HITACHI

GE Hitachi Nuclear Energy

James C. Kinsey
Vice President, ESBWR Licensing

PO Box 780 M/C A-55
Wilmington, NC 28402-0780
USA

T 910 675 5057
F 910 362 5057
jim.kinsey@ge.com

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 07-613

Docket No. 52-010

November 21, 2007

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

Subject: **Response to Portion of NRC Request for Additional Information Letter Nos. 76, 100, and 105 Related to ESBWR Design Certification Application - RAI Numbers 7.1-53, 7.2-59 Supplement 1, 7.3-11, and 7.9-16 Supplement 1**

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 NRC letters dated October 11, 2006, May 30, 2007, and August 16, 2007. GEH responses to RAI Numbers 7.1-53, 7.2-59 Supplement 1, 7.3-11, and 7.9-16 Supplement 1, are 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. A non-proprietary version is provided in Enclosure 2.

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 of 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,

James C. Kinsey
Vice President, ESBWR Licensing

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NRO

References:

1. MFN 06-388, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 76 Related to ESBWR Design Certification Application*, October 11, 2006
2. MFN 07-327, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GE, *Request For Additional Information Letter No. 100 Related To ESBWR Design Certification Application*, dated May 30, 2007
3. MFN 07-460, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GEH, *Request For Additional Information Letter No. 105 Related To ESBWR Design Certification Application*, dated August 16, 2007

Enclosures:

1. MFN 07-613 - Enclosure 1 - Response to Portion of NRC Request for Additional Information Letter Nos. 76, 100, and 105 Related to ESBWR Design Certification Application - RAI Numbers 7.1-53, 7.2-59 Supplement 1, 7.3-11, and 7.9-16 Supplement 1 - GEH Proprietary Information
2. MFN 07-613 - Enclosure 2 - Response to Portion of NRC Request for Additional Information Letter Nos. 76, 100, and 105 Related to ESBWR Design Certification Application - RAI Numbers 7.1-53, 7.2-59 Supplement 1, 7.3-11, and 7.9-16 Supplement 1 – Non-Proprietary Version
3. Affidavit – David H. Hinds, dated November 21, 2007

cc: AE Cubbage USNRC (with enclosure)
GB Stramback GEH/San Jose (with enclosure)
RE Brown GEH/Wilmington (with enclosure)
eDRF Sections: 0000- 0070-2124 (RAI 7.1-53)
0000-0074-2563 (RAI 7.2-59, Supplement 1)
0000-0077-1728 (RAI 7.3-11)
0000-0076-2578 (RAI 7.9-16, Supplement 1)

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Enclosure 2

Response to Portion of NRC Request for Additional Information Letter Nos. 76, 100, and 105 Related to ESBWR Design Certification Application - RAI Numbers 7.1-53, 7.2-59 Supplement 1, 7.3-11, and 7.9-16 Supplement 1

Non-Proprietary Version

NRC RAI 7.1-53

DCD Tier 2, Rev. 3, Section 7.1.2 states that the Reactor Protection System (RPS) includes: "Reactor Trip Functions, MSIV functions of the LD&IS and ATWS/ SLC functions." Topical Report NEDO-33288, Application of NUMAC for the ESBWR Reactor Trip System, in the explanation of terms it is stated: "RPS: The RPS is one of the functions of the Reactor Trip System." The LTR also states "The RTS is the term used to collectively refer to the RPS, NMS and SPTM: The terms "RPS" and "RTS" must be consistently defined in the ESBWR documents. Please clarify and revise both documents.

GEH Response

"RTS" is defined in the," Explanation of Terms" subsection of the Licensing Topical Report NEDO-33288, "Application of Nuclear Measurement Analysis and Control (NUMAC) for the ESBWR Reactor Trip System" to collectively refer to the RPS, the Suppression Pool Temperature Monitoring (SPTM) function, and the safety-related PRNM and SRNM functions of the Neutron Monitoring System (NMS). Subsection 7.2 of DCD Rev. 4 states that," The Reactor Trip System includes the Reactor Protection System (RPS), the Neutron Monitoring System (NMS), and the Suppression Pool Temperature Monitoring System (SPTM) functions." Subsection 7.2.1.2 of DCD Rev. 4 defines the RPS to be," the overall complex of instrument channels, trip logics, trip actuators, manual controls, and scram logic circuitry that initiates rapid insertion of control rods to shut down the reactor". The RPS and SPTM functions of the RTS (along with the MSIV functions of the LD&IS) are performed through NUMAC equipment in Reactor Trip and Isolation Function (RTIF) cabinets. The NMS SRNM and PRNM functions of the RTS are performed through NUMAC equipment in NMS panels that are separate from the RTIF cabinets.

Instead of the statement in DCD Rev.3 that the RPS includes Reactor Trip Functions, etc., Subsection 7.1.2 of DCD Revision 4 states that," RTIF Cabinets include the RPS, the Main Steam Isolation Valve (MSIV) Functions of the Leak Detection And Isolation System (LD&IS), Anticipated Transient Without Scram/Standby Liquid Control (ATWS/SLC) Functions, and SPTM Functions". This agrees with the LTR NEDO-33288 description of RTIF, with the addition of the ATWS/SLC functions.

DCD/LTR Impact

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

For historical purposes, the original text of NRC RAI 7.2-59 and the GE response are included.

NRC RAI 7.2-59

Provide the reference for the [[ ]] shown in Table 4-1 of NEDE-33197P. If these values were measured or calculated provide details of these measurements or calculations. Include this information in the LTR.

GE Response:

The [[ ]] and the constants in Table 4-1 were based on ANSI/ANS-5.1-1994, Decay Heat Power in LWRs, Table 9: parameters for U235 thermal fission (alpha and lambda in 23 groups). [[

]] Extensive comparisons were performed during transient power operation, comparing LPRM to GT responses as described in NEDE-33197P Section 7.2.6. The [[ ]] significantly improved the response of the gamma thermometers under transient conditions.

However, as discussed in the response to RAI 7.2-18, the GTs will be used only to calibrate the LPRMs and not be used for core monitoring under transient conditions (the LPRMs will be used for core monitoring during transient conditions). Therefore the [[ ]] is not likely to be needed.

If GTs are chosen as AFIPs for the BWR and the [[ ]] is utilized, its uncertainties will be factored into the total uncertainty analysis.

DCD/LTR Impact:

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

The following changes will be made in the next revision of LTR NEDE-33197P:

Below Table 4-1, insert the following text – [[

]]

This LTR will be submitted to the NRC by September 28, 2007.

{3} Refers to Paragraph (3) of the affidavit enclosed in LTR 33197P, Rev. 0, which provides the basis for the proprietary determination.

NCR RAI 7.2-59 S01:

The staff will not review the [[ ]] as part of the ESBWR application. and any determination by the staff regarding the acceptability of the topical report will not constitute a regulatory decision regarding this model.

Please augment the update to the LTR to additionally include the following text below Table 4-1 taken verbatim from the RAI response:

"GTs will be used only to calibrate the LPRMs and not be used for core monitoring under transient conditions (the LPRMs will be used for core monitoring during transient conditions). Therefore the [[ ]] is not likely to be needed.

If GTs are chosen as AFIPs for the ESBWR and the [[ ] is utilized, its uncertainties will be factored into the total uncertainty analysis."

GEH Response:

As a result of on-going, detailed engineering work, GEH has decided that the [[ ]] will be utilized for core monitoring so that "slow" non-steady state core power changes can be monitored with GTs. The [[ ]] should not be significant for LPRM calibration since LPRM calibration is performed only during steady-state conditions. However, the non-steady state response of the GTs is important for core monitoring during relatively "slow" core power changes. A [[ ]] was developed to compensate for the time lag in the GT response during non-steady state conditions and is documented in Section 4.5 of the Licensing Topical Report (LTR) NEDE-33197P, Rev. 1, September 2007, "Gamma Thermometer System for LPRM Calibration and Power Shape Monitoring."

Additionally, the [[ ]] was utilized in the in-plant Tokai 2 test for the following non-steady state conditions: startup, flow change, control blade movement, and power down at End Of Cycle. Section 7.2.6 of the LTR documents the results of these non-steady state core conditions. As documented in this section, the utilization of the [[ ]] resulted in substantially reducing the time lag in the GT response. Additionally, as shown in Figures 7-55 through 7-58 of the LTR which graphs the uncompensated and compensated GT signals compared to the LPRM

readings, the compensated GT readings tracked the LPRM reading much closer for both "slow" core power changes and steady state conditions.

Therefore, it is requested that NRC review the [[
]] for acceptability as it is to be utilized for "slow" non-steady state conditions in the ESBWR.

DCD/LTR Impact:

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

No changes to LTR NEDE-33197P are required by this response.

NRC RAI 7.3-11

Provide a piping and instrumentation diagram (P&ID) for the Gravity-Driven Cooling System (GDCS) and proper reference to the P&ID

Several places within DCD, Tier 2, Revision 1, Section 7.3.1.2 reference Figure 6.3-2 as the piping and instrumentation diagram. Per the DCD,Rev. 1, this figure is "Typical GDCS Squib Valve"

1) Please identify what is meant by the term "Typical" for this particular diagram. This is an item that must be of fixed design, tested with a report of the final product identified in Tier 1 if it is not available now.

2) The only figure close to a piping and instrumentation diagram is Figure 6.3-1, "GDCS Configuration". However, this diagram requires updating to include the instrumentation for the GDCS identified in the text of 7.3.1.2.

3) For the ADS and GDCS, provide a thorough and complete piping and instrumentation diagram including the logics for both the ADS and the GDCS. This would begin with the inclusion of the ECCS start signal, include all sensors, interlocks, start signals and time delays.

GEH Response

The reference to Figure 6.3-2 within DCD, Tier 2, Revision 1, Section 7.3.1.2 as the piping and instrumentation diagram for GDCS was deleted in Revision 2.

4) Figure 6.3-2 is a simple depiction of the squib valve function and does not represent the detailed design. DCD Tier 1, Revision 4, Table 2.4.2-3 "ITAAC for the Gravity Driven Cooling System" ITAAC #9 and #12 include type test criteria for GDCS Squib valves. Additional tests are described in DCD Tier 2, Revision 4, Section 14.2.8.1.65.
5) Figure 6.3-1, "GDCS Configuration", is a representation of the system configuration, which does not show the instrumentation. The reference to this diagram in DCD, Tier 2, Revision 1, Section 7.3.1.2 as the piping and instrumentation diagram for GDCS was deleted in Revision 4.
6) Figure 5.1-2 located in DCD Tier 2, Revision 4 describes the ADS (Nuclear Boiler System [NBS]). Figures 6.3-1 and 6.3-1a located in DCD Tier 2, Revision 4 describe the GDCS. The simplified logic diagrams for these systems were previously submitted with MFN 07-001. The operation of the GDCS including ECCS start signal, sensors, interlocks, and time delays is described in DCD Tier 2, Revision 4, Section 7.3.1.2.2.

DCD Impact

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

For historical purposes, the original text of NRC RAI 7.9-16 and the GE response are included.

NRC RAI 7.9-16

Please describe what type of provisions have been made for long term storage of historical data from safety as well as non-safety related systems and what provisions have been made for retrieving such data. Short-term data storage and retrieval and intervals up to 3 months are addressed for the non-essential distributed control and information system (NE-DCIS) historian in DCD, Tier 2, Revision 1, Section 7.9.2.1. Please confirm if any of the safety related data is stored in a safety related historian. If so, provide the capability of this part of the system.

GE Response

The system design is not yet complete; as such, specific details requested in this RAI are not available. However, as stated in DCD Revision 3, Tier 2, Section 7.1.5.5.9, the nonsafety-related Distributed Control and Information System (N-DCIS) includes a "historian" function that records measured and calculated point data for the plant, which includes safety-related and non safety-related data. It is expected that the N-DCIS storage capability will be enough to make this information available to the operator and plant engineering staff for analysis and trending for nominally a fuel cycle. As the N-DCIS local storage becomes full, the data can be archived on optical storage media (both locally and offsite) such that it will be available for later playback; the archiving will be possible on-line. The archived data can be played back as necessary on the plant N-DCIS or offline for easier analysis. It is not intended that safety-related data will be stored on a safety-related medium.

NRC RAI 7.9-16 S01

The response is unacceptable. The response identifies that the design is not yet complete. Therefore, please identify how and where this information will become available. For example, would it be in the form of an ITAAC, COL Item or document to be provided as part of the remaining Design Certification Process.

GEH Response

From Revision 3 to Revision 4 of DCD Tier 2, Subsection 7.1.5.5.9 "Historian" was renumbered to 7.1.5.2.4.9; it states, "The Historian is the repository for all measured and calculated point data for the plant." This subsection's bullet list indicates Historian functions as follows:

- Stores point data, plant operating activities, and abnormal event sequences, along with their time-tags, for retrieval and analysis;
- Stores third-party generated data, such as 3D MONICORE data, in a format compatible with the display and report system;
- Stores RG 1.97 variables for current trending or later analysis; and
- Provides on-line data storage capability dependent on plant history and events that is nominally for one fuel cycle. The system warns the system operator about remaining disk storage space, giving the operator time for download to an off-line archiving device. The preferred archiving device uses optical disks.

The third and fourth bullet items in this list should provide the information needed by the NRC to evaluate data recording and archiving. This means that all measured and calculated point data for the plant, whether from the nonsafety-related (N-DCIS) or suitably isolated safety-related (Q-DCIS) equipment, is passed to the N-DCIS for storage in the Historian as nonsafety-related data. These functions for data recording and archiving are defined as Historian requirements whose implementation is governed by the "ESBWR I&C Software Management Plan," NEDE-33226P, and "ESBWR I&C Software Quality Assurance Plan," NEDE-33245P, which provide hardware/software development, construction, testing, and approval processes.

For storage periods longer than one fuel cycle (perhaps considered "long term"), data storage and retrieval of historical data is addressed by the COL applicant's 10 CFR 50 Appendix B program. Retrieval of off-line data is accomplished by accessing the recording medium used by the off-line archiving device. Historical data, whether from safety-related or nonsafety-related sensors, is not considered safety-related. All historical data is stored in the N-DCIS historian or archived in a nonsafety-related off-line device.

DCD/LTR Impact

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

MFN 07-613

Enclosure 3

Affidavit

GE Hitachi Nuclear Energy

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 07-613, Mr. James C. Kinsey to U.S. Nuclear Regulatory Commission, entitled *Response to Portion of NRC Request for Additional Information Letter Nos. 76, 100, and 105 Related to ESBWR Design Certification Application - RAI Numbers 7.1-53, 7.2-59 Supplement 1, 7.3-11, and 7.9-16 Supplement 1,* dated November 21, 2007. The GEH proprietary information in Enclosure 1, which is entitled *Response to Portion of NRC Request for Additional Information Letter Nos. 76, 100, and 105 Related to ESBWR Design Certification Application - RAI Numbers 7.1-53, 7.2-59 Supplement 1, 7.3-11, and 7.9-16 Supplement 1 - 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. A non-proprietary version of this information is provided in Enclosure 2.

(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 details of GEH ESBWR methods, techniques, information, procedures, and assumptions related to the application of the gamma thermometers to the GEH ESBWR.

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 21st day of November 2007.

David H. Hinds
GE Hitachi Nuclear Energy