HITACHI

Proprietary Information Notice
This letter forwards proprietary information in accordance with 10 CFR 2.390. The balance of this letter may be considered non-proprietary upon the removal of Enclosure 1.

GE Hitachi Nuclear Energy

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MFN 09-054

Docket No. 52-010

February 10, 2009

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. 229 Related to ESBWR Design Certification Application - Emergency Core Cooling Systems - RAI Numbers 6.3-84 and 6.3-86

Enclosures 1 and 2 contain the GE Hitachi Nuclear Energy (GEH) responses to the subject NRC RAIs transmitted via the Reference 1 letter. DCD markups associated with the response to RAI 6.3-86 are included in Enclosure 3.

Enclosure 1 contains proprietary information as defined in 10CFR2.390. The affidavit contained in Enclosure 4 identifies that the information contained in Enclosure 1 has been handled and classified as proprietary to GEH. GEH hereby requests that the proprietary information in Enclosure 1 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17. Enclosure 2 is the non-proprietary version of the RAI responses, which does not contain proprietary information and is suitable for public disclosure.

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

Sincerely,

Lee F. Dougherty for

Richard E. Kingston
Vice President, ESBWR Licensing

D068
NRO

Reference:

1. MFN 08-611, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 229 Related to ESBWR Design Certification Application*, July 30, 2008

Enclosures:

1. MFN 09-054 - Response to Portion of NRC Request for Additional Information Letter No. 229 Related to ESBWR Design Certification Application - Emergency Core Cooling Systems - RAI Numbers 6.3-84 and 6.3-86 - GEH Proprietary Information
2. MFN 09-054 - Response to Portion of NRC Request for Additional Information Letter No. 229 Related to ESBWR Design Certification Application - Emergency Core Cooling Systems - RAI Numbers 6.3-84 and 6.3-86 - Non-Proprietary Version
3. MFN 09-054 - Response to Portion of NRC Request for Additional Information Letter No. 229 Related to ESBWR Design Certification Application - Emergency Core Cooling Systems - RAI Number 6.3-86 - DCD Markups
4. Affidavit – Larry J. Tucker - dated February 10, 2009

cc:	AE Cubbage	USNRC (with enclosures)
	DH Hinds	GEH/Wilmington (with enclosures)
	RE Brown	GEH/Wilmington (with enclosures)
	eDRF	RAI 6.3-84: 0000-0091-9593
		RAI 6.3-86: 0000-0092-1807

Enclosure 2

MFN 09-054

Response to Portion of NRC Request for Additional Information Letter No. 229 Related to ESBWR Design Certification Application

Emergency Core Cooling Systems

RAI Numbers 6.3-84 and 6.3-86

Non-Proprietary Version

NRC RAI 6.3-84:

In DCD Revision 5, Tier 2, Section 6.3.3.3, where single-failure is addressed, please include discussion using TRACG to demonstrate that the core will be covered with a single failure assumption if one GDCS check valve failed to close when the RPV pressure is higher than that of GDCS.

GEH Response:

A TRACG run was conducted to ascertain the reactor pressure vessel (RPV) water level in the event that one Gravity-Driven Cooling System (GDCS) check valve failed to close during an Isolation Condenser drain line (ICDL) break Design Basis Accident (DBA). The results demonstrate that the core will remain covered during the ICDL DBA with GDCS check valve failure.

Included in this response are figures that illustrate water level in the chimney region of the core remain above the Top of Active Fuel (TAF). Furthermore, the minimum level does not represent a more bounding case for minimum level analyses.

Consistent with DCD Tier 2, Revision 5, Subsection 6.3.3.7.9, the ICDL break is considered to be the most limiting core level case. Figure 6.3-84-1 shows the GDCS pipe flows during the TRACG run. It can be seen that there is the expected backflow through the GDCS line at approximately [[ ]] seconds when the GDCS injection valves open. The other GDCS lines show no sign of reverse flow indicating that the check valves on these lines are operating successfully. Once RPV pressure has equalized with containment, forward GDCS flow resumes and begins to fill the RPV.

Figure 6.3-84-2 shows the RPV internal chimney level response during the accident. Minimum chimney level is reached at [[ ]] seconds at a level of [[ ]] m. This is [[ ]] cm above TAF, providing more water over the core than the bounding analysis.

The first footnote to DCD Tier 2, Table 6.3-6, correctly states: "Single, active failures are considered in the [Emergency Core Cooling Systems] ECCS performance analysis. Other postulated failures are not specifically considered, because they all result in at least as much ECCS capacity as one of the above failures." NUREG-0800, Standard Review Plan, Section 6.3 Emergency Core Cooling System, II. Acceptance Criteria, Item 3. of SRP Acceptance Criteria, states: "Check valves in the passive safety systems (except those for which proper function can be demonstrated and documented) are considered components subject to single-failure consideration." In accordance with this criterion, the failure of a GDCS check valve is not considered an active failure. Furthermore, since the statements made in DCD Tier 2, Revision 5, Subsection 6.3.3.3 remain correct, a change to the DCD is not necessary.

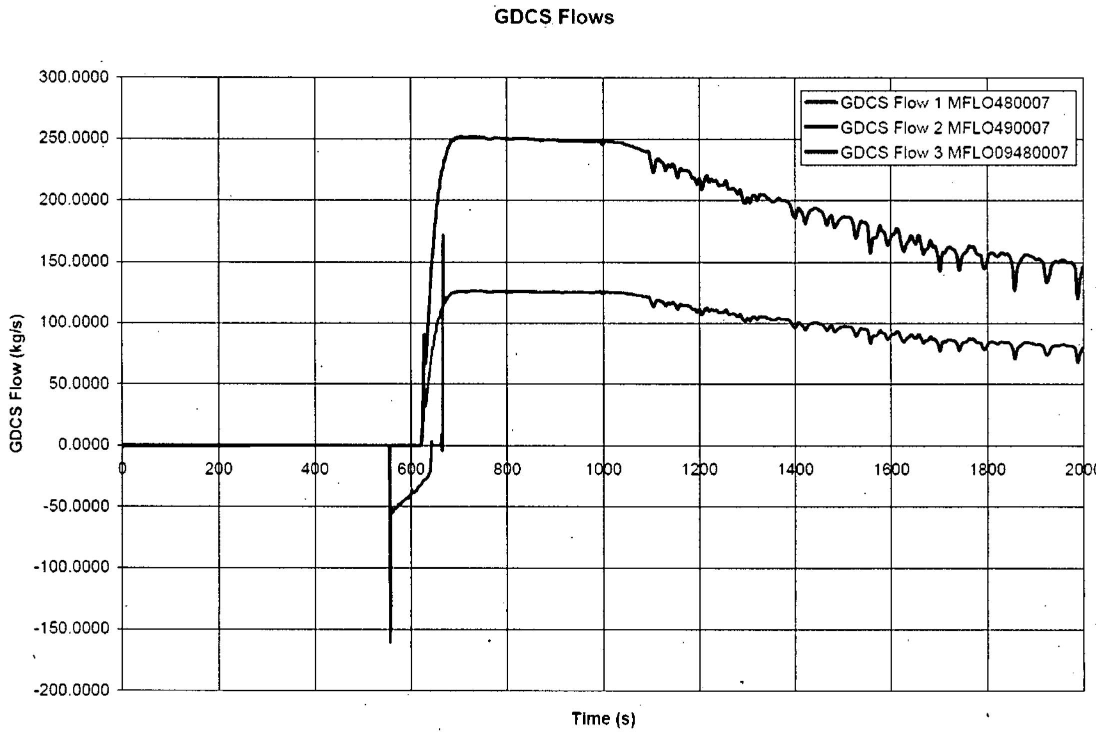

Figure 6.3-84-1. GDCS Flows into the RPV for ICDL Break with Failure of one GDCS Check Valve

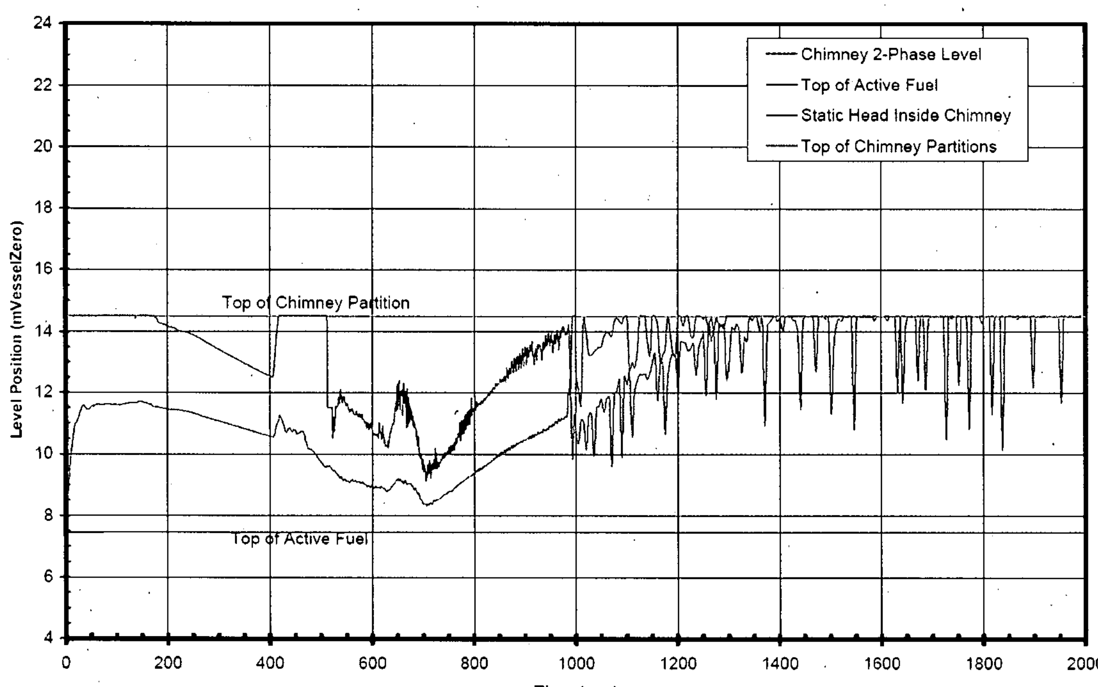

Figure 6.3-84-2. Chimney Level inside RPV for ICDL Break with Failure of one GDCS Check Valve

DCD Impact:

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

NRC RAI 6.3-86:

DCD Revision 5, Tier 2, Section 6.3.3.7.9 states: "Nominal cases were not run for the IC drain line break since it was identified more limiting than the GDCS injection line break after the sensitivity evaluation." Please include these sensitivity evaluations in the Reference Section 6.3.6, and where appropriate, include in the discussion in the pertinent subsections.

GEH Response:

The sensitivity studies mentioned in DCD Tier 2 were scoping TRACG runs modeling the Isolation Condenser drain line (ICDL) break. TRACG cases for the ICDL break show that the accident is more limiting than the Gravity-Driven Cooling System (GDCS) injection line break. The results from these TRACG runs are shown in Table 6.3-86-1.

Comparing the results shown in Table 6.3-86-1 to those in DCD Tier 2, Revision 5, Table 6.3-5, the ICDL break case at nominal conditions show lower chimney levels than the GDCS injection line break cases. Furthermore, the collapsed downcomer levels are also noticeably lower for the ICDL break cases. Based on these observations, the ICDL case was chosen as the limiting scenario for ESBWR Emergency Core Cooling Systems (ECCS) performance with respect to minimum reactor core water level.

DCD Tier 2, Revision 5, Subsection 6.3.3.7.9 provides a discussion of the ICDL break case. The DCD will be updated to include the result of the Nominal ICDL break case in DCD Tier 2, Table 6.3-5. The appropriate subsections will also be updated as noted in the markups shown in Enclosure 3.

Table 6.3-86-1. Summary of ECCS-LOCA Performance Analyses

Break Location	Break Size+ m^2 (ft^2)	Minimum Chimney Static Head* Level Above Vessel Zero Per Active Single Failure, m (ft)			PCT**	Maximum Local and Core Wide Oxidations (%) ***	Minimum Downcomer Collapsed Water Level Above Vessel Zero Per Active Single Failure, m (ft)			Change in MCPR From Start of Event	Change in RPV Press. From Start of Event
		1 SRV	1 GDCS	1 DPV			1 SRV	1 GDCS	1 DPV		
Based on standard TRACG evaluation model:											
ICS Drain Line	0.01824 (0.1963)	8.40 (27.55)	8.55 (28.04)	8.56 (28.08)	No heatup	<1.0	5.95 (19.52)	6.04 (19.82)	5.85 (19.19)	Increases	Decreases

+ The break area is from the reactor pressure vessel side of the break.

* Chimney static head is calculated by adding the static head in the chimney to the elevation of bottom of the chimney.

** No break results in core uncovery, and thus, there is no cladding heatup and PCT remains < 316°C (600°F).

*** Maximum local oxidation values are provided. The local oxidation values are calculated using TRACG. This results in a fraction of total cladding volume of fueled rods and water rods of <1.0%. The core-wide metal-water reaction is also <0.1%.

DCD Impact:

DCD Tier 2, Subsections 6.3.3.4, 6.3.3.7.5, and 6.3.3.7.9, and DCD Tier 2, Table 6.3-5, will be revised as noted in the markups in Enclosure 3.

Enclosure 3

MFN 09-054

Response to Portion of NRC Request for Additional Information Letter No. 229 Related to ESBWR Design Certification Application

Emergency Core Cooling Systems

RAI Number 6.3-86

DCD Markups

- A small lag time (to open all valves and depressurize the vessel); and
- The GDCS flow entering the vessel.

Key ECCS actuation setpoints and time delays for all the ECCS systems are provided in Table 6.3-1.

The ADS actuation logic includes a delay time to confirm the presence of a low water level (Level 1) initiation signal.

The GDCS flow delivery rates are addressed within Subsection 6.3.3.7 for the various breaks analyzed. Piping and instrumentation for the GDCS and ADS are addressed within Subsection 6.3.2. The operational sequence of ECCS for the limiting case is shown in Table 6.3-~~9~~10a (~~GDCS Injection~~ICS Drain Line Break with failure of one GDCS Injection Valve).

Operator action is not required for 72 hours, except as a monitoring function, following any LOCA.

6.3.3.5 Use of Dual Function Components for ECCS

The ECCS systems ADS and GDCS are designed to accomplish only one function, to cool the reactor core following a LOCA. The ECCS system SLC System is designed to be used during an Anticipated Transient Without Scram (ATWS), and the ECCS system ICS is designed to avoid unnecessary use of other ESFs for residual heat removal. Both, SLC System and ICS, provide additional liquid inventory upon actuation. To this extent, components or portions of these systems, except for the pressure relief function of SRVs, are not required for operation of other systems. Because the SRV opens either on ADS initiating signal or by spring-actuated pressure relief in response to an overpressure condition, no conflict exists.

6.3.3.6 Limits on ECCS Parameters

Subsections 6.3.3.1 and 6.3.3.7.1 and the tables referenced in those sections provide limits on ECCS parameters. Any number of components in any given system may be out-of-service, up to the entire system. The maximum allowable out-of-service time is a function of the level of redundancy and the specified test intervals.

6.3.3.7 ECCS Performance Analysis for LOCA

6.3.3.7.1 LOCA Analysis Procedures and Input Variables

For the system response analysis, the TRACG model was used. The input variables are based on nominal values. A conservative assumption made in the analysis is that all preferred power is lost simultaneously with the initiation of the LOCA. The significant input variables used for the response analysis are listed in Table 6.3-1. Figures 6.2-6 to 6.2-8 show the TRACG nodalization of the RPV, the containment, and the steam line system. Refer to Subsection 6.2.1.1.3.1 for the discussion of the TRACG nodalization.

6.3.3.7.2 Accident Description

The sequence of events for the four representative break locations are shown in Tables 6.3-7 through 6.3-10.

6.3.3.7.3 Break Spectrum Calculations

A representative set of cases was analyzed to evaluate the spectrum of postulated break sizes and locations to demonstrate ECCS system performance. A summary of results of these calculations is shown in Table 6.3-5 and graphically in Figure 6.3-6.

The pipe breaks sizes and elevations (relative to the bottom of the vessel) for all vessel penetrations including main steam lines, DPV/IC line, feedwater line, RWCU/SDC line, IC return line, GDCS injection line, GDCS equalizing line, and bottom drain line are listed in Table 6.3-5a. The PCCS condensate return line is not included since it is connected to the GDCS pool.

Conformance to the 10 CFR 50.46 acceptance criteria [PCT ≤ 1204°C (2200°F), local oxidation ≤ 17% and core-wide metal-water reaction ≤ 1%] is demonstrated for the fuel parameters listed in Table 6.3-1. For each bundle design in a plant, conformance is reconfirmed for the limiting break. Details of calculations for specific breaks are included in subsequent paragraphs.

6.3.3.7.4 Large Line Breaks Inside Containment

Because the ESBWR design has no recirculation lines, the maximum DPV stub tube break, the maximum inside steam line break, the maximum feedwater line break, and the maximum RWCU/SDC suction line break are the largest area break locations. The total stub tube break flow includes back flow from the IC through the IC return line. Similarly, the total RWCU/SDC suction line break flow includes flow through the bottom head drain line. The maximum inside steam line break and the maximum feedwater line break were analyzed as representative cases for this group of breaks. Important output variables from these cases are shown in Table 6.3-5 and Figures 6.3-7 through 6.3-22.

The variables are:

- Minimum critical power ratio (MCPR) as function of time;
- Chimney water level as a function of time;
- Downcomer water level as a function of time;
- System pressures as a function of time;
- Steamline and break flow as a function of time;
- ADS flow as a function of time;
- Flow into vessel as a function of time; and
- PCT as a function of time.

6.3.3.7.5 Intermediate Line Breaks Inside Containment

The only case in this group of breaks is the ICS ~~return~~ drain line break. Since the ESBWR response to this LOCA event is rapid depressurization through the ADS valves, the results for this case are similar to the large steam line break case previously discussed. Important variables from these analyses are shown in Table 6.3-5.

the individually modeled IC that suffers the line break. The effect is such that only two of the IC's are seen to have a mitigating effect on the accident. Furthermore, the IC drain line break size is four times as large as the GDCS injection line break. This increase in area results in a larger loss of inventory from the RPV as is reflected in the lower collapsed DC level. The collapsed DC level presented in Table 6.3-5 indicates that the IC drain line break with failure of one GDCS injection valve is the most limiting. ~~Nominal cases were not run for the IC drain line break since it was identified more limiting than the GDCS injection line break after the sensitivity evaluation.~~Results of nominal cases are also shown in Table 6.3-5.

6.3.3.8 ECCS-LOCA Performance Analysis Conclusions

The ECCS-LOCA performance analyses are performed according to the key parameters listed in Table 6.3-11. Results of these analyses demonstrate the compliance with all the applicable acceptance criteria. It is concluded that the ECCS would perform its function in an acceptable manner.

6.3.4 ECCS Performance Tests

All systems of the ECCS are tested for their operational ECCS function during the preoperational or startup test program. As applicable, each component is tested for power source, range, setpoint, limit switch setting, torque switch setting, etc. Subsection 6.3.2.7.4 contains additional details on GDCS testing, and Subsection 6.3.2.8.4 contains additional details on ADS testing. See Chapter 14 for a thorough discussion of preoperational testing for these systems.

6.3.4.1 Reliability Tests and Inspections

The average reliability of a standby (non-operating) safety system is a function of the duration of the interval between periodic functional tests. The factors considered in determining the periodic test interval of the ECCS are:

- The desired system availability (average reliability);
- The number of redundant functional system success paths;
- The failure rates of the individual components in the system; and
- The schedule of periodic tests (simultaneous versus uniformly staggered versus randomly staggered).

All ECCS safety-related valves are tested during plant initial power ascension per RG 1.68, Appendix A, except that the mechanical components of the ECCS squib type valves are fully tested by the manufacturer prior to delivery to the site.

All SRVs, which include those used for ADS, and DPVs are bench tested to establish lift settings in compliance with ASME Code Section XI.

Testing of the initiating instrumentation and controls portion of the ECCS is discussed in Subsection 7.3.1. The emergency power system, which supplies electrical power to the ECCS is tested as described in Subsection 8.3.1. The frequency of testing is specified in the Technical Specifications. Components inside the DW can be visually inspected only during periods of access to the DW.

Table 6.3-5

Summary of ECCS-LOCA Performance Analyses

Break Location	Break Size+ m^2 (ft^2)	Minimum Chimney Static Head* Level with reference to Vessel Zero Per Active Single Failure m (ft)			PCT **	Maximum Local and Core Wide Oxidations (%) ***	Minimum Downcomer Collapsed Water Level Above Vessel Zero Per Active Single Failure m (ft)			Change in MCPR From Start of Event	Change in RPV Press. From Start of Event
		1 SRV	1 GDCS	1 DPV			1 SRV	1 GDCS	1 DPV		
Based on standard TRACG evaluation model:											
Steam Line Inside Containment	0.09832 (1.058)	8.47 (27.80)	8.36 (27.43)	8.76 (28.74)	No heatup	<1.0	7.46 (24.47)	7.47 (24.50)	7.43 (24.38)	Increases	Decreases
Feedwater Line++	0.07420 (0.7986)	8.37 (27.47)	8.26 (27.09)	8.35 (27.3)	No heatup	<1.0	6.36 (20.87)	6.69 (21.95)	6.69 (21.95)	Increases	Decreases
GDCS Injection Line	0.004561 (0.04910)	8.69 (28.52)	8.90 (29.19)	8.73 (28.64)	No heatup	<1.0	6.13 (20.09)	6.20 (20.34)	6.31 (20.71)	Increases	Decreases
Bottom Head Drain Line	0.004052 (0.04361)	8.35 (27.39)	8.62 (28.29)	8.42 (27.63)	No heatup	<1.0	5.97 (19.59)	6.27 (20.56)	6.26 (20.52)	Increases	Decreases
ICS Drain Line	0.01824 (0.1963)	8.40 (27.55)	8.55 (28.04)	8.56 (28.08)	No heatup	<1.0	5.95 (19.52)	6.04 (19.82)	5.85 (19.19)	Increases	Decreases
Based on bounding values:											
IC Drain Line	0.01824 (0.1963)	8.33 (27.33)	8.19 (26.87)	8.31 (27.26)	No heatup	<1.0	4.91 (16.11)	4.92 (16.16)	5.02 (16.49)	Increases	Decreases
GDCS Injection Line	0.004561 (0.04910)	8.82 (28.93)	8.34 (27.35)	8.87 (29.09)	No heatup	<1.0	5.65 (18.53)	5.60 (18.37)	5.59 (18.34)	Increases	Decreases

\+ The break area is from the RPV side of the break.

++ For the feedwater line break, the total break area from the TB side is limited at the two parallel venturi sections, with flow area of 0.04997 m^2 each.

* Chimney static head level with reference to vessel zero is calculated by adding the equivalent height of water corresponding to the static head of the two-phase mixture inside the chimney to the elevation (7.896 m) of bottom of chimney.

** No break results in core uncovery, and thus, there is no cladding heatup and PCT remains < 316°C (600°F).

*** Maximum local oxidation values are provided. The local oxidation values are calculated using TRACG. This results in a fraction of total cladding volume of fueled rods and water rods of <1.0%. The core-wide metal-water reaction is also <0.1%.

Enclosure 4

MFN 09-054

Affidavit

Larry J. Tucker

Dated February 10, 2009

GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, Larry J. Tucker, state as follows:

(1) I am the Manager, ESBWR 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 09-054, Mr. Richard E. Kingston to U.S. Nuclear Regulatory Commission, entitled *Response to Portion of NRC Request for Additional Information Letter No. 229 Related to ESBWR Design Certification Application - Emergency Core Cooling Systems - RAI Numbers 6.3-84 and 6.3-86,* dated February 10, 2009. The GEH proprietary information in Enclosure 1, which is entitled *MFN 09-054 - Response to Portion of NRC Request for Additional Information Letter No. 229 Related to ESBWR Design Certification Application - Emergency Core Cooling Systems - RAI Numbers 6.3-84 and 6.3-86 - 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, *MFN 09-054 - Response to Portion of NRC Request for Additional Information Letter No. 229 Related to ESBWR Design Certification Application - Emergency Core Cooling Systems - RAI Numbers 6.3-84 and 6.3-86 - Non-Proprietary 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 analytical information for determining the thermodynamic and hydraulic response of the ESBWR. GE utilized methodology developed based upon prior experience from its fleet, with significant resource allocation in developing the analytical methodology 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 February 2009.

Larry J. Tucker

Larry J. Tucker
GE-Hitachi Nuclear Energy Americas LLC