Entergy

Entergy Nuclear Northeast
Entergy Nuclear Operations, Inc.
James A. Fitzpatrick NPP
P.O. Box 110
Lycoming, NY 13093
Tel 315 349 6024 Fax 315 349 6480

September 27, 2004
JAFP-04-0158

T.A. Sullivan
Site Vice President - JAF

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Subject: **James A. Fitzpatrick Nuclear Power Plant**
Docket No. 50-333
Follow-up Response to Request for Additional Information and Revision to Proposed License Amendment to Safety Limit Minimum Critical Power Ratio (SLMCPR)(TAC No. MC3391)

References:
1) Entergy Nuclear Operations, Inc. letter to USNRC (JAFP-04-0083) Proposed License Amendment to Safety Limit Minimum Critical Power Ratio (SLMCPR), dated June 4, 2004
2) USNRC letter to Entergy Nuclear Operations, Inc., Request for Additional Information Concerning Safety Limits for Minimum Critical Power Ratio (TAC NO. MC3391), dated July 6, 2004
3) Entergy Nuclear Operations, Inc. letter to USNRC (JAFP-04-0117) Response to Request for Additional Information Regarding Proposed License Amendment to Safety Limit Minimum Critical Power Ratio (SLMCPR) (TAC NO. MC3391), dated July 27, 2004
4) Telecom dated August 5, 2004 between NRC Staff and JAF Personnel Regarding Clarification of Question 1 of Response in Reference 3
5) GE Nuclear Energy letter to USNRC (MFN 04-081) Part 21 Reportable Condition and 60-Day Interim Report Notification: Non-conservative SLMCPR, dated August 24, 2004

Gentlemen:

Pursuant to 10CFR50.90, Entergy Nuclear Operations, Inc. (ENO) is submitting a revised request for amendment to the TS for JAFNPP. This proposed change provides revised values for the Safety Limit Minimum Critical Power Ratio (SLMCPR) for both single and dual recirculation loop operation.

By letter dated June 4, 2004 (Reference 1), ENO proposed to amend the Technical Specifications (TS) for the James A. FitzPatrick Nuclear Power Plant (JAFNPP) by revising the Safety Limit Minimum Critical Power Ratio (SLMCPR) for both single and dual recirculation loop operation.

On July 6, 2004, ENO received a request for additional information (RAI) (Reference 2) from the NRC with four questions concerning our SLMCPR submittal. ENO provided its response to that request via Reference 3.

On August 5, 2004, a telecom was held per your Staff's request to obtain additional clarification regarding ENO's written response to Question 1 (reference 4). Attachment 1 to this letter provides the additional information requested during that telecom. In accordance with 10CFR2.390(b)(1), an affidavit

APO1

attesting to the proprietary nature of the enclosed information and requesting withholding from public disclosure is included with Attachment 1. Attachment 2 contains the same information with the proprietary information removed, and is provided for public disclosure.

During the preparation of the response provided in Attachment 1, two issues were identified. Global Nuclear Fuel (GNF) and GE Nuclear Energy (GENE) issued a 10 CFR Part 21 Notification (Reference 5), which identified JAFNPP as an affected plant (60-Day Interim Report for current operation and Reportable Condition for the SLMCPR licensing submittal (Reference 1)). Attachment 5 provides a summary of the technical basis for the revised SLMCPR values and describes the impact of the Part 21 issue as it relates to the SLMCPR values.

The second issue that was identified was an error in the original application (Reference 1) in the details provided in Attachments 4 and 5, Table 1 (Comparison of the FitzPatrick Cycle 17 and Cycle 16 SLMCPR). (These attachments contain the same information except that Attachment 4 is the proprietary version and Attachment 5 is the non-proprietary version.) Specifically, the values provided in the last row (Calculated Safety Limit MCPR (SLO)) and last two columns of that row (FitzPatrick Cycle 17 GETAB Bases (1.09) and FitzPatrick Cycle 17 Revised Bases (1.06)) were incorrect due to an input variable error. The SLO value should have been 1.10 for FitzPatrick Cycle 17 GETAB Bases and 1.07 for FitzPatrick Cycle 17 Revised Bases. This was identified by GNF during the verification process. The corrected values can be found in Table R-1 in Attachment 1 of this revised submittal. The change in the data provided in the attachments did not affect any of the other information in the submittal nor did it impact the proposed TS values, since JAFNPP had requested a SLO value of 1.07 as described in Attachment 2 of Reference 1.

The signed original of the Application for Amendment to the Operating License is enclosed for filing. Attachment 3 contains the proposed new TS page and Attachment 4 provides the marked-up version of the current TS page. Attachment 5 is a revised summary of the technical basis for the SLMCPR values and is considered proprietary information by GNF. In accordance with 10CFR2.390(b)(1), an affidavit attesting to the proprietary nature of the enclosed information and requesting withholding from public disclosure is included with Attachment 5. As noted above, Attachment 5 also describes the impact of the Part 21 issue as it relates to the SLMCPR values. Attachment 6 is the same GNF summary with the proprietary information removed, and is provided for public disclosure.

This revised license amendment request and follow-up response does not change the scope or conclusions in the original application, nor does it change the no significant hazards consideration determination.

In accordance with 10CFR50.91, a copy of this revised application and follow-up response, with appropriate attachments, is being provided to the designated New York State official.

Regarding our proposed schedule for this amendment, Reference 1 requested your review and approval of the revised SLMCPR by September 3, 2004 with implementation prior to startup from the refueling outage. Based on the time frame for providing the requested information due to combining the RAI response and the revised licensing submittal addressing the Part 21 Notification, JAFNPP requests that this amendment be approved by November 30, 2004 with a 60 day implementation period. The requested approval date and implementation period will allow sufficient time for effective planning and implementation of the change prior to any impact to the operating cycle. The current TS SLMCPR values are conservative to the requested values in this submittal and provide adequate margin for the core reload following startup from the refueling outage.

There are no commitments contained in this letter.

If you have any questions concerning this transmittal or require additional information, please contact Mr. Richard Plasse at (315) 349-6793.

I declare under penalty of perjury that the forgoing is true and correct.

Executed on this the 27th day of September, 2004.

Very truly yours,

T. A. Sullivan
Site Vice President

TS:tp:dmr

Attachments:
1. Additional Information in Support of ENO's Response to Question 1 of Reference 3 (RAI Regarding SLMCPR) (Proprietary Information)
2. Additional Information in Support of ENO's Response to Question 1 of Reference 3 (RAI Regarding SLMCPR) (Non-Proprietary Version)
3. Revised Technical Specification Page (Retyped)
4. Technical Specification Page (Mark-up)
5. GNF Summary of Technical Basis for Revised SLMCPR Values (Proprietary Information)
6. GNF Summary of Technical Basis for Revised SLMCPR Values (Non-Proprietary Version)

cc: Regional Administrator, Region I
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Office of the Resident Inspector
U. S. Nuclear Regulatory Commission
P. O. Box 136
Lycoming, NY 13093

Mr. P. Milano, Sr. Project Manager
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Mail Stop: 8C2
Washington, DC 20555

Mr. Paul Eddy
New York State Department
of Public Service
3 Empire State Plaza, 10th Floor
Albany, New York 12223

Mr. Peter R. Smith, President
NYSERDA
17 Columbia Circle
Albany, NY 12203-6399

Affidavit

I, Margaret E. Harding, state as follows:

(1) I am Manager, Fuel Engineering Services, Global Nuclear Fuel – Americas, L.L.C. ("GNF-A") and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in the attachment, "ADDITIONAL INFORMATION IN SUPPORT OF ENO'S RESPONSE TO QUESTION 1 OF REFERENCE 3 (RAI REGARDING SLMCPR)" dated September 17, 2004. GNF proprietary information is indicated by enclosing it in double brackets. In each case, the superscript notation [3] refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.

(3) In making this application for withholding of proprietary information of which it is the owner or licensee, GNF-A relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4) and 2.390(a)(4) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information," and some portions also qualify under the narrower definition of "trade secret," within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GNF-A's competitors without license from GNF-A constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information which reveals cost or price information, production capacities, budget levels, or commercial strategies of GNF-A, its customers, or its suppliers;

d. Information which reveals aspects of past, present, or future GNF-A customer–funded development plans and programs, of potential commercial value to GNF-A;

e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a. and (4)b., above.

(5) To address the 10 CFR 2.390 (b) (4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GNF-A, and is in fact so held. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in (6) and (7) following. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GNF-A, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or subject to the terms under which it was licensed to GNF-A. Access to such documents within GNF-A is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GNF-A are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information identified in paragraph (2) is classified as proprietary because it contains details of GNF-A's fuel design and licensing methodology.

The development of the methods used in these analyses, along with the testing, development and approval of the supporting methodology was achieved at a significant cost, on the order of several million dollars, to GNF-A or its licensor.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GNF-A's competitive position and foreclose or reduce the availability of profit–making opportunities. The fuel design and licensing methodology is part of GNF-A's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC–approved methods.

The research, development, engineering, analytical, and NRC review costs comprise a substantial investment of time and money by GNF-A or its licensor.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GNF-A's competitive advantage will be lost if its competitors are able to use the results of the GNF-A experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GNF-A would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GNF-A of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining these very valuable analytical tools.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed at Wilmington, North Carolina, this 17th day of September 2004.

Margaret E. Harding
Global Nuclear Fuel – Americas, LLC

ATTACHMENT 2 to JAFP-04-

ADDITIONAL INFORMATION IN SUPPORT OF ENO'S RESPONSE TO QUESTION 1 OF REFERENCE 3 (RAI REGARDING SLMCPR)

(Non-Proprietary Version)

Entergy Nuclear Operations, Inc.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

September 17, 2004

ADDITIONAL INFORMATION IN SUPPORT OF ENO'S RESPONSE
TO QUESTION 1 OF REFERENCE 3 (RAI REGARDING SLMCPR)

Proprietary Information Notice

This document is the GNF non-proprietary version of the GNF proprietary document. From the GNF proprietary version, the information denoted as GNF proprietary (enclosed in double brackets) was deleted to generate this version.

ADDITIONAL INFORMATION IN SUPPORT OF ENO'S RESPONSE
TO QUESTION 1 OF REFERENCE 3 (RAI REGARDING SLMCPR)

In a letter dated June 4, 2004, Entergy Nuclear Operations, Inc. (the licensee) requested a revision to the Technical Specifications (TS) for the James A. FitzPatrick Nuclear Power Plant (JAFNNP). Specifically, the licensee proposed changes to the safety limit values in TS 2.1.1.2 for the minimum critical power ratio (MCPR). The Nuclear Regulatory Commission (NRC) staff had questions regarding the information provided, to which a response was provided on July 27, 2004. During a telecom held on August 5, 2004, the NRC staff requested additional clarification of the response provided for question number one. The revised response is provided below, and replaces the response provided for question number one on July 27, 2004, in its entirety:

RAI 1:

> "Provide the values for power and non-power distribution uncertainties listed in Table 1 of Attachment 4 to the June 4 application. Justify that the proposed reduction of the MCPR value is still providing enough margin for Cycle 17 operation with respect to the results shown in Table 4.1 of General Electric Company (GE) Topical Report NEDC-32601P-A, "Methodology and Uncertainties for Safety Limit MCPR Evaluations." Explain why the reduction in the calculated MCPR value due to using the improved/revised methodology is greater for Cycle 17 than the reduction shown in Table 4.1 of NEDO-32601P-A."

