FENOC

FirstEnergy Nuclear Operating Company

Perry Nuclear Power Plant
10 Center Road
Perry, Ohio 44081

John K. Wood
Vice President, Nuclear

440-280-5224
Fax: 440-280-8029

December 11, 2000
PY-CEI/NRR-2529L

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

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

Ladies and Gentlemen:

Nuclear Regulatory Commission review and approval of a license amendment is requested 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. Specifically, the change modifies the MCPR Safety Limit value, as calculated by Global Nuclear Fuel (GNF), by increasing the limit for two recirculation loop operation from 1.09 to 1.10.

Attachment 1 provides a Summary of the Proposed Technical Specification Change, a Description of the Proposed Technical Specification Change, a Safety Analysis, and an Environmental Consideration. Attachment 2 provides the Significant Hazards Consideration. Attachment 3 provides the annotated Technical Specification page reflecting the proposed change.

Attachment 4 provides a non-proprietary version of the GNF report regarding how the new MCPR Safety Limit was determined for PNPP. Attachment 5 contains the proprietary version of this GNF report. Since Attachment 5 contains material that Global Nuclear Fuel considers proprietary information as described in 10 CFR 2.790(a)(4), an affidavit requesting that this information be withheld from disclosure is provided as Attachment 6.

There are no regulatory commitments included in this letter or its attachments. If you have questions or require additional information, please contact Mr. Gregory A. Dunn, Manager - Regulatory Affairs, at (440) 280-5305.

Very truly yours,

John K. Wood

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

Attachment 5 contains Proprietary Information as described in 10 CFR 2.790(a)(4). Upon separation of Attachment 5, this letter may be decontrolled.

APO1

I, John K. Wood, hereby affirm that (1) I am Vice President - Perry, of the FirstEnergy Nuclear Operating Company, (2) I am duly authorized to execute and file this certification as the duly authorized agent for The Cleveland Electric Illuminating Company, Toledo Edison Company, Ohio Edison Company, and Pennsylvania Power Company, and (3) the statements set forth herein are true and correct to the best of my knowledge, information and belief.

John K. Wood

Subscribed to and affirmed before me, the 11th day of December, 2000

Jane E Mott

JANE E. MOTT
Notary Public, State of Ohio
My Commission Expires Feb. 20, 2005
(Recorded in Lake County)

SUMMARY

This License Amendment Request proposes an amendment of the Technical Specifications for the Perry Nuclear Power Plant (PNPP). The proposed amendment would modify the existing Minimum Critical Power Ratio (MCPR) Reactor Core Safety Limit contained in Technical Specification (TS) 2.1.1.2, for Cycle 9.

DESCRIPTION OF THE PROPOSED CHANGE

This Technical Specification change is proposed to reflect the results of the PNPP plant/cycle-specific MCPR Safety Limit analyses, which increases the MCPR Safety Limit value for two recirculation loop operation from 1.09 to 1.10, and maintains the single recirculation loop operation value at 1.11.

Specifically, change PNPP TS 2.1.1.2 to read:

> "With the reactor steam dome pressure ≥ 785 psig and core flow ≥ 10% rated flow:
>
> MCPR shall be ≥ 1.10 for two recirculation loop operation or ≥ 1.11 for single recirculation loop operation."

This will be implemented following refueling outage 8.

Attachment 3 provides the annotated page from the PNPP Technical Specifications.

SAFETY ANALYSIS

BACKGROUND

The Minimum Critical Power Ratio (MCPR) Safety Limit is one of the limits used to protect the nuclear fuel. Since the parameters that result in fuel damage are not directly observable during reactor operation, the thermal and hydraulic conditions that result in the onset of transition boiling (i.e., MCPR = 1.00) have been used to mark the beginning of the region in which fuel damage could occur. Although it is recognized that the onset of transition boiling would not result in damage to Boiling Water Reactor (BWR) fuel rods, the critical power at which boiling transition is calculated to occur has been adopted as a convenient limit. The Safety Limit (proposed to be set at 1.10 for PNPP Cycle 9) is defined as the critical power ratio in the limiting fuel assembly for which more than 99.9% of the fuel rods in the core are expected to avoid boiling transition, considering the power distribution within the core and various uncertainties. The MCPR Safety Limit provides a 95% probability at the 95% confidence level that following any abnormal operating occurrence, greater than 99.9% of the fuel rods avoid boiling transition.

