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Energy to Serve Your WorldSM

HL-6152

November 26, 2001

Docket No. 50-366

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

Edwin I. Hatch Nuclear Plant - Unit 2
Safety Limit Minimum Critical Power Ratios (SLMCPR),
Submittal of Additional Information

Ladies and Gentlemen:

By letter dated May 23, 2001, Southern Nuclear Operating Company (SNC) proposed a change to the Plant Hatch Unit 2 Technical Specifications, Appendix A to Operating License NPF-5, to change the Safety Limit Minimum Critical Power Ratios (SLMCPR) in Technical Specification (TS) 2.1.1.2 to reflect results of a cycle-specific calculation performed for Unit 2 Operating Cycle 17, using NRC-approved methodology for determining SLMCPRs. The information supporting the proposed change was provided by Global Nuclear Fuel and considered to be Global Nuclear Fuel proprietary information. In subsequent discussions, NRC staff requested that the Proprietary version of this information to be revised to limit the amount of information designated to be proprietary. Global Nuclear Fuel has provided the revised designation of information and it has been incorporated into the Proprietary Basis for Change in Enclosure 1. It is requested that this information, considered to be Global Nuclear Fuel proprietary information as described in 10 CFR 2.790(a)(4) and the attached affidavit (Attachment 1), be withheld from public disclosure. Proprietary text is denoted in Enclosure 1 by enclosure in double brackets. A nonproprietary version of Enclosure 1 is attached for public disclosure (Attachment 2).

Mr. H. L. Sumner, Jr. states he is Vice President of Southern Nuclear Operating Company and is authorized to execute this oath on behalf of Southern Nuclear Operating Company, and to the best of his knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

H. L. Sumner, Jr.

Sworn to and subscribed before me this 26th day of November 2001.

Notary Public

Commission Expiration Date: 5/25/2003

IFL/eb

AP01

U.S. Nuclear Regulatory Commission

Page 2

November 26, 2001

Enclosure: Proprietary Version of the Basis for Change Request

Attachments:

1. Affidavit of Proprietary Information
2. Nonproprietary Version of the Basis for Change Request

cc: Southern Nuclear Operating Company
Mr. P. H. Wells, Nuclear Plant General Manager
SNC Document Management (R-Type A02.001)

U.S. Nuclear Regulatory Commission, Washington, D.C.
Mr. L. N. Olshan, Project Manager - Hatch

U.S. Nuclear Regulatory Commission, Region II
Mr. L. A. Reyes, Regional Administrator
Mr. J. T. Munday, Senior Resident Inspector - Hatch

State of Georgia
Mr. L. C. Barrett, Commissioner - Department of Natural Resources

ATTACHMENT 1

**Edwin I. Hatch Nuclear Plant - Unit 2
Request to Revise Technical Specifications:
Safety Limit Minimum Critical Power Ratios (SLMCPR)**

Affidavit of Proprietary Information



Global Nuclear Fuel

A Joint Venture of GE, Toshiba, & Hitachi

Affidavit

I, **Glen A. Watford**, being duly sworn, depose and 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 Hatch 2 Cycle 17,” November 6, 2001.
- (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 2.790(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) 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.

Affidavit

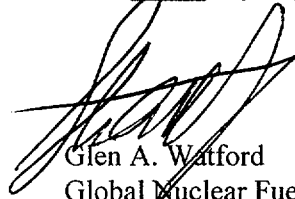
State of North Carolina)
County of New Hanover)

SS:

Glen A. Watford, being duly sworn, deposes and says:

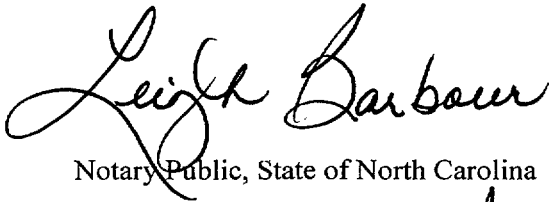
That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge, information, and belief.

Executed at Wilmington, North Carolina, this 8th day of November, 2001



Glen A. Watford
Global Nuclear Fuel – Americas, LLC

Subscribed and sworn before me this 8th day of November, 2001



Notary Public, State of North Carolina

My Commission Expires February 6, 2006

ATTACHMENT 2

**Edwin I. Hatch Nuclear Plant - Unit 2
Request to Revise Technical Specifications:
Safety Limit Minimum Critical Power Ratios (SLMCPR)
Nonproprietary Version of the Basis for Change Request**

Attachment 2

Edwin I. Hatch Nuclear Plant - Unit 2 Request to Revise Technical Specifications: Safety Limit Minimum Critical Power Ratios (SLMCPR)

Nonproprietary Version of the Basis for Change Request

PROPOSED CHANGES

SNC requests that the Technical Specifications (TS) contained in Appendix A to the Plant Hatch Unit 2 Operating License NPF-5 be amended to revise Technical Specifications Section 2.1.1.2 to reflect changes in the Safety Limit Minimum Critical Power Ratios (SLMCPR), which are based on Global Nuclear Fuel's (GNF) application of GE's NRC-approved methodology for calculating SLMCPRs.

BACKGROUND

The proposed changes involve revising the SLMCPRs contained in Section 2.1.1.2 of the Plant Hatch Unit 2 TS. In the course of calculating a cycle-specific SLMCPR for another utility, it was determined that the GESTAR II (*General Electric Standard Application for Reactor Fuel*, NEDE-24011-P-A-11¹, and U. S. Supplement NEDE-24011-P-A-11-US¹, November 17, 1995) fuel type generic SLMCPR may be non-conservative when applied to some core and fuel designs. To rectify this deficiency, GE proposed, and the NRC accepted, a new procedure for determining cycle-specific SLMCPRs (Reference 1). GE also proposed, and the NRC has accepted, the application of reduced power distribution uncertainties in the calculation of SLMCPRs for plants using the 3D MONICORE model in the process computer for core monitoring (Reference 1).

DISCUSSION OF THE PROPOSED CHANGE

GNF's calculation for the plant-specific SLMCPR values for Unit 2 Cycle 17 is based upon NRC-approved methods and procedures for calculating SLMCPRs each operating cycle for plants using the 3D MONICORE system. The procedures incorporate cycle-specific parameters into the analysis, including the reference loading pattern and actual bundle parameters, which are evaluated at the projected exposure distribution based on projected control blade patterns for the rodged burn through the cycle. The analysis considers the full cycle exposure range to determine the most limiting point(s). At these exposure point(s), conservative variations of the projected control blade patterns are used to maximize the number of bundles that contribute rods calculated to be susceptible to boiling transition in order to obtain a conservative calculation of the SLMCPR. The calculation also includes the application of reduced power distribution uncertainties associated with the 3D MONICORE core monitoring system. This calculation resulted in a Cycle 17 SLMCPR value of 1.08 for dual loop operation (DLO), and 1.10 for single loop operation (SLO). The current Unit 2 SLMCPR TS value for Cycle 16 DLO is 1.07; the SLO value is 1.08.

¹Revision 11 has since been superseded by Revision 14, dated June, 2000. This revision incorporates the material contained in Reference 1.

EVALUATION

The proposed changes revise the Technical Specifications to reflect changes in the SLMCPRs due to the plant-specific evaluation performed by GNF for Unit 2, Reload 16, Cycle 17. The new SLMCPRs were calculated using NRC-approved methods and procedures (Reference 1). The procedures incorporate plant cycle specific parameters which include: 1) the expected reference loading pattern, 2) conservative variations of projected control blade patterns, 3) the actual bundle parameters, 4) the full cycle exposure range, and 5) reduced power distribution uncertainties associated with the process computer system.

The SLMCPR is set such that no mechanistic fuel damage is calculated to occur if the limit is not violated. Since the parameters which result in fuel damage are not directly observable during reactor operation, the thermal and hydraulic conditions resulting in a departure from nucleate boiling have been used to mark the beginning of the region where fuel damage could occur. Although it is recognized that a departure from nucleate boiling would not necessarily result in damage to BWR fuel rods, the critical power at which boiling transition is calculated to occur has been adopted as a convenient limit. However, the uncertainties in monitoring the core operating state and in the procedures used to calculate the critical power result in an uncertainty in the value of the critical power. Therefore, the SLMCPR is defined as the CPR in the limiting fuel assembly for which more the 99.9% of the fuel rods in the core are expected to avoid boiling transition considering the power distribution within the core and all uncertainties. The SLMCPRs for Cycle 17 at Unit 2 are 1.08 for dual loop operation and 1.10 for single loop operation.

Comparison of Hatch Unit 2 Cycle 17 and 16 SLMCPR Values

Table 1 summarizes the relevant input parameters and results of the SLMCPR determination for the Hatch-2 Cycle 17 and 16 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 Hatch-2 Cycle 17 and Cycle 16 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.

[[]]

The uncontrolled bundle pin-by-pin power distributions were compared between the Hatch-2 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 Hatch-2 Cycle 17 limiting case analyzed at EOC-2K, [[]] the Hatch-2 Cycle 17 bundles are flatter than the bundles used for the Cycle 16 SLMCPR analysis.

Summary

[[] have been used to compare quantities that impact the calculated SLMCPR value. Based on these comparisons, the conclusion is reached that the Hatch-2 Cycle 17 core/cycle has a flatter core MCPR distribution [[]] and flatter in-bundle power distributions [[]] than what was used to perform the Cycle 16 SLMCPR evaluation.

The calculated 1.08 Monte Carlo SLMCPR for Hatch-2 Cycle 17 is consistent with what one would expect [[]] 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 Hatch-2 Cycle 17 core is appropriate. It is reasonable that this value is 0.01 higher than the 1.07 value calculated for the previous cycle.

For single loop operations (SLO) the calculated safety limit MCPR for the limiting case is 1.10 as determined by specific calculations for Hatch-2 Cycle 17.

Table 2
Comparison of the Hatch-2 Cycle 17 and Cycle 16 SLMCPR

QUANTITY, DESCRIPTION	Hatch-2 Cycle 16	Hatch-2 Cycle 17
Number of Bundles in Core	560	560
Limiting Cycle Exposure Point	EOC-1.0K	EOC-2.0K
Cycle Exposure at Limiting Point [MWd/STU]	12050	10145
Reload Fuel Type	GE13	GE13
Latest Reload Batch Fraction [%]	34.3%	32.9%
Latest Reload Average Batch Weight % Enrichment	3.78%	3.78%
Batch Fraction for GE13	99.3%	99.3%
Batch Fraction for GE14	0.7%	0.7%
Core Average Weight % Enrichment	3.67%	3.74%
Core MCPR (for limiting rod pattern)	1.29	1.28
[[]]
[[]]
Power distribution uncertainty	Reduced NEDC-32694P-A	Reduced NEDC-32694P-A
Non-power distribution uncertainty	Revised NEDC-32601P-A	Revised NEDC-32601P-A
Calculated Safety Limit MCPR	1.07	1.08

CONCLUSION

Based on all of the information presented above, it is concluded that the calculated SLMCPR values of 1.08 and 1.10, for dual loop and single loop operation, respectively, for the Hatch-2 Cycle 17 core are appropriate.

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.