



# PECO NUCLEAR

A Unit of PECO Energy

10 CFR 50.90

PECO Energy Company  
965 Chesterbrook Boulevard  
Wayne PA 19087-5691

June 14, 2000

Docket No. 50-277

License No. DPR-44

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

Subject: Peach Bottom Atomic Power Station, Unit 2  
License Change Application ECR 00-00759

Dear Sir/Madam:

PECO Energy Company (PECO Energy) hereby submits License Change Application ECR 00-00759, in accordance with 10 CFR 50.90, requesting a change to the Peach Bottom Atomic Power Station (PBAPS), Unit 2 Facility Operating License. This proposed change will revise Technical Specifications (TS) TS 2.1.1.2 ("Reactor Core SLs") and 5.6.5.b.2 ("Core Operating Limits Report"). These Sections will be revised to: 1) incorporate revised Safety Limit Minimum Critical Power Ratios (SLMCPRs) due to the cycle specific analysis performed by Global Nuclear Fuel (Formerly General Electric Nuclear Energy) for PBAPS, Unit 2, Cycle 14, which will include the use of the GE-14 fuel product line, 2) delete a previously added footnote to TS 2.1.1.2 which is no longer necessary, and 3) update a reference contained in TS 5.6.5.b.2 which documents an analytical method used to determine the core operating limits.

Information supporting this request is contained in Attachment 1 to this letter, and the proposed pages to the PBAPS, Unit 2 TS are contained in Attachment 2. Attachment 3 (letter from J. A. Baumgartner (Global Nuclear Fuel) to K. W. Hunt (PECO Energy Company), "Peach Bottom 2 Cycle 14 Safety Limit MCPR," dated May 22, 2000) specifies the new SLMCPRs for PBAPS, Unit 2. Attachment 3 contains information proprietary to Global Nuclear Fuel. Global Nuclear Fuel requests that the document be withheld from public disclosure in accordance with 10 CFR 2.790(a)(4). An affidavit supporting this request is also contained in Attachment 3. Attachment 4 contains a non-proprietary version of the Global Nuclear Fuel document.

APD1

June 14, 2000  
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We request that the amendment to the PBAPS, Unit 2 TS be approved by September 9, 2000, and be made effective prior to the restart from the upcoming PBAPS, Unit 2 refueling outage.

If you have any questions, please do not hesitate to contact us.

Very truly yours,



James A. Hutton  
Director - Licensing

Enclosures: Affidavit, Attachment 1, Attachment 2, Attachment 3, Attachment 4

cc: H. J. Miller, Administrator, Region I, USNRC  
A. C. McMurtry, USNRC Senior Resident Inspector, PBAPS  
R. R. Janati, Commonwealth of Pennsylvania

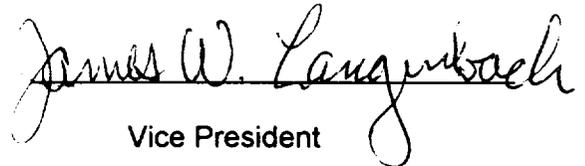
COMMONWEALTH OF PENNSYLVANIA:

: ss.

COUNTY OF CHESTER :

J. W. Langenbach, being first duly sworn, deposes and says:

That he is Vice President of PECO Energy Company; the Applicant herein; that he has read the attached License Change Application ECR 00-00759, for Peach Bottom Facility Operating License DPR-44, and knows the contents thereof; and that the statements and matters set forth therein are true and correct to the best of his knowledge, information and belief.

  
Vice President

Subscribed and sworn to  
before me this 14<sup>th</sup> day  
of June 2000.

  
Notary Public

Notarial Seal  
Carol A. Walton, Notary Public  
Tredyffrin Twp., Chester County  
My Commission Expires May 28, 2002  
Member, Pennsylvania Association of Notaries

**ATTACHMENT 1**

**PEACH BOTTOM ATOMIC POWER STATION  
UNIT 2**

**Docket No. 50-277**

**License No. DPR-44**

**LICENSE CHANGE APPLICATION  
ECR 00-00759**

**"Revision of SLMCPRs"**

**Supporting Information - 6 Pages**

## Introduction

PECO Energy Company, Licensee under Facility Operating License DPR-44 for the Peach Bottom Atomic Power Station (PBAPS), Unit 2, requests that the Technical Specifications (TS) contained in Appendix A to the Operating License be amended to: 1) revise TS 2.1.1.2 to reflect changes in the Safety Limit Minimum Critical Power Ratios (SLMCPRs) due to the cycle specific analysis performed by Global Nuclear Fuel (formerly General Electric Nuclear Energy (GENE)) for PBAPS, Unit 2, Cycle 14, which includes the use of the GE-14 product line, 2) delete the cycle specific footnote for the SLMCPRs contained in TS 2.1.1.2 ("Reactor Core SLs"), and 3) update a reference contained in TS 5.6.5.b.2 ("Core Operating Limits Report") which documents an analytical method used to determine the core operating limits. The TS pages showing the proposed changes are contained in Attachment 2. Attachment 3 (letter from J. A. Baumgartner (Global Nuclear Fuel) to K. W. Hunt (PECO Energy Company), "Peach Bottom 2 Cycle 14 Safety Limit MCPR," dated May 22, 2000) specifies the new SLMCPRs for PBAPS, Unit 2, Cycle 14.