The MCPR Safety Limit is determined using a statistical model that combines the uncertainties in operating parameters and the procedures used to calculate critical power.

The probability of the occurrence of boiling transition is determined using the NRC-approved critical power correlations used by Global Nuclear Fuel-Americas, L.L.C. (GNF-A, or simply GNF). These evaluations yielded a different calculated SLMCPR value because different inputs were used, due to differences in the core and bundle designs between Cycle 8 and Cycle 9.

GNF's calculations of the plant specific MCPR Safety Limit for PNPP are based upon the NRC approved methods in Amendment 25 to NEDE-24011-P-A, "General Electric Standard Application for Reactor fuel (GESTAR II)", and several other NRC approved GE documents, which are incorporated by reference into GESTAR II. These documents are listed in Attachments 4 and 5. The NRC acceptance of these cycle-specific methods for determining Safety Limit MCPR was documented in a Safety Evaluation dated March 11, 1999.

Attachment 4 provides a non-proprietary version of the GNF report entitled "Additional Information Regarding the Cycle Specific SLMCPR for Perry Unit 1 Cycle 9". Attachment 5 provides the proprietary version of the GNF document. Attachment 6 provides a GNF affidavit requesting the withholding of disclosure of the proprietary information provided in Attachment 5.

IMPACT ON OTHER REACTOR PARAMETERS

The MCPR Safety Limit has no influence on peak pressure due to MSIV closure; thus there is no influence on the reactor pressure vessel integrity.

The bases for the Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) and Linear Heat Generation Rate (LHGR) are to limit the peak clad temperature during a Loss of Coolant Accident and to prevent 1% plastic strain of the clad. The MCPR Safety Limit has no influence on MAPLHGR and LHGR.

The MCPR Safety Limit has no influence on the nuclear characteristics of the fuel bundle during cold shutdown. Therefore, there is no influence on shutdown margin.

CONCLUSION

This change maintains the MCPR Safety Limit to the same margin of safety as described in the PNPP Updated Safety Analysis Report (USAR) and GESTAR II.

ENVIRONMENTAL CONSIDERATION

The proposed Technical Specification change request was evaluated against the criteria of 10CFR51.22 for environmental considerations. The proposed change does not significantly increase individual or cumulative occupational radiation exposures, does not significantly change the types or significantly increase the amounts of effluents that may be released offsite, and as discussed in Attachment 2, does not involve a significant hazards consideration. Based on the foregoing, it has been concluded that the proposed Technical Specification change meets the criteria given in 10 CFR 51.22(c)(9) for a categorical exclusion from the requirement for an Environmental Impact Statement.

SIGNIFICANT HAZARDS CONSIDERATION

The standards used to arrive at a determination that a request for amendment does not involve a significant hazard are included in Commission regulation 10CFR50.92, which states that operation of the facility in accordance with the proposed changes would not:

1) involve a significant increase in the probability or consequences of an accident previously evaluated; or
2) create the possibility of a new or different kind of accident from any accident previously evaluated; or
3) involve a significant reduction in a margin of safety.

The proposed amendment establishes a revised Safety Limit Minimum Critical Power Ratio (MCPR) value of 1.10 for two recirculation loop operation. The proposed amendment has been reviewed with respect to these three factors, and it has been determined that the proposed change does not involve a significant hazard because:

1. The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   Per the Perry Nuclear Power Plant (PNPP) Updated Safety Analysis Report (USAR) Section 4.2.1, the fuel system design bases are provided in the General Electric Standard Application for Reactor Fuel (GESTAR II). The Minimum Critical Power Ratio (MCPR) Safety Limit is one of the limits used to protect the fuel in accordance with the design basis. The NRC-approved MCPR Safety Limit calculations establish margin to the onset of transition boiling. The basis of the MCPR Safety Limit calculation remains the same, ensuring that greater than 99.9% of all fuel rods in the core avoid transition boiling. These NRC-approved calculations were used to determine the proposed limit, therefore there is not an increase in the probability of transition boiling. Also, the change does not result in any physical plant modifications or physically affect any plant components. Therefore, no individual precursors of an accident are affected. As a result, there is no increase in the probability of occurrence of a previously analyzed accident.

