

PROPRIETARY INFORMATION – WITHHOLD UNDER 10 CFR 2.390

10 CFR 50.90

August 19, 2011

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Peach Bottom Atomic Power Station, Unit 3
Renewed Facility Operating License No. DPR-56
NRC Docket No. 50-278

Subject: Response to Request for Additional Information - License Amendment Request
Concerning Safety Limit Minimum Critical Power Ratio Change

- References:
- 1) Letter from M. D. Jesse (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "License Amendment Request - Safety Limit Minimum Critical Power Ratio Change," dated June 8, 2011
 - 2) Letter from J. D. Hughey (U.S. Nuclear Regulatory Commission) to M. J. Pacilio (Exelon Generation Company, LLC), "Peach Bottom Atomic Power Station, Unit 3 - Request for Additional Information Regarding License Amendment Request for Safety Limit Minimum Critical Power Ratio Change (TAC NO. ME6931)," dated August 11, 2011

In the Reference 1 letter, Exelon Generation Company, LLC (Exelon) requested a proposed change to modify Technical Specification (TS) 2.1.1 ("Reactor Core SLs"). Specifically, this change incorporates revised Safety Limit Minimum Critical Power Ratios (SLMCPRs) due to the cycle specific analysis performed by Global Nuclear Fuel for Peach Bottom Atomic Power Station (PBAPS), Unit 3, Cycle 19.

In the Reference 2 letter, the U.S. Nuclear Regulatory Commission requested additional information. Attached is our response to this request.

Attachment 1 contains the Exelon response to RAI-07. Attachment 2 contains the Global Nuclear Fuel's response to the remainder of the questions.

**Attachment 2 transmitted herewith contains Proprietary Information.
When separated from Attachment 2, this document is decontrolled.**

U.S. Nuclear Regulatory Commission
Response to Request for Additional Information –
License Amendment Request Concerning
Safety Limit Minimum Critical Power Ratio Change
August 19, 2011
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Attachment 2 contains information proprietary to Global Nuclear Fuel. Global Nuclear Fuel requests that the document be withheld from public disclosure in accordance with 10 CFR 2.390. Attachment 3 contains a non-proprietary version of the Global Nuclear Fuel document. An affidavit supporting this request is also contained in Attachment 3.

There are no commitments contained within this letter.

Should you have any questions concerning this letter, please contact Tom Loomis at (610) 765-5510.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 19th day of August 2011.

Respectfully,

A handwritten signature in black ink, appearing to read "Michael D. Jesse", is written over a horizontal line.

Michael D. Jesse
Director, Licensing & Regulatory Affairs
Exelon Generation Company, LLC

- Attachments:
- 1) Response to RAI-07
 - 2) Proprietary Version of Global Nuclear Fuel Letter (Charles F. Lamb (Global Nuclear Fuel) to Jim Tusar (Exelon Generation Company, LLC), dated August 12, 2011 - CFL-EXN-HE3-11-092)
 - 3) Non-Proprietary Version of Global Nuclear Fuel Letter and Affidavit

cc: USNRC Region I, Regional Administrator
USNRC Senior Resident Inspector, PBAPS
USNRC Project Manager, PBAPS
R. R. Janati, Commonwealth of Pennsylvania
S. T. Gray, State of Maryland

