HITACHI

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Proprietary Notice
This letter forwards proprietary information in accordance with 10CFR2.390. Upon the removal of Enclosure 1 and 3, the balance of this letter may be considered non-proprietary.

MFN 09-459

Docket No. 52-010

July 10, 2009

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

Subject: **Response to Portion of NRC RAI Letter No. 339 Related to ESBWR Design Certification Application – DCD Tier 2 Section 3.9 – Mechanical Systems and Components; RAI Numbers 3.9-215 S01 Parts A, B, C & D (revised) and 3.9-244 S01 (revised)**

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) response to a portion of the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) letter number 339 sent by NRC letter dated May 26, 2009 (Reference 1). RAI Numbers 3.9-215 S01 Parts A, B, C & D (revised) and 3.9-244 S01 (revised) are addressed in Enclosure 1. Enclosure 3 contains changes to NEDE-33313P as a result of GEH's response to this RAI. Verified LTR changes associated with these RAI responses are identified in the enclosed markups by enclosing the text within a black box.

GEH's responses to RAI Numbers 3.9-215 S01 Part D and 3.9-244 S01 were first issued by MFN 09-392 dated June 18th, 2009. Enclosure 1 of this MFN letter revises our response to RAI Number 3.9-215 S01 Part D and to RAI Number 3.9-244 S01 based on updated analysis.

Enclosures 1 and 3 contains GEH proprietary information as defined by 10 CFR 2.390. GEH customarily maintains this information in confidence and withholds it from public disclosure. Enclosures 2 and 4 are the non-proprietary versions, which do not contain proprietary information and are suitable for public disclosure.

The affidavit contained in Enclosure 5 identifies that the information contained in Enclosures 1 and 3 has been handled and classified as proprietary to GEH. GEH hereby requests that the information in Enclosures 1 and 3 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17.

D068
NRO

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

Sincerely,

Richard E. Kingston

Richard E. Kingston
Vice President, ESBWR Licensing

Reference:

1. MFN 09-365 Letter from U.S. Nuclear Regulatory Commission to J. G. Head, GEH, *Request For Additional Information Letter No. 339 Related to ESBWR Design Control Document* dated May 26, 2009

Enclosures:

1. Response to Portion of NRC RAI Letter No. 339 Related to ESBWR Design Certification Application - DCD Tier 2 Section 3.9 – Mechanical Systems and Components; RAI Numbers 3.9-215 S01 Parts A, B, C & D (revised) and 3.9-244 S01 (revised) - Proprietary Version
2. Response to Portion of NRC RAI Letter No. 339 Related to ESBWR Design Certification Application - DCD Tier 2 Section 3.9 – Mechanical Systems and Components; RAI Numbers 3.9-215 S01 Parts A, B, C & D (revised) and 3.9-244 S01 (revised) - Public Version
3. Response to Portion of NRC RAI Letter No. 339 Related to ESBWR Design Certification Application - LTR Markups RAI Number 3.9-215 S01 Parts A, B, C & D (revised) and 3.9-244 S01 (revised) - Proprietary Version
4. Response to Portion of NRC RAI Letter No. 339 Related to ESBWR Design Certification Application - LTR Markups RAI Numbers 3.9-215 S01 Parts A, B, C & D (revised) and 3.9-244 S01 (revised) - Public Version
5. Affidavit

cc:	AE Cubbage	USNRC (with enclosures)
	JG Head	GEH/Wilmington (with enclosures)
	DH Hinds	GEH/Wilmington (with enclosures)
	eDRF Section	0000-0092-7093 R3 (RAIs 3.9-215 S01 Parts A, B, C & D (revised) and 3.9-244 S01 (revised))

Enclosure 2

MFN 09-459

Response to Portion of NRC Request for

Additional Information Letter No. 339

Related to ESBWR Design Certification Application

DCD Tier 2 Section 3.9 – Mechanical Systems and Components

RAI Numbers 3.9-215 S01 Part A, B, C & D (revised)

And 3.9-244 S01 (revised)

Public Version

NRC RAI 3.9-215 S01

Summary: Information summarizing the results of the metallurgical evaluations and stress concentration factor (SCF) that may be used with finite element analysis.