   The fundamental sequences of accidents and transients have not been altered. The Safety Limit MCPR is established to avoid fuel damage in response to anticipated operational occurrences. Compliance with a MCPR safety limit greater than or equal to the calculated value will ensure that less than 0.1% of the fuel rods will experience boiling transition. This in turn ensures fuel damage does not occur following transients due to excessive thermal stresses on the fuel cladding. The MCPR Operating Limits are set higher (i.e., more conservative) than the Safety Limit such that potentially limiting plant transients prevent the MCPR from decreasing below the MCPR Safety Limit during the transient. Therefore, there is no impact on any of the limiting USAR Appendix 15B transients. The radiological consequences remain the same as previously stated in the USAR. Therefore, the consequences of an accident do not increase over previous evaluations in the USAR.

2. The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The MCPR Safety Limit basis is preserved, which is to ensure that transition boiling does not occur in at least 99.9% of the fuel rods in the core as a result of the limiting postulated transient. The value is calculated in accordance with GESTAR II. The GESTAR II analyses have been accepted by the NRC as comprehensive for ensuring that fuel designs will perform within acceptable bounds. The MCPR Safety Limit is one of the limits established to ensure the fuel is protected in accordance with the design basis. The function, location, operation, and handling of the fuel remain unchanged. No changes in the design of the plant or the method of operating the plant are associated with this revised safety limit value. Therefore, no new accident precursors are created due to this change. As a result, no new or different kind of accident from any previously evaluated is created.

3. The proposed change does not involve a significant reduction in a margin of safety.

   This change revises the PNPP MCPR Safety Limit value. The new MCPR Safety Limit value does not alter the design or function of any plant system, including the fuel. The new MCPR Safety Limit value was calculated using NRC-approved methods described in GESTAR II. The MCPR Safety Limit value is consistent with GESTAR II, the NRC Safety Evaluation of GESTAR II, and the Technical Specification Bases (Section 2.1.1.2) for the MCPR Safety Limit. Use of these methods satisfies the fuel design safety criteria that less than 0.1% of the fuel rods are predicted to experience transition boiling if the safety limit is not violated. Therefore, enforcing the new value for the MCPR Safety Limit does not involve a reduction in the margin of safety.

2.0 SAFETY LIMITS (SLs)

2.1 SLs

2.1.1 Reactor Core SLs

2.1.1.1 With the reactor steam dome pressure < 785 psig or core flow < 10% rated core flow:

THERMAL POWER shall be ≤ 23.8% RTP.

2.1.1.2 With the reactor steam dome pressure ≥ 785 psig and core flow ≥ 10% rated core flow:

MCPR shall be ≥ ~~1.09~~ 1.10 for two recirculation loop operation or ≥ 1.11 for single recirculation loop operation.

2.1.1.3 Reactor vessel water level shall be greater than the top of active irradiated fuel.

2.1.2 Reactor Coolant System Pressure SL

Reactor steam dome pressure shall be ≤ 1325 psig.

2.2 SL Violations

With any SL violation, the following actions shall be completed:

2.2.1 Within 1 hour, notify the NRC Operations Center, in accordance with 10 CFR 50.72.

2.2.2 Within 2 hours:

2.2.2.1 Restore compliance with all SLs; and

2.2.2.2 Insert all insertable control rods.

2.2.3 Within 24 hours, notify the plant manager and the corporate executive responsible for overall plant nuclear safety.

(continued)

Attachment **Additional Information Regarding the Cycle Specific SLMCPR for Perry Unit 1 Cycle 9** **October 25, 2000**

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 No. M99070 and M95081), January 11, 1999.

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

Comparison of Perry Unit 1 CYCLE 9 SLMCPR Value

Table 1 summarizes the relevant input parameters and results of the Safety Limit Minimum Critical Power Ratio, SLMCPR, determination for the Perry Unit 1 Cycle 9 and 8 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 9 and Cycle 8 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.

