HITACHI

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.

GE Hitachi Nuclear Energy

Richard E. Kingston
Vice President, ESBWR Licensing

PO Box 780
3901 Castle Hayne Road, M/C A-55
Wilmington, NC 28402 USA

T 910 819 6192
F 910 362 6192

MFN 09-017

Docket No. 52-010

January 20, 2009

U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Document Control Desk
Rockville, MD 20852

Subject: Response to Portion of NRC Request for Additional Information Letter No. 263 Related to ESBWR Design Certification Application – Human Factors Engineering - RAI Number 18.11-21 S03

The purpose of this letter is to submit a response to Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) 18.11-21 S03 (Reference 1).

Enclosure 1 contains the response to RAI 18.11-21 S03. RAI 18.11-21 Supplement 2 was responded to in Reference 2 as requested by the NRC in Reference 3. Supplement 1 was previously responded to in Reference 4 as requested by the NRC in Reference 5. Reference 6 provided the original response as originally requested by NRC in Reference 7.

Enclosure 1 contains GEH proprietary information as defined by 10 CFR 2.390. GEH customarily maintains this information in confidence and withholds it from public disclosure. Enclosure 2 is the non-proprietary version, which does not contain proprietary information and is suitable for public disclosure.

The affidavit contained in Enclosure 3 identifies that the information contained in Enclosure 1 has been handled and classified as proprietary to GEH. GEH hereby requests that the information in Enclosure 1 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17.

D068
NRO

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

Sincerely,

Richard E. Kingston

Richard E. Kingston
Vice President, ESBWR Licensing

References:

1. MFN 08-899 - Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GEH, *Request For Additional Information Letter No. 263 Related To ESBWR Design Certification Application*, dated November 6, 2008
2. MFN 08-481 - *Response to Portion of NRC Request for Additional Information Letter No. 178 Related to ESBWR Design Certification Application – Human Factors Engineering - RAI Numbers 18.7-7 S03, 18.7-8 S03, 18.8-2 S02, 18.11-21 S02, 18.11-25 S02, 18.11-32 S02, and 18.12-4 S03*, dated July 2, 2008
3. MFN 08-460 - Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GEH, *Request For Additional Information Letter No. 178 Related To ESBWR Design Certification Application*, dated May 6, 2008
4. MFN 08-281, *Response to Portion of NRC Request for Additional Information Letter Nos. 125 Related to E5BWR Design Certification Application - Human Factors Engineering - RAI Number 18.11-21 S01*, dated March 26, 2008
5. MFN 07-702 - Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GEH, *Request For Additional Information Letter No. 125 Related To ESBWR Design Certification Application*, dated December 17, 2007
6. MFN 06-446, *Response to Portion of NRC Request for Additional* Information *Letter No. 74 – ESBWR Human Factors Engineering NEDO-33276, Rev. 0, HFE Verification and Validation Implementation Plan – RAI Numbers 18.11-1 through 18.11-33*, dated November 22, 2006
7. MFN 06-386, *Request for Additional Information Letter No.74 Related to ESBWR Design Certification Application*, dated October 11, 2006

Enclosures:

1. MFN 09-017 – Submittal of Response to NRC Request Related to ESBWR Design Certification Application Chapter 18 - Human Factors Engineering - RAI Number 18.11-21 S03 – Proprietary Version
2. MFN 09-017 – Submittal of Response to NRC Request Related to ESBWR Design Certification Application Chapter 18 - Human Factors Engineering - RAI Number 18.11-21 S03 – Public Version
3. Affidavit

cc:

AE Cubbage	USNRC (with enclosure)
RE Brown	GEH/Wilmington (with enclosure)
DH Hinds	GEH/Wilmington (with enclosure)
eDRF	0000-0093-9421

Enclosure 2

MFN 09-017

Submittal of Response to NRC Request Related to ESBWR Design Certification Application

Chapter 18

Human Factors Engineering

RAI Number 18.11-21 S03

Non-Proprietary Version

For historical purposes, the original text of RAI 18.11-21 and any previous supplements and GE/GEH responses are included. Any original attachments or DCD mark-ups are not included to prevent confusion.

NRC RAI 18.11-21

NEDO-33276, Section 4.3.4.3 discusses participants in validation exercises. The section simply states that V&V teams will be made up of GE personnel, GE subcontractors, and COL holder personnel. However, this section does not describe the types of personnel that will actually serve as operating crews for the simulations. Nor is any information provided on how the sample of participants will be constructed. Please provide information as to what types of personnel will participate in validation tests and how they will be sampled.

GE Response

The HFE V&V teams performing qualitative validation of display usability for a wide range of tasks in the mockup, part task and full scope simulators will include GE personnel, COL Holder personnel (operations, maintenance, training, QA, etc.), and GE subcontractors. The personnel selected for the validation will include BWR/ABWR/ESBWR trainers, people with SRO licenses at various nuclear plants, start up engineers, I&C engineers, PRA/HRA engineers and Human Factors engineers. The crews will include former SROs and people training to be ESBWR operators and SROs. For mock ups and part task simulations one simulated crew member at a time might be sufficient to test the MMIS for a single system. In the case of a full scope simulator a minimal crew of three would be used to test the MMIS.

The observers will be selected as appropriate from HFE staff experienced in Human Factors, C&I, Nuclear Engineering, System Engineering, Plant Operation, Computers, Procedures, Training, PRA/HRA, SPDS, System Safety Engineering, Maintainability, and Reliability.

DCD/LTR Impact

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

LTR NEDO-33276, Rev 0 section 4.3.4.3 will be revised as described above at the next revision.

NRC RAI 18.11-21 S01

NEDO-33276, Rev 1, Section 4.4.3 generally discusses participants in validation exercises. However, several aspects of participant selections are not identified in the plan:

- *how the sample of participants will account for human variability*
- *how minimum and normal crew configurations will be assembled and what they will consist of*
- *how sampling bias will be prevented*

NEDO-33276 should be revised to provide the information or indicate that the detailed V&V implementation plan will address these participant sampling considerations.

GEH Response

Validation testing as discussed in NEDO-33276, Section 4.4 applies to testing and validation of the integrated system to ensure that it can adequately support plant personnel in the safe operation of the plant.

The following changes will be made to NEDO-33276, Rev 1:

A. In section 4.4.3, first paragraph, second sentence, change the word "the" to "integrated system"

B. The second paragraph will be revised as noted in the attached markup.

C. The following paragraphs will be added to NEDO-33276, Section 4.4.3 to address the question "How the sample of participants will account for human variability":

> "A full scope simulator is used to test the HSI of multiple systems. For full scope simulator tests, all participants have previously undergone ESBWR operator training. To properly account for human variability, the sample of participants used in testing reflects the characteristics of the population from which the sample is drawn.
>
> The characteristics expected to contribute to system performance variation are specifically identified. These characteristics are taken into account during sampling to ensure that variation along those dimensions is included in the validation. These characteristics are determined from operator experience and task analysis and include:

5. License and qualifications
6. Skill and experience
7. Age
8. General demographics"

D. The following paragraphs will be added to NEDO-33276, Section 4.4.3 to address the question "How minimum and normal crew configurations will be assembled and what they will consist of":

> "In the case of full scope simulator HSI testing, a minimum crew configuration of two and a normal crew configuration of three are tested.

In the full scope simulator, a normal crew of three is used to test the HSI, as determined in NEDO-33266. This crew consists of: two licensed Reactor Operators and one Senior Reactor Operator (SRO). The first licensed Reactor Operator is assigned to normal control actions at the MCR HSI. The second licensed Reactor Operator is assigned to control of testing, surveillance and maintenance activities. This crew operates the ESBWR during all phases of normal plant operation, abnormal events, and emergency conditions.

A minimal crew of two is used to test HSI capabilities in a condition in which one of the normal crew licensed reactor operators has become incapable of performing operating procedures due to accident, illness, etc. This crew consists of one SRO and one licensed Reactor Operator."

E. The following paragraphs will be added to NEDO-33276, Section 4.4.3 to address the question "How sampling bias will be prevented":

> "Randomized sampling should be used to select participants from a population representative of the plant personnel who interact with the HSI. To prevent sampling bias, use of the following should be avoided:
>
> 1. Participants who are part of the design organization.
> 2. Participants who were involved in prior design evaluations. (However, participants may perform a training evaluation following ESBWR operator training.)
> 3. Participants who were selected for some specific characteristic (selecting only good or experienced crews.)"

More detailed information regarding participant sampling and crew configurations will be provided in the HFE Verification and Validation work instructions.

DCD/LTR Impact

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

LTR NEDO-33276, Rev 1 will be revised as noted in the attached markup.

NRC RAI 18.11-21 S02

GEH's response to RAI 18.11-21, Supplement 1, addressed several aspects of human variability in validation testing of an integrated system. The only remaining question is the number of crews GEH plans to use for integrated system validation. Please indicate how many crews will participate in the testing.

GEH Response

GEH will use a minimum of three crews for integrated system validation. This decision is made based on the following considerations:

7. When deciding on the number of crews to be used in integrated system validation, a compromise is made between beginning validation testing earlier in the design process and waiting long enough to obtain a sufficient number of trained crew members.

   The average number of crews employed in a typical operating power plant is five. Selecting a minimum of three crews for validation testing achieves a compromise between testing early and training crews by representing greater than half the average number of crews in a real plant.

8. The more variable test participant performance, the greater the sample size required to adequately represent human variability.

   Because integrated system testing requires comprehensive knowledge of the systems included in the test, test participants receive formal classroom and simulator training. At the conclusion of training, the selected test participants have completed sufficient ESBWR specific training to exhibit an acceptably stable level of performance across trials. A result of this training is the reduction of task performance variance.

9. The amount of covariation between personnel and system variability - The less sensitive the integrated system performance is to human performance, the less that variation needs to be assessed and the lower the needed sample size.

   Because the integrated system of the ESBWR is to be automated to an extensive degree, the impact of operator input on system performance is attenuated, allowing for the selection of a smaller number of crews.

10. Crew homogeneity – The greater the extent to which crew members are similar to each other along the personnel dimensions that contribute to task performance variance, the lower sample size need be.

The characteristics that contribute to task performance variation are identified and taken into account during sampling, ensuring that variation along those dimensions is included in integrated system validation. However, due to the training and qualification requirements for integrated validation test participants, variability among participants may be limited.

11. Test design – The test design employed impacts the sample size needed.

    Because of the threat to statistical conclusion validity posed by low sample size, tests measuring performance were constructed to accommodate a small number of crews. Because of insufficient power to reject the null hypothesis, integrated system validation tests do not rely on statistical significance to validate or invalidate the design.

12. The Ability to Generalize - Because low sample size hinders the ability to make generalizations from observed test performance to real world performance, using the greatest number of crews possible is desirable for validation. However, as sample size may be limited, consideration of this will be taken into account when interpreting test results.

DCD / LTR Impact

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

LTR NEDO-33276, Rev 1 is being completely re-written and will incorporate the information presented above. To specify the minimum number of crews to be used during integrated system validation testing, NEDO-33276, section 5.4.2.2 will be revised as indicated in the attached markup.

NRC RAI 18.11-21 S03

In response to RAI 18.11-21 S02, GEH indicated that a minimum of three crews will participate in validation trials. GEH provided a rationale based on several considerations including expected number of ESBWR crews, expected performance variability, and the influence of automation on performance. The staff has some follow-up questions on the information GEH provided:

• The minimum number of crews is identified, but not what factors would lead the participation of more than three crews. Please provide this information.

• Consideration 3 in the response states that the extensive use of automation minimizes the impact of crew performance on system performance. However, won't the validation tests include multiple failures including the failure of automation requiring operator action? In such scenarios, are more than three crews needed?

• Consideration 5 of the response involves the test design employed. NUREG-0711, Rev. 2 identifies 5 criteria associated with test design— coupling crews and scenarios, test procedures, training of test conductors, training of test participants, and conduct of pilot studies. The consideration suggests that the test design accommodates a small number of crews, but does not identify what criteria are involved to achieve this.

GEH Response

A. *The minimum number of crews is identified, but not what factors would lead to the participation of more than three crews. Please provide this information.*

The minimum and expected number of crews to be used in validation trials is three. Because of the considerations listed in this RAI response, GEH has determined that there are no factors that would necessitate making the use of additional crews a requirement for a scenario.

The basis for determining that three crews are an acceptable minimum was provided in GEH RAI response 18.11-21 S02 (MFN 08-481). The same basis supports three crews being a sufficient number. This basis is summarized below (please note the comments for numbers 3, 5, and 6):

7. The average number of crews employed in a typical operating power plant is five, therefore, three crews represent greater than half the average number of crews in a real plant.
8. The more variable test participant performance, the greater the sample size required to adequately represent human variability. Test participant training stabilizes performance, reducing task performance variance.

9. Because the integrated system of the ESBWR is to be automated to an extensive degree, the impact of operator input on system performance is attenuated, allowing for the selection of a smaller number of crews. (See part B of this response for additional details regarding scenarios involving automation failure.)

10. The greater the extent to which crew members are similar to each other along the personnel dimensions that contribute to task performance variance, the lower sample size need be. The characteristics that contribute to task performance variation are identified and taken into account during sampling, ensuring that variation along those dimensions is included in integrated system validation. However, due to the training and qualification requirements for integrated validation test participants, variability among participants may be limited.

11. Because of the threat to statistical conclusion validity posed by low sample size, tests measuring performance were constructed to accommodate a small number of crews. Because of insufficient power to reject the null hypothesis, integrated system validation tests do not rely on statistical significance to validate or invalidate the design. (See part C of this response for additional details regarding which test design criteria are involved in accommodating a small number of crews.)

12. Because low sample size can make generalization difficult from observed test performance to real world performance, consideration of this will be taken into account when interpreting test results. However, full scope simulator integrated system validation testing occurs in the context of tests done previously during the iterative design process, early validation tests using the part-task simulator, and pilot tests. This additional testing, performed on a larger sample of participants, will help to increase the generalizability of results. (See part B of this response for additional detail.)

B. *Consideration 3 in the response states that the extensive use of automation minimizes the impact of crew performance on system performance. However, won't the validation tests include multiple failures including the failure of automation requiring operator action? In such scenarios, are more than three crews needed?*

Yes, validation tests will include scenarios in which automation failure occurs. This will not necessitate making the use of additional crews a requirement for these scenarios.

Manual human backup actions to compensate for automation failure are initially designated during allocation of function (NEDO-33220, rev 2), developed during task analysis (NEDO-33221, rev 2), and incorporated into HSI design (NEDO-33268, rev 3), procedures (NEDO-33274, rev 3), and training (NEDO-33275, rev 2). The HSI, procedures, and training are then validated through simulator testing (see below) or through talk/walk through. These validations will include automation failures. Thus, the integrated HSI system is designed to support operator actions and reduce operator performance variability in response to automation failure.

To the extent that plant performance is dependent on the interaction of personnel with plant systems, the range of human variability needs to be adequately represented in the data. In scenarios where automation has failed, the crew will be performing actions manually, giving crew actions a greater, more direct impact on system performance. Because of the increased impact of operations actions on the validation of integrated plant performance, it is important to ensure that an adequate amount of participant and crew performance variability is represented in scenarios with automation failure.

While the minimum and expected number of crews used during full scope simulator integrated system validation is three, NEDE-33376P, rev 2, section 5.4.2 states that the participants selected for early validation activities using a part-task simulator can include trainers, licensed SROs, licensed operators from other BWRs, start up engineers, I&C engineers, HRA/PRA engineers and human factors engineers.

Also, the testing that occurs during full scope simulator integrated system validation does not occur in a vacuum, but in the context of the testing that has occurred during the iterative design process (for examples, see NEDO-33268, rev 3, section 3.3.5.6 and NEDO-33274, rev 3, section 4.1.3.3), early validation tests using the part-task simulator, and pilot tests. The participants used during these earlier tests represent a larger proportion of human variability, and the results and context of these tests are taken into consideration when interpreting data collected using three crews during full scope integrated system validation.

Furthermore, if testing on any performance measure (plant, personnel, or supplemental) results in integrated validation failure or a HED (as defined in NEDE-33276P, revision 2, sections 5.4.4.1 – 5.4.4.7), as part of the resolution process (defined in NEDE-33276P, revision 2, section 6.4) it may be determined that[[

]]

Therefore, based on the considerations mentioned above, in scenarios in which plant performance is dependent on the interaction of personnel with plant systems, human variability will be adequately represented in the data and additional crews will not be a requirement.

C. *Consideration 5 of the response involves the test design employed. NUREG-0711, Rev. 2 identifies 5 criteria associated with test design— coupling crews and scenarios, test procedures, training of test conductors, training of test participants, and conduct of pilot studies. The consideration suggests that the test design accommodates a small number of crews, but does not identify what criteria are involved to achieve this.*

The following test design criteria contribute to the determination of sample size:

- **Coupling crews and scenarios** (See NEDE-33276P, revision 2, section 5.4.5.1 for details.)

  A within-crews incomplete block design is used, in which a minimum of three crews will participate in each scenario. By using the same crews for multiple scenarios, a smaller number of crews is needed to implement this test design than if each scenario were assigned a unique set of crews.

- **Test procedures** (See NEDE-33276P, revision 2, section 5.4.5.2 for details.) **& Test conductor training** (See NEDE-33276P, revision 2, section 5.4.5.3 for details.)

  Having clear, detailed, and objective procedures, and test personnel (conductor) training allows scenarios to be uniformly administered across crews, reducing the amount of noise in the test results. Training reduces the variability with which test personnel:
  - Interact with crews
  - Observe operator performance
  - Evaluate operator performance
  - Use test procedures

  Therefore, uniform treatment across crews by test personnel reduces two sources of variability:

  3. Actual crew performance variability - Inconsistent test personnel treatment between crews can contribute to crew performance variability. By training test personnel to administer and interact uniformly across crews, this minimizes one source of crew performance variability.

  4. Observed crew performance variability - Inconsistent observations, data recording, or data analysis by test personnel can contribute to crew performance variability seen in the resulting data. By training test personnel to observe, record, and analyze data consistently, this minimