

#### **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.

'MFN 08-087

February 4, 2008

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

#### **GE Hitachi Nuclear Energy**

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Docket No. 52-010

Subject: Response to Portion of NRC Request for Additional Information Letter No. 137 – Related to ESBWR Design Certification Application – RAI Numbers 4.3-11 and 4.4-68

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) response to the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) sent by the Reference 1 NRC letter. GEH response to RAI Numbers 4.3-11 and 4.4-68 is addressed in Enclosures 1, 2 and 3.

Enclosure 1 contains GEH proprietary information as defined by 10 CFR 2.390. GEH customarily maintains this information in confidence and withholds it from public disclosure. Enclosure 2 is the non-proprietary version, which does not contain proprietary information and is suitable for public disclosure.

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 information in 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, please contact me.

Sincerely,

Vames C. Kinsey // Vice President, ESBWR Licensing



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Reference:

 MFN 08-027, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GEH, Request For Additional Information Letter No. 137 Related To ESBWR Design Certification Application, dated January 10, 2008

Enclosures:

- MFN 08-087 Response to Portion of NRC Request for Additional Information Letter No. 137 – Related to ESBWR Design Certification Application – RAI Numbers 4.3-11 and 4.4-68 – GEH Proprietary Information
- MFN 08-087 Response to Portion of NRC Request for Additional Information Letter No. 137 – Related to ESBWR Design Certification Application – RAI Numbers 4.3-11 and 4.4-68 – Non-Proprietary Version
- 3. MFN 08-087 Response to Portion of NRC Request for Additional Information Letter No. 137 – Related to ESBWR Design Certification Application – RAI Numbers 4.3-11 and 4.4-68 – Affidavit
- cc:AE CubbageUSNRC (with enclosure)GB StrambackGEH/San Jose (with enclosure)RE BrownGEH/Wilmington (with enclosure)DH HindsGEH/Wilmington (with enclosures)eDRF0000-0080-2640 and 0000-0079-8558

Enclosure 2

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# Response to Portion of NRC Request for

## Additional Information Letter No. 137

### **Related to ESBWR Design Certification Application**

**RAI Numbers 4.3-11 and 4.4-68** 

**Non-Proprietary Version** 

#### NRC RAI 4.3-11

Provide additional details regarding the initial core shutdown margin calculation

The initial core nuclear design includes a calculation of the shutdown margin (SDM). The shutdown margin prediction is based on a prediction of the [[

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The staff requires additional details regarding the [[ ]]. Please provide (1) the technical basis for the [[ ]], and (2) qualification of the [[ ]] based on relevant operating experience with similar fuel designs for fresh initial or predominantly fresh restart cores.

#### **<u>GEH Response</u>**

The ESBWR initial core cold critical design eigenvalues were presented in Table 3-2 and in Figure 3-3 of NEDC-33326P, *GE14E for ESBWR Initial Core Nuclear Design Report*. The cold critical design values are repeated here in Figure 1. These design eigenvalues were then used to determine cold shutdown margin through the cycle. Based on these design values, [[ ]] was shown to be the minimum cold shutdown margin for the initial core. This margin is predicted to steadily increase throughout the cycle and is above [[ ]] at the end of cycle.

A general discussion on cold eigenvalue determination was provided in Section 3.2 of NEDC-33326P. Additional material was provided in Section 1.6.5 of NEDC-33239P, *GE14 for ESBWR Nuclear Design Report*, Revision 2, including actual cold critical test results for various BWRs based on PANAC11 core simulator predictions. The cold critical design eigenvalues were empirically determined from a database of cold critical results based on actual tests performed at BWRs. Cold critical tests are incorporated into the plant startup procedure as control rods are withdrawn from a cold all-rods-in condition at the beginning of cycle (BOC). Additional opportunities may exist for middle of cycle (MOC) cold critical tests in the event a plant experiences an outage at some point during the cycle. Such cold critical tests were recently performed at both BOC and MOC state points for a US BWR (Plant A). These tests are of particular interest since the core was comprised of approximately [[

]]. Hence, the results are relevant to the ESBWR initial core. The calculated cold critical eigenvalues are shown in Figure 4.3-11-1. These test results indicate that the ESBWR cold critical design eigenvalue selection is sufficiently conservative. It should also be noted that additional conservatism was applied in the cold shutdown margin evaluation by designing to a minimum shutdown margin of [[

]]. The predicted cold shutdown margin through the cycle is provided in Figure 4.3-11-2 along with the standard and initial core design target values. These initial core results were previously provided in NEDC-33326P, Table 3-17 and Figure 3-55.

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# Figure 4.3-11-1 ESBWR Initial Core Cold Design Eigenvalue

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Figure 4.3-11-2 ESBWR Initial Core Predicted Cold Shutdown Margin

### **DCD** Impact

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

No changes to LTR NEDC-33326P will be made in response to this RAI.

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#### NRC RAI 4.4-68

Verify the R-factor method

Verify that the initial core *R*-factors are calculated consistent with the nodal void conditions.

#### **GEH Response**

The GE14E R-factors generated for the ESBWR initial core are consistent with the nodal void conditions observed for the ESBWR initial core rodded depletion calculations that are documented in NEDC-33326P, *GE14E for ESBWR Initial Core Nuclear Design Report*. Figure 4.4-68-1 shows the bundle average void fraction corresponding to the MCPR limiting bundle at each exposure state point for the initial core rodded depletion calculation. The axial profile used for the R-factor calculations has [[

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Figure 4.4-68-1 Bundle Average Void Fractions for MCPR Limiting Bundles

#### DCD Impact

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

No changes to LTR NEDC-33326P will be made in response to this RAI.

### MFN 08-087

### **Enclosure 3**

# **Response to Portion of NRC Request for**

## Additional Information Letter No. 137

# **Related to ESBWR Design Certification Application**

### **RAI Numbers 4.3-11 and 4.4-68**

Affidavit

### **GE Hitachi Nuclear Energy**

### AFFIDAVIT

#### I, David H. Hinds, state as follows:

- (1) I am General Manager, New Units Engineering, GE Hitachi Nuclear Energy ("GEH"), 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 GEH's letter, MFN 08-087, Mr. James C. Kinsey to U.S. Nuclear Energy Commission, entitled "Response to Portion of NRC Request for Additional Information Letter No. 137 Related to ESBWR Design Certification Application RAI Numbers 4.3-11 and 4.4-68," dated February 4, 2008. The proprietary information in enclosure 1, which is entitled "Response to Portion of NRC Request for Additional Information Letter No. 137 Related to ESBWR Design Certification Application RAI Numbers 4.3-11 and 4.4-68," dated February 4, 2008. The proprietary information Letter No. 137 Related to ESBWR Design Certification Application RAI Numbers 4.3-11 and 4.4-68 GEH Proprietary Information," is delineated by a [[dotted underline inside double square brackets.<sup>[3]</sup>]] Figures and large equation objects are identified with double square brackets before and after the object. 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, 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, <u>Critical Mass Energy Project v. Nuclear Regulatory Commission</u>, 975F2d871 (DC Cir. 1992), and <u>Public Citizen Health Research Group v. FDA</u>, 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's 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 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 contains details of GEH's evaluation methodology.

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 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 4<sup>th</sup> day of February 2008.

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David H. Hinds GE Hitachi Nuclear Energy