[[

]].

[[

]].

The uncontrolled bundle pin-by-pin power distributions were compared between the Perry Unit 1 Cycle 9 bundles and the Cycle 8 bundles. Pin-by-pin power distributions are characterized in terms of R-factors using the NRC approved methodology[2]. [[

]]

Summary

[[ ]] 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 9 core/cycle has a less flat core MCPR distribution [[ ]] and flatter in-bundle power distributions [[ ]] than what was used to perform the Cycle 8 SLMCPR evaluation.

Attachment **Additional Information Regarding the Cycle Specific SLMCPR for Perry Unit 1 Cycle 9** **October 25, 2000**

The calculated 1.10 Monte Carlo SLMCPR for Perry Unit 1 Cycle 9 is consistent with what one would expect [[ ]]

the 1.10 SLMCPR value is appropriate.

Based on all of the facts, observations and arguments presented above, it is concluded that the calculated SLMCPR value of 1.10 for the Perry Unit 1 Cycle 9 core is appropriate. It is reasonable that this value is about the same (within 0.01) as the 1.09 value calculated for the previous cycle.

For single loop operations (SLO) the calculated safety limit MCPR for the limiting case is 1.11 [[ ]]

Supporting Information

The following information is provided in response to NRC questions on previous submittals containing GE14 fuel designs:

1. Provide the fuel types and numbers of assemblies used in Perry Unit 1 Cycle 9 operation and identify if they are fresh or irradiated fuel (once or twice burned, etc.). Also, provide the fuel loading pattern for Cycle 9 and identify its difference from Cycle 8 and the impact on the SLMCPR calculation.

Response:

The requested core loading information is provided as Figures 1 and 2. The impact of the fuel loading pattern differences on the calculated SLMCPR is correlated to the values of [[ ]]

2. The approved methodologies used include NEDC-32694P, NEDC-32601P, Amendment 25 to NEDE-24011P-A, and NEDC-32505P, Revision 1. However, Table 1 indicates that the same power distribution uncertainty in GETAB is used for both Cycle 8 and 9. Please identify which power distribution uncertainties and SLMCPR uncertainties for SLMCPR are used to support this amendment request.

Response:

The GETAB (NEDO-10958-A) power distribution uncertainties are used for both Cycle 8 and 9. GETAB is invoked by reference from NEDE-24011P-A. The GETAB power distribution uncertainties are also reported in column 2 of Table 2.1 of NEDC-32601P. For the GETAB methodology, only the "TIP Reading and Bundle Power" and the "TIP Reading Random Uncertainty" values are classified as power distribution uncertainties. The GETAB values for these two quantities given in column 2 of Table 2.1 of NEDC-32601P are the ones that were used for this submittal. The NRC staff has taken the position in their SER dated March 11, 1999 that the non-power distribution uncertainties reported in NEDC-32601P are "revisions" or "updates" to the GETAB values. GE (GNF) has accepted this position so that the revised non-power distribution uncertainties are used for all SLMCPR calculations performed after June 1999 regardless of which approved methodology is used for the power distribution uncertainties. A line has been added to Table 1 to indicate that the revised non-power distribution uncertainties from NEDC-32601P-A Table 2.1 were used for Perry Unit 1, Cycle 9.

[[GNF Proprietary Information]]
[[enclosed by double brackets]]

3. Provide the details for R-Factor calculation for GE14 fuel and provide the data bases to justify that the approach is conservative with respect to the approved method stated in NEDC-32505P, Revision 1.

Response:

Calculation of GE14 R-factors follows the approved methodology of NEDC-32505P Rev. 1. The R-factor calculations consist of three essential components: the weight scheme for combining rod peaking factors, the additive constants for adjusting individual position performance and the behavior for partially controlled conditions. The weighting scheme of GE14 is identical to that of GE12 because the two bundles are identical in the lattice geometry. The GE14 bundle is similar to the GE12 bundle. It is a 10x10 design with 78 full length rods, 14 part length rods and 2 large central water rods. The location of the part length rods and the water rods are identical. The main difference is that the length of the part length rods and the spacer locations are slightly different. The additive constants are derived from the test data along with the GEXL coefficients. For partially controlled conditions, the bundle R-factors are calculated based on the prescribed axial power shapes that corresponds to the specific GEXL correlation. [[

]] The process used for GE14 is the same as the approved methodology in NEDC-32505PA Rev. 1 and the recommendations in the SER.