This License Change Application provides a discussion and description of the proposed TS changes, a safety assessment of the proposed TS changes, information supporting a finding of No Significant Hazards Consideration and information supporting an Environmental Assessment.

## Discussion and Description of the Proposed Change

The proposed changes involve: 1) revising the Safety Limit Minimum Critical Power Ratio (SLMCPR) values contained in TS 2.1.1.2 ("Reactor Core SLs") for two and single loop recirculation, 2) deleting the cycle specific footnote for the SLMCPRs contained in TS 2.1.1.2, and 3) updating a reference contained in TS 5.6.5.b.2 ("Core Operating Limits Report") which documents an analytical method used to determine the core operating limits.

The SLMCPR values are being revised for PBAPS, Unit 2 based on the reload core design for Cycle 14, which will use the GE-14 fuel product line. The SLMCPRs have been determined in accordance with NRC approved methodology described in "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-13 (GESTAR-II), and U. S. Supplement, NEDE-24011-P-A-13-US, August 1996, and Amendment 25. Amendment 25 provides the methodology for determining the cycle specific MCPR safety limits that replace the former generic fuel type dependent values. Amendment 25 is used for determining the upcoming Cycle 14, and the future SLMCPRs. Future SLMCPRs determined in accordance with Amendment 25 will not need prior NRC approval for each cycle unless the value changes. The NRC safety evaluation approving Amendment 25 is contained in a letter from the NRC to General Electric, dated March 11, 1999 (F. Akstulewicz (NRC) to G. 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)).

PBAPS, Unit 2, Cycle 14 will be the first use of GE-14 fuel at PECO Energy Company. The GE-14 fuel bundle is a 10 by 10 fuel rod array versus the 9 by 9 fuel rod array used in GE-11 and GE-13 bundles which are currently installed at PBAPS, Units 2 and 3. Global Nuclear Fuel (formerly General Electric Nuclear Energy (GENE)) has designed GE-14 to be in compliance with Amendment 22 to "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-13,

and U. S. Supplement, NEDE-24011-P-A-13-US, August, 1996 (GESTAR-II). Amendment 22 was the basis for compliance for GE-11 and GE-13.

Prior to the March 11, 1999 NRC evaluation, Amendment 25 was not approved for generic use at each plant, but was approved on a cycle by cycle basis. Therefore, a footnote was added to TS 2.1.1.2 to specify that the approval of the SLMCPR was applicable only for the specific cycle. As a result of the NRC approval of Amendment 25, the footnote to TS 2.1.1.2 can be deleted. This change was approved for PBAPS, Unit 3, as discussed in the NRC safety evaluation (Amendment No. 233), dated October 5, 1999.

As a part of the proposed changes, a reference contained in TS 5.6.5.b.2 is being updated to reflect a later revision of the analysis. This analysis, and updated revision, is the "Maximum Extended Load Line Limit and ARTS Improvement Program Analyses for Peach Bottom Atomic Power Station Units 2 and 3," Revision 2, March 1995 (ARTS/MELLLA). TS 5.6.5.b contains the analytical methods used to determine the core operating limits. Revision 1 of the ARTS/MELLLA analysis was updated to Revision 2 to reflect changes in the analysis that were previously approved by the NRC as documented in a safety evaluation report dated August 10, 1994 (Amendment No. 192 for PBAPS, Unit 2). Revising the Technical Specifications to reflect the Revision 2 analysis is an administrative change which will ensure that the references contained in the PBAPS Technical Specifications are accurate and consistent with other licensing documents. No technical changes are being proposed in this request as a result of the update in the revision number. This change was approved for PBAPS, Unit 3, as discussed in the NRC safety evaluation (Amendment No. 233), dated October 5, 1999.

### Safety Assessment

The proposed TS changes will revise TS 2.1.1.2 ("Reactor Core SLs") to reflect the changes in the cycle specific analysis performed by Global Nuclear Fuel for PBAPS, Unit 2, Cycle 14, which includes the use of the GE-14 fuel product line. This change also proposes to delete the cycle specific footnote for the SLMCPRs contained in TS 2.1.1.2. A reference to an analysis contained in TS 5.6.5.b.2 ("Core Operating Limits Report") is also being updated.

