

ATTACHMENT 3

GNF Response to RAI 44 – Non-Proprietary Version and Affidavit

GNF Letter CFL-EXN-HE0-13-036 R1

ENCLOSURE 2

CFL-EXN-HE0-13-036 R1

Revised GNF Response to NRC RAI 44 for License Amendment Request
for Use of Neutron Absorbing Spent Fuel Pool Rack Inserts for Peach
Bottom Atomic Power Station Units 2 and 3

Non-Proprietary Information – Class I (Public)

INFORMATION NOTICE

This is a non-proprietary version of CFL-EXN-HE0-13-036 R1 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 [[]].

RAI-44:

PBAPS has proposed a two tier approach for crediting degraded Boraflex until the NETCO-SNAP-IN[®] rack inserts are installed. The second tier, i.e., the ‘Restricted’ tier, credits Boraflex with more than 50% degradation. To account for the potential relocation of Boraflex during a seismic event, PBAPS has proposed an additional burnup requirement past the point of peak reactivity for the ‘Restricted’ tier. The NRC staff requires additional information regarding the ‘Restricted’ tier. Please provide the following information:

- a) Provide the k_{eff} of the Restricted storage cells both with and without the additional burnup requirement and with the Boraflex being credited.
- b) Provide the k_{eff} of the Restricted storage cells both with and without the additional burnup requirement but without the Boraflex being credited.
- c) Provide a description of the Monte Carlo models that are being used to provide those estimations of k_{eff} . The description can be in reference to the model that was used for the ‘Unrestricted’ tier.

GNF RESPONSE TO RAI-44:

Items a. and b.

The responses to RAI-44.a and RAI-44.b are provided in Table 44-1 and Table 44-2. Table 44-1 provides the nominal, in-rack reactivities for the system with and without credit for burnup past the point of peak reactivity and Boraflex. Table 44-2 provides the same information but includes biases, tolerances, and uncertainties, as appropriate, from NEDO-33686 (Reference 44-1).

Note that the “Without Boraflex, Without Burnup” numbers are for illustrative purposes only, as Tier-2 cells are restricted from storage of bundles without burnup being credited.

Table 44-1 –Nominal System Reactivities (Keff)

Nominal In-Rack Keff	With Boraflex	Without Boraflex
With Burnup	[[
Without Burnup]]

Table 44-2 – System Reactivities Including Biases, Tolerances, and Uncertainties (KMax)

Max In-Rack Keff	With Boraflex	Without Boraflex
With Burnup	[[
Without Burnup]]

The application of the NEDO-33686 adders to the nominal values in Table 44-1 was done in two ways. For the “With Boraflex” cases, the final bias, tolerance, and uncertainty values were taken directly from Table 14 of NEDO-33686 and applied without modification. For the “Without Boraflex” cases, the same source of information was used to assess total bias, tolerance and

uncertainty adders, but the following Boraflex related terms were removed as they are not appropriate for application in the cases where Boraflex is not credited:

- [[

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When assessing the appropriateness of the remaining bias, tolerance, and uncertainty terms for application to these cases, justification is most clearly provided by discussing the impact of the changes to the system being modeled on each category of adders, as is done in the following sections.

[[

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Item c.

In response to RAI-44.c, it is noted that the Monte Carlo models utilized to calculate these numbers were identical to those described in Sections 4.2 and 5.2 of NEDO-33686, with the following exceptions:

Monte Carlo Storage Rack Models

With Boraflex:

Boraflex panels are modeled with thinning beyond that described in Section 5.2 to represent a uniform B-10 areal density of 0.01113 B-10/cm². This is consistent with the description provided in Appendix C of NEDO-33686.

Without Boraflex:

All Boraflex materials are modeled as water.

Monte Carlo Bundle Models

With Burnup:

The analysis used to credit burnup for this BWR analysis can be divided into two steps which contain elements which are distinct from those described in NEDO-33686. The first step involves the selection of a limiting bundle, and the second involves the modeling of that bundle in the rack system.

Selecting a Limiting Bundle

The limiting bundle to model in the rack system is selected by performing the following steps:

[[

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Modeling the Bundle in the Storage System

The same limiting bundle is assumed to exist in every allowable storage location, consistent with the methodology outlined in NEDO-33686. As opposed to the single peak reactivity lattice assumption, however, the bundle in the burnup credit analysis is [[

]]

Without Burnup:

The bundles are modeled with one axial zone representing the entire fuel assembly consistent with the bundle modeling assumptions described in Section 4.2 of NEDO 33686. The lattice selected to represent this axial zone has an in-core reactivity of 1.2170, as described in Appendix C of the same report.

REFERENCE:

- 44-1. Global Nuclear Fuel, “Peach Bottom Atomic Power Station: Fuel Storage Criticality Safety Analysis of Spent Fuel Storage Racks with Boraflex,” NEDO-33686, Revision 1, June 2012.

ENCLOSURE 3

CFL-EXN-HE0-13-036 R1

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-HE0-13-036 R1, C. Lamb (GNF-A) to T. Loomis (Exelon Nuclear), entitled "Revised GNF Response to NRC RAI 44 for the License Amendment Request for Use of Neutron Absorbing Spent Fuel Pool Rack Inserts for Peach Bottom Atomic Power Station Units 2 and 3," dated April 16, 2013. GNF-A proprietary information in Enclosure 1, which is entitled "Revised GNF Response to NRC RAI 44 for License Amendment Request for Use of Neutron Absorbing Spent Fuel Pool Rack Inserts for Peach Bottom Atomic Power Station Units 2 and 3," is identified by a dotted underline inside double square brackets. [[This sentence is an example.^{3}]] In all cases, 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), above, is classified as proprietary because it contains details of the nuclear fuel criticality licensing methodology for the GEH Boiling Water Reactor (BWR). Development of these methods, techniques, and information and their application for the design, modification, and analyses methodologies and processes was achieved at a significant cost GNF-A.

The development of the evaluation processes along with the interpretation and application of the analytical results is derived from the 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 16th day of April 2013.



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

ATTACHMENT 4

Updated Markup of Technical Specification Page 4.0-2 (Units 2 and 3)

4.0 DESIGN FEATURES (continued)

4.3 Fuel Storage

4.3.1 Criticality

4.3.1.1 The spent fuel storage racks are designed and shall be maintained with:

a. Fuel assemblies having a maximum k-infinity of 1.270 → ~~1.362~~ in the normal reactor core configuration at cold conditions;

b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 10.3 of the UFSAR; ~~and~~

d. The installed neutron absorbing rack inserts having a Boron-10 areal density ≥ 0.0102 g/cm².

c. A nominal 6.280 inch center to center distance between fuel assemblies placed in the storage racks ~~;~~ ← ; and

4.3.1.2 The new fuel storage racks shall not be used for fuel storage. The new fuel shall be stored in the spent fuel storage racks.

4.3.2 Drainage

The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below plant elevation 219 ft.

4.3.3 Capacity

The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 3819 fuel assemblies.

4.0 DESIGN FEATURES (continued)

4.3 Fuel Storage

4.3.1 Criticality

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- a. Fuel assemblies having a maximum k-infinity of 1.270 → ~~1.362~~ in the normal reactor core configuration at cold conditions;
- b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 10.3 of the UFSAR; and
- c. A nominal 6.280 inch center to center distance between fuel assemblies placed in the storage racks. ← ; and

d. The installed neutron absorbing rack inserts having a Boron-10 areal density ≥ 0.0102 g/cm².

4.3.1.2 The new fuel storage racks shall not be used for fuel storage. The new fuel shall be stored in the spent fuel storage racks.

4.3.2 Drainage

The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below plant elevation 219 ft.

4.3.3 Capacity

The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 3819 fuel assemblies.