4. Provide the details for GEXL14 correlation including its development and verification process, and data bases, and justify that the GEXL14 correlation is conservative.

Response:

Section 1.2.7 of NEDE-24011-P-A (GESTAR II) provides the conditions by which a GEXL correlation may be developed and documented. Explicit NRC approval of the "GEXL topical report" is not required under the NRC-approved provisions of Amendment 22 to GESTAR II.

An overview of the evaluations performed for GE14 fuel was provided previously in NEDC-32868P, Revision 0, December 1998 titled "GE14 Compliance with Amendment 22 of NEDE-24011-P-A (GESTAR II)". This document was transmitted by G. A. Watford (GE) letter MFN-045-98 to the attention of M. J. Davis at the NRC Document Control Desk dated December 11, 1998. Section 2.8.3 of this document describes the GEXL14 correlation.

Additional supporting details were provided previously by separate transmittal of "GEXL14 Correlation for GE14 Fuel", NEDC-32851P, Revision 1, September 1999. This document was transmitted by G.A. Watford (GE) letter FLN-2000-12 dated August 8, 2000 to the NRC Document Control Desk and to the attention of Tai L. Huang (NRC). Section 3 of NEDC-32851P, Rev. 1 describes the database used to develop the GEXL14 correlation for GE14 fuel.

GEXL14 correlation is developed based on the full scale ATLAS test data. The full scale test data were used to generate the GEXL coefficients as well as the additive constants for R-factor calculations to accurately predict the data points over the application range. The report "GE14 Compliance with Amendment 22 of NEDE-24011-P-A (GESTAR II)" documents the GEXL14 data and verification base. The database used to develop the GEXL14 correlation consists of [[ ]] different test assemblies. This correlation development database consisted of a total of [[ ]] critical power data points. The database used to verify the GEXL14 correlation consists of [[ ]] different test assemblies. The correlation verification database consisted of a total of [[ ]] data points. [[

]]

The GEXL14 correlation is valid for GE14 fuel over the following range of state points:

	Database range	Correlation application range
Pressure:	[[	]]
Mass Flux:	[[	]]
Inlet Subcooling:	[[	]]
R-factor:	[[	]]
*exception		[[ ]]

[[

]]

The GEXL14 correlation like previous GEXL correlations is derived as a best fit to the ATLAS critical power data. The GEXL correlation is not intended to be conservative. The GEXL correlation is derived following the process described in GESTAR II (NEDE-24011-P-A-14) Section 1.1.7.C.iv "Correlation fit to data shall be best fit". The bias and uncertainty in the correlation is determined as specified in GESTAR Section 1.1.7. The overall GEXL14 uncertainty is [[ ]]. This uncertainty is an explicit input to the approved SLMCPR methodology.

5. Provide justification that the impacts of low R-factor and low subcooling are reflected in developing the overall bias and uncertainty, inaccuracies associated with the GEXL correlation are accounted for in the SLMCPR calculation. Also, identify the analysis and the data bases available in the approved topical report.

Response:

The "GEXL14 Correlation for GE14 Fuel", NEDC-32851P, Revision 1, September 1999 was transmitted by G.A. Watford (GE) letter FLN-2000-12 dated August 8, 2000 to the NRC Document Control Desk and to the attention of Tai L. Huang (NRC). Section 3 of NEDC-32851P, Rev. 1 describes the database used to develop the GEXL14 correlation for GE14 fuel.

[[

]]

It is difficult to predict and therefore detect the rod location of the boiling transition in a bundle with low R-factor because many rods show the same vulnerability to boiling transition; nevertheless, the critical power value itself is well-predicted. This fact is supported by the lack of any trend in the correlation error as the lower R-factor values are approached. The second point is that the GEXL14

correlation exhibits the typical almost-linear behavior in the critical quality for low R-factor values that one would expect [[

]]

6. The staff approved those methodologies cited in Question 2 with one condition that the 3D-MONICORE bundle power calculational uncertainty should be verified when applied to fuel and core designs not included in the benchmark comparisons in Tables 3.1 and 3.2 of NEDC-32694P, and three actions should be taken for application of NEDC-32601P for a new fuel. GE14 is considered a new fuel at the time the staff approved those licensing topical reports, therefore, provide the details of the actions taken and verification for Perry Unit 1 Cycle 9 operation.