The new SLMCPRs are calculated using NRC approved methodology described in "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-13, and U.S. Supplement, NEDE-24011-P-A-13-US (GESTAR-II), August 1996, and Amendment 25. Amendment 25 is used for determining the upcoming Cycle 14 SLMCPRs. Future SLMCPRs determined in accordance with Amendment 25 will not need prior NRC approval for each cycle unless a value changes. The NRC safety evaluation approving Amendment 25 is contained in a letter from the NRC to General Electric, dated March 11, 1999.

PBAPS, Unit 2, Cycle 14 will be the first use of GE-14 fuel at PECO Energy Company. Global Nuclear Fuel has designed GE-14 to be in compliance with Amendment 22 to "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-13, and U. S. Supplement, NEDE-24011-P-A-13-US, August, 1996 (GESTAR-II). Amendment 22 was the basis for compliance for GE-11 and GE-13.

The SLMCPR analysis establishes SLMCPR values that will ensure that greater than 99.9% of all fuel rods in the core avoid transition boiling if the limit is not violated. The SLMCPRs are calculated to include cycle specific parameters which include: 1) the actual core loading, 2)

conservative variations of projected control blade patterns, 3) the actual bundle parameters (e.g., local peaking), and 4) the full cycle exposure range. The new SLMCPRs at PBAPS, Unit 2, Cycle 14 are 1.09 (two-loop operation) and 1.10 (single-loop operation) as shown in Attachment 2. Additional information regarding the 1.09 and 1.10 cycle specific SLMCPRs for PBAPS, Unit 2 Cycle 14 is contained in the Attachment 3 letter.

As discussed in the attached letter from Global Nuclear Fuel, the GETAB methodology was utilized instead of the newly approved method in licensing technical report NEDC-32694P, "Power Distribution Uncertainties for Safety Limit MCPR Evaluation", for determining the power distribution uncertainties since the additional CPR margin that is provided by taking credit for the excessive GETAB conservatism was not required to efficiently operate PBAPS, Unit 2, Cycle 14. NEDC-32694P, "Power Distribution Uncertainties For Safety Limit MCPR Evaluations," was used for the non-power distribution uncertainties. As discussed in the SER dated March 11, 1999, these methods adequately account for the respective uncertainties and their use. Additionally, as a result of the use of the GE-14 product line, no dose calculations are being adversely impacted.

The footnote associated with TS 2.1.1.2 is no longer necessary due to the approval of Amendment 25. Therefore, this note is being deleted. A similar change was previously approved for PBAPS, Unit 3, as discussed in the NRC safety evaluation (Amendment No. 233), dated October 5, 1999.

The reference to the Revision 1 ARTS/MELLLA analysis contained in TS 5.6.5.b.2 is being updated to a Revision 2 analysis to reflect changes that were previously approved by the NRC as documented in the safety evaluation report dated August 10, 1994 (Amendment No. 192 for PBAPS, Unit 2). This is an administrative change which will ensure that the references contained in the PBAPS, Unit 2 Technical Specifications are accurate and consistent with other licensing documents. A similar change was previously approved for PBAPS, Unit 3, as discussed in the NRC safety evaluation (Amendment No. 233), dated October 5, 1999.

#### Information Supporting a Finding of No Significant Hazards Consideration

We have concluded that the proposed changes to the PBAPS, Unit 2 TS, which will revise TS 2.1.1.2, and 5.6.5.b.2 do not involve a Significant Hazards Consideration. In support of this determination, an evaluation of each of the three (3) standards set forth in 10 CFR 50.92 is provided below.

1. The proposed TS changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

The derivation of the cycle specific SLMCPRs for incorporation into the TS, and its use to determine cycle specific thermal limits, has been performed using the methodology discussed in "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-13, and U.S. Supplement, NEDE-24011-P-A-13-US, August 1996, and Amendment 25. Amendment 25 was approved by the NRC in a March 11, 1999 safety evaluation report.

