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Proprietary Notice

This letter forwards proprietary information in accordance with 10 CFR 2.390. Upon the removal of Enclosure 1, the balance of this letter may be considered non-proprietary.

MFN 08-655

Docket No. 52-010

October 9, 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. 211 Related to ESBWR Design Certification Application – Human Factors Engineering - RAI Numbers 18.8-35 S03, 18.8-50 S01, 18.8-51 S01, 18.8-52 S01, and 18.8-59 S01**

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) responses to the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) dated June 3, 2008, (Reference 1).

RAI 18.8-35 S03 was previously responded to in Reference 2, as requested by the NRC in Reference 3. Reference 4 provided the response to the first supplement, for this RAI as requested by Reference 5. RAI 18.8-35 S03 was responded to in Reference 6, as originally requested by the NRC in Reference 7.

RAIs 18.8-50 S01, 18.8-51 S01, 18.8-52 S01 and 18.8-59 S01 were originally responded to by Reference 2, as requested by the NRC in Reference 3.

GEH's response to RAIs 18.8-35 S03, 18.8-50 S01, 18.8-51 S01, 18.8-52 S01 and 18.8-59 S01 are addressed in Enclosure 1. Attachment 1 contains the proposed text changes and markups referenced in Enclosure 1.

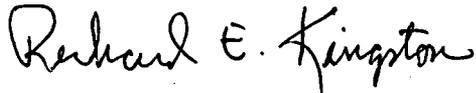
Enclosure 1 contains GE Hitachi Nuclear Energy (GEH) proprietary information as defined by 10 CFR 2.390. GEH customarily maintains this information in confidence and withholds it from public disclosure. A non-proprietary version is provided in Enclosure 2.

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The affidavit contained in Enclosure 3 identifies that 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,



Richard E Kingston
Vice President, ESBWR Licensing

References:

1. MFN 08-502 - Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GEH, *Request For Additional Information Letter No. 211 Related To ESBWR Design Certification Application*, dated June 3, 2008
2. MFN 08-050 - *Response to Portion of NRC Request for Additional Information Letter No. 119 Related to ESBWR Design Certification Application – Human Factors Engineering - RAI Numbers 18.8-2 S01, 18.8-8 S02, 18.8-16 S02, 18.8-17 S02, 18.8-18 S02, 18.8-31 S02, 18.8-32 S02, 18.8-33 S02, 18.8-35 S02, 18.8-41 S02, 18.8-49 S02 and, 18.8-50 through 18.8-59*, dated March 11, 2008
3. MFN 07-657 - Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GEH, *Request For Additional Information Letter No. 119 Related To ESBWR Design Certification Application*, dated December 5, 2007
4. MFN 07-334 - Submittal of “*ESBWR DCD Chapter 18, Human Factors Engineering - RAI to DCD Roadmap Document*” dated June 27, 2007
5. Email from AE Cabbage to DL Lewis, *List of Chapter 18 RAIs for Roadmap Request*, dated May 18, 2007
6. MFN 06-443, *Response to Portion of NRC Request for Additional Information Letter No. 71 – ESBWR Human Factors Engineering NEDO-33268, Rev. 1, Human-System Interface Design Implementation Plan – RAI Numbers 18.8-1 through 18.8-49*, dated November 20, 2006
7. MFN 06-383, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 71 Related to ESBWR Design Certification Application*, October 10, 2006

Enclosure 2

MFN 08-655

**Response to NRC Request for Additional Information
Letter No. 211 Related to ESBWR Design Certification
Application
Human Factors Engineering
RAI Numbers
18.8-35 S03, 18.8-50 S01, 18.8-51 S01, 18.8-52 S01,
and 18.8-59 S01**

Non-Proprietary Version

Do Not Electronically Transmit

For historical purposes, the original text of RAIs 18.8-35, 18.8-50, 18.8-51, 18.8-52, and 18.8-59 and any previous supplemental text and GE/GEH responses are included preceding each supplemental response. Any original attachments or DCD mark-ups are not included to prevent confusion.

RAI

18.8-35

NRC RAI 18.8-35

NEDO-33268, Section 4.7.2.5.2, Methods of Evaluation, lists three such methods. However, the actual methods are not described. For example, the first item listed is "Electronic Evaluation." The section does not describe how a user of the document conducts this evaluation. Also, why have several of the methods (listed in Figure 5 and shown on Fig 7) been omitted from this section, e.g., full-scope simulator?

GE Response

Other evaluation methods will be considered in addition to those listed and discussed in NEDO-33268.

The instructions and procedures in question are common to the discipline of human factors engineering. The methods and results of the selected techniques will be summarized in the results summary report.

Other types of evaluations to be considered and their merit and conduct, including the simulator, will be further discussed in the next revision.

DCD Impact/LTR Impact

DCD Tier #2, Section 18.8 will be revised as appropriate.

LTR NEDO-33268 Rev. 2 will include a revision as described above.

NRC RAI 18.8-35 S01

(Editorial Note: GEH was asked by NRC to provide a Roadmap Document (MFN 07-334) that provided an explanation of where information went that was previously discussed in the original RAI response. This was Roadmap Document provided to NRC and the responses were considered to be supplemental responses based on the NRC requests. The following excerpt from the Roadmap Document provides the GEH response provided as the Supplement 1 response to this RAI.)

GEH Response

Chapter 18 Roadmap Document								
RAI NO	SEC	#	NRC Supplemental	DocName /Question	Resolved	Plan	Section	Resolution Description
18.8-35	8	35	N	LTR NEDO-33268	From GE response	33217 33268	1.4.2(4) 3.3.5.6	Additional description of evaluation methods will be established in teamwork plans per MMIS and HFE Implementation plan guidance (33217:1.4.2(4)) and will be input to the style guide.
18.8-35	8	35	Y	Methods of evaluation 2.	From GE response			See previous response

NRC RAI 18.8-35 S02

In the original RAI, the staff requested clarification of the methods of evaluation to be used. The descriptions of the methods of evaluation from the original RAI are now on Pages 37-38 of NEDO-33268, Revision 2 and have been slightly abbreviated. The same need for clarification still exists. The section still does not describe how a user of the document conducts the evaluations. Also, the lead-in paragraph references Figure 6, but Figure 6 does not address methods of evaluation. In Revision 0, the same paragraph referenced Figure 7, which did illustrate how multiple methods of evaluation can be sequenced, but this Figure has been removed in Revision 2. Please clarify.

GEH Response

The HSI work instructions will describe the methods for HSI Tests and Evaluations per NUREG-0711.

Tables 1-3, Figures 3-6, and the Appendix should have been deleted from the back of Revision 2. Any remaining references to them will be removed in our next editorial pass as the contents are described adequately in text.

DCD Impact/LTR Impact

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

LTR NEDO-33268, Revision 2 will be revised as noted in the attached markup (See Attachment 1).

NRC RAI 18.8-35 S03

In RAI 18.8-35, the staff requested that GEH describe the evaluation methods GEH uses to implement NUREG-0711, Section 8.4.6. GEH's response states that the HSI work instructions describe the methods for HSI Tests and Evaluations per NUREG-0711. The staff position is that the HSI Design implementation plan needs to specifically describe the HSI evaluation methods. Please include this information in the HSI Design implementation plan or submit the appropriate HSI Work Instructions for staff review.

GEH Response

The test and evaluation process that supports the Human System Interface (HSI) design is covered in HFE Test and Evaluation Work instruction. The HFE Test and Evaluation work instruction describes the steps taken and the tools used to perform the tests and evaluations of HSI design options.

This response provides excerpts from the GEH proprietary HFE Test and Evaluation work instruction for the purpose of supplying specific details of the process and tools used by the human factors engineering (HFE) team. This response is similar and more comprehensive than the response to RAI 18.8-59 S01, which is also included in this letter.

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DCD/LTR Impact

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

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

RAI

18.8-50

NRC RAI 18.8-50

Concept of operations is briefly mentioned in Sections 3.1.3 and 3.3.5.4 of NEDO-33268, Revision 2. Additional clarification is needed as to how the concept of operations will be developed by the HFE team, what factors will be included in the concept of operations description, and how it will be documented. Note that the concept of operations is not identified in NEDO-33268, Revision 2, Section 5, Results.

GEH Response

To follow the guidelines regarding concept of operations as described in NUREG-0711, the Human-System Interface team will coordinate and collaborate with other GEH teams working on the following related NEDOs:

- NEDO-33219, ESBWR HFE Functional Requirements Analysis Plan Implementation Plan
- NEDO-33220, ESBWR HFE Allocation of Functions Implementation Plan
- NEDO-33221, ESBWR HFE Task Analysis
- NEDO-33266, ESBWR HFE Staffing and Qualifications Plan

The method for this coordination and collaboration will be described in HSI work instructions.

A new bullet, "Concept of operations from a Human-System Interface perspective", will be added to Section 5 Results.

DCD Impact/LTR Impact

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

LTR NEDO-33268, Revision 2 will be revised as noted in the attached markup (See Attachment 1).

NRC RAI 18.8-50 S01

In RAI 18.8-50, the staff requested that GEH describe how the HFE Team will develop the concept of operations. GEH's response indicates that the methods for HFE Team coordination and collaboration in developing the concept of operations are described in the HSI Work Instruction. The staff position is that the HSI Design implementation plan needs to specifically describe how the concept of operations will be developed. Please include this information in the HSI Design implementation plan or submit the appropriate HSI Work Instructions for staff review.

GEH Response

The GEH proprietary work instructions, as well as the steps presented below, are dynamic in that use of the instructions may result in revisions that add, reword, delete, combine, reorder, or otherwise refine steps to improve the workflow and design product. Work instruction revisions continue to include the detail that will develop the design in accordance with NEDO-33268. The following work instruction steps are used to develop the concept of operations document:

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DCD/LTR Impact

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

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

RAI

18.8-51

NRC RAI 18.8-51

NEDO-33268, Revision 2, Section 3.1.3, states that the HFE team will develop functional requirements for the HSI that encompass the considerations identified in the two criteria for the Functional Requirements Specification. However, no additional information is provided. Additional clarification is needed as to how the requirements will be developed by the HFE team and how it will be documented. Note that the functional requirements are not identified in Section 5, Results.

GEH Response

To follow the guidelines regarding functional requirement specification as described in NUREG-0711, the team will follow the process illustrated in Figure 2 of NEDO-33268:

NEDO-33268

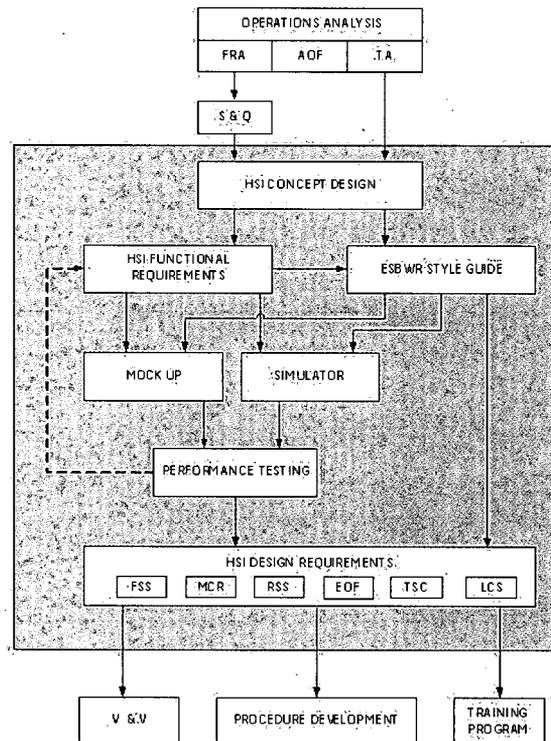


Figure 2 Human-System Interface Design Implementation Process.

The HSI work instructions provide the methodology.

The HSI Style Guide is the design requirements document. Design requirements will be entered into an industry-standard software requirements tracking/traceability tool.

A new bullet, "Functional requirement specification from a Human-System Interface perspective" will be added to Section 5 Results.

DCD Impact/LTR Impact

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

LTR NEDO-33268, Revision 2 will be revised as noted in the attached markup (See Attachment 1).

NRC RAI 18.8-51 S01

In RAI 18.8-51, the staff requested that GEH describe how functional requirements specifications are developed. GEH's response indicates that the methodology for developing functional requirements specifications is provided in the HSI Work Instruction. The staff position is that the HSI Design implementation plan needs to provide the methodology for developing functional requirements specifications. Please include this information in the HSI Design implementation plan or submit the appropriate HSI Work Instructions for staff review.

GEH Response

The steps provided below are an example of a portion of a GEH proprietary work instruction. The GEH proprietary work instruction, as well as the steps presented below, is dynamic in that use of the instruction may result in revisions that will add, reword, delete, combine, reorder, or otherwise refine steps to improve the workflow and design product. Work instruction revisions continue to include the detail that will develop the design in accordance with NEDO-33268.

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DCD/LTR Impact

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

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

RAI

18.8-52

NRC RAI 18.8-52

In NEDO-33268, Revision 2, Section 3.3.4 General Approach, GEH states that with respect to risk-important actions, the design seeks to minimize the probability that errors occur and maximize the probability that an error is detected if one is made. However, no guidance is provided in the methodology for how this design objective will be achieved.

GEH Response

NRC RAI 18.8-52 through NRC RAI 18.8-58 are 7 RAIs that address the same list of items in Section 3.3.4, General Approach, list item numbers 3-9. Our response to each of these is the same:

The HSI work instructions provide the methodology.

DCD Impact/LTR 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.

NRC RAI 18.8-52 S01

In RAIs 18.8-52 to 18.8-58, the staff requested GEH to describe how Human System Interface (HSI) detailed design and integration objectives would be achieved. These objectives correspond to review criteria 3-9 of NUREG-0711, Section 8.4.5. The staff asked this question because NEDO-33268, Revision 2, Section 3.3.4, "General Approach" essentially repeats these objectives without describing how they will be achieved. In the response to RAIs 18.8-52 to 18.8-58, GEH states that the ESBWR HSI Work Instructions provide the methodology. The staff position is that the HSI Design implementation plan needs to specifically describe how the HSI detailed design and integration objectives will be achieved. Please include this information in the HSI Design implementation plan or submit the appropriate HSI Work Instructions for staff review. RAIs 18.8-53 to 18.8-58 will remain open pending the resolution of 18.8-52 S01.

GEH Response

Steps from GEH proprietary work instructions for the HSI design are provided in more detail in response to RAI 18.8-2 S02. Portions of that response provide the details of how the objectives described in the subject RAIs are achieved.

In the table below the left hand column contains the objectives stated in NEDO-33268 with the related RAI number in parentheses. The right hand column contains the specific steps that address the objectives with numbering from RAI 18.8-2 S02 in parenthesis to allow cross review of RAI responses. The GEH work instructions, as well as the steps presented below, are dynamic in that use of the instructions results in revisions that add, reword, delete, combine, reorder, or otherwise refine steps to improve the workflow and design product. Work instruction revisions continue to include the detail that will develop the design in accordance with NEDO-33268.

The steps presented below are focused on the main control room; other HSIs within the scope of NEDO-33268 are developed in a similar manner.

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DCD/LTR Impact

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

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

RAI

18.8-59

NRC RAI 18.8-59

With respect to trade-off evaluations, how are the factors identified in NEDO-33268, Revision 2, Page 33 used to develop selection criteria and how are they applied by the HFE engineer. And how will the HFE engineer determine the relative benefits of design alternatives and document the bases for their selection. In addition, what guidance will be provided to design engineers for the conduct of performance-based tests, including the selection of participants, testbeds, performance measures, and analyses?

GEH Response

To follow the guidelines for HSI Tests and Evaluations as described in NUREG-0711, the methodology for the conduct of performance-based tests, including the selection of participants, test beds, performance measures, and analyses will be detailed within the HSI work instructions. The results will be included in the results summary report.

The HSI Style Guide is the design requirements document. Design requirements will be entered into an industry-standard software requirements tracking/traceability tool.

Trade-off evaluations will be done on a case-by-case basis, and any design decisions that deviate from the original requirements will be documented as part of the requirements tracking and in the results summary report.

DCD Impact/LTR 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.

NRC RAI 18.8-59 S01

In RAI 18.8-59, the staff's RAI requested GEH to describe how trade-off evaluations will be performed. GEH's response indicates that the methodology for trade-off evaluations is provided in the HSI Work Instruction. The staff position is that the HSI Design implementation plan needs to specifically describe how trade-off evaluations will be performed. Please include this information in the HSI Design implementation plan or submit the appropriate HSI Work Instructions for staff review.

GEH Response

The test and evaluation process that supports the Human System Interface (HSI) design is covered in the HFE Test and Evaluation Work instruction. The HFE Test and Evaluation Work instruction describes the steps taken and the tools used to perform the evaluation of HSI design options. Trade off studies are done using a standard trade off process in the form of a GEH proprietary tool.

This response provides excerpts from the GEH proprietary HFE Test and Evaluation work instruction for the purpose of supplying specific details of the process and tools used by the human factors engineering (HFE) team. This response is similar and less comprehensive than the response to RAI 18.8-35 S03.

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DCD/LTR Impact

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

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

Attachment 1 for RAI 18.8-35 S03

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Attachment 1 for RAI 18.8-35 S03

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Attachment 2 for RAI 18.8-35 S03

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Attachment 3 for RAI 18.8-35 S03

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Attachment 4 for RAI 18.8-35 S03

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Attachment 4 for RAI 18.8-35 S03

Attachment 6 for RAI 18.8-35 S03

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Attachment 7 for RAI 18.8-35 S03

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Attachment 2 for RAI 18.8-59 S01

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Attachment 3 for RAI 18.8-59 S01

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MFN 08-655

Enclosure 3

Affidavit

GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, **David H. Hinds**, state as follows:

- (1) I am the General Manager, New Units Engineering, GE-Hitachi Nuclear Energy Americas LLC ("GEH"). I 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 08-655, Richard E Kingston to Nuclear Regulatory Commission, entitled, *Response to Portion of NRC Request for Additional Information Letter No. 211 Related to ESBWR Design Certification Application – Human Factors Engineering - RAI Numbers 18.8-35 S03, 18.8-50 S01, 18.8-51 S01, 18.8-52 S01, and 18.8-59 S01*, October 9, 2008. GEH text proprietary information in Enclosure 1, which is entitled "Response to NRC Request for Additional Information Letter No. 211 Related to ESBWR Design Certification Application - Human Factors Engineering - RAI Numbers 18.8-35 S03, 18.8-50 S01, 18.8-51 S01, 18.8-52 S01, and 18.8-59 S01", is identified by a dark red dotted underline inside double square brackets [[This sentence is an example.⁽³⁾]]. Figures and large equation objects containing GEH proprietary information 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) above is classified as proprietary because it identifies details of GEH ESBWR methods, techniques, information, procedures, and assumptions related to the application of human factors engineering 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 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 9th-day of October 2008.



David H. Hinds
GE-Hitachi Nuclear Energy Americas LLC