



GE Energy

Proprietary Notice

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

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MFN 06-467 Supplement 2

Docket No. 52-010

June 13, 2007

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

Subject: **Response to Portion of NRC Request for Additional Information
Letter No. 66 – RAI Number 21.6-88 S02**

Enclosure 1 contains GE's response to the subject NRC RAIs transmitted via the Reference 1 letter.

Enclosure 1 contains GNF proprietary information as defined by 10 CFR 2.390. GNF customarily maintains this information in confidence and withholds it from public disclosure. A non-proprietary version is provided in Enclosure 2.

The affidavit contained in Enclosure 3 identifies that the information contained in Enclosure 1 has been handled and classified as proprietary to GNF. GE hereby requests that the information of Enclosure 1 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17.

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

James C. Kinsey
Project Manager, ESBWR Licensing

Reference:

1. MFN 06-377, Letter from U. S. Nuclear Regulatory Commission to Mr. David H. Hinds, *Request for Additional Information Letter No. 66 Related to ESBWR Design Certification Application*, October 10, 2006.

Enclosures:

1. MFN 06-467, Supplement 2 - Response to Portion of NRC Request for Additional Information Letter No. 66 Related to ESBWR Design Certification Application – RAI Number 21.6-88 S02 – GNF Proprietary Information
2. MFN 06-467, Supplement 2 - Response to Portion of NRC Request for Additional Information Letter No. 66 Related to ESBWR Design Certification Application – RAI Number 21.6-88 S02 – Non-Proprietary version
3. Affidavit – Jens G. M. Andersen – dated June 13, 2007

cc: AE Cubbage USNRC (with enclosures)
GB Stramback GE/San Jose (with enclosures)
BE Brown GE/ Wilmington (with enclosures)
eDRF 0000-0069-2957

Enclosure 2

MFN 06-467 Supplement 2

Response to Portion of NRC Request for

Additional Information Letter No. 66

Related to ESBWR Design Certification Application

RAI Number 21.6-88 S02

Non-Proprietary Version

NRC RAI 21.6-88 S02

Comments on Supplement 1 to RAI 21.6-88 response:

Supplement 1 to MFN-06-467 states that the pressure drop iteration accounts for the bypass flow fraction using [[

]]. Please explain how the elements of the [[
]] are determined.

Explain any differences in the determination of the bypass flow rate using [[
]] as in the ESBWR calculation and the method used in the outer loop iteration described in NEDO-20953-A to converge the in-channel and bypass flow rates. If the approaches are consistent (as would be indicated by the statements in Section 1.5.5 of NEDC-33239P (LTR)) clarify the description of the [[
]] in the revised LTR and provide, as a supplemental response, the parameters calculated by [[
]] that are used as [[
]]. Alternatively provide as a supplemental response a detailed description of the means by which [[
]] in terms of the information already provided in Supplement 1 to MFN-06-467.

If the elements of the [[
]] are calculated in a manner that is not consistent with Section 1.5.5 for the specific application to the ESBWR, update the NEDC-33239P LTR to also include a description of the method by which this calculation is performed.

If the elements are derived from the iterative [[
]] calculations, provide the number of elements and the ranges of applicable power and flow rates as an RAI response. If another means is or was used to determine the elements, provide the [[
]] and a description of the origin of the elements as an RAI response.

In the mathematical expression for the axial power shape parameter (the fraction of bundle power below the core midplane) explain why [[
]] in the update to the LTR.

Describe the basis for the [[
]] given that the [[
]] is based on calculated [[
]] for [[
]] as an RAI response. Are there any flow regime transitions for the high power ESBWR bundles (i.e. above [[
]]) specifically that may result in channel flow errors as a result of the extrapolation between [[
]]? If so, are they of sufficient magnitude to perturb the nodal power distribution beyond the established uncertainties? Provide the answer as an RAI response.

Verify in an RAI response that the bypass voiding is calculated according to the method in PANAC11AE8. Alternatively, if the response to RAI 4.4-39 request for supplemental information contains a [[

]] verify that the bypass region is predominantly liquid (i.e. <5% void above the LPRM D detector).

GE Response

The bypass flow in PANAC11 can be input or obtained from a [[
]]. Section 1.5.1 of NEDC-33239P will be revised to add the previous sentence. [[
]] are obtained from a code approved by the NRC
to perform thermal hydraulic analysis [[
]]
The DCD PANAC11 calculations used a [[

]]

The integrated bundle power PCij is calculated [[

]]

[[

]] Extensive
qualification of the PANACEA model described in Section 1.6 of NEDC-33239P shows the
robustness of this approach to determine the flow distribution.

With regard to flow regimes, the inlet flow is subcooled for all assemblies and fully developed
annular flow is experienced by almost all assemblies with the possible exception of very low
powered peripheral locations that may not develop annular flow. Assemblies operating beyond
annular flow would be operating in the liquid deficient regime and in violation of thermal limits.
The fuel hydraulic model has been confirmed adequate over the range of flow regimes allowed.

Results of bypass void fraction evaluations will be provided in response to RAI 4.4-39
Supplement 1.

Affected Documents

NEDC-33239P will be revised as indicated above. Revision 3 of NEDC-33239P is scheduled for
August 24, 2007.

Enclosure 3

MFN 06-467 Supplement 2

Response to Portion of NRC Request for

Additional Information Letter No. 66

Related to ESBWR Design Certification Application

RAI Number 21.6-88 S02

GNF Affidavit

Global Nuclear Fuel – Americas

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 Enclosure 1 of MFN 06-467 Supplement 2, James C. Kinsey to Document Control Desk (USNRC), *Response to Portion of NRC Request for Additional Information Letter No. 66 – RAI Number 21.6-88 S02*, dated June 13, 2007. The proprietary information in Enclosure 1, *MFN 06-467, Supplement 2 - Response to Portion of NRC Request for Additional Information Letter No. 66 Related to ESBWR Design Certification Application –RAI Number 21.6-88 S02 – GNF Proprietary Information*, is identified by [[dotted underline inside double square brackets⁽³⁾]]. Figures and other large objects are identified with double square brackets before and after the object. 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, 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, 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 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 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 13th day of June 2007.



Jens G. M. Andersen
Consulting Engineer, Thermal Hydraulic Methods
Global Nuclear Fuel – Americas, L.L.C.