The basis of the SLMCPR calculation is to ensure that greater than 99.9% of all fuel rods in the core avoid transition boiling if the limit is not violated. The new SLMCPRs preserve the existing margin to transition boiling. The GE-14 fuel is in compliance with

Amendment 22 to "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-13, and U. S. Supplement, NEDE-24011-P-A-13-US, August, 1996 (GESTAR-II), which provides the fuel licensing acceptance criteria. The probability of fuel damage will not be increased as a result of these changes. Additionally, as a result of the use of the GE-14 product line, no dose calculations are being adversely impacted. Therefore, the proposed TS changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

In addition to the change to the SLMCPRs, the footnote to TS 2.1.1.2 is being deleted. The footnote associated with TS 2.1.1.2 was originally included to ensure that the SLMCPR value was only applicable for the identified cycle. Since that time, Amendment 25 has been approved. Therefore, this footnote is no longer necessary. The footnote was for information only, and has no impact on the design or operation of the plant. A similar change was previously approved for PBAPS, Unit 3, as discussed in the NRC safety evaluation (Amendment No. 233), dated October 5, 1999. The deletion of the footnote associated with TS 2.1.1.2 is an administrative change that does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The reference to the Revision 1 ARTS/MELLLA analysis contained in TS 5.6.5.b.2 is being updated to a Revision 2 analysis, to reflect changes that were previously approved by the NRC as documented in the safety evaluation report dated August 10, 1994 (Amendment No. 192 for PBAPS, Unit 2). This is an administrative change which will ensure that the references contained in the PBAPS, Unit 2 Technical Specifications are accurate and consistent with other licensing documents. No technical changes are occurring which have not been previously approved by the NRC. A similar change was previously approved for PBAPS, Unit 3, as discussed in the NRC safety evaluation (Amendment No. 233), dated October 5, 1999. Therefore, this change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed TS changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

The SLMCPR is a TS numerical value, calculated to ensure that transition boiling does not occur in 99.9% of all fuel rods in the core if the limit is not violated. The new SLMCPRs are calculated using NRC approved methodology discussed in "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-13 (GESTAR-II), and U.S. Supplement, NEDE-24011-P-A-13-US, August 1996, and Amendment 25. Additionally, the GE-14 fuel is in compliance with Amendment 22 to "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-13, and U. S. Supplement, NEDE-24011-P-A-13-US, August, 1996 (GESTAR-II), which provides the fuel licensing acceptance criteria. The SLMCPR is not an accident initiator, and its revision will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Additionally, this proposed change will delete footnotes contained in TS 2.1.1.2 as the result of the NRC approval of analysis associated with Amendment 25. The proposed change also updates the ARTS/MELLLA analysis reference contained in TS 5.6.5.b.2. This revision contains information which was previously approved by the NRC. Similar

changes were previously approved for PBAPS, Unit 3, as discussed in the NRC safety evaluation (Amendment No. 233), dated October 5, 1999. Therefore, the deletion of the footnote associated with TS 2.1.1.2, and the updating of the reference contained in TS 5.6.5.b.2 are administrative changes that do not create the possibility of a new or different kind of accident from any previously evaluated.

3. The proposed TS changes do not involve a significant reduction in a margin of safety.

There is no significant reduction in the margin of safety previously approved by the NRC as a result of: 1) the proposed changes to the SLMCPRs, which includes the use of GE-14 fuel, 2) the proposed change that will delete the footnote to TS 2.1.1.2, and 3) updating the ARTS/MELLLA analysis reference contained in TS 5.6.5.b.2. The new SLMCPRs are calculated using methodology discussed in "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-13 (GESTAR-II), and U.S. Supplement, NEDE-24011-P-A-13-US, August 1996, and Amendment 25. The SLMCPRs ensure that greater than 99.9% of all fuel rods in the core will avoid transition boiling if the limit is not violated when all uncertainties are considered, thereby preserving the fuel cladding integrity. Therefore, the proposed TS changes will not involve a significant reduction in the margin of safety previously approved by the NRC.

Additionally, the proposed changes that delete the footnote to TS 2.1.1.2, and update the revision to the ARTS/MELLLA analysis reference contained in TS 5.6.5.b.2, are administrative changes that will not significantly reduce the margin of safety previously approved by the NRC.

Conclusion

We have concluded that the proposed changes to PBAPS, Unit 2 do not involve a Significant Hazards Consideration.

Information Supporting an Environmental Assessment

An environmental assessment is not required for the proposed changes in the SLMCPR limits since the proposed changes conform to the criteria for "actions eligible for categorical exclusion" as specified in 10 CFR 51.22(c)(9). The proposed changes will have no impact on the environment. The proposed changes do not involve a significant hazards consideration as discussed in the preceding section. The proposed changes do not involve a significant change in the types or significant increase in the amounts of any effluents that may be released offsite. In addition, the proposed changes do not involve a significant increase in individual or cumulative occupational radiation exposure.

