HITACHI

GE Hitachi Nuclear Energy

Richard E. Kingston
Vice President, ESBWR Licensing

PO Box 780 M/C A-55
Wilmington, NC 28402-0780
USA

T 910 819 6192
F 910 362 6192
rick.kingston@ge.com

Proprietary Information Notice
This letter forwards proprietary information in accordance with 10 CFR 2.390. The balance of this letter may be considered non-proprietary upon the removal of Enclosure 1.

MFN 08-927

Docket No. 52-010

November 24, 2008

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. 245 Related to ESBWR Design Certification Application - Containment Systems - RAI Number 6.2-194**

Enclosures 1 and 2 contain the GE Hitachi Nuclear Energy (GEH) response to the subject NRC RAI transmitted via the Reference 1 letter.

Enclosure 1 contains proprietary information as defined in 10 CFR 2.390. The affidavit contained in Enclosure 3 identifies that the information contained in Enclosure 1 has been handled and classified as proprietary to GEH. GEH hereby requests that the proprietary information in Enclosure 1 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17. Enclosure 2 is the non-proprietary version of the RAI response, which does not contain proprietary information and is suitable for public disclosure.

If you have any questions or require additional information, please contact me.

Sincerely,

Richard E. Kingston

Richard E. Kingston
Vice President, ESBWR Licensing

D068
NRO

Reference:

1. MFN 08-658, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 245 Related to ESBWR Design Certification Application*, August 20, 2008

Enclosures:

1. MFN 08-927 - Response to Portion of NRC Request for Additional Information Letter No. 245 Related to ESBWR Design Certification Application - Containment Systems - RAI Number 6.2-194 - GEH Proprietary Information
2. MFN 08-927 - Response to Portion of NRC Request for Additional Information Letter No. 245 Related to ESBWR Design Certification Application - Containment Systems - RAI Number 6.2-194 - Non-Proprietary Version
3. Affidavit - David H. Hinds - dated November 24, 2008

cc:	AE Cubbage	USNRC (with enclosures)
	DH Hinds	GEH/Wilmington (with enclosures)
	RE Brown	GEH/Wilmington (with enclosures)
	eDRF	0000-0092-8802

Enclosure 2

MFN 08-927

Response to Portion of NRC Request for Additional Information Letter No. 245 Related to ESBWR Design Certification Application

Containment Systems

RAI Number 6.2-194

Non-Proprietary Version

NRC RAI 6.2-194:

The staff reviewed GEH response to RAI 6.2-23 S02 in GEH letter MFN 08-270 and conducted an independent ESBWR shield wall annulus pressurization analysis. The staff developed the shield wall annulus model for the TRACE computer code. The staff performed analyses for double ended pipe breaks in the FW and RWCU lines. The staff used TRACE to calculate transient break mass and energy releases and the shield wall annulus pressurization. Based on its review of GEH's response to RAI 6.2-23 S02 and TRACE analyses, the staff makes the following requests which need to be addressed for the staff to complete its review:

A. *Justify the use of a 0.5 multiplier on the FW break flow from the RSW side of the break indicated in the GEH's response to RAI 6.2-23 S02. Reference to a report or a technical paper is insufficient.*

   Provide specific calculations which support this multiplier and specifically discuss how any reference supports the use of the multiplier.

B. *Justify the RWCU break flow calculation from the RSW side of the break including the use of a 0.5 multiplier on break flow indicated in the GEH response to RAI 6.2-23 S02. GEH should provide specific calculations which compare the Moody choked flow values to other critical flow calculation methods for subcooled flow such as the Henry-Fauske calculation method.*

   Provide specific calculations which support the 0.5 multiplier and specifically discuss how any reference supports the use of the multiplier. Reference to a report or a technical paper is insufficient.

C. *Revise the TRACG model to include obstructions to flow in the shield wall annulus, such as pipe penetrations or provide an analysis which specifically shows that the impact of not including these features on the final figures of merit, such as pressure in the shield wall annulus, is negligible.*

D. *Confirm that the pressure drop due to wall roughness was included in the TRACG shield wall annulus model. If not, provide specific analyses that the impact on the final figures of merit, such as shield wall annular pressure, is negligible.*

GEH Response:

A. The break flow calculated from the containment analysis of a feedwater line break with failure of one safety relief valve (SRV) bounding case (DCD Tier 2, Revision 5) is used to compare the break flow used in the annulus pressurization analysis with the feedwater line break scenario. Results show that the break flow from the Reactor Shield Wall (RSW) side used in the annulus pressurization analysis is much higher, [[ ]], than the value calculated from the feedwater line break with failure of one SRV bounding case for the containment analysis.

   The selection of the multiplier in the blowdown break flow on the RSW side of the break is based on the modeling assumption provided on Page B-12 of NEDO-20533-1, "The General Electric Mark III Pressure Suppression Containment System Analytical Model Supplement 1," Appendix B, September 1975.

This document provides detailed discussions on the pipe inventory blowdown for a postulated instantaneous guillotine rupture of a primary system pipe, including modeling recommendation and comparisons with the experimental data.

In addition, this multiplier was stated in the Generic Annulus Pressurization Mass and Energy Release Methodology provided to the NRC in Page 2 of Attachment 1 to letter MFN 178-78, dated May 2, 1978.

The above information regarding the selection of the multiplier is also applied to the response for the Part B of this RAI.

B. The break flow calculated from the water level analysis of a Reactor Water Cleanup/Shutdown Cooling (RWCU/SDC) line break is used to compare the break flow used in the annulus pressurization analysis with RWCU/SDC line break scenario. Results show that the break flow from the RSW side used in the annulus pressurization analysis is higher, [[ ]], than the value calculated from the RWCU/SDC line break for the water level analysis.

   As for the comparison with the Henry-Fauske calculation method, the critical flow table provided in the Appendix A of the Technical Manual for the GOTHIC computer program is used for comparison. Results are presented in Table 6.2-194.

C. The flow obstructions for the flow into the shield wall annulus were considered in the current annulus pressurization analysis. The discussion regarding the obstructions to flow in the shield wall annulus is included in the response to RAI 6.2-23 S01, Item 5, under Part D (MFN 06-159, Supplement 1, dated September 12, 2007).

D. The current annulus pressurization analysis did not include the wall roughness in the computer model. A reanalysis was performed with a conservative value of the surface roughness to hydraulic diameter ratio of [[ ]] applied to the TRACG computer model. Results show that the impact on the pressure response is negligible.

DCD Impact:

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

Table 6.2-194. Break Flow Comparison

[[

]]

Enclosure 3

MFN 08-927

Affidavit

David H. Hinds

Dated November 24, 2008

GE Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, David H. Hinds, state as follows:

(1) I am the Manager, New Units Engineering, GE Hitachi Nuclear Energy ("GEH"), 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 GEH letter MFN 08-927, Mr. Richard E. Kingston to U.S. Nuclear Regulatory Commission, entitled *Response to Portion of NRC Request for Additional Information Letter No. 245 Related to ESBWR Design Certification Application - Containment Systems - RAI Number 6.2-194,* dated November 24, 2008. The GEH proprietary information in Enclosure 1, which is entitled *MFN 08-927 - Response to Portion of NRC Request for Additional Information Letter No. 245 Related to ESBWR Design Certification Application - Containment Systems - RAI Number 6.2-194 - GEH Proprietary Information,* is delineated by a [[dotted underline inside double square brackets.{3}]]. Figures and large equation 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. A non-proprietary version of this information is provided in Enclosure 2, *MFN 08-927 - Response to Portion of NRC Request for Additional Information Letter No. 245 Related to ESBWR Design Certification Application - Containment Systems - RAI Number 6.2-194 - Non-Proprietary Version.*

(3) In making this application for withholding of proprietary information of which it is the owner, GEH 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 GEH competitors without license from GEH 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 GEH customer-funded development plans and programs, resulting in potential products to GEH;

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 GEH, 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 GEH, 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 GEH. Access to such documents within GEH 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 GEH 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 identifies detailed GE ESBWR analytical information for determining the thermodynamic and hydraulic response of the ESBWR. GE utilized methodology developed based upon prior experience from its fleet, with significant resource allocation in developing the analytical methodology over several years at a substantial cost.

The development of the evaluation process along with the interpretation and application of the analytical results is derived from the extensive experience database that constitutes a major GEH asset.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GEH's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GEH'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 GEH.

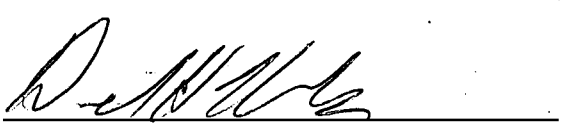
The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GEH's competitive advantage will be lost if its competitors are able to use the results of the GEH 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 GEH 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 GEH of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing 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 24th day of November 2008.



David H. Hinds
GE Hitachi Nuclear Energy Americas LLC