



**HITACHI**

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**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 09-077

Docket No. 52-010

January 30, 2009

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

**Subject: Response to Portion of NRC RAI Letter No. 220 Related to ESBWR Design Certification Application – DCD Tier 2 Section 3.9 – Mechanical Systems and Components; RAI Number 3.9-212**

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) letter number 220 sent by NRC letter dated July 29, 2008 (Reference 1). RAI Number 3.9-212 is addressed in Enclosure 1.

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,

Richard E. Kingston  
Vice President, ESBWR Licensing

*Does NRO*

## Reference:

1. MFN 08-609 Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GEH, *Request For Additional Information Letter No. 220 Related to NEDE-33312P, "ESBWR Steam Dryer Acoustic Load Definition," NEDE-33313P, "Steam Dryer Structural Evaluation," NEDC-33408P, "ESBWR Steam Dryer-Plant Based Load Evaluation Methodology," NEDE-33259P, "Reactor Internals Flow Induced Vibration Program," and ESBWR Design Control Document, Revision 5*, dated July 29, 2008

## Enclosures:

1. Response to Portion of NRC RAI Letter No. 220 Related to ESBWR Design Certification Application - DCD Tier 2 Section 3.9 – Mechanical Systems and Components; RAI Number 3.9-212 - Proprietary Version
2. Response to Portion of NRC RAI Letter No. 220 Related to ESBWR Design Certification Application - DCD Tier 2 Section 3.9 – Mechanical Systems and Components; RAI Number 3.9-212 – Non-Proprietary Version
3. Affidavit

cc: AE Cubbage  
RE Brown  
DH Hinds  
eDRF Section

USNRC (with enclosures)  
GEH/Wilmington (with enclosures)  
GEH/Wilmington (with enclosures)  
0000-0092-7086 (RAI 3.9-212)

**Enclosure 2**

**MFN 09-077**

**Response to Portion of NRC Request for  
Additional Information Letter No. 220  
Related to ESBWR Design Certification Application  
Mechanical Systems and Components**

**RAI Number 3.9-212**

**Non-Proprietary Version**

**NRC RAI 3.9-212**

*Summary: Provide comparison of ABWR and ESBWR dryer designs*

*Since the ESBWR steam dryer design is based on the ABWR dryer design, provide a comparison of these two designs and explain how the differences in the designs may affect the stress analysis results for ESBWR dryer. GEH should also provide the stress analysis results including fatigue evaluation for ABWR design. Also discuss comparison of these calculated results with the measured results and provide the associated uncertainties and bias errors.*

**GEH Response**

A comparison of the key parameters of the ABWR and ESBWR dryer designs are contained in Table 3L-1 of Revision 5 of ESBWR DCD, Appendix 3L. As shown in that table, [[

]]. Additional fabrication improvements in the ESBWR design are discussed in the response to RAI 3.9-214 (MFN 09-069). The primary purpose of the design changes between ABWR and ESBWR dryer is to compensate for the higher ESBWR fluctuating pressure loading due to the approximately 15% higher steam flow in the ESBWR plant. Therefore, the expectation is that the measured vibratory induced stresses on the ESBWR prototype plant dryer will be comparable to those measured on the ABWR prototype plant dryer.

The stress analysis results for the ABWR prototype plant steam dryer are contained in GE document 23A6703, "Steam Dryer Stress Analysis Report". The results of the stress evaluation contained in 23A6703 show that the ABWR dryer fully meets both ASME and Japanese MITI service level stress acceptance level criteria.

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]] Test data was gathered during the ABWR prototype plant power ascension up through 100% licensed power and 111% rated core flow. [[

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Method I was [[ ]] and is applicable to components that have many closely spaced vibration frequencies and/or closely spaced natural vibration modes distributed over a relatively narrow frequency range. The method utilizes a strain energy weighting method applied to all modes over the entire frequency range. It is applied by determining the maximum peak-to-peak (p-p) amplitude from an unfiltered time history segment. This maximum value is multiplied by a combined shape factor (derived from the strain energy weighting method) and stress concentration factors to yield the maximum stress value that could be expected to be found anywhere on the structure. [[

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Method II was [[ ]] and is applicable for components that have many closely spaced vibration frequencies and/or closely spaced natural vibration modes that are unevenly distributed over several frequency ranges. The method is very similar to Method I, except that it is applied over several separate frequency bands. The maximum stress amplitude values for each frequency band are then added together absolutely to yield a conservatively high value for the overall maximum stress amplitude that could be found anywhere on the structure. [[

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Although Methods I and Method II are not used for the ESBWR steam dryer analysis, further details on these methods can be found in Subsection 3L.5.5.2 of Revision 5 of ESBWR DCD, Appendix 3L. For both Methods I and II, the instrumented component stress intensities were compared to a conservative fatigue stress allowable of 68.9 MPa (7.0kg/mm<sup>2</sup> or approximately 10,000 psi).

The maximum stress intensity for each instrumented component of the ABWR prototype plant steam dryer, as determined from the startup test data through 100% rated core thermal power and 111% of rated core flow is as follows:

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[[

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**DCD Impact**

No change will be made to the DCD.

**LTR Impact**

No changes will be made to LTR NEDE-33313P.

**References:**

1. GEH Internal Document – 23A6703 Revision 0, “Steam Dryer Stress Analysis Report”

**MFN 09-077**

**Enclosure 3**

**Affidavit**

# 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 09-068, Mr. Richard E. Kingston to U.S. Nuclear Regulatory Commission, entitled *Response to Portion of NRC RAI Letter No. 220 Related to ESBWR Design Certification Application - DCD Tier 2 Section 3.9 – Mechanical Systems and Components; RAI Number 3.9-209*, dated January 30, 2009. The GEH proprietary information in Enclosure 1, which is entitled *Response to Portion of NRC RAI Letter No. 220 Related to ESBWR Design Certification Application - DCD Tier 2 Section 3.9 – Mechanical Systems and Components; RAI Number 3.9-212 - Proprietary Version*, 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. A non-proprietary version of this information is provided in Enclosure 2, *Response to Portion of NRC RAI Letter No. 220 Related to ESBWR Design Certification Application - DCD Tier 2 Section 3.9 – Mechanical Systems and Components; RAI Number 3.9-212 - 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 30<sup>th</sup> day of January 2009.



David H. Hinds  
GE-Hitachi Nuclear Energy Americas LLC