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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 08-840

Docket No. 52-010

October 31, 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. 243 – Related To Design Control Document (DCD)
Revision 5 – RAI Number 4.2-30**

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 Number 4.2-30 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 10 CFR 9.17.

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

Sincerely,

Richard E. Kingston
Vice President, ESBWR Licensing

DOGB
LRO

References:

1. MFN 08-689 Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GEH, *Request For Additional Information Letter No. 243 Related To Design Control Document (DCD) Revision 5*, dated September 4, 2008

Enclosures:

1. MFN 08-840 – Response to Portion of NRC Request for Additional Information Letter No. 243 – Related To Design Control Document (DCD) Revision 5 – RAI Number 4.2-30 – GEH Proprietary Information
2. MFN 08-840 – Response to Portion of NRC Request for Additional Information Letter No. 243 – Related To Design Control Document (DCD) Revision 5 – RAI Number 4.2-30 – Non-Proprietary Version
3. MFN 08-840 – Response to Portion of NRC Request for Additional Information Letter No. 243 – Related To Design Control Document (DCD) Revision 5 – RAI Number 4.2-30 – Affidavit

cc: AE Cabbage USNRC (with enclosures)
RE Brown GEH/Wilmington (with enclosures)
DH Hinds GEH/Wilmington (with enclosures)
eDRF 0000-0084-2503/R4

Enclosure 2

MFN 08-840

**Response to NRC Request for
Additional Information Letter No. 243
Related To Design Control Document (DCD) Revision 5
RAI Number 4.2-30
Non-Proprietary Version**

NRC RAI 4.2-30

MCNP confirmatory analyses

NEDE-33243P, Section 2.2, the heating rate is calculated with the assumption that the average energy deposited is based solely on the (n,α) reaction. NRC staff has conducted simplified MCNP confirmatory analyses that show the (n,α) reaction contributes only 60% to the total heating rate. In particular, there is a sizable carbon scattering cross section which leads to a significant energy deposition contribution. Explain how scattering and gamma contributions to the heating rate are either accounted for or bounded by the method used in Section 2.2. If the method used for calculating the heating rate is determined to be non-conservative, provide a further discussion on the subsequent effects on related analyses (e.g. swelling rates, FEA inputs, etc.).

GEH Response

GEH has performed additional MCNP calculations to tally the neutron and photon energy deposition for the ESBWR control rods. ENDF/B-VI cross section library was used for the calculation. In the GEH MCNP model, carbon atoms were included in the control rod poison along with B-10 and B-11 so the heating contribution from carbon scattering is accounted for. This calculation was performed for the undepleted control rod at the hot, 40% void condition. The energy deposition results are summarized below:

Table 4.2-30-1 Energy Deposition (MeV/fission)

[[

]]

The total energy deposition in the control rod poison region is [[]] MeV/fission, of which only [[]] is from photon energy deposition.

The heating calculation for the control rod, as described in Section 2.2 of NEDE-33243P, Revision 2, is based on the assumption of 2.79 MeV energy deposition per neutron absorption via the B-10 (n,α) reaction. Based on the calculated μ (ratio of average absorptions in the control poison to the total fissions in the

adjacent bundles) of [[]], the total energy deposition would be [[] MeV/fission. Thus, the assumed 2.79 MeV/absorption has about [[]] higher energy deposition than the direct heating calculation and, therefore, is bounding.

The conservatism of the 2.79 MeV/absorption can be explained by the fact that about 6% of the B-10 (n, α) reaction leads to the ground state of Li-7 with a Q-value of 2.79 MeV. The remaining 94% of the reaction leads to the excited state of Li-7 with a Q-value of 2.31 MeV, followed by the immediate decay of Li-7 that emits a 0.48-MeV gamma. Unless the gamma energy is deposited locally in the poison region, the net energy deposition would always be bounded by 2.79 MeV/absorption.

The use of the beginning-of-life absorption rate for the heating calculation is conservative as the heat generation rate decreases with the control rod depletion. The use of the beginning-of-life peaking factor for determining the heating rate in the peak absorber tube is also conservative as the peaking factor decreases with the control rod depletion. All these conservative measures were taken to assure that the calculated heating rate is conservative.

DCD Impact

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

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

Enclosure 3

MFN 08-840

Response to NRC Request for

Additional Information Letter No. 243

Related To Design Control Document (DCD) Revision 5

RAI Number 4.2-30

Affidavit

GE-Hitachi Nuclear Energy Americas LLC

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 08-840, Mr. Richard E. Kingston to U.S. Nuclear Energy Commission, entitled "*Response to Portion of NRC Request for Additional Information Letter No. 243 – Related To Design Control Document (DCD) Revision 5 – RAI Number 4.2-30,*" dated October 31, 2008. The proprietary information in enclosure 1, which is entitled "*MFN 08-840 – Response to Portion of NRC Request for Additional Information Letter No. 243 – Related To Design Control Document (DCD) Revision 5 – RAI Number 4.2-30 – 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.
- (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, 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'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) is classified as proprietary because it contains details of GEH's control rod 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 to GEH.
- (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 31st day of October 2008.



David H. Hinds
GE-Hitachi Nuclear Energy Americas LLC