A) *In Section 3.1 of the GENE report, DRF GE-NE 0000-0092-7093-1P, Class II, April 2005, "recommended Weld Quality and Stress Concentration Factors for use in the Structural Analysis of Exelon Replacement Steam Dryer,"*

(i) GEH states, [[

]]*." GEH is requested to provide information summarizing the results of the metallurgical evaluations which support these conclusions.*

(ii) GEH further states that in the ESBWR steam dryer, as in the replacement dryers, the [[ ]]*. However,* [[ ]]*. GEH is requested to explain whether a* [[ ]].

B) *The GENE report provides the stress concentration factor (SCF) that may be used with finite element analysis to obtain the peak stress at the fillet weld using one of the following three approaches:*

(a) [[ ]]*, the SCF of 4 is applied* [[ ]].
(b) [[ ]]*, the SCF of 1.8 is applied* [[ ]].
(c) [[ ]]*, the SCF of 1.8 is applied* [[ ]].

GEH is requested to further discuss the technical bases of these approaches by providing the following:

(i) For Approach (a), GEH defines the [[ ]]*. GEH is requested to explain how the* [[ ]].

(ii) In Section 2.3 of the report, GEH claims that the fatigue stress calculated using Approach (b) is equal to or higher than the one using Approach (a). GEH is requested to provide a technical justification for this claim. In Section 3.2, GEH

further states that the various studies have shown that the calculated fatigue stress using Approach (a) correlates reasonably well with that using Approach (b). GEH is requested to provide a summary of the results of these studies and confirm whether it supports the claim made in Section 2.3.

(iii) GEH is also requested to provide data showing how well the fatigue stress calculated using Approach (c) compare with that calculated using Approaches (a) and (b).

(iv) GEH also needs to explain whether the three approaches mentioned above are applicable to fillet welds mainly subject to bending stresses or they are equally applicable to the welds mainly subject to membrane stresses alone, or subject to both bending and membrane stresses.

C) *In Section 2.3 of the report, GEH states that the* [[

]]. *GEH is requested to explain the meaning and significance of the terms "*[[ ]]*." What may be the recommended values of SCFs, if Approach (b) or (c) is used to obtain the* [[ ]]*?*

D) *GEH states that it will treat the* [[

]]. *The staff agrees with GEH that this is a conservative method to assess fatigue damage. However, this particular method should be included in LTR NEDE-33313P. In addition, the LTR should be revised to include a summary and conclusions of the GENE report, DRF GE-NE 0000-0092-7093-1P, Class II, April 2005.*

GEH Response

Part A)(i) GEH took boat samples of the original production welds as part of the root cause evaluations for the steam dryer failures that occurred at extended power uprate conditions. GEH metallurgical evaluations showed there were no weld quality issues associated with the fatigue failures of these steam dryers. [[

]].

GEH will add a statement to LTR NEDE-33313 conveying [[

]].

A)(ii) [[

]]. One criterion when selecting inspection methods are the service requirements of the component. Since most fatigue related fractures occur at the surface, PT examinations are of particular importance to steam dryers. [[

]].

GEH will add a statement to LTR NEDE-33313 describing [[

]].

Part B)(i) In the original response GEH explained [[

]].

GEH will add a statement to LTR NEDE-33313 describing [[

]].

Part B)(ii) For shell element model, the [[

]].

[[

]]

Figure B-1: [[ ]].

[[

]].

[[

]]

Figure B-2. [[ ]]

[[

]]

Figure B-3: 3D view showing [[
]].

[[

]]

Figure B-4: [[ ]]

A coordinate system [[

[[

]]

[[ ]]

Figure B-5: [[

]].

]]

Resolving the [[

[[

]]

Figure B-6: View looking down on [[

]].

