



GE Energy

Proprietary Notice

*This letter forwards GNF  
proprietary information in  
accordance with 10CFR2.390.  
Upon the removal of Enclosures 1  
and 2, the balance of this letter may  
be considered non-proprietary.*

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MFN 06-291

Docket No. 52-010

August 22, 2006

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

**Subject: Response to NRC Request for Additional Information Letter No. 21  
Related to ESBWR Design Certification Application -- Nuclear Design  
-- RAI Number 4.3-1**

Enclosures 1 and 2 contain GE's response to the subject NRC RAI transmitted via the Reference 1 letter. This completes GE's response to RAI Letter No. 21.

Enclosures 1 and 2 contain GNF proprietary information as defined by 10 CFR 2.390. GNF customarily maintains this information in confidence and withholds it from public disclosure.

The affidavit contained in Enclosure 4 identifies that the information contained in Enclosures 1 and 2 has been handled and classified as proprietary to GNF. GE hereby requests that the information of Enclosures 1 and 2 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17. A non proprietary version of Enclosure 1 is contained in Enclosure 3. Due to the nature of the data files contained in Enclosure 2, the Enclosure 2 cover page, which contains a description of the files, provides the extent of available non-proprietary information.

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If you have any questions about the information provided here, please let me know.

Sincerely,

A handwritten signature in cursive script, appearing to read "Kathy Sedney for".

David H. Hinds  
Manager, ESBWR

Enclosures:

1. MFN 06-291 - Response to NRC Request for Additional Information Letter No. 21 Related to ESBWR Design Certification Application – Nuclear Design – RAI Number 4.3-1 – GNF Proprietary Information
2. MFN 06-291 – Nuclear Lattice Parameters – RAI Number 4.3-1 (CD) – GNF Proprietary Information
3. MFN 06-291 - Response to NRC Request for Additional Information Letter No. 21 Related to ESBWR Design Certification Application – Nuclear Design – RAI Number 4.3-1 – Non Proprietary Version
4. Affidavit – Jens G. M. Andersen – dated August 22, 2006

Reference:

1. MFN 06-116, Letter from U. S. Nuclear Regulatory Commission to Mr. David H. Hinds, *Request for Additional Information Letter No. 21 Related to ESBWR Design Certification Application*, April 24, 2006

cc: WD Beckner USNRC (w/o enclosures)  
AE Cabbage USNRC (with enclosures)  
LA Dudes USNRC (w/o enclosures)  
AA Lingenfelter GNF/Wilmington (w/o enclosures)  
GB Stramback GE/San Jose (with enclosures)  
eDRF 0000-0056-8456

**ENCLOSURE 3**

**MFN 06-291**

**Response to NRC Request for Additional Information**

**Letter No. 21 Related to**

**ESBWR Design Certification Application**

**Nuclear Design**

**RAI Number 4.3-1**

**Non Proprietary Version**

NRC RAI 4.3-1

*The staff requires additional information to review the uncertainty associated with determining nuclear parameters. Provide the results of the TGBLA calculation of cross sections, infinite eigenvalues, and lattice parameters. Specifically, provide the results of the TGBLA analysis which gives the infinite eigenvalue predicted at each depletion step for each void condition (0, 40, 70 and 90%). Also, provide void branch cases that were performed in order to predict void coefficient, i.e. infinite eigenvalues calculated at 0, 40, and 70% voids for each void history; this is not required for each depletion point, only approximately beginning of life (BOL), 1/3 depleted, 2/3 depleted, and end of life (EOL).*

GE Response

As requested above, the twelve (12) lattices that are utilized in the ESBWR core design have been regenerated with the modified TGBLA06AE5 for purposes of providing the lattice infinite eigenvalues and pin power distributions at 0, 40, and 70% void fraction depletions. The 90% void fraction data is provided by the evaluation a quadratic fit of the 0, 40, 70% void fraction data at 90% void fraction.

The instantaneous void branch cases have been generated using the standard production method. The "standard production method" is to utilize the isotopic concentrations generated with the 40% void fraction depletion case and instantaneously changing the in-channel void fraction to 0% and to 70% to create the branch cases.

The instantaneous void results are then combined with the depletion results to form coefficients which can be used in the following equation to evaluation the lattice k-infinity as a function of instantaneous void U and history void UH. Note that the coefficients C10-C15 are also a function of exposure.

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The requested data are provided in twelve spreadsheets, one spreadsheet per lattice.

There are six (6) tabs in each spreadsheet. The tabs are described below.

MFN 06-291  
Enclosure 3

Tab Label	Description
Lattice description	Lattice Name, Enrichment and Gadolinium placement
Kinf_data	Columns A:F - K-infinity results for Hot Uncontrolled depletion cases Columns J:O - Hot Uncontrolled Instantaneous Void branch cases Columns P:V – Coefficients C10-C15 for k-infinity evaluation Columns X:AQ – Instantaneous Void Results based on K-infinity Fit Evaluations for 0%, 40%, 70% and 90% void history. Columns AT:AY - Cold Uncontrolled branch cases
RP_HU_data	Rod Power distributions from Hot Uncontrolled depletion cases for 0, 40, and 70% void with 90% extrapolated results. Note that the rod power distribution includes gamma heat deposition effects
ModDens	Tabulation of lattice average moderator density as a function of temperature and in-channel void fraction
Plot_HU	Plot of lattice Hot Uncontrolled k-infinity from depletion cases
Plot_CU	Plot of lattice Cold Uncontrolled k-infinity from branch cases as a function of void history

No DCD changes will be made in response to this RAI.

**ENCLOSURE 4**

**MFN 06-291**

**Affidavit**

## Affidavit

I, Jens G. M. Andersen, state as follows:

- (1) I am Consulting Engineer, Thermal Hydraulic Methods, 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 Enclosures 1 and 2 of GE letter MFN 06-291, David H. Hinds to U. S. Nuclear Regulatory Commission, *Response to NRC Request for Additional Information Letter No. 21 Related to ESBWR Design Certification Application – Nuclear Design – RAI Number 4.3-1*, dated August 22, 2006. The proprietary information in Enclosure 1, *Response to NRC Request for Additional Information Letter No. 21 Related to ESBWR Design Certification Application – Nuclear Design – RAI Number 4.3-1*, is delineated by enclosure inside double square brackets. Figures and large equation objects are identified with double square brackets before and after the object. The proprietary information in Enclosure 2, *Nuclear Lattice Parameters – RAI Number 4.3-1 (CD)*, contains the designation “GNF Proprietary Information <sup>{3}</sup>” on the CD label. In each case, the superscript notation <sup>{3}</sup> 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, 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 aspects of past, present, or future GNF-A customer-funded development plans and programs, of potential commercial value 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 the 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. 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.

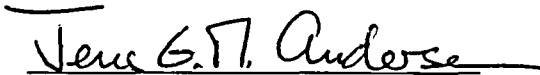
The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

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.

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 22<sup>nd</sup> day of August 2006.

  
Jens G. M. Andersen  
Global Nuclear Fuels – Americas, LLC