Additionally, in accordance with 10 CFR 51.41, a review was performed to determine the impact of the proposed administrative changes that delete the footnote to TS 2.1.1.2, and updates the revision to the ARTS/MELLLA analysis contained in TS 5.6.5.b.2, on the conclusions of the NRC's Final Environmental Statement for PBAPS. The considerations included in 10 CFR 51.45(b) were used in this review with the following conclusions. Since these changes are administrative only, implementation of the proposed changes have no impact on the environment. Since there is no impact on the environment, there are no adverse environmental effects that cannot be avoided. Since these changes are administrative only and have no impact on operation of the facility nor on the environment, there is no value in

considering alternatives to the proposed changes. Since the operation of the facility is not affected by the proposed changes, there is no impact on the original assessment of the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity. Since the operation of the facility is unaffected by the proposed changes, there is no change to the commitment of resources and therefore, no irreversible nor irretrievable commitment of resources involved.

**ATTACHMENT 2**

**PEACH BOTTOM ATOMIC POWER STATION  
UNIT 2**

**Docket No. 50-277**

**License No. DPR-44**

**TECHNICAL SPECIFICATIONS CHANGES**

**Attached Pages**

**Unit 2**

**TS Page 2.0-1**

**TS Page 5.0-21**

## 2.0 SAFETY LIMITS (SLs)

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### 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  $\leq$  25% RTP.

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

MCPR shall be  $\geq$  1.09 for two recirculation loop operation or  $\geq$  1.10 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  $\leq$  1325 psig.

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### 2.2 SL Violations

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

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

2.2.2 Within 2 hours:

2.2.2.1 Restore compliance with all SLs; and

2.2.2.2 Insert all insertable control rods.

2.2.3 Within 24 hours, notify the Plant Manager and the Vice President - Peach Bottom Atomic Power Station.

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(continued)

5.6 Reporting Requirements (continued)

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5.6.5 CORE OPERATING LIMITS REPORT (COLR)

- a. Core operating limits shall be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and shall be documented in the COLR for the following:
1. The Average Planar Linear Heat Generation Rate for Specification 3.2.1;
  2. The Minimum Critical Power Ratio for Specifications 3.2.2 and 3.3.2.1;
  3. The Linear Heat Generation Rate for Specification 3.2.3; and
  4. The Control Rod Block Instrumentation for Specification 3.3.2.1.
- b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:
1. NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel" (latest approved version as specified in the COLR);
  2. NEDC-32162P, "Maximum Extended Load Line Limit and ARTS Improvement Program Analyses for Peach Bottom Atomic Power Station Units 2 and 3," Revision 2, March, 1995;
  3. PECO-FMS-0001-A, "Steady-State Thermal Hydraulic Analysis of Peach Bottom Units 2 and 3 using the FIBWR Computer Code";
  4. PECO-FMS-0002-A, "Method for Calculating Transient Critical Power Ratios for Boiling Water Reactors (RETRAN-TCPPECo)";
  5. PECO-FMS-0003-A, "Steady-State Fuel Performance Methods Report";
  6. PECO-FMS-0004-A, "Methods for Performing BWR Systems Transient Analysis";

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(continued)

ATTACHMENT 4

PEACH BOTTOM ATOMIC POWER STATION  
UNIT 2

Docket No. 50-277

License No. DPR-44

LICENSE CHANGE APPLICATION  
ECR 00-00759

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.

**Comparison of PEACH BOTTOM UNIT 2 CYCLE 14 and 13 SLMCPR Values**

Table 1 summarizes the relevant input parameters and results of the SLMCPR determination for the Peach Bottom Unit 2 Cycle 14 and 13 cores. The SLMCPR evaluations were performed using NRC approved methods and uncertainties<sup>[1]</sup>. 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 Peach Bottom Unit 2 Cycle 14 and Cycle 13 SLMCPR values it is important to note the impact of the differences in the core and bundle designs. These differences are summarized in Table 1.

[[[

[[[

The uncontrolled bundle pin-by-pin power distributions were compared between the Peach Bottom Unit 2 Cycle 14 bundles and the Cycle 13 bundles. Pin-by-pin power distributions are characterized in terms of R-factors using the NRC approved methodology[2]. [[[

**Summary**

[[[ have been used to compare quantities that impact the calculated SLMCPR value. Based on these comparisons, the conclusion is reached that the Peach Bottom Unit 2 Cycle 13 core/cycle has a flatter core MCPR distribution [[[ and flatter in-bundle power distributions [[[ than what was used to perform the Cycle 14 SLMCPR evaluation.

The calculated 1.09 Monte Carlo SLMCPR for Peach Bottom Unit 2 Cycle 14 is consistent with what one would expect [[[ the 1.09 SLMCPR value is appropriate.

Based on all of the facts, observations and arguments presented above, it is concluded that the calculated SLMCPR value of 1.09 for the Peach Bottom Unit 2 Cycle 14 core is appropriate. It is reasonable that this value is smaller than the 1.10 value calculated for the previous cycle.