Response:

The referenced requirement for 3D-MONICORE and the three actions pertaining to NEDC-32601P correspond to the four items listed as the NRC's Technical Position in Enclosure 2 accompanying their SER dated March 11, 1999 approving NEDC-32601P and NEDC-32694P. The NRC positions are quoted here together with the actions taken to satisfy each item. Item (a) is the specific requirement from NEDC-32694P that pertains to 3D-MONICORE. Items (b), (c) and (d) are the three actions pertaining to NEDC-32601P referred to in the question.

Item (a): Since changes in the fuel and core design can have a significant effect on the calculation accuracy, the 3D-MONICORE bundle power calculational uncertainty should be verified when applied to fuel and core designs not included in the benchmark comparisons of Tables-3.1 and 3.2 of NEDC-32694P.

This item pertains only to the application of the reduced power distribution uncertainties and methodology given in NEDC-32694P. This item or part of the question is not applicable when the original GETAB methodology and uncertainties are used. The original GETAB methodology and uncertainties have been demonstrated to be sufficiently conservative to be generically applicable to all GE fuel designs. In fact, the GETAB methodology has been shown to be sufficiently conservative to also be applicable to some fuels and monitoring systems not developed by GE. Note that the original GETAB methodology and uncertainties produces SLMCPR values that are on the order of [[ ]] than the SLMCPR values produced using the methodology and reduced uncertainties defined in NEDC-32694P. The original approved GETAB methodology and uncertainties were used since the additional CPR margin that is provided by taking credit for the excessive GETAB conservatism was not required to efficiently operate Perry Unit 1, Cycle 9.

Item (b): Since changes in fuel design can have a significant effect on the calculation accuracy, the TGBLA fuel rod power calculational uncertainty should be verified when applied to fuel designs not included in the benchmark comparisons of Table 3.1 of NEDC-32601P.

Attachment **Additional Information Regarding the Cycle Specific SLMCPR for Perry Unit 1 Cycle 9** **October 25, 2000**

The fidelity of the TGBLA lattice physics calculations for fuel rod powers depend on the lattice designs. The key considerations are the lattice geometry, the location of the water rods, the location of the gadded rods and for vanished-rod lattices the location of the part-length rods. All these characteristics are identical for GE12 and GE14. See the response to question (3) above. Although the length of the part-length rods is different between GE12 and GE14, this has no impact on the lattice calculations which are performed either for a fully-rodded or partially-rodded lattice. Table 3.1 of NEDC-32601P includes several 10x10 lattices. The values given in Table 3.1 for GE12 are representative of the values being calculated for GE14, thus there is no impact.

Item (c): The effect of the correlation of rod power calculation uncertainties should be reevaluated to insure the accuracy of R-Factor uncertainty when the methodology is applied to a new fuel lattice.

The R-factor uncertainty is dominated by the same factors that influence the rod powers as described above for item (b). The uncertainty is the same for GE12 and GE14. The derivation of the uncertainty value is presented for GE 10x10 lattices (i.e., GE12 and GE14) in Appendix C of NEDC-32601P-A.

Item (d): In view of the importance of MIP criterion and its potential sensitivity to changes in fuel bundle designs, core loading and operating strategies, the MIP criterion should be reviewed periodically as part of the procedural review process to insure that the specific value recommended in NEDC-32601 P is applicable to future designs and operating strategies.

The calculated value of MIP depends only on two things: [[

]] The GEXL correlation for GE14 was provided in the Amendment 22 submittal for GE14 together with the uncertainty [[ ]] that is needed for the SLMCPR analyses and the calculation of MIP. See also the response to question (4) above. GE (GNF) continues to monitor MIP and periodically assess it as part of their procedural review process. Specific scoping analyses preformed for cores partially and fully-loaded with GE14 fuel have given no indications that suggests that the MIP values from these calculations are statistically distinct from historical data. [[

]] Thus there is no indication that the MIP criteria should be changed.

Prepared by:

11/3/00

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

Verified by:

S.B. Shelton
Technical Program Manger

Table 1

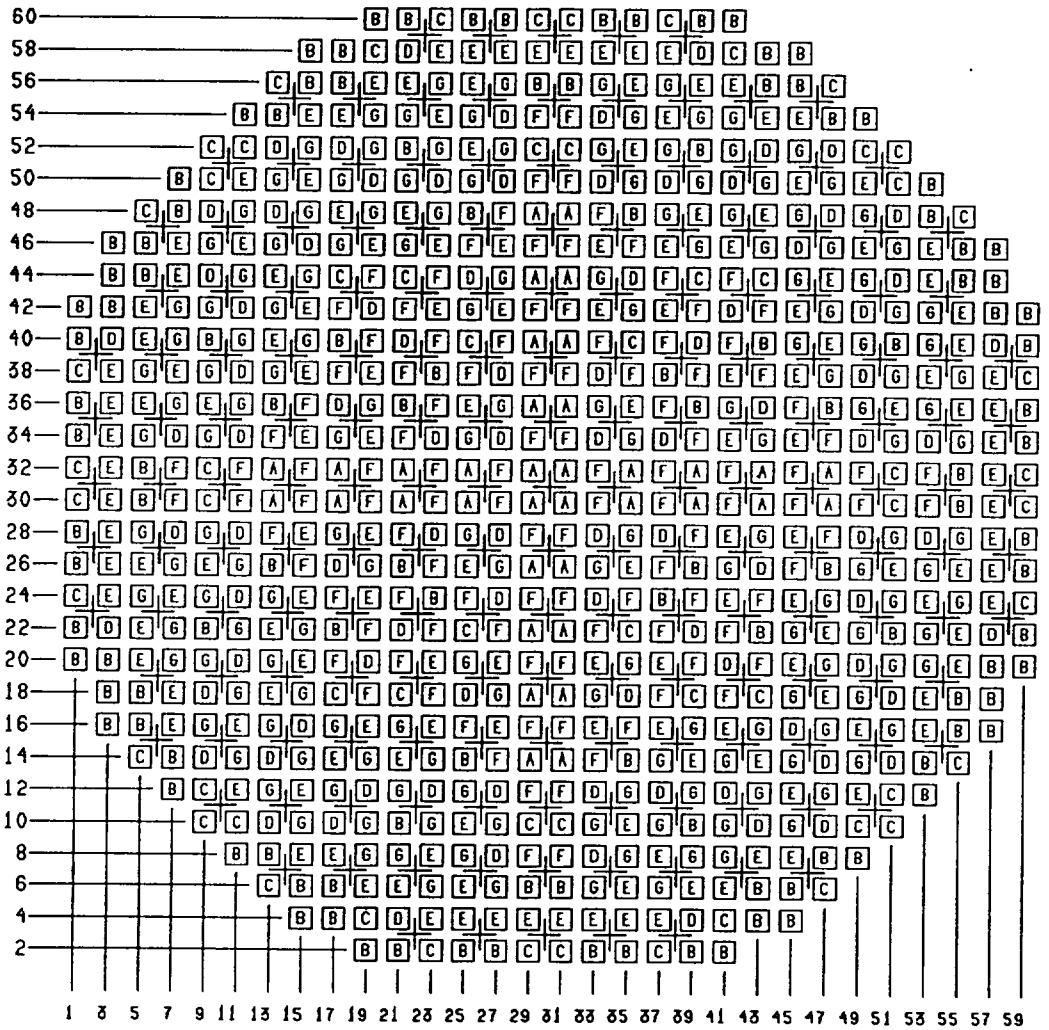
Comparison of the Perry Unit 1 Cycle 9 and Cycle 8 SLMCPR

[[

]]

Attachment **Additional Information Regarding the Cycle Specific SLMCPR for Perry Unit 1 Cycle 9** **October 25, 2000**