]].

Although this [[

]].

Part B)(iii) The RAI supplement Part B approach (c) [[

]].

GEH will add a statement to LTR NEDE-33313 discussing [[
]].

Part B)(iv) The three approaches mentioned above [[

]].

The specified SCF [[

]].

GEH will add a statement to LTR NEDE-33313 discussing [[
]].

Part C) The "ends of welds are not covered" refers to a two sided fillet weld where the weld is not wrapped around the ends, see figure C-1 below. The ends of the plate are not welded. [[
]].

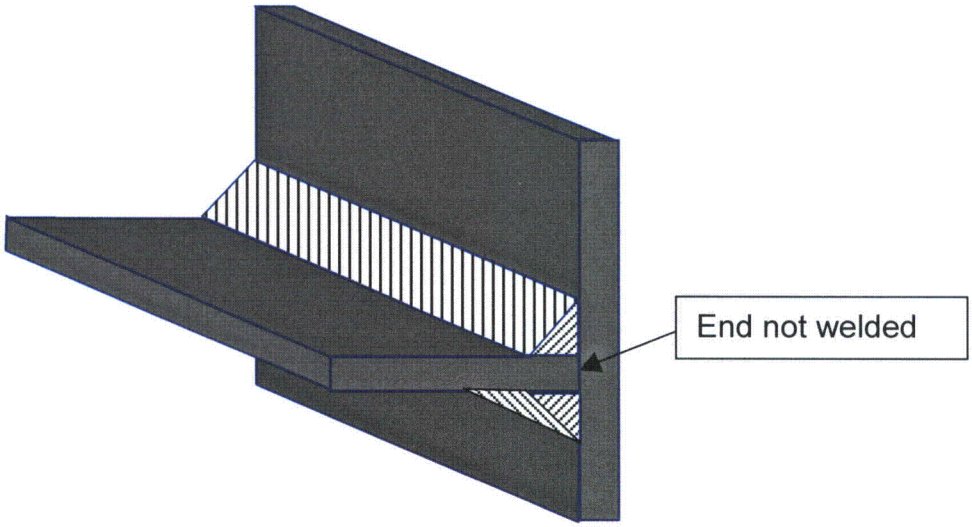


Figure C-1: Two sided fillet weld not welded all the way around.

Part D)(revised) LTR NEDE-33313P will be revised with particular method in addition to the summary and conclusions of the GENE report, DRF GE-NE 0000-0092-7093-1P.

DCD Impact
No change will be made to the DCD.

LTR Impact
LTR 33313P, Section 4.1 and 11 were revised and section 4.2 was added as noted in the attached markup.

NRC RAI 3.9-244 S01

RAI Summary

Include explanation of weld quality and fatigue factors in the topical report, NEDE-33313P.

RAI Text

In its response to NRC RAI 3.9-244. GEH states that the statement in Section 4.0 was only intended to apply to the design article of ASME Subsection NG with an exception to the weld quality and fatigue factors as explained in Subsections 4.1 and 7.1 of the LTR (NEDE-33313P). However, the staff finds that neither Subsection 4.1 nor 7.1 explains weld quality factor. The staff also notes that the weld quality factor and fatigue factor for use in the steam dryer analysis are explained in the GENE Report DRFGE-NE 0000-0092-7093-1P, Recommended Weld Quality and Stress Concentration Factors for Use in the Structural Analysis of Exelon Replacement Steam dryer. The staff requests that GEH include this explanation of weld quality and fatigue factors in the topical report. NEDE-33313P.

GEH Response (revised)

NEDE-33313P will be revised to explain the use of weld quality and fatigue factors in the steam dryer analyses by extracting information from GENE Report DRFGE-NE 0000-0092-7093-1P in coordination with additional information in RAI 3.9-215 response.

DCD Impact

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

LTR Impact

Section 4.1 of NEDE-33313P will be revised as shown in the attached markup.