For single loop operations (SLO) the calculated safety limit MCPR for the limiting case is 1.10 [[[

**Supporting Information**

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

*1. Provide the fuel types and numbers of assemblies used in Peach Bottom 2 Cycle 14 operation and identify if they are fresh or irradiated fuel (once or twice burned, etc.). Also, provide the fuel loading pattern for Cycle 14 and identify its difference from Cycle 13 and the impact on the SLMCPR calculation.*

Response:

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

*2. The approved methodologies used include NEDC-32694P, NEDC-32601P, Amendment 25 to NEDE-24011P-A, and NEDC-32505P, Revision 1. However, Table 1 indicates that the same power distribution uncertainty in GETAB is used for both Cycle 13 and 14. Please identify which power distribution uncertainties and SLMCPR uncertainties for SLMCPR are used to support this amendment request.*

Response:

The GETAB (NEDO-10958-A) power distribution uncertainties are used for both Cycle 13 and 14. GETAB is invoked by reference from NEDE-24011P-A. The GETAB power distribution uncertainties are also reported in column 2 of Table 2.1 of NEDC-32601P. For the GETAB methodology, only the "TIP Reading and Bundle Power" and the "TIP Reading Random Uncertainty" values are classified as power distribution uncertainties. The GETAB values for these two quantities given in column 2 of Table 2.1 of NEDC-32601P are the ones that were used for this submittal. The NRC staff has taken the position in their SER dated March 11, 1999 that the non-power distribution uncertainties reported in NEDC-32601P are "revisions" or "updates" to the GETAB values. GE (GNF) has accepted this position so that the revised non-power distribution uncertainties are used for all SLMCPR calculations performed after June 1999 regardless of which approved methodology is used for the power distribution uncertainties. A line has been added to Table 1 to indicate that the revised non-power distribution uncertainties from NEDC-32601P Table 4.1 were used for Peach Bottom 2, Cycle 14.

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

Response:

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

derived from the test data along with the GEXL coefficients. For partially controlled conditions, the bundle R-factors are calculated based on the prescribed axial power shapes that corresponds to the specific GEXL correlation. [ ] The process used for GE14 is the same as the approved methodology in NEDC-32505PA Rev. 1 and the recommendations in the SER.

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

Response:

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

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

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

[ ]

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

5. The staff approved those methodologies cited in Question 2 with one condition that the 3D-MONICORE bundle power calculational uncertainty should be verified when applied to fuel and core designs not included in the benchmark comparisons in Tables 3.1 and 3.2 of NEDC-32694P, and three actions should be taken for application of NEDC-32601P for a new fuel. GE14 is considered a new fuel at the time the staff approved those licensing topical reports, therefore, provide the details of the actions taken and verification for Peach Bottom 2 Cycle 14 operation.

Response:

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

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

This item pertains only to the application of the reduced power distribution uncertainties and methodology given in NEDC-32694P. This item or part of the question is not applicable when the original GETAB methodology and uncertainties are used. The original GETAB methodology and uncertainties have been demonstrated to be sufficiently conservative to be generically applicable to all GE fuel designs. In fact, the GETAB methodology has been shown to be sufficiently conservative to also be applicable to some fuels and monitoring systems not developed by GE. Note that the original GETAB methodology and uncertainties produces SLMCPR values that are on the order of [ ] than the SLMCPR values produced using the methodology and reduced uncertainties defined in NEDC-32694P. The original approved GETAB methodology and uncertainties were used since the additional CPR margin that is provided by taking credit for the excessive GETAB conservatism was not required to efficiently operate Peach Bottom 2, Cycle 14.

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

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

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

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

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

The calculated value of MIP depends only on two things:[ ] The GEXL correlation for GE14 was provided in the Amendment 22 submittal for GE14 together with the uncertainty [ ] that is needed for the SLMCPR analyses and the calculation of MIP. See also the response to question (4) above. GE (GNF) continues to monitor MIP and periodically assess it as part of their procedural review process.

