

Exelon Generation
4300 Winfield Road
Warrenville, IL 60555

www.exeloncorp.com

10 CFR 50.90

RS-02-145

August 15, 2002

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

Quad Cities Nuclear Power Station, Unit 1
Facility Operating License No. DPR-29
NRC Docket No. 50-254

Subject: Supplemental Request for Technical Specifications Change for Minimum Critical Power Ratio Safety Limit

Reference: Letter from P. R. Simpson (Exelon Generation Company, LLC) to U. S. NRC, "Request for Technical Specifications Change for Minimum Critical Power Ratio Safety Limit," dated May 30, 2002

In the above referenced letter, Exelon Generation Company, LLC (EGC) submitted a request for a change to the operating license and Technical Specifications (TS) for Quad Cities Nuclear Power Station (QCNPS), Unit 1. The proposed change revises the values of the Safety Limit for the Minimum Critical Power Ratio (SLMCP) in TS Section 2.1.1, "Reactor Core SLs," for Unit 1 Cycle 18 for both two loop operation and single loop operation to 1.10 and 1.11, respectively.

On July 24, 2002, Global Nuclear Fuel (GNF) informed EGC of an error in the determination of the SLMCP limits for QCNPS Unit 1 Cycle 18. Specifically, the bias related to the GEXL14 correlation for top peaked power shapes was not properly applied to all GE14 fuel types.

GNF has re-calculated the SLMCP values for QCNPS Unit 1 Cycle 18 using the revised safety methodology described in NEDC-32601P-A, "Methodology and Uncertainties for Safety Limit MCP Evaluation," and the results are provided in Attachment A. The results do not change the SLMCP values that were proposed in the above referenced letter.

Some of the information contained in Attachment A is classified as proprietary to our fuel supplier, GNF, and is identified as text contained between opening double brackets ([]) and closing double brackets (]). The proprietary information is of the type that GNF maintains in confidence and withholds from public disclosure. It has been handled and classified as proprietary as supported by the affidavit in Attachment C. EGC hereby requests that this information be withheld from public disclosure in accordance with the

APP01

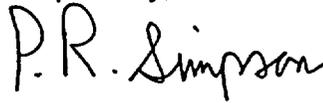
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provisions of 10 CFR 2.790, "Public inspections, exemptions, requests for withholding." Attachment B provides an edited, non-proprietary version of the information in Attachment A.

EGC has reviewed the information supporting a finding of no significant hazards consideration that was previously provided to the NRC in Attachment C of the above referenced letter. The supplemental information provided in this submittal does not affect the bases for concluding that the proposed TS change does not involve a significant hazards consideration.

Should you have any questions related to this letter, please contact Mr. Kenneth M. Nicely at (630) 657-2803.

Respectfully,



P. R. Simpson
Manager – Licensing
Mid-West Regional Operating Group

Attachments:

- Attachment A: Global Nuclear Fuel Additional Information Regarding the Cycle Specific SLMCPR for Quad Cities Unit 1 Cycle 18 (PROPRIETARY VERSION)
- Attachment B: Global Nuclear Fuel Additional Information Regarding the Cycle Specific SLMCPR for Quad Cities Unit 1 Cycle 18 (NON-PROPRIETARY VERSION)
- Attachment C: Global Nuclear Fuel Affidavit

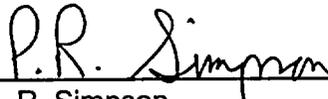
cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Quad Cities Nuclear Power Station
Office of Nuclear Facility Safety – Illinois Department of Nuclear Safety

STATE OF ILLINOIS)
COUNTY OF DUPAGE)
IN THE MATTER OF)
EXELON GENERATION COMPANY, LLC) Docket Number
QUAD CITIES NUCLEAR POWER STATION, UNIT 1) 50-254

SUBJECT: Supplement to Request for Technical Specifications Change for Minimum Critical Power Ratio Safety Limit

AFFIDAVIT

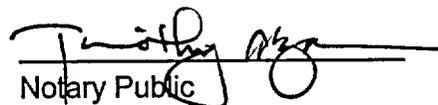
I affirm that the content of this transmittal is true and correct to the best of my knowledge, information and belief.



