	0.0%
Core Average Weight % Enrichment	4.0	4.1
Core MCPR (for limiting rod pattern)	1.37	1.47
[[		[3]]]
[[		[3]]]
Power distribution uncertainty	GETAB NEDO-10958-A	GETAB NEDO-10958-A
Non-power distribution uncertainty	Revised NEDC-32694P-A	Revised NEDC-32694P-A
Calculated Safety Limit MCPR	**1.10**	**1.08**

Attachment Additional Information Regarding the Cycle Specific SLMCPR for Perry Unit 1 Cycle 10 September 25, 2003

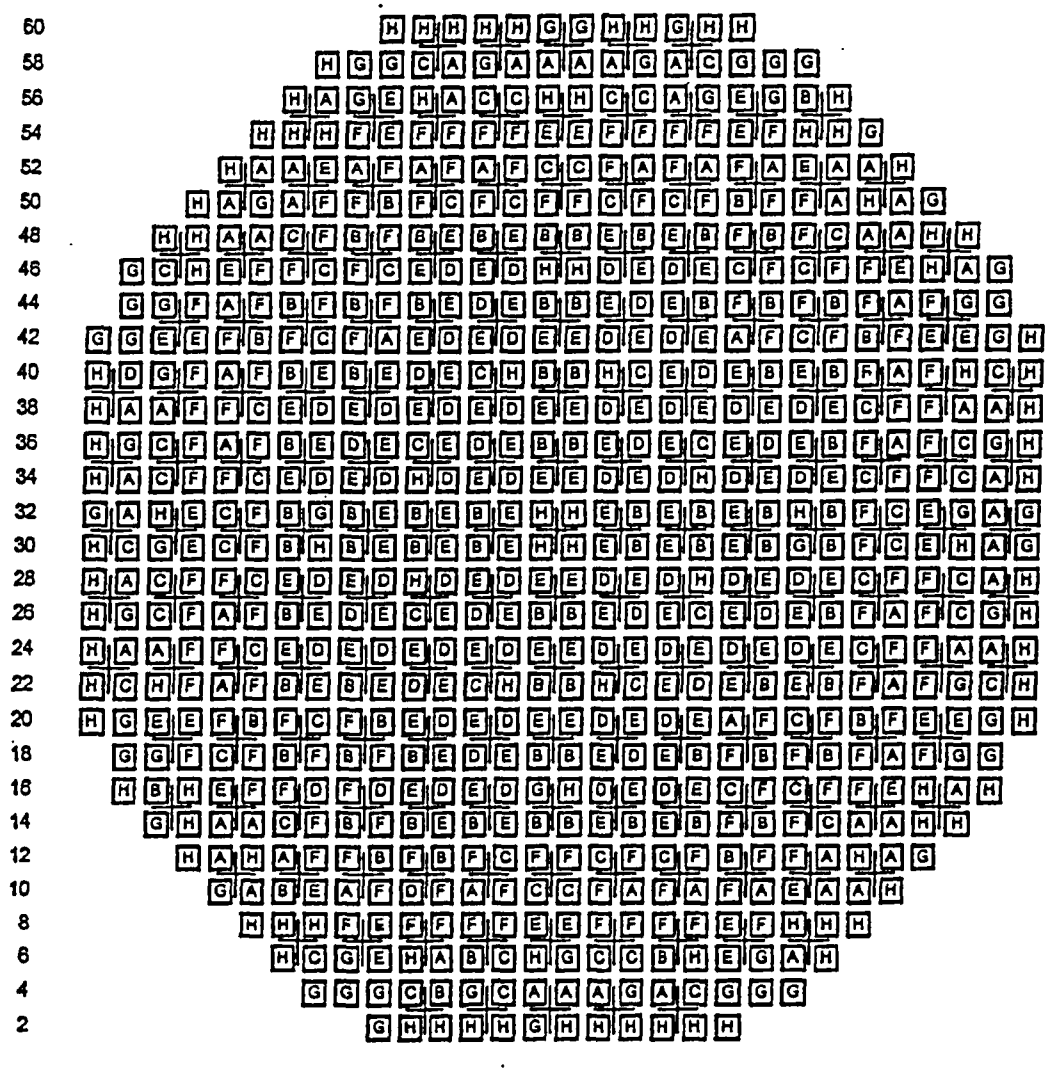
Figure 1 Reference Core Loading Pattern – Cycle 9



Fuel Type	
A=GE14-P10SNAB415-12G7.0-120T-150-T-3940	E=GE12-P10SSB369-14GZ-120T-150-T
B=GE14-P10SNAB416-17GZ-120T-150-T-3941	F=GE12-P10SSB369-12GZ-120T-150-T
C=GE14-P10SNAB416-17GZ-120T-150-T-3942	G=GE12-P10SSB399-14GZ-120T-150-T
D=GE14-P10SNAB415-16GZ-120T-150-T-3943	H=GE12-P10SSB399-16GZ-120T-150-T

Attachment Additional Information Regarding the Cycle Specific SLMCPR for Perry Unit 1 Cycle 10 September 25, 2003

Figure 2 Cycle Management Core Loading Pattern – Cycle 10



Fuel Type	
A=GE14-P10SNAB415-12G7.0-120T-150-T6-3959	E=GE14-P10SNAB413-16GZ-120T-150-T6-2580
B=GE14-P10SNAB416-17GZ-120T-150-T6-3960	F=GE14-P10SNAB413-16GZ-120T-150-T6-2581
C=GE14-P10SNAB416-17GZ-120T-150-T6-3961	G=GE12-P10SSB399-14GZ-120T-150-T6
D=GE14-P10SNAB415-16GZ-120T-150-T6-3962	H=GE12-P10SSB399-16GZ-120T-150-T6