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Proprietary Notice
This letter forwards proprietary information in accordance with 10CFR2.390. Upon the removal of Enclosure 2, the balance of this letter may be considered non-proprietary.

MFN 08-124, Supplement 1

Docket No. 52-010

August 20, 2009

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

Subject: **Supplemental Response to Portion of NRC Request for Additional Information Letter No. 116 Related to ESBWR Design Certification Application – RAI Number 21.6-65 S02**

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) supplemental response to the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) 21.6-65 S02 sent by NRC Letter 116, Reference 1. The original response to RAI 21.6-65 S02 was previously submitted to the NRC via Reference 2.

GEH response to RAI Number 21.6-65 S02 is addressed in Enclosure 1. Enclosures 2 and 3 contain the LTR markups associated with this response. Enclosure 2 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 3 is a non-proprietary version, suitable for public disclosure, of Enclosure 2.

The response to RAI Number 21.6-63 S01 is unchanged from that provided in Reference 2. The response to RAI Number 21.6-65 S02, as provided in Enclosures 1, 2 and 3 is modified to provide LTR markups as stated.

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

Sincerely,

Richard E. Kingston

Richard E. Kingston
Vice President, ESBWR Licensing

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NRO

References:

1. MFN 07-632, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 116 Related to ESBWR Design Certification Application*, November 15, 2007
2. MFN 08-124, Response to Portion of NRC Request for Additional Information Letter No. 116 – Related to ESBWR Design Certification Application – RAI Numbers 21.6-63 S01 and 21.6-65 S02, February 15, 2008

Enclosures:

1. Supplemental Response to Portion of NRC Request for Additional Information Letter No. 116 Related to ESBWR Design Certification Application - RAI Number 21.6-65 S02
2. Supplemental Response to Portion of NRC Request for Additional Information Letter No. 116 Related to ESBWR Design Certification Application - RAI Number 21.6-65 S02 – LTR Markups – GEH Proprietary Information
3. Supplemental Response to Portion of NRC Request for Additional Information Letter No. 116 Related to ESBWR Design Certification Application - RAI Number 21.6-65 S02 – LTR Markups – Public Version
4. Supplemental Response to Portion of NRC Request for Additional Information Letter No. 116 Related to ESBWR Design Certification Application - RAI Number 21.6-65 S02 – Affidavit

cc: AE Cubbage USNRC (with enclosures)
JG Head GEH/Wilmington (with enclosures)
DH Hinds GEH/Wilmington (with enclosures)
eDRF Section 0000-0087-3472

Enclosure 1

MFN 08-124, Supplement 1

Supplemental Response to Portion of NRC Request for Additional Information Letter No. 116 Related to ESBWR Design Certification Application

RAI Number 21.6-65 S02

NRC RAI 21.6-65 S02

Provide the RAI response in the DCD or Topical Report.

As discussed in a conference call on November 9, 2007, please provide the information in GEH's original RAI response to RAI 21.6-57 in MFN 07-347, dated June 21, 2007, in the DCD or as a supplement to the Topical Report NEDE-33083P, Section 4, "Transient Analysis."

This request is in addition to RAI 21.6-65, Supplement No. 1, dated 9/6/07, (ML072410422) which has not been responded to as of the date of this letter. GEH should consider incorporating the response to Supplement No. 1 also into the DCD or supplement to the Topical Report NEDE-33083P, Section 4, "Transient Analysis."

GEH Supplemental Response

The information in GEH's original responses to RAI 21.6-57 (transmitted via Letter MFN 07-008, January 26, 2007) and RAI 21.65 S01 (transmitted via Letter MFN 08-340, April 7, 2008) will be incorporated into LTR NEDE-33083P, "TRACG Application for ESBWR Transient Analysis", Supplement 3, Revision 1, Attachment A.

DCD/LTR Impact

No DCD changes will be made response to this RAI.

LTR NEDE-33083P, "TRACG Application for ESBWR Transient Analysis", Supplement 3, Attachment A will be revised (Revision 1) as indicated in the attached LTR markup.

Enclosure 3

MFN 08-124, Supplement 1

Supplemental Response to Portion of NRC Request for Additional Information Letter No. 116 Related to ESBWR Design Certification Application

RAI Number 21.6-65 S02

LTR Markups

Public Version

NRC RAI 21.6-57

Provide the following additional information about the load rejection with no bypass (LRNB) event:

A. Table 4.7-1 states that the turbine valve closure scram is initiated at 0.08 seconds into the transient. What percentage of full open are the valves when you initiate a reactor scram? What is the delay time associated with the signal? Provide justification supporting the selection of your turbine control valve closure times and signal delay times.

B. What is the amount of time from when the scram signal is initiated to when the rods actually begin to insert for the transient analyses? Justify this value.

C. Provide a version of DCD Tier 2, Figure 15.3-5e magnifying the area between 0-2 seconds.

GEH RESPONSE

A. In Table 4.7-1 of Demonstration Calculations for ESBWR AOOs (MFN 04-109), the Turbine Control Valve (TCV) is [[ ]] open at the time (TCV) closure scram is initiated at [[ ]]. The turbine bypass valve (BPV) is open [[ ]].

The TCV is closed after a delay of [[ ]], which is the sum of the transmitter response time [[ ]] and logic response time [[ ]]. In ESBWR DCD Rev. 1, Tier 2 LRNB event analysis, Table 15.3-6, the response is further delayed while the bypass system is given time to act. Because the ESBWR is a full bypass plant, there is no TCV scram if the bypass operates properly. This extra delay is needed to interrogate the bypass response in order to determine whether the scram should be bypassed or not. After detection of not enough bypass availability, the Reactor Protection System initiates a reactor scram, [[ ]] after the turbine-generator load rejection sensing devices trip to initiate turbine control valves fast closure.

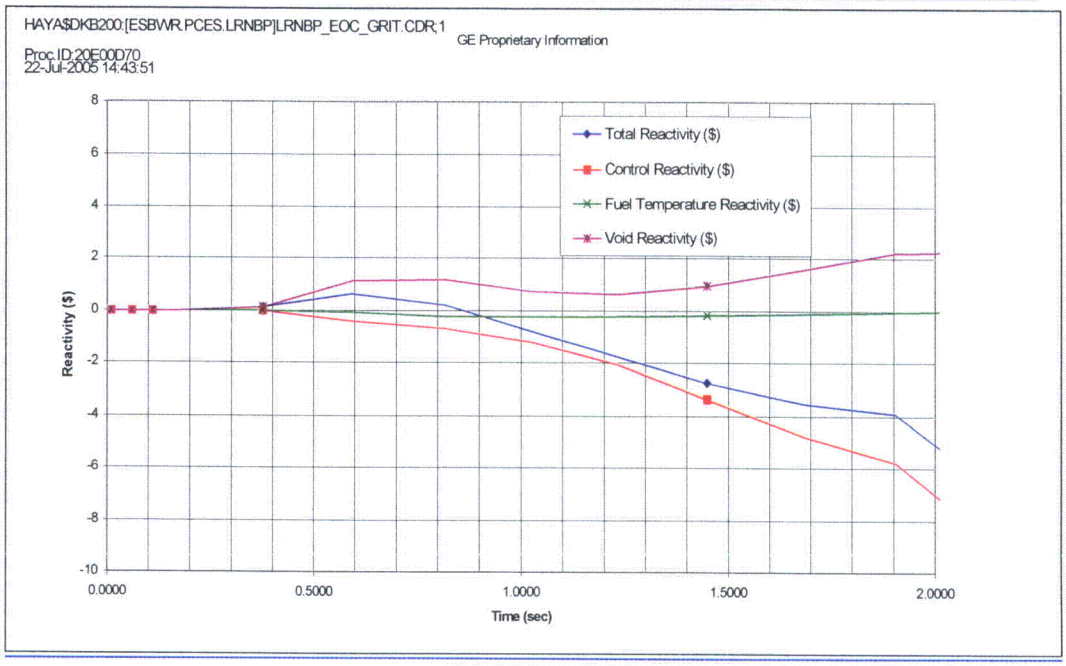
The TCV closure time characteristics in DCD Rev 1, Tier 2, Subsection 15.3.5, for the Load Rejection with Total Bypass Failure analysis, are generic and are based on limiting TCV closure characteristics (i.e. maximum steam reduction in shortest time). The closure characteristics can be found in DCD Tier 2 Section 10.2.

For the analysis presented in Subsection 15.3.5, in DCD Rev 1, Tier 2, the TCV closure scram is initiated at [[ ]], and at that time the TCV is open [[ ]] and the BPV is open [[ ]].

B. In the DCD Tier 2, for the Load Rejection with Total Turbine Bypass Failure analysis, the duration from the time the scram signal is initiated [[ ]] to the time when the rods actually begin to insert [[ ]]. Therefore, the analysis delay time envelopes the control rod scram time requirements criteria that this duration (the maximum delay time between deenergizing of scram solenoids to start control rod motion) be less than or equal to [[ ]].

C. A 0-2 second plot corresponding to Fig. 15.3-5e of DCD Tier 2 is shown in Figure 21.6-57-1.

Fig. 21.6-57-1 Generator Load Rejection With Total Turbine Bypass Failure



NRC RAI 21.6-65 S01

The original RAI requested GEH to provide additional information about the TRACG nodalization used to model ESBWR anticipated operational occurrences (AOO) and infrequent events (IEs).

The staff requests the following additional information to complete its review of this portion of the ESBWR design certification:

How are the channels selected for evaluating the maximum deltaCPR/ICPR that is used to determine the OLMCPR? Do you use the hot channel every time? Or do you take the maximum of all the channel groups? The staff is concerned for cold water injection events where although the Ring 3 channels (peripheral channels) do not have a hot channel, it is possible that these channel groups may experience the highest deltaCPR/ICPR.

GEH RESPONSE

The process for determining the OLMCPR (Operating Limit Minimum Critical Power Ratio) in the ESBWR AOO and IE events is identical to that approved for the operating plants in Ref. [1]. Section 7.3.1 and 7.3.2 in Ref. [2] describes this process in detail.

The licensing criterion to be satisfied is that less than 0.1% of the fuel rods are expected to experience a boiling transition for the most severe AOO. Since the core MCPR always occurs in the hottest channels, the deltaCPR/ICPR of the hot channels are selected for the determination of OLMCPR.

TRACG calculation comparisons in Table 1 show that although the decrease in ΔCPR/ICPR of the peripheral channel (#341) in Ring 3 is greater than the hottest bundle (#2400) in Ring 2 for an IICI (Inadvertent Isolation Condenser Initiation) event in DCD Tier 2 Chapter 15 and in Ref. [2]; the Minimum Critical Power Ratio (MCPR) of the hot channel is much lower than the peripheral channel (Figures 1 and 2).

Therefore, the method for calculating OLMCPR is not affected by the fact that the ΔCPR/ICPR of the peripheral channel is higher than the interior channel in the cold water injection events, because the MCPR of the hot channel is substantially lower than that of the peripheral channel.

Table 1. MCPR and ΔCPR/ICPR Comparisons

Bundle/Channel	ICPR[1]	MCPR	ΔCPR[2]	ΔCPR/ICPR
#2400 (Ring 2)	1.4149	1.3137	-0.1012	-0.0715
#341 (Ring 3)	2.0823	1.8961	-0.1862	-0.0894

(1) CPR at time~10 sec.
(2) ΔCPR= MCPR-ICPR

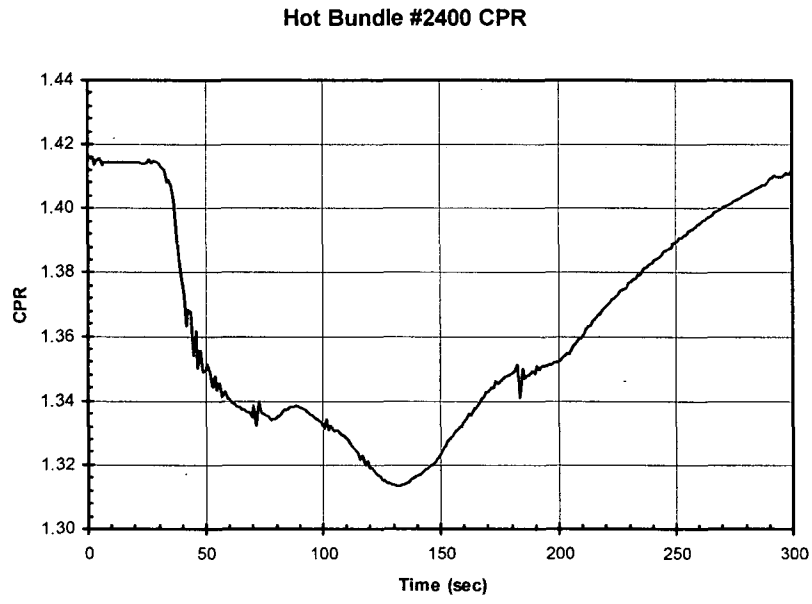


Figure 1. IICI Hot Bundle #2400 CPR

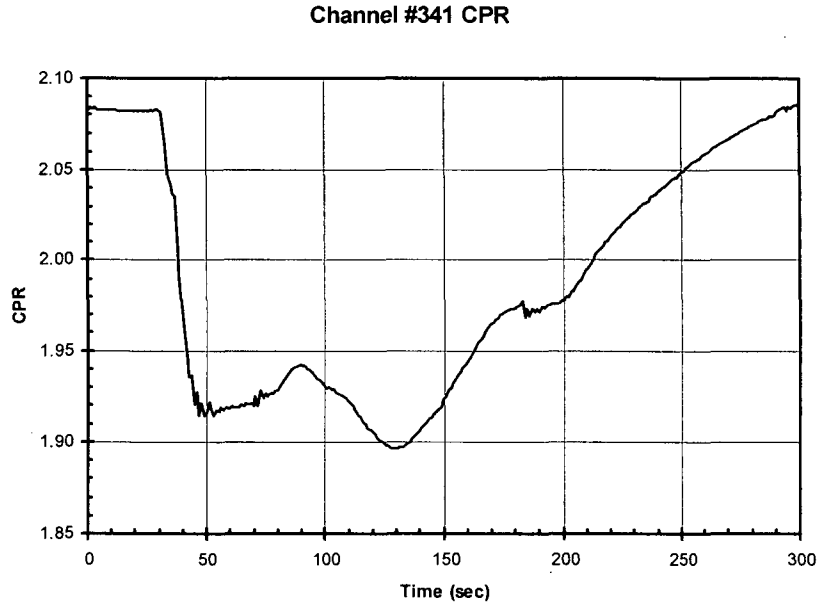


Figure 2. IICI Peripheral Channel #341 CPR

REFERENCES

[1] GEH, Licensing Topical Report, NEDE-32906P-A, Rev. 3, "TRACG Application for Anticipated Operational Occurrences (AOO) Transient Analysis," September 2006.

[2] GEH, Licensing Topical Report, NEDE-33083P, Supp. 3, "TRACG Application for ESBWR Transient Analysis," December 2007.

Enclosure 4

MFN 08-124, Supplement 1

Supplemental Response to Portion of NRC Request for Additional Information Letter No. 116 Related to ESBWR Design Certification Application

RAI Number 21.6-65 S02

LTR Markups

Affidavit

GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, **Larry J. Tucker**, state as follows:

(1) I am Manager, ESBWR 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 08-124, Supplement 1, Mr. Richard E. Kingston to U.S. Nuclear Energy Commission, entitled "Supplemental Response to Portion of NRC Request for Additional Information Letter No. 116 Related to ESBWR Design Certification Application - RAI Number 21.6-65 S02" dated August 20, 2009. The proprietary information in enclosure 2, entitled "*Supplemental Response to Portion of NRC Request for Additional Information Letter No. 116 Related to ESBWR Design Certification Application - RAI Number 21.6-65 S02 – LTR Markups – GEH Proprietary Information,*" is delineated by [[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 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 20th day of August 2009.

Larry J. Tucker
GE-Hitachi Nuclear Energy Americas LLC