P. R. Simpson
Manager – Licensing
Mid-West Regional Operating Group

Subscribed and sworn to before me, a Notary Public in and
for the State above named, this 15th day of
August, 2002





Notary Public

Attachment B

**Quad Cities Nuclear Power Station, Unit 1
Supplement to Request for Technical Specifications
Change for Minimum Critical Power Ratio Safety Limit**

**Global Nuclear Fuel Additional Information Regarding the Cycle
Specific SLMCPR for Quad Cities Unit 1 Cycle 18
(NON-PROPRIETARY VERSION)**

Attachment B

**Quad Cities Nuclear Power Station, Unit 1
Supplement to Request for Technical Specifications
Change for Minimum Critical Power Ratio Safety Limit**

**Global Nuclear Fuel Additional Information Regarding the Cycle
Specific SLMCPR for Quad Cities Unit 1 Cycle 18
(NON-PROPRIETARY 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 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.
- [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 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] GEXL96 Correlation for ATRIUM-9B Fuel, NEDC-32981P, Revision 0, September 2000.
- [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.

Comparison of Quad Cities Unit 1 SLMCPR Values for Cycles 18 and 17, 17A

Table 1 summarizes the relevant input parameters and results of the SLMCPR determination for the Quad Cities Unit 1 Cycle 18 and 17 cores. The SLMCPR evaluations were performed using NRC-approved methods and uncertainties^[1], supplemented with Quad Cities Unit 1 specific uncertainties as indicated in Table 2. These calculations use the GEXL14 correlation for GE14 fuel and GEXL96^[6] for the SPC fuel. The GEXL14 bias and uncertainty values used in confirming the DLO and SLO SLMCPR values for Cycle 18 of Quad Cities Unit 1 are the higher values indicated on sheet 35 of the presentation materials attached to Reference [7]. The SLMCPR evaluations for Cycles 17 and 17A were performed by SPC. The quantities that have been shown to have some impact on the determination of the safety limit MCPR (SLMCPR) are provided.

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.

[[]]

[[]]
[[]]

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. The calculated 1.10 Monte Carlo SLMCPR for Quad Cities Unit 1 Cycle 18 is consistent with what one would expect [[]]

Based on all of the facts, observations and arguments presented above, it is concluded that the calculated SLMCPR value of 1.10 for the Quad Cities Unit 1 Cycle 18 core is appropriate.

For single loop operations (SLO) the calculated safety limit MCPR for the limiting case is 1.11 as determined by specific calculations for Quad Cities Unit 1 Cycle 18.

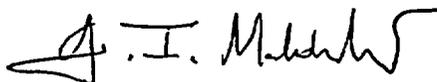
Supporting Information

The following information is provided in response to NRC questions on similar submittals regarding changes in Technical Specification values of SLMCPR. NRC questions pertaining to how GE14 applications satisfy the conditions of the NRC SER^[1] have been addressed in Reference [4]. Other generically applicable questions related to application of the GEXL14 correlation and the applicable range for the R-factor methodology are addressed in References [5] and [7]. Only those items that require a plant/cycle specific response are presented below since all the others are contained in the references that have already been provided to the NRC.

The core loading information for Quad Cities Unit 1 Cycles 17A and 18 is provided in Figures 1 and 2, respectively. The impact of the fuel loading pattern differences on the calculated SLMCPR is correlated to the values of [[]]

The power and non-power distribution uncertainties that are used in the analyses are indicated in Table 2. The referenced document numbers have previously been reviewed and approved by the NRC. The SER (Reference [1]) specifically provides that higher uncertainty values be used when necessary as was the case for this SLMCPR evaluation for Quad Cities Unit 1 Cycle 18.

Prepared by:



G. I. Maldonado
Technical Program Manager

Verified by:



H. Zhang
Technical Program Manager

Table 1
Comparison of the Quad Cities Unit 1 Cycle 18 and Cycle 17, 17A SLMCPR

| QUANTITY, DESCRIPTION | Quad Cities Unit 1 Cycle 17 | Quad Cities Unit 1 Cycle 17A | Quad Cities Unit 1 Cycle 18 |
|--|-----------------------------------|------------------------------------|-----------------------------------|
| Number of Bundles in Core | 724 | 724 | 724 |
| Limiting Cycle Exposure Point | N/A | N/A | EOR-1.5K |
| Cycle Exposure at Limiting Point [MWd/MTU] | N/A | N/A | 15500 |
| Reload Fuel Type | ATRIUM-9B | ATRIUM-9B | GE14 |
| Latest Reload Batch Fraction [%] | 32.6% | 0% | 40.9% |
| Latest Reload Average Batch Weight % Enrichment | 3.82% | 0% | 4.10% |
| Batch Fraction for GE14 | 0% | 0% | 40.9% |
| Batch Fraction for ATRIUM-9B | 60.1% | 60.1% | 59.1% |
| Batch Fraction for GE10 | 39.9% | 39.9% | 0% |
| Core Average Weight % Enrichment | 3.52% | 3.52% | 3.85% |
| Core MCPR (for limiting rod pattern) | N/A | N/A | 1.49 |
| [[| | |]] |
| [[| | |]] |
| Power distribution uncertainty | N/A | N/A | See Table 2, Column 2 |
| Non-power distribution uncertainty | N/A | N/A | See Table 2, Column 2 |
| Calculated Safety Limit MCPR | 1.11¹ | 1.15¹ | 1.10² |

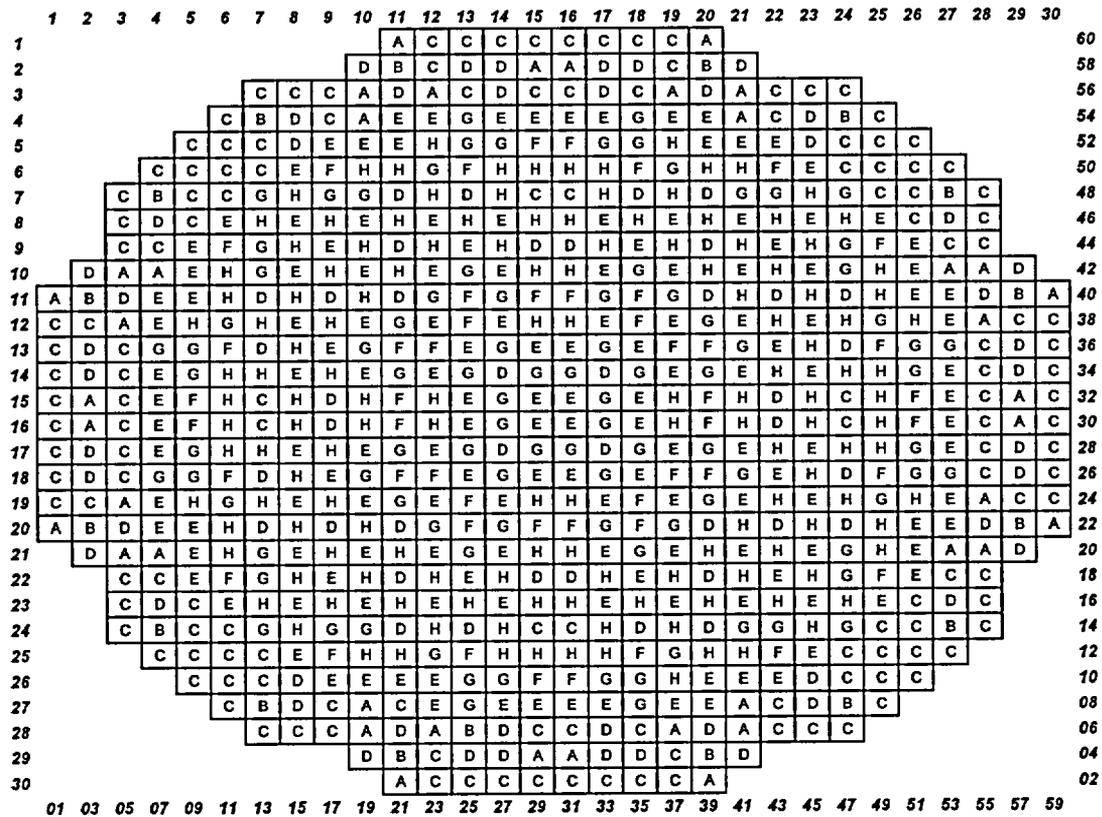
¹ SPC Safety Limit MCPR of 1.11/1.15 includes the effects of channel bow per SPC approved method.

² GNF Safety Limit MCPR of 1.10 does not include the effects of channel bow per GNF approved method. Such effects are incorporated in the Operating Limit.

Table 2 Comparison of Quad Cities Unit 1 Cycle 18 Specific Inputs to NRC-accepted Values

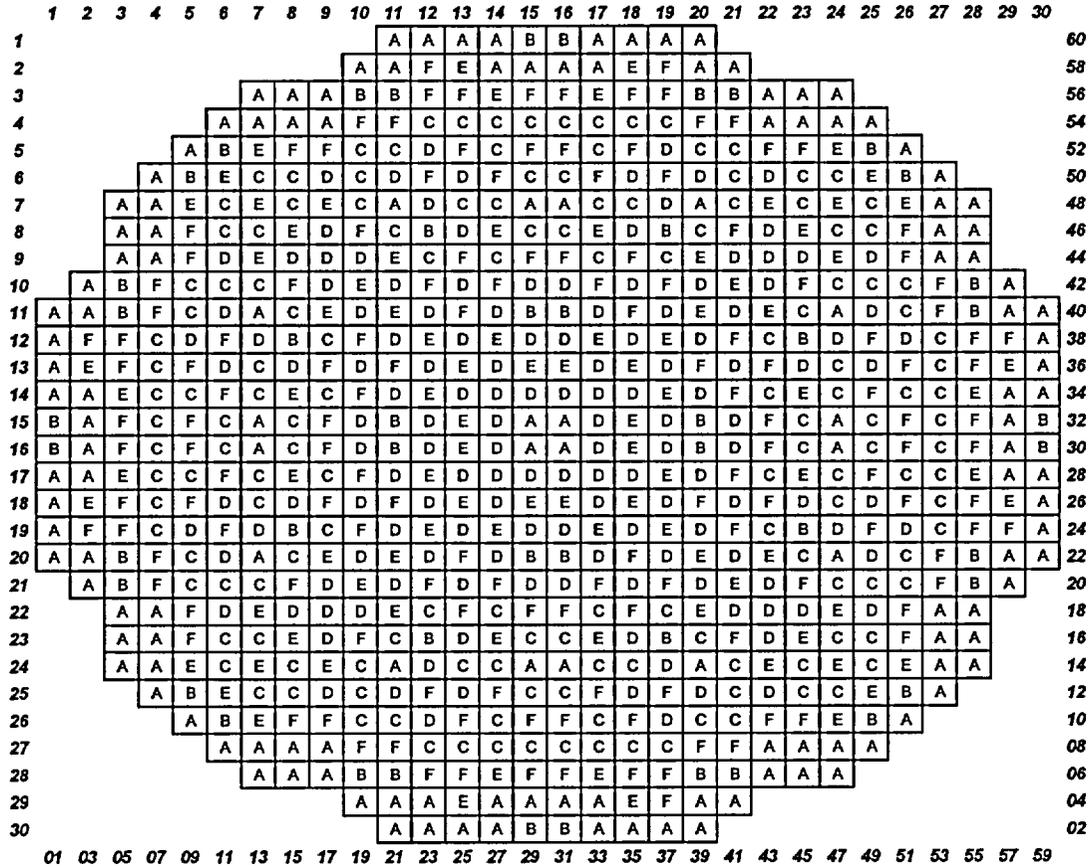
| DESCRIPTION | COLUMN 1 Uncertainty Values (%) previously accepted by NRC | COLUMN 2 Quad Cities Unit 1 Specific Values (%) |
|--|--|--|
| Non-power Distribution Uncertainties | From Table 2.1 of NEDC-32601P-A | |
| Core flow rate (derived from pressure drop) | 2.5 TLO 6.0 SLO | 2.5 TLO 6.0 SLO |
| Individual channel flow area | [[]] | [[]] |
| Individual channel friction factor | 5.0 | 5.0 |
| Friction factor multiplier | [[]] | [[]] |
| Reactor pressure | [[]] | [[]] |
| Core inlet temperature | 0.2 | 0.2 |
| Feedwater temperature | [[]] | [[]] |
| Feedwater flow rate | [[]] | 2.3 |
| Power Distribution Uncertainties consistent with the Revised Methodology of NEDC-32601P-A | GETAB uncertainties as used to produce values shown in Table 4.1 of NEDC-32601P-A | Specific Values (%) |
| GEXL R-factor | [[]] | [[]] |
| Random effective TIP reading | 1.2 TLO 2.85 SLO | 1.2 TLO 2.85 SLO |
| Systematic effective TIP reading | [[]] | [[]] |
| Integrated effective TIP reading | [[]] | [[]] |
| Bundle power | [[]] | 4.156 |
| Effective total bundle power uncertainty | [[]] | 5.0 |

Figure 1 Reference Core Loading Pattern – Cycle 17A



| Bundle Name | Number in Core | Cycle Loaded |
|--|----------------|--------------|
| A GE10-P8HXB311-8GZ-100T-145-T6-3869 | 40 | 14 |
| B GE10-P8HXB312-7GZ-100T-145-T6-3870 | 17 | 14 |
| C GE10-P8HXB332-8G5 0-100T-145-T6-3872 | 144 | 15 |
| D GE10-P8HXB333-4G5 0/6G4 0-100T-145-T6-3871 | 88 | 15 |
| E ATRM9-P9DATB348-11G6.5-SPC100T-9WR-144-T6-2444 | 152 | 16 |
| F ATRM9-P9DATB360-11G6.5-SPC100T-9WR-144-T6-2445 | 48 | 16 |
| G ATRM9-P9DATB383-11GZ-SPC100T-9WR-144-T6-2446 | 92 | 17 |
| H ATRM9-P9DATB382-12GZ-SPC100T-9WR-144-T6-2438 | 143 | 17 |
| Total | 724 | |

Figure 2 Reference Core Loading Pattern – Cycle 18



| Bundle Name | Number in Core | Cycle Loaded |
|--|----------------|--------------|
| A ATRM9-P9DATB348-11G6 5-SPC100T-9WR-144-T6-2444 | 145 | 16 |
| B ATRM9-P9DATB360-11G6 5-SPC100T-9WR-144-T6-2445 | 48 | 16 |
| C GE14-P10DNAB411-14GZ-100T-145-T6-2564 | 152 | 18 |
| D GE14-P10DNAB409-15GZ-100T-145-T6-2565 | 144 | 18 |
| E ATRM9-P9DATB383-11GZ-SPC100T-9WR-144-T6-2446 | 92 | 17 |
| F ATRM9-P9DATB382-12GZ-SPC100T-9WR-144-T6-2438 | 143 | 17 |
| Total | 724 | |

Attachment C

**Quad Cities Nuclear Power Station, Unit 1
Supplement to Request for Technical Specifications
Change for Minimum Critical Power Ratio Safety Limit**

Global Nuclear Fuel Affidavit



Global Nuclear Fuel

A Joint Venture of GE, Toshiba, & Hitachi

Affidavit

I, **Glen A. Watford**, 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 Quad Cities Unit 1 Cycle 18,” August 2, 2002.
- (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.

Affidavit

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.

Affidavit

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 2nd day of August, 2002.



Glen A. Watford
Global Nuclear Fuel – Americas, LLC