Enclosure 4

MFN 09-459

Response to Portion of NRC Request for

Additional Information Letter No. 339

Related to ESBWR Design Certification Application

LTR Markup for

RAI Numbers 3.9-215 S01 Part A, B, C & D (revised)

And 3.9-244 S01 (revised)

Public Version

~~10.0~~11.0 REFERENCES

[1] NEDE 33312P, "License Topical Report, ESBWR Steam Dryer Acoustic Load Definition".

[2] American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section II Part D, 2001 Edition, 2003 Addenda.

[3] 26A6642AK, Rev. 54, ""ESBWR Design Control Document", Tier 2, Chapter 3, Sections 3-9-3-11.

[4] American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III, 2001 Edition, 2003 Addenda.

[5] 26A6642AN rev. 54, "ESBWR Design Control Document", Tier 2, Chapter 3, Appendices 3G to 3L.

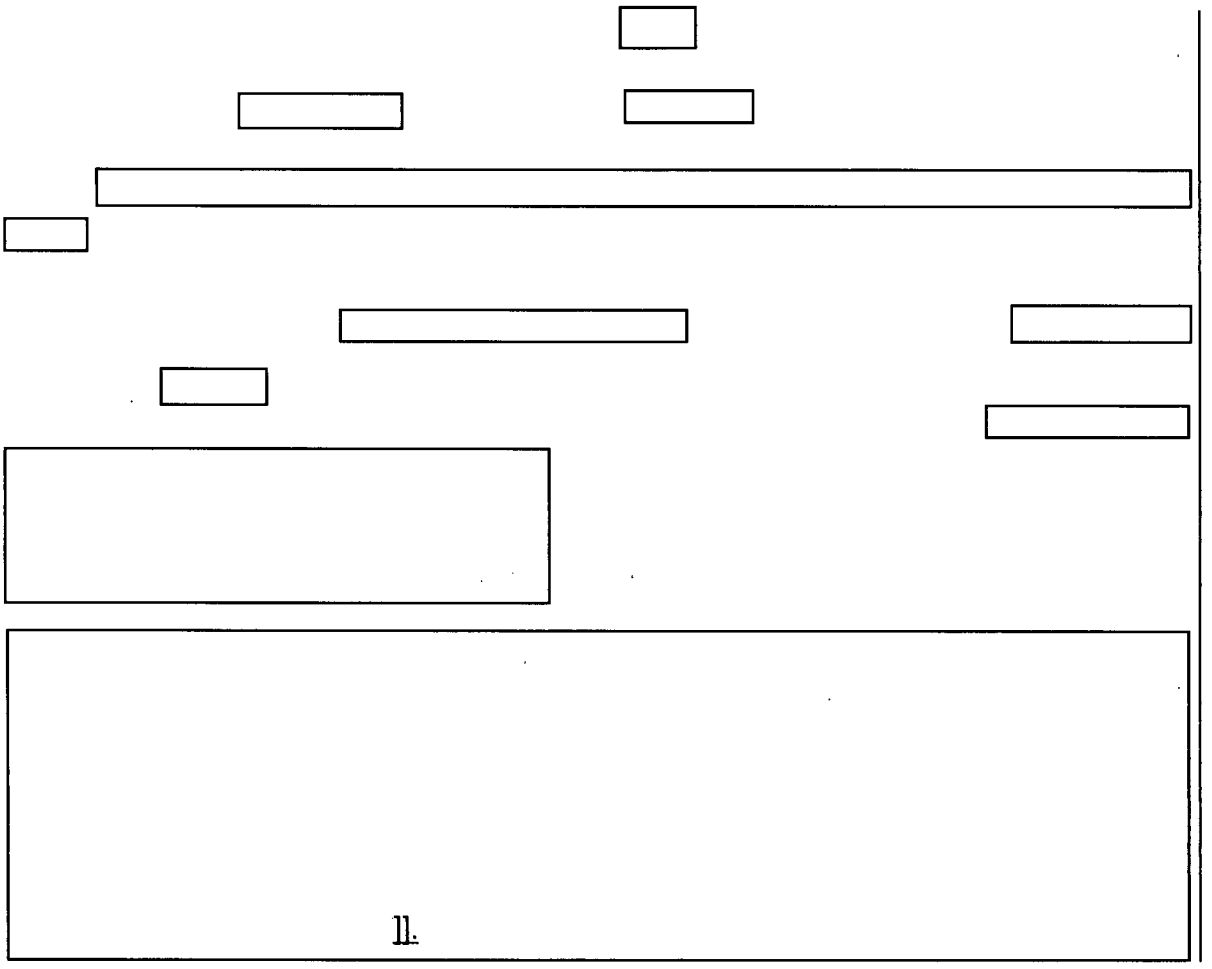
[6] ANSYS Release 11~~0~~.0, ANSYS Incorporated, 2008~~5~~.