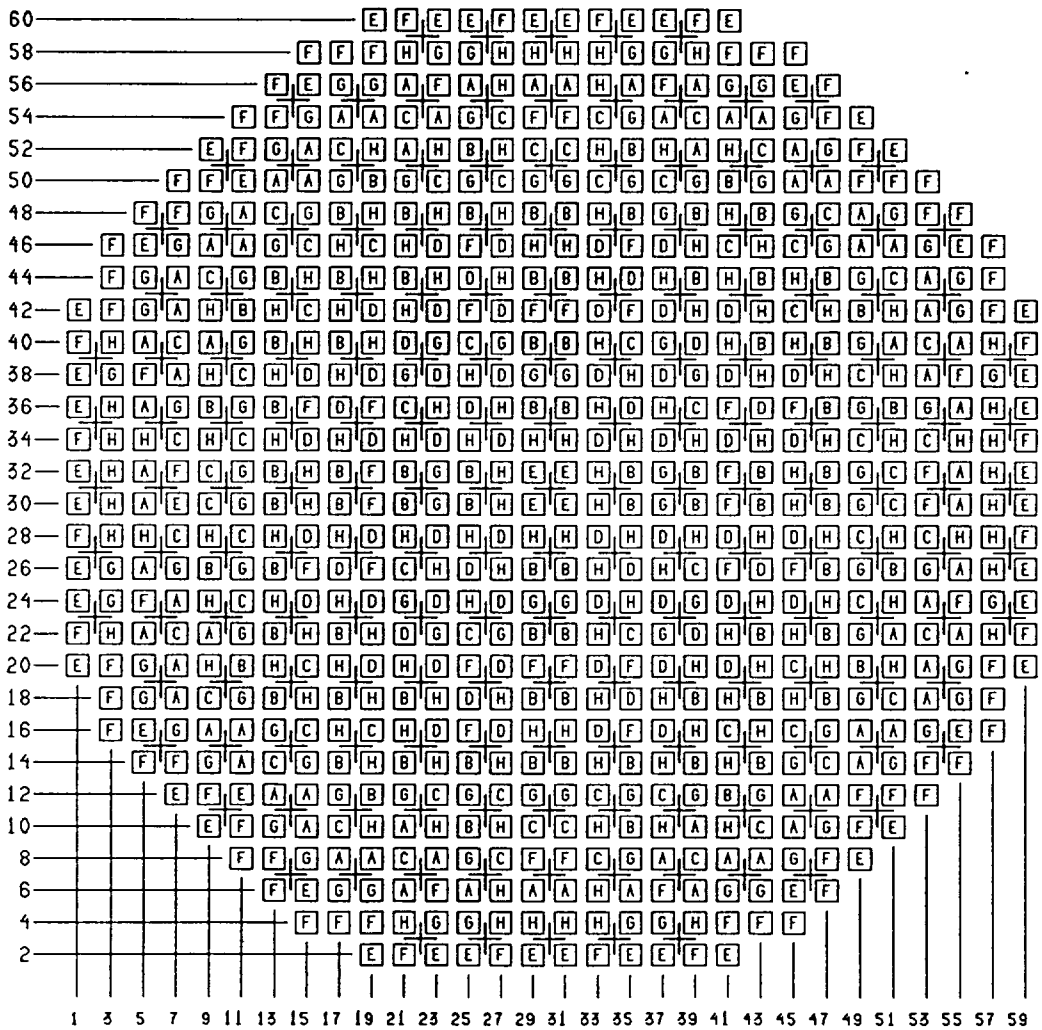
Figure 1 Reference Core Loading Pattern – Cycle 8



FUEL TYPE	
A = GE10-P8SXB306-11GZ3-120M-150-T	E = GE12-P10SSB369-12GZ-120T-150-T
B = GE11-P9SUB338-10GZ-120T-146-T	F = GE12-P10SSB399-14GZ-120T-150-T
C = GE11-P9SUB338-12GZ-120T-146-T	G = GE12-P10SSB399-16GZ-120T-150-T
D = GE12-P10SSB369-14GZ-120T-150-T	

Attachment **Additional Information Regarding the Cycle Specific SLMCPR for Perry Unit 1 Cycle 9** **October 25, 2000**

Figure 2 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