Attachment 1

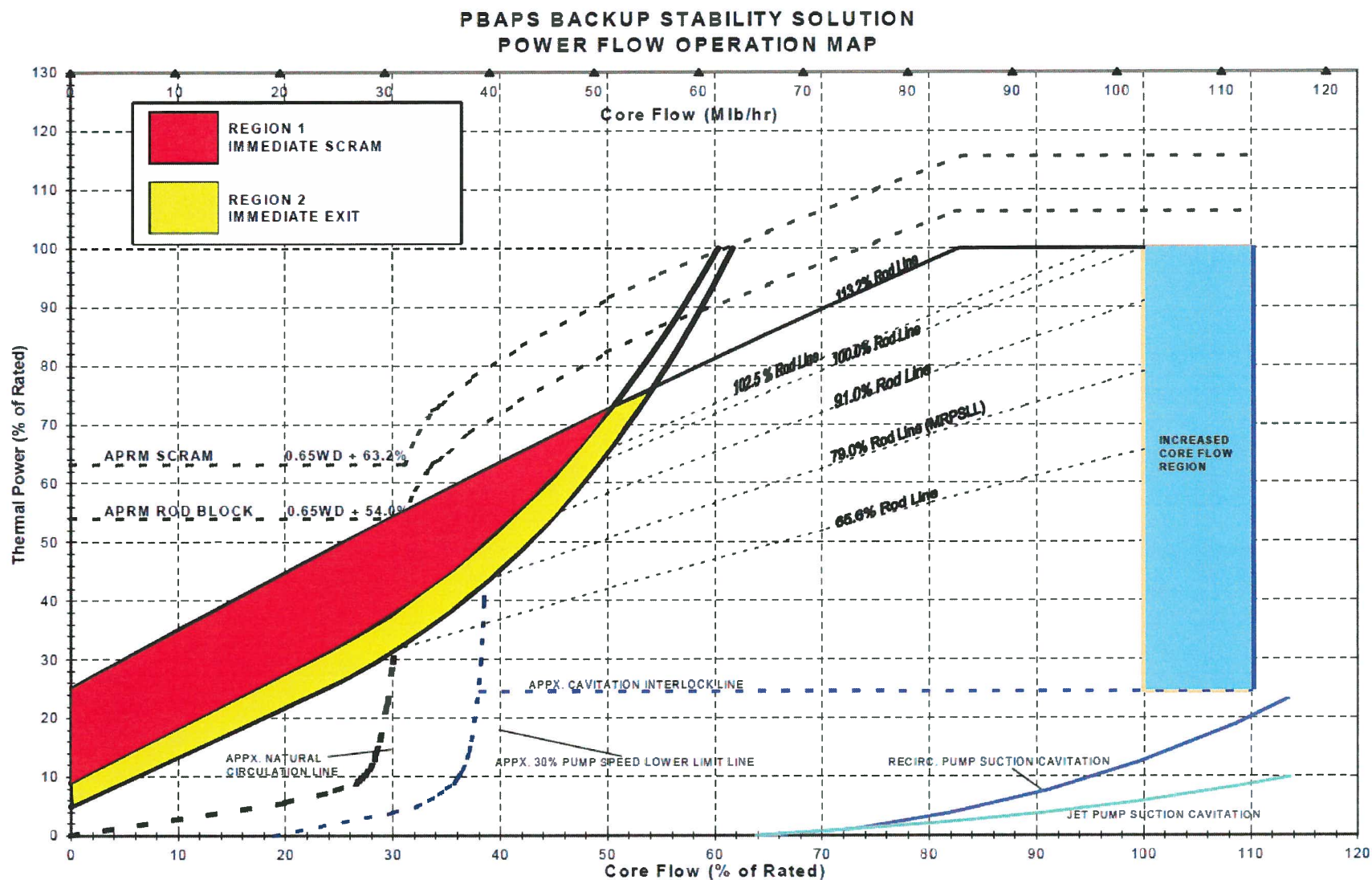
Response to RAI-07

Question:

RAI-07: Provide an updated version of the power/flow map for PBAPS Unit 3, Cycle 19, operation including stability Option III features of scram region and controlled entry region for back-up stability protection.

Response:

The following is the power/flow map for back-up stability protection at Peach Bottom Atomic Power Station (PBAPS), Unit 3. PBAPS, Unit 3 does not use the controlled entry region. Instead, this region is conservatively treated as an immediate exit region (Region 2) on the power/flow map. Region 1 on the power/flow map is the scram region.



Attachment 3

Non-Proprietary Version of Global Nuclear Fuel Letter and Affidavit

ENCLOSURE 2

CFL-EXN-HE3-11-092

Response to NRC RAIs for Peach Bottom Unit 3 Cycle 19 SLMCPR
Submittal

Non-Proprietary Information – Class I (Public)

INFORMATION NOTICE

This is a non-proprietary version of CFL-EXN-HE3-11-092 Enclosure 1, which has the proprietary information removed. Portions of the document that have been removed are indicated by white space inside an open and closed bracket as shown here [[]].

REQUEST FOR ADDITIONAL INFORMATION RELATED TO
LICENSE AMENDMENT REQUEST FOR TECHNICAL SPECIFICATION CHANGES
TO SAFETY LIMIT MINIMUM CRITICAL POWER RATIO VALUES
PEACH BOTTOM ATOMIC POWER STATION – UNIT 3
DOCKET NO. 50-278

By letter to the Nuclear Regulatory Commission (NRC) dated June 8, 2011¹, Exelon Generation Company, LLC, (Exelon) submitted a License Amendment Request for Peach Bottom Atomic Power Station (PBAPS), Unit 3. The submittal seeks to revise Technical Specification 2.1.1, "Reactor Core SLs [safety limits]" to reflect revised Safety Limit Minimum Critical Power Ratio values for Operating Cycle 19. The NRC staff has reviewed Exelon's submittal and determined that additional information, as described below, is needed to complete the review. (Note that the "Attachment 4" referenced below is the non-publicly available, proprietary version of Attachment 5 associated with the submittal dated June 8, 2011.)

¹ Agencywide Documents Access and Management System (ADAMS) Accession No. ML111600180

RAI-01:

Provide the PBAPS Unit 3 cycle-specific fuel quantity for each fuel type and state when the specific fuel types are loaded in the core (i.e., fresh, once, or twice burn) as depicted in Figure 1 of Attachment 4 for the Cycle 19 core loading diagram.

RESPONSE TO RAI-01:

Table RAI-01-1 is provided below for clarification.

Table RAI-01-1

Figure 1 of Attachment 4 (Cycle 19) Core Description – Fuel Type, Bundle Name, Number of Bundles, and Cycle Loaded

Fuel Type	Bundle Name	Number of Bundles	Cycle Loaded
	Irradiated:		
A	GE14-P10DNAB416-15GZ-100T-150-T6-2908	24	18
B	GE14-P10DNAB408-15GZ-100T-150-T6-3213	83	18
C	GNF2-P10DG2B400-13GZ-100T2-150-T6-2850-LUA	2	16
D	GE14-P10DNAB414-14GZ-100T-150-T6-3200	24	18
E	GE14-P10DNAB403-15GZ-100T-150-T6-3003	30	18
F	GE14-P10DNAB417-15GZ-100T-150-T6-3199	48	18
G	GE14-P10DNAB408-15GZ-100T-150-T6-3213	13	18
H	GE14-P10DNAB420-13GZ-100T-150-T6-3198	48	18
J	GE14-P10DNAB414-14GZ-100T-150-T6-3002	62	17
K	GE14-P10DNAB416-15GZ-100T-150-T6-2908	80	17
L	GE14-P10DNAB409-15GZ-100T-150-T6-2913	24	17
N	GE14-P10DNAB403-15GZ-100T-150-T6-3003	16	17
O	GE14-P10DNAB403-15GZ-100T-150-T6-3003	2	18
P	GE14-P10DNAB418-12GZ-100T-150-T6-3005	24	17
Q	GE14-P10DNAB412-14GZ-100T-150-T6-3004	16	17
	Fresh:		
T	GNF2-P10DG2B390-4G8.0/8G7.0/2G6.0-100T2-150-T6-3992	60	19
R	GNF2-P10DG2B399-13GZ-100T2-150-T6-3993	16	19
U	GNF2-P10DG2B404-13GZ-100T2-150-T6-3994	16	19
I	GNF2-P10DG2B395-14GZ-100T2-150-T6-3991	16	19
M	GNF2-P10DG2B390-4G8.0/8G7.0/2G6.0-100T2-150-T6-3992	96	19
S	GNF2-P10DG2B404-13GZ-100T2-150-T6-3994	64	19

RAI-02:

Provide the information to obtain a final core loading pattern as shown in Figure 1 of Attachment 4 including procedures, guidelines, criteria, and approved methodologies used for this analysis.

RESPONSE TO RAI-02:

The loading pattern is developed collaboratively by GNF and Exelon based on Exelon input. Among the inputs are:

- Cycle Energy Requirements – fuel bundle design (nuclear) and loading patterns
- Thermal Limit Margins
- Reactivity Margins – minimum shutdown margin, minimum and maximum hot excess reactivity
- Discharge Exposure Limitations and Other Limits - as established by safety analysis
- Desired Control Rod Patterns – sequences and durations
- Channel Distortion Minimization

Methods used to analyze the core-loading pattern are in accordance with GESTAR II (Reference 02-1). GESTAR II is the umbrella for all procedures, guidelines, criteria, and methodologies used for this analysis. There is no change in approved methodologies. This is a SLMCPR Technical Specifications change within approved methodologies. SLMCPR is not the primary driver in developing the fuel cycle core design. The energy plan, reactivity, and thermal margins are the primary drivers.

REFERENCES:

02-1: Global Nuclear Fuel, "General Electric Standard Application for Reactor Fuel (GESTAR II)," NEDE-24011-P-A-18 and NEDE-24011-P-A-18-US, April 2011.

RAI-03:

Provide the rationale for why a 35.1% reload batch fraction for GNF2 fuel caused the proposed SLMCPR to change by 0.02 for two recirculation loop operation and 0.03 for single recirculation loop operation for the proposed loading pattern in Figure 1 of Attachment 4.

Response to RAI-03:

Section 2.1 of Attachment 4 describes the major contributors to the SLMCPR change. In addition to the explanation provided in this section, Table 6 of Attachment 4 provides a list of the GEXL critical power uncertainties determined in accordance to the NRC-approved methodology contained in GESTAR II (Reference 03-1) along with the values actually used. PBAPS Unit 3 Cycle 19 is the first full reload of GNF2 and therefore applies a higher critical power uncertainty value to the SLMCPR calculation than the GE14 value used in the previous reload, which contributes to an increase in the SLMCPR.

REFERENCES:

- 03-1: Global Nuclear Fuel, "General Electric Standard Application for Reactor Fuel (GESTAR II)," NEDE-24011-P-A-18 and NEDE-24011-P-A-18-US, April 2011.

RAI-04:

Confirm that the fuel-related coefficients and constants are the same in the approximation of the correlation for the MCPR Importance Parameter (MIP) and the R-factor Importance Parameter (RIP) for all of the fuels shown in Figure 5 of Attachment 4.

Response to RAI-04:

All of the fuels shown in Figure 5 of Attachment 4 use the same coefficients and constants in the approximation of the correlation for the MIP and RIP. The correlation provides an estimate to check the reasonableness of the Monte Carlo result. It is not used for any other purpose. The methodology and final SLMCPR is based on the rigorous Monte Carlo analysis. A description of the correlation used for the TLO SLMCPR estimate using the MIPRIP correlation is provided below.

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Background for RAI-05.1 to RAI-05.3:

Section 2.1, "Major Contributors to SLMCPR Change," states that Table 3 presents estimated impacts on the TLO SLMCPR due to methodology deviations, penalties, uncertainties and/or deviations from approved values.

RAI-05.1:

Provide calculation details and justify that the results listed in Table 3 are conservative related to methodology deviations, penalties, uncertainties and/or deviations from approved values.

Response to RAI-05.1:

The Monte Carlo TLO and SLO results listed in Table 3 of Attachment 4 are conservative related to methodology deviations, penalties, and/or uncertainties deviations from approved values. Section 2.2 of Attachment 4 discusses the deviations from the NRC-approved values.

RAI-05.2:

Provide a qualitative explanation of the impact on the SLMCPR estimate at rated power and rated flow versus minimum core using MIPRIP correlation as described in Section 2.1 of Attachment 4.

Response to RAI-05.2:

Section 2.1 of Attachment 4 states that if the minimum core flow case is applicable, the TLO SLMCPR estimate is also provided for that case although the MIPRIP correlation is only applicable to the rated core flow cases, and that this is done only to provide some reasonable assessment basis for the minimum core flow trend. As described in Table 3 of Attachment 4, an additional uncertainty of 0.003 is applied to the estimated SLMCPR for the low core flow case as a result.

RAI-05.3:

Provide a justification that all affected factors including any fuel-related Part 21 issues are reflected in Table 3.

Response to RAI-05.3:

There are no known 10 CFR Part 21 factors that affect the PBAPS Unit 3 Cycle 19 SLMCPR calculations.

RAI-06:

Provide a reactor core map that depicts the 0.1 percent of fuel bundles that may experience boiling transition for the limiting SLMCPR case. Include information regarding the fuel bundle group, group exposure, the number of bundles, fuel type and the percent contribution to the number of fuel rods that are subjected to boiling transition.

Response to RAI-06:

The bundle groupings for the TLO SLMCPR calculations are shown in Table RAI-06-1, along with the number of bundles in the group, their contribution to percent number of rods in boiling transition (NRSBT) and the group average exposure at the analysis point. The 2-dimensional core map of the bundle groupings is shown in Figure RAI-06-1 for the upper left hand quadrant in the core. The bundle groupings for the SLO SLMCPR calculations are shown in Table RAI-06-2, along with the number of bundles in the group, their contribution to the percent NRSBT and the group average exposure at the analysis point. [[

]]. Both the TLO and SLO are [[
]].

Table RAI-06-1
Bundle Group, Number of Bundles, Bundle Type, Percent Contribution to NRSBT,
and Group Exposure for TLO

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Figure RAI-06-1
Two-Dimensional Map of the Bundle Groupings for Percent Contribution to
NRSBT for TLO

Table RAI-06-2
Bundle Group, Number of Bundles, Bundle Type, Percent Contribution to NRSBT,
and Group Exposure for SLO

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Figure RAI-06-2
Two-Dimensional Map of the Bundle Groupings for Percent Contribution to
NRSBT for SLO

ENCLOSURE 3

CFL-EXN-HE3-11-092

Affidavit

Global Nuclear Fuel – Americas

AFFIDAVIT

I, **Atul A. Karve**, state as follows:

- (1) I am Engineering Manager, Methods, Global Nuclear Fuel – Americas, LLC (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 Enclosure 1 of GNF's letter, CFL-EXN-HE3-11-092, C. Lamb (GNF-A) to J. Tusar (Exelon Nuclear), entitled "GNF Response to NRC RAIs for Peach Bottom Unit 3 Cycle 19 SLMCPR Submittal," dated August 12, 2011. GNF-A proprietary information in Enclosure 1, which is entitled "Response to NRC RAIs for Peach Bottom Unit 3 Cycle 19 SLMCPR Submittal," is identified by a dotted underline inside double square brackets. ~~[[This sentence is an example.^{3}]]~~ A "[[" marking at the beginning of a table, figure, or paragraph closed with a "]" marking at the end of the table, figure or paragraph is used to indicate that the entire content between the double brackets is proprietary. In each case, the superscript notation ^{3} refers to Paragraph (3) of 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" (Exemption 4). The material for which exemption from disclosure is here sought 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, 975 F2d 871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704 F2d 1280 (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 aspects of past, present, or future GNF-A customer-funded development plans and programs, resulting in potential products to GNF-A;

- d. 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 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. 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. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.
- (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 this methodology, along with the testing, development and approval was achieved at a significant cost to GNF-A.

The development of the fuel design and licensing methodology along with the interpretation and application of the analytical results is derived from an extensive experience database that constitutes a major GNF-A asset.

- (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 information 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.

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 on this 12th day of August 2011.

A handwritten signature in black ink, appearing to read "Atul Karve".

Atul Karve
Engineering Manager, Methods
Global Nuclear Fuel – Americas, LLC