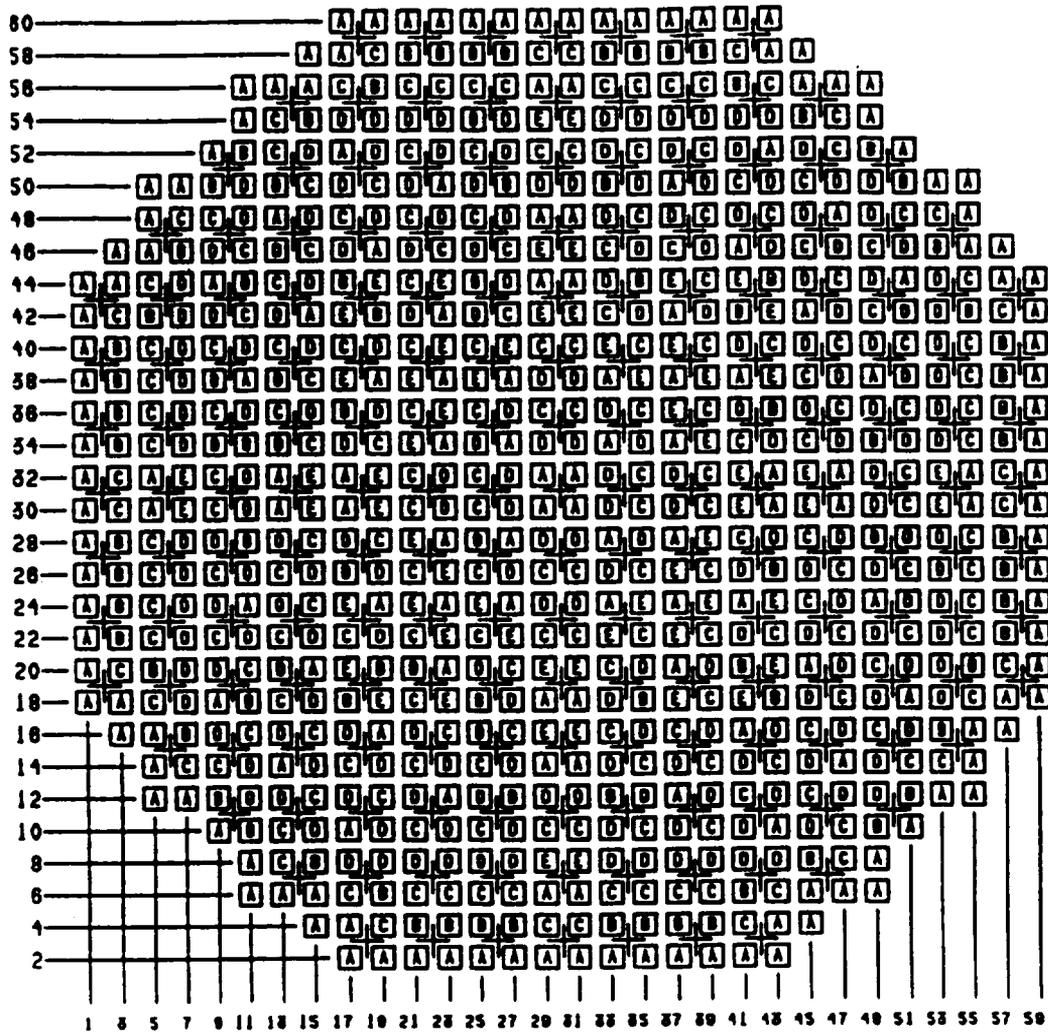
Specific scoping analyses performed for cores partially and fully-loaded with GE14 fuel have given no indications that suggests that the MIP values from these calculations are statistically distinct from historical data. [[ ]] Thus there is no indication that the MIP criteria should be changed.

Prepared by:

Verified by:

P. J. Vescovi  
Technical Project Manager  
Peach Bottom 2 Project

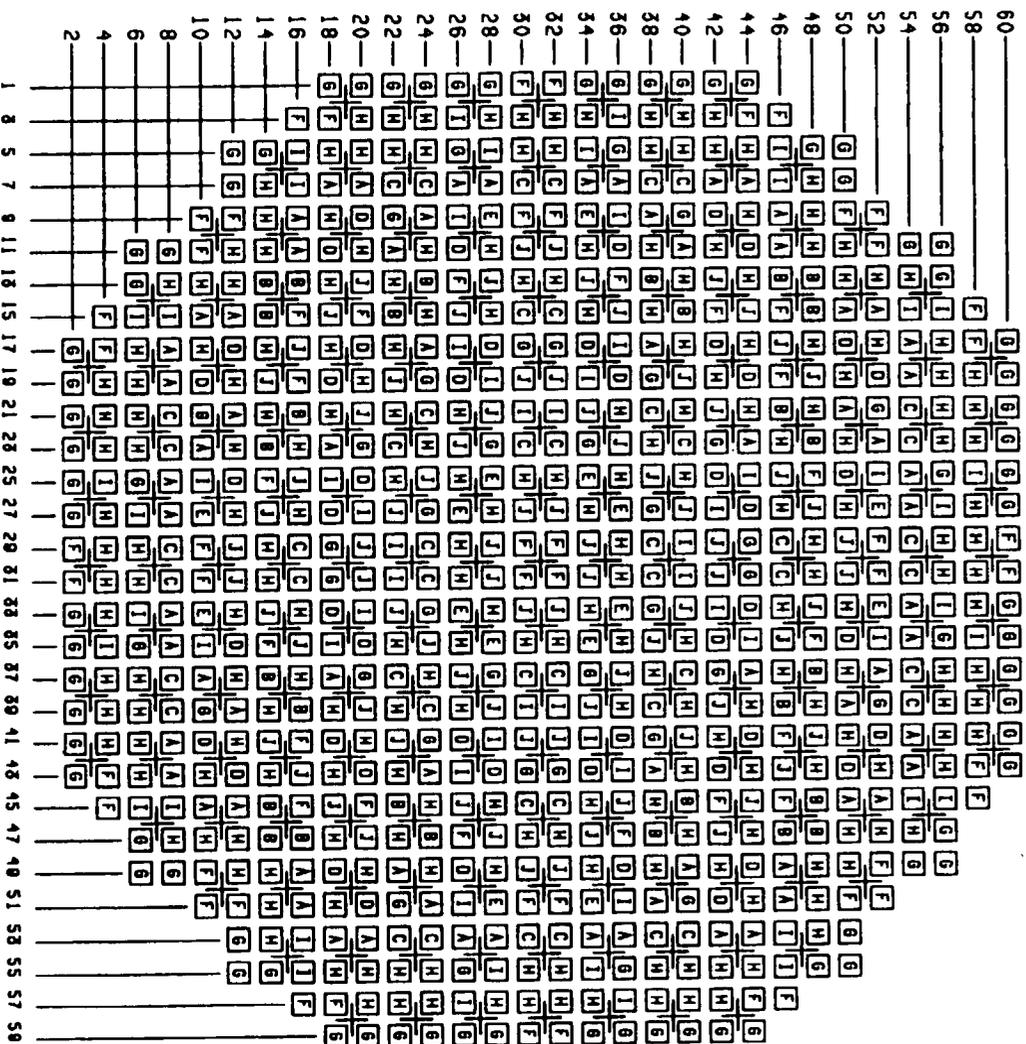
D. P. Stier  
Nuclear and Safety Analysis



Fuel Type			
A=GE11-P9HUB387-12GZ3-100T-146-T	(Cycle 11)	D=GE13-P9DTB409-13GZ-100T-146-T	(Cycle 13)
B=GE13-P9DTB397-13GZ-100T-146-T	(Cycle 12)	E=GE13-P9DTB406-12GZ-100T-146-T	(Cycle 13)
C=GE13-P9DTB392-15GZ-100T-146-T	(Cycle 12)		

Figure 1 Reference Core Loading Pattern – Cycle 13

Cycle Specific SLMCPR for Peach Bottom Unit 2 Cycle 14



FUEL TYPE	
A = GE14-P10DNAB396-146Z-100T-150-T-2408	F = GE13-P90T8397-136Z-100T-146-T
B = GE14-P10DNAB397-15GZ-100T-150-T-2407	G = GE13-P90T8392-156Z-100T-146-T
C = GE14-P10DNAB396-146Z-100T-150-T-2408	H = GE13-P90T8409-136Z-100T-146-T
D = GE14-P10DNAB397-15GZ-100T-150-T-2407	I = GE13-P90T8406-126Z-100T-146-T
E = GE14-P10DNAB396-146Z-100T-150-T-2408	J = GE14-P10DNAB397-156Z-100T-150-T-2407

Figure 2 Reference Core Loading Pattern -- Cycle 14

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

**Table 1**

**Comparison of the Peach Bottom Unit 2 Cycle 14 and Cycle 13 SLMCPR**

[[ ]]

**ATTACHMENT 3**

**PEACH BOTTOM ATOMIC POWER STATION  
UNIT 2**

**Docket No. 50-277**

**License No. DPR-44**

**LICENSE CHANGE APPLICATION  
ECR 00-00759**

**Letter From J. A. Baumgartner (Global Nuclear Fuel) to K. W. Hunt (PECO Energy Company),  
"Peach Bottom 2 Cycle 14 Safety Limit MCPR," dated May 22, 2000**



**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, Nuclear Fuel Engineering, 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 attachment, “Additional Information Regarding the Cycle Specific SLMCPR for Peach Bottom Unit 2 Cycle 14,” May 22, 2000. The proprietary text has been enclosed by double brackets.
- (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.

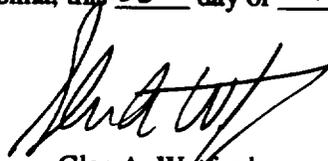
Affidavit

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 23<sup>rd</sup> day of May, 2000



Glen A. Watford  
Global Nuclear Fuel – Americas, LLC

Subscribed and sworn before me this 23<sup>rd</sup> day of May, 2000



Notary Public, State of North Carolina

My Commission Expires Feb. 1, 2001