4.0 DESIGN CRITERIA

The steam dryer, including the dryer units, is a non-safety related item and is classified as an Internal Structure per Reference 3, as defined in Reference 4, Subsection NG, Paragraph NG-1122. The steam dryer is not an ASME Code component, but the design shall comply to the applicable requirements of ASME Code Subsection NG-3000 except for the weld quality and fatigue factors as discussed in Subsections 4.1 and 7.~~, to the extent possible.~~

4.1 FATIGUE CRITERIA

The steam dryer fatigue evaluation consists of calculating the alternating stress intensity from FIV loading at all locations in the steam dryer structure and comparing it with the allowable design fatigue threshold stress intensity requirements from Reference 5. [[



]]

The [[

]].

If the [[

]].

The specified SCF [[

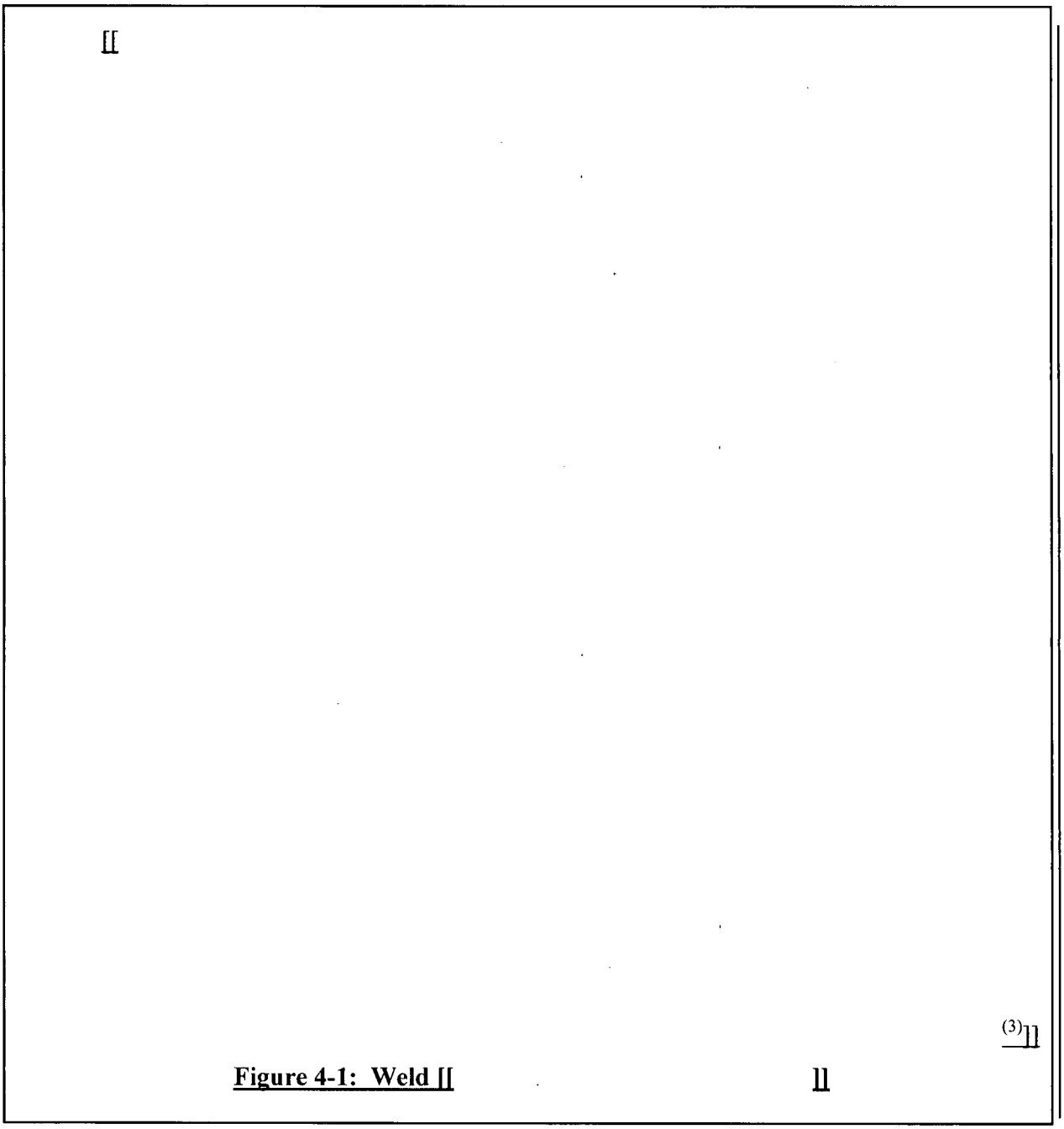
]]

4.2 WELD QUALITY FACTOR

For the case of steam dryer, which is not a core support structure, it was [[

]]

[[



]][3]

Figure 4-1: Weld [[ ]]

MFN 09-459

Enclosure 5

Affidavit

GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, Larry J. Tucker, state as follows:

(1) I am the Manager, ESBWR, 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 Enclosures 1 and 3 of GEH letter MFN 09-459, Mr. Richard E. Kingston to U.S. Nuclear Regulatory Commission, entitled *Response to Portion of NRC RAI Letter No. 339 Related to ESBWR Design Certification Application – DCD Tier 2 Section 3.9 – Mechanical Systems and Components; RAI Numbers 3.9-215 S01 Parts A, B, C & D (revised) and 3.9-244 S01 (revised),* dated July 10, 2009. The GEH proprietary information in Enclosure 1, which is entitled *Response to Portion of NRC RAI Letter No. 339 Related to ESBWR Design Certification Application - DCD Tier 2 Section 3.9 – Mechanical Systems and Components; RAI Numbers 3.9-215 S01 Parts A, B, C & D (revised) and 3.9-244 S01 (revised) - Proprietary Version* and in Enclosure 3, which is entitled *Response to Portion of NRC RAI Letter No. 339 Related to ESBWR Design Certification Application - LTR Markups RAI Number 3.9-215 S01 Parts A, B, C & D (revised) and 3.9-244 S01 (revised) - Proprietary Version* 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. Non-proprietary versions of this information is provided in Enclosure 2 *Response to Portion of NRC RAI Letter No. 339 Related to ESBWR Design Certification Application - DCD Tier 2 Section 3.9 – Mechanical Systems and Components; RAI Numbers 3.9-215 S01 Parts A, B, C & D (revised) and 3.9-244 S01 (revised) - Public Version* and in Enclosure 4 *Response to Portion of NRC RAI Letter No. 339 Related to ESBWR Design Certification Application - LTR Markups RAI Numbers 3.9-215 S01 Parts A, B, C & D (revised) and 3.9-244 S01 (revised) - Public 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 design information. GE utilized prior design information and experience from its fleet with significant resource allocation in developing the system 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 10th day of July, 2009.

Larry J. Tucker
GE-Hitachi Nuclear Energy Americas LLC