Revised Response to RAI 1:

The values for the power and non-power distribution uncertainties used to determine the calculated Safety Limit MCPR (SLMCPR) values provided in Table 1 of Attachment 4 to the June 4 application are as noted in the Table 2a rows with column 1 designations of "Power Distribution Uncertainties" and "Non-power Distribution Uncertainties".

Cycle 17 was first evaluated using the Cycle 16 uncertainties to provide results for comparison on the same uncertainty basis. Specifically, for the Cycle 16 evaluation and the Cycle 17 evaluation SLMCPR results provided in Table 1, columns 2 and 3, respectively, the uncertainties used were provided in Table 2a, column 2. Note that these Standard Uncertainties are consistent with those that are listed in Table 2.1, NEDC-32601P-A. The "Non-power Distribution Uncertainties" in Table 2a are the Revised Uncertainties provided in Table 2.1, column 3; and the "Power Distribution Uncertainties" are the GETAB Uncertainties provided in Table 2.1, column 2. This is completely consistent with the NRC approved methodology as described in NEDC-32601P-A.

Similarly, the Cycle 17 SLMCPR was also evaluated using Revised Methodology and Reduced power uncertainties, consistent with the NRC approved methodology described in both NEDC-32601P-A and NEDC-32694P-A. Specifically for the Cycle 17 SLMCPR evaluation results provided in Table 1, column 4 of Attachment 4 to the June 4 application, the uncertainties used

were consistent with those provided in Table 2a, column 3, with the exception of the R-factor uncertainty used in the evaluation that was provided in Table 2b. Note that Table 2b identifies any value that was used in the evaluation that is not consistent with the "Standard Uncertainties" provided in NEDC-32601P-A and 32694P-A. In this case, the R-factor uncertainty was increased from the NEDC-32601P-A value to account for the effect of increased channel bow consistent with current GNF fuel performance.

Note that the Standard Uncertainties provided in Table 2a, column 3, are consistent with those that are listed in Table 2.1, NEDC-32601P-A and Tables 4.1 and 4.2, NEDC-32694P-A. The "Non-power Distribution Uncertainties" in Table 2a are the Revised Uncertainties provided in Table 2.1, column 3 (same as for Cycle 16 evaluation); and the "Power Distribution Uncertainties" are the Reduced power uncertainties consistent with uncertainties provided in Table 4.2, column 2, NEDC-32694P-A. This is also completely consistent with the NRC approved methodology as described in NEDC-32601P-A and NEDC-32694P-A.

Table 4.1 NEDC-32601P-A results are only applicable to an evaluation that uses only "Revised Methodology". The Cycle 17 results, provided in Table 1, column 4 of Attachment 4 to the June 4 application used both the Revised Methodology and Reduced power uncertainties.

The 0.03 reduction from the Cycle 16 1.09 dual loop operation (DLO) value to the Cycle 17 1.06 DLO value and the 0.03 reduction from the Cycle 16 1.10 single loop operation (SLO) value to the Cycle 17 1.07 value are consistent with reductions observed in SLMCPR evaluations for other GE BWRs that have applied both Revised Methodology and Reduced power uncertainties. A breakdown and explanation of the two reductions follows.

To facilitate this discussion, Tables R-1 through R-4 were generated and are included with this response. Table R-1 shows that the "un-rounded" DLO SLMCPR value decreases by a net 0.035 and the SLO value decreases by a net 0.037 going from Cycle 16, using GETAB power uncertainties and a [[ ]] R-factor uncertainty, to Cycle 17 using Reduced power uncertainties and a [[ ]] R-factor uncertainty. The slightly larger change in SLO value is expected, since the SLO starting value is larger than the DLO starting value and the same fractional change to the SLO value will yield a slightly larger absolute change than would be observed in the DLO value. Accordingly, additional discussion will focus on resolving the differences observed in the DLO SLMCPR values.

Table R-2 compares the Cycle 16 and Cycle 17 "un-rounded" calculated SLMCPR values using combinations of GETAB and Reduced power uncertainties and [[ ]] R-factor uncertainties to illustrate the effect of these changes. Selected results are compared in Table R-2 and are used in the following discussion.

Table R-3 provides a detailed breakdown into four individual components of the estimated and calculated change in SLMCPR from Cycle 16 to Cycle 17 and compares the net change to the observed 0.035 DLO SLMCPR decrease. Estimated values were based upon the magnitudes of these components that were observed in other plant SLMCPR evaluations combined with the effect calculated using a correlation that estimates SLMCPR values using a combination of the bundle-by-bundle MCPR distribution and the associated pin-by-pin power/R-factor distribution, hence forward in this discussion referred to as "the correlation".

Bundle-by-bundle MCPR distribution and the bundle pin-by-pin power/R-factor distribution is virtually the same and is not expected to significantly affect the SLMCPR value. Increasing the R-factor uncertainty from [[ ]] resulted in a calculated increase of [[ ]] (See Table R-2). This is larger than was expected (~0.005) from observation of other plant SLMCPR evaluations. Changes of [[ ]] to SLMCPR were respectively observed for MOC and EOC cycle exposure points, but higher values of pin-by-pin R-factor in limiting bundles at BOC increased the relative effect of the R-factor uncertainty change at this cycle exposure point, which is the limiting point for the Cycle 17 evaluation.

Consistent with other SLMCPR evaluations, the effect of using [[ ]] (although larger changes have been observed in other plant SLMCPR evaluations). However, the difference observed between the calculated SLMCPR values ranged from [[ ]], while using R-factor uncertainties of [[ ]], respectively.

The final individual component of the change accounts for the observation that the calculated Cycle 16 SLMCPR value was higher and the Cycle 17 SLMCPR value was slightly lower than the SLMCPR values determined by the correlation. Table R-4 provides the results of using the correlation to estimate both the Cycle 16 and the Cycle 17 SLMCPRs using a R-factor uncertainty of [[ ]]. These results show that the Cycle 16 calculated SLMCPR value is high by [[ ]] and the Cycle 17 calculated SLMCPR value is low by [[ ]], resulting in a net effect of [[ ]]. This component is applied to both the estimated and calculated difference columns in Table R-3.

Incorporating this final component of a net [[ ]] bias into Table R-3 yields a net estimated change in SLMCPR from Cycle 16 to Cycle 17 of [[ ]]. This result agrees very well with both the

(1) net differences of [[ ]] in calculated SLMCPR accounting for the individual calculated effects of the R-factor uncertainty, Reduced power uncertainties and accounting for the bias between calculated SLMCPR values and estimated values using the correlation, and

(2) actual difference of –0.035 in calculated SLMCPR observed between Cycle 16 evaluation using a R-factor uncertainty of [[ ]]and Cycle 17 using a R-factor uncertainty of [[ ]].

In summary, the changes observed in both DLO and SLO SLMCPR calculated values between Cycle 16 and Cycle 17 have been evaluated and shown to be expected and reasonable. The resultant 1.06 SLMCPR value being requested in the June 4, 2004 application is therefore confirmed to be appropriate for Cycle 17 operation.

Table R-1 Cycle 16 and Cycle 17 SLMCPR Comparison

SLMCPR Parameter	Cycle 16 MOC GETAB Bases	Cycle 17 BOC Revised/Reduced Bases	Cycle 17 to Cycle 16 Difference
Product of bundle-by-bundle MCPR distribution and the bundle pin-by-pin power/R-factor distribution	[[		]]
DLO SLMCPR	[[	]]	**- 0.035**
SLO SLMCPR	[[	]]	**- 0.037**

Table R-2 Cycle 17 BOC SLMCPR vs Uncertainty Parameters

Description	R-factor Uncertainty (%)	Power Uncertainty	Calculated SLMCPR
Vary R-factor Uncertainty	[[ ]]	GETAB	[[ ]]
Vary R-factor Uncertainty	[[ ]]	GETAB	[[ ]]
Delta			[[ ]]
Vary R-factor Uncertainty	[[ ]]	Revised/Reduced	[[ ]]
Vary R-factor Uncertainty	[[ ]]	Revised/Reduced	[[ ]]
Delta			[[ ]]
Vary Power Uncert.	[[ ]]	GETAB	[[ ]]
Vary Power Uncert.	[[ ]]	Revised/Reduced	[[ ]]
Delta			[[ ]]
Vary Power Uncert.	[[ ]]	GETAB	[[ ]]
Vary Power Uncert.	[[ ]]	Revised/Reduced	[[ ]]
Delta			[[ ]]

Table R-3 Cycle 16 to Cycle 17 DLO SLMCPR Change Summary

SLMCPR Parameter	Cycle 16 (MOC)	Cycle 17 (BOC)	Estimated Effect on Cycle 17 SLMCPR	Calculated Effect on Cycle 17 SLMCPR
1. Product of bundle-by-bundle MCPR distribution and the bundle pin-by-pin power/R-factor distribution	[[	]]	Values are essentially the same (No significant effect)	Values are essentially the same (No significant effect)
2. R-factor Uncertainty	[[			]]
3. Applied Methodology and Power Uncertainties	GETAB	Revised / Reduced Power	[[	]]
4. Adjustment of results to Correlation Estimate Bias (See Table R-4)	GETAB Correlation Parameters	Revised / Reduced Power Correlation Parameters	[[	]]
Total Effect to SLMCPR	N/A	N/A	[[	]]
Actual Difference (See Table R-1)			**- 0.035**	

Table R-4 DLO SLMCPR Correlation Estimate vs. Calculation

Cycle / Methodology	SLMCPR Calculation	SLMCPR Correlation Estimate	Correlation to Calculation Bias
16 / GETAB	[[		]]
17 / Revised and Reduced, [[ ]] R-factor Uncert.	[[		]]
Net effect on Cycle 16 to Cycle 17 SLMCPR Change	N/A	N/A	[[ ]]

ATTACHMENT 3 to JAFP-04-

REVISED TECHNICAL SPECIFICATION PAGE (RETYPED)

Safety Limit Minimum Critical Power Ratio (SLMCPR)

Entergy Nuclear Operations, Inc.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

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 ≤ 25% RTP.

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

MCPR shall be ≥ 1.07 for two recirculation loop operation or ≥ 1.09 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 within 2 hours:

2.2.1 Restore compliance with all SLs; and

2.2.2 Insert all insertable control rods.

ATTACHMENT 4 to JAFP-04-

TECHNICAL SPECIFICATION PAGE (MARK-UP)

Safety Limit Minimum Critical Power Ratio (SLMCPR)

Entergy Nuclear Operations, Inc.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

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 ≤ 25% 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~~ 1.07 for two recirculation loop operation or ≥ ~~1.10~~ 1.09 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 within 2 hours:

2.2.1 Restore compliance with all SLs; and

2.2.2 Insert all insertable control rods.

Affidavit

I, Margaret E. Harding, state as follows:

(1) I am Manager, Fuel Engineering Services, Global Nuclear Fuel – Americas, L.L.C. ("GNF-A") and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in the attachment, "Additional Information Regarding the Cycle Specific SLMCPR for FitzPatrick Cycle 17" dated September 17, 2004. GNF proprietary information is indicated by enclosing it in double brackets. In each case, the superscript notation [3] refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.

(3) In making this application for withholding of proprietary information of which it is the owner or licensee, GNF-A relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4) and 2.390(a)(4) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information," and some portions also qualify under the narrower definition of "trade secret," within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GNF-A's competitors without license from GNF-A constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information which reveals cost or price information, production capacities, budget levels, or commercial strategies of GNF-A, its customers, or its suppliers;

d. Information which reveals aspects of past, present, or future GNF-A customer–funded development plans and programs, of potential commercial value to GNF-A;

e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a. and (4)b., above.

(5) To address the 10 CFR 2.390 (b) (4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GNF-A, and is in fact so held. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in (6) and (7) following. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GNF-A, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or subject to the terms under which it was licensed to GNF-A. Access to such documents within GNF-A is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GNF-A are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information identified in paragraph (2) is classified as proprietary because it contains details of GNF-A's fuel design and licensing methodology.

The development of the methods used in these analyses, along with the testing, development and approval of the supporting methodology was achieved at a significant cost, on the order of several million dollars, to GNF-A or its licensor.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GNF-A's competitive position and foreclose or reduce the availability of profit–making opportunities. The fuel design and licensing methodology is part of GNF-A's comprehensive BWR safety and technology

base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC–approved methods.

The research, development, engineering, analytical, and NRC review costs comprise a substantial investment of time and money by GNF-A or its licensor.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GNF-A's competitive advantage will be lost if its competitors are able to use the results of the GNF-A experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GNF-A would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GNF-A of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining these very valuable analytical tools.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed at Wilmington, North Carolina, this 17th day of September 2004.

Margaret E. Harding

Margaret E. Harding
Global Nuclear Fuel – Americas, LLC

ATTACHMENT 6 to JAFP-04-

GNF SUMMARY OF TECHNICAL BASIS FOR REVISED SLMCPR VALUES

(Non-Proprietary Version)

Entergy Nuclear Operations, Inc.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

Additional Information Regarding the Cycle Specific SLMCPR for FitzPatrick Cycle 17

September 17, 2004

Proprietary Information Notice

This document is the GNF non-proprietary version of the GNF proprietary document. From the GNF proprietary version, the information denoted as GNF proprietary (enclosed in double brackets) was deleted to generate this version.

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] Letter, Jason S. Post (GE Energy) to U.S. Nuclear Regulatory Commission Document Control Desk, "Part 21 Reportable Condition and 60-Day Interim Report Notification: Non-conservative SLMCPR", MFN-04-081, August 24, 2004.

[7] Letter, Glen A. Watford (GNF-A) to U. S. Nuclear Regulatory Commission Document Control Desk with attention to J. Donoghue (NRC), "Final Presentation Material for GEXL Presentation – February 11, 2002", FLN-2002-004, February 12, 2002.

Discussion

The Safety Limit Minimum Critical Power Ratio (SLMCPR) evaluations for the FitzPatrick Cycle 17 were performed using NRC approved methodology and uncertainties [1]. Table 1 summarizes the relevant input parameters and results of Cycle 17 and Cycle 16 cores. Additional information is provided in response to NRC questions related to 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 to the applicable range for the R-factor methodology, are addressed in Reference [5]. Items that require a plant/cycle specific response are presented below.

Previously, the SLMCPR was calculated on the upper boundary of the power/flow operating map only at 100% flow / 100% power (rated flow/rated power), which had been shown in NEDC-32601P-A to result in conservative SLMCPR evaluation values using the same control rod pattern used for rated flow/rated power evaluations. Recent evaluations for BWR plants fueled by GNF fuel bundle designs determined that limiting control blade patterns developed for less than rated flow at rated power condition sometimes yield more limiting bundle-by-bundle MCPR distributions and/or more limiting bundle axial power shapes than the limiting control blade patterns developed for a rated flow/rated power SLMCPR evaluation, as reported in Reference [6]. Therefore, to conservatively account for operation at lower flow/rated power conditions, SLMCPR evaluations were also performed at the lowest core flow rate (80% rated flow) at rated power condition for the same three FitzPatrick Cycle 17 exposure points that were previously calculated for the rated flow/rated power evaluations. The limiting exposure point for this condition is MOC (9000 MWd/ST).

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. The impact of these parameters on the FitzPatrick Cycle 17 and Cycle 16 SLMCPR values is summarized in Table 1 and explained further in Table 3.

The core loading information for FitzPatrick Cycle 16 is provided in Figure 1. For comparison the core loading information for FitzPatrick Cycle 17 is provided in Figure 2. The impact of the fuel loading pattern differences on the calculated SLMCPR is correlated to the values of [[

]]

[[

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The uncontrolled bundle pin-by-pin power distributions were compared between the FitzPatrick Cycle 17 bundles and the Cycle 16 bundles. Pin-by-pin power distributions are characterized in terms of R-factors using the NRC approved methodology [2]. For the FitzPatrick Cycle 17 limiting case analyzed at MOC, [[

]] the FitzPatrick Cycle 17 bundles have a more peaked power distribution than the bundles used for the Cycle 16 SLMCPR analysis.

Table 1 summarizes the relevant input parameters and results of Cycle 17 evaluated at the limiting condition of 80% rated flow/rated power and both Cycle 17 and Cycle 16 at rated flow/rated power for comparison. The SLMCPR values were calculated for FitzPatrick using uncertainties that have been previously reviewed and approved by the NRC as listed in Table 2a and described in Reference [1] and where warranted, higher plant-cycle-specific uncertainties as listed in Table 2b. In addition to using a larger uncertainty for the GEXL R-factor to account for increased channel bow consistent with current GNF fuel operation, for the lower flow evaluations, the Core Flow Rate and Random effective TIP reading uncertainties were increased by the inverse of the core flow fraction to conservatively account for an increase in relative uncertainty that may occur as core flow decreases. Although justification may exist to continue to use the same uncertainties at lower flow as are specified for rated flow in the current GNF SLMCPR methodology, no such credit was taken for the FitzPatrick low flow Cycle 17 evaluation.

These calculations use the GEXL14 correlation for GE14 fuel. [[

]]

Table 3 provides a detailed breakdown into individual components of the SLMCPR for Cycle 17 and Cycle 16 evaluations and compares the summation of components to the calculated SLMCPR values. Estimated component values were based upon the magnitudes of components that have been observed in other plant SLMCPR evaluations. The components were added to base SLMCPR values that were calculated using a correlation that estimates SLMCPR values [[ ]], hence forward in this discussion referred to as "the correlation". The calculated SLMCPR for both the rated flow/rated power and the limiting 80% rated flow/rated power agree with the correlated values within the expected +/- 0.01 standard deviation.

For single loop operation (SLO) the calculated safety limit MCPR for the limiting case is 1.09 as determined by specific calculations for FitzPatrick Cycle 17 using the 80% rated flow/rated power initial condition at MOC. The dual loop operation (DLO) and SLO SLMCPR values calculated for FitzPatrick Cycle 17 are shown in Table 1.

Summary

The calculated 1.07 DLO SLMCPR and 1.09 SLO SLMCPR for FitzPatrick Cycle 17 are consistent with expectations [[

]] these values are appropriate when the approved methodology and the reduced uncertainties given in NEDC-32601P-A and NEDC-32694P-A are used.

Based on the information and discussion presented above, it is concluded that the calculated SLMCPR of 1.07 for DLO and 1.09 for SLO are appropriate for the FitzPatrick Cycle 17 core.

Table 1
Comparison of the FitzPatrick Cycle 17 and Cycle 16 SLMCPR

QUANTITY, DESCRIPTION	FitzPatrick Cycle 16	FitzPatrick Cycle 17	FitzPatrick Cycle 17
Number of Bundles in Core	560	560	560
Limiting Cycle Exposure Point	MOC	BOC	MOC
Cycle Exposure at Limiting Point (MWd/STU)	8000	200	9000
% Rated Flow	100	100	80
Reload Fuel Type	GE14	GE14	GE14
Latest Reload Batch Fraction, %	35.0	36.4	36.4
Latest Reload Average Batch Weight % Enrichment	4.05	4.05	4.05
Core Fuel Fraction for GE14 (%) Core Fuel Fraction for GE12 (%)	35.0 65.0	71.4 28.6	71.4 28.6
Core Average Weight % Enrichment	4.06	4.05	4.05
Core MCPR (for limiting rod pattern)	1.46	1.37	1.38
[[			]]
[[			]]
[[			]]
Power distribution methodology	GETAB NEDO-10958-A	Revised NEDC-32601P-A	Revised NEDC-32601P-A
Power distribution uncertainty	GETAB NEDO-10958-A	Reduced NEDC-32694P-A	Reduced NEDC-32694P-A
Non-power distribution uncertainty	Revised NEDC-32601P-A	Revised NEDC-32601P-A	Revised NEDC-32601P-A
Calculated Safety Limit MCPR (DLO)	**1.09**	**1.06**	**1.07**
Calculated Safety Limit MCPR (SLO)	**1.10**	**1.07**[1]	**1.09**

[1] Corrected value from initial submittal value of 1.06.

Table 2a

Standard Uncertainties

DESCRIPTION	FitzPatrick Cycle 16 100% Flow	FitzPatrick Cycle 17 100% Flow	FitzPatrick Cycle 17 80% Flow
Non-power Distribution Uncertainties	Revised NEDC-32601P-A	Revised NEDC-32601P-A	Revised NEDC-32601P-A
Core flow rate (derived from pressure drop)	2.5 DLO 6.0 SLO	2.5 DLO 6.0 SLO	2.5 DLO 6.0 SLO
Individual channel flow area	[[ ]]	[[ ]]	[[ ]]
Individual channel friction factor	5.0	5.0	5.0
Friction factor multiplier	[[ ]]	[[ ]]	[[ ]]
Reactor pressure	[[ ]]	[[ ]]	[[ ]]
Core inlet temperature	0.2	0.2	0.2
Feedwater temperature	[[ ]]	[[ ]]	[[ ]]
Feedwater flow rate	[[ ]]	[[ ]]	[[ ]]
Power Distribution Uncertainties	GETAB NEDC-32601P-A	Reduced NEDC-32694P-A	Reduced NEDC-32694P-A
GEXL R-factor	[[ ]]	[[ ]]	[[ ]]
Random effective TIP reading	1.2 DLO 2.85 SLO	1.2 DLO 2.85 SLO	1.2 DLO 2.85 SLO
Systematic effective TIP reading	8.6	[[ ]]	[[ ]]
Integrated effective TIP reading	N/A	[[ ]]	[[ ]]
Bundle power	N/A	[[ ]]	[[ ]]
Effective total bundle power uncertainty	4.3	[[ ]]	[[ ]]

Table 2b

Exceptions to the Standard Uncertainties Used in FitzPatrick Cycle 17

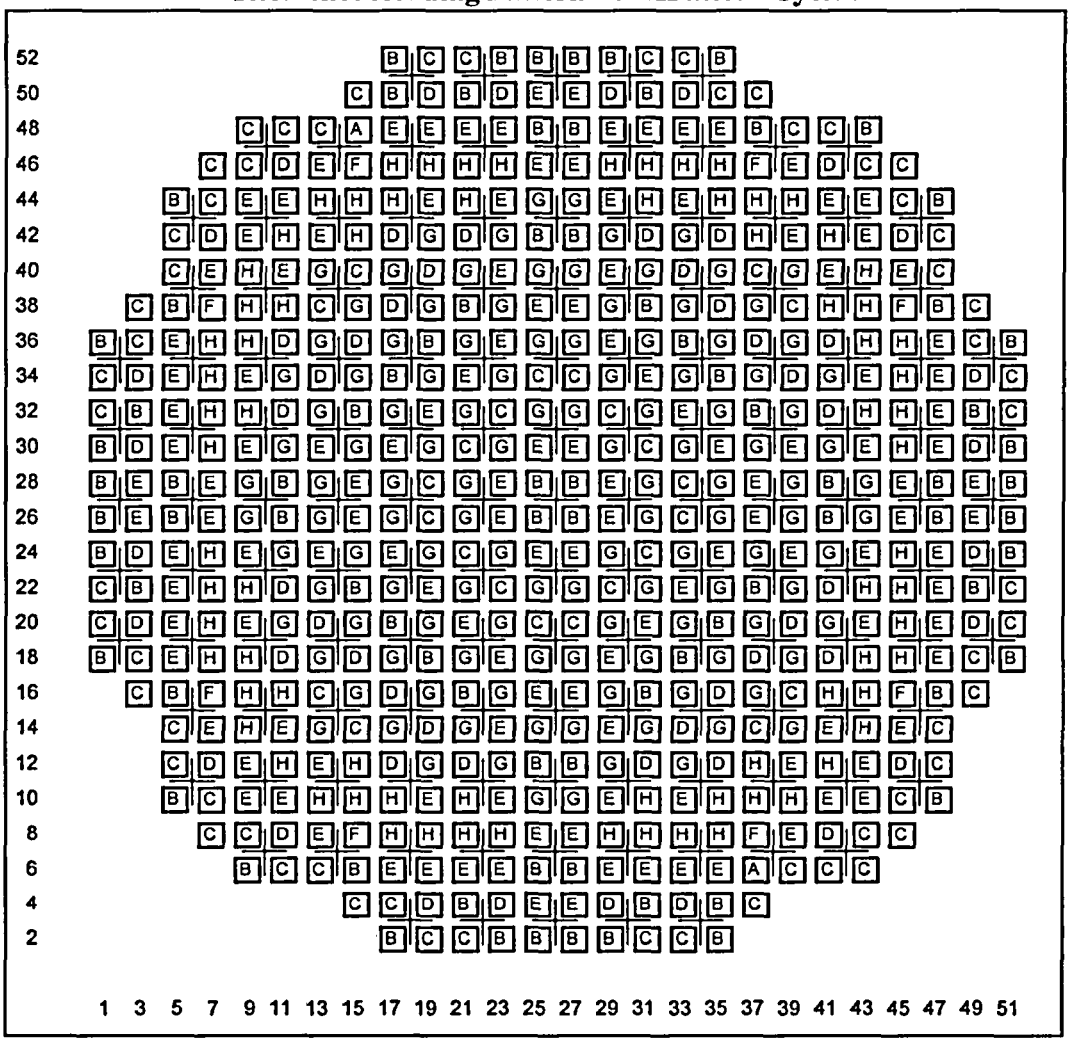
Core Flow Rate	[[ ]]
GEXL R-factor	[[ ]]
Random effective TIP reading	[[ ]]

Table 3

Monte Carlo Calculated DLO SLMCPR vs. Estimate by Component Parameter

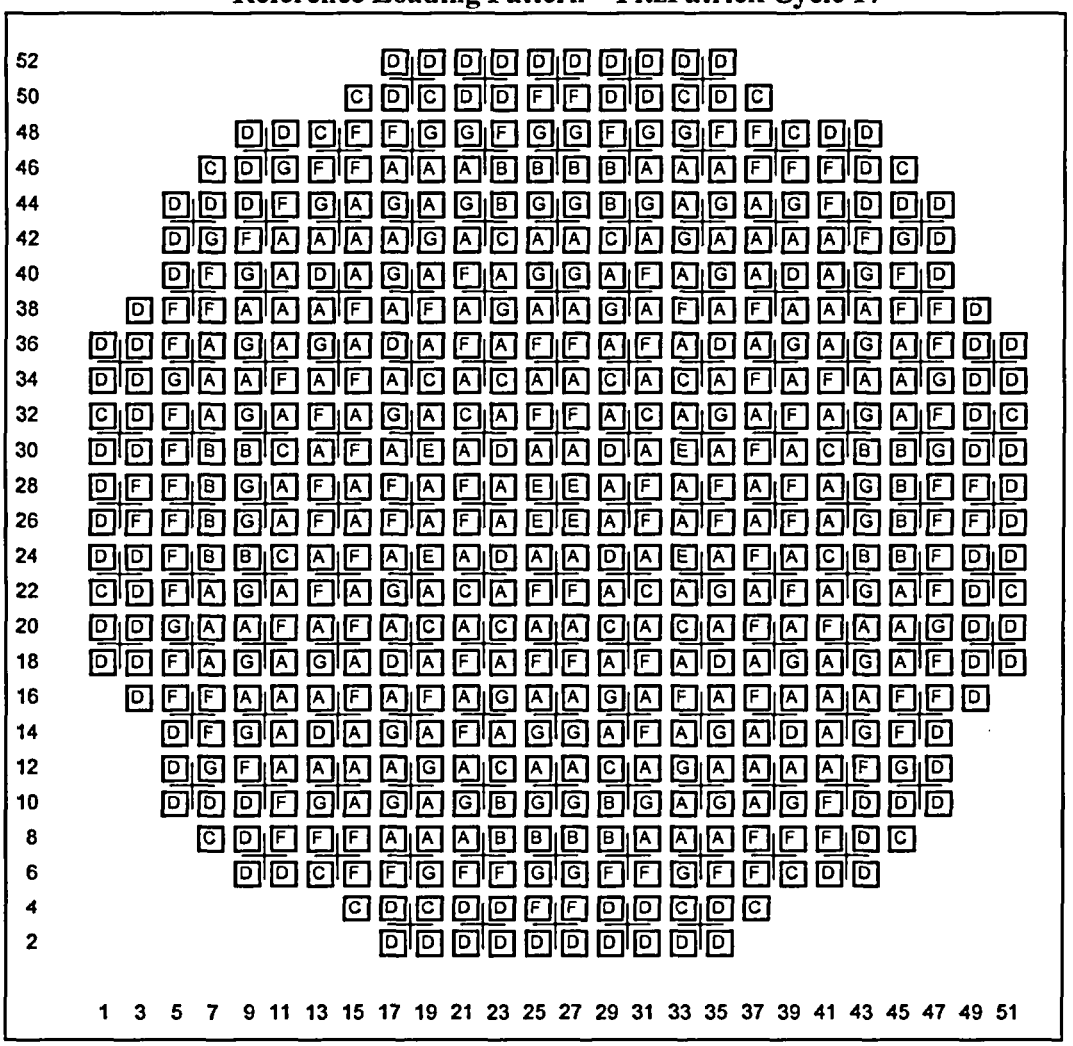
Component Parameter	FitzPatrick Cycle 16 100% Flow	FitzPatrick Cycle 17 100% Flow	FitzPatrick Cycle 17 80% Flow
Base SLMCPR Estimate – Using Correlation (GETAB Uncertainties for Cycle 16, Revised Meth. and Reduced Power Uncertainties for Cycle 17)	[[		]]
Core Flow and Random effective TIP reading Uncertainty Increase	N/A	N/A	[[ ]]
R-factor Uncertainty Increase from 1.6 to 2.0%	N/A	[[ ]]	[[ ]]
Total Estimated SLMCPR	[[		]]
Calculated SLMCPR	[[		]]
[redacted]	[redacted]	[redacted]	[redacted]
Calculated – Estimated Delta	[[		]]

Figure 1
Reference Loading Pattern – FitzPatrick Cycle 16



Code	Bundle Name	Number Loaded	Cycle Loaded
A	GE12-P10DSB412-17GZ-100T-150-T	2	13
B	GE12-P10DSB407-14G6.0-100T-150-T	82	14
C	GE12-P10DSB407-17GZ-100T-150-T	84	14
D	GE12-P10DSB405-16GZ-100T-150-T-2396	56	15
E	GE12-P10DSB405-17GZ-100T-150-T-2395	132	15
F	GE12-P10DSB407-14G6.0-100T-150-T	8	15
G	GE14-P10DNAB405-16GZ-100T-150-T-2551	120	16
H	GE14-P10DNAB405-16GZ-100T-150-T-2552	76	16

Figure 2
Reference Loading Pattern – FitzPatrick Cycle 17



Code	Bundle Name	Number Loaded	Cycle Loaded
A	GE14-P10DNAB405-16GZ-100T-150-T6-2794	180	17
B	GE14-P10DNAB405-15G6.0-100T-150-T6-2793	24	17
C	GE12-P10DSB405-16GZ-100T-150-T6-3859	40	15
D	GE12-P10DSB405-17GZ-100T-150-T6-3858	112	15
E	GE12-P10DSB407-14G6.0-100T-150-T6	8	15
F	GE14-P10DNAB405-16GZ-100T-150-T6-2562	120	16
G	GE14-P10DNAB405-16GZ-100T-150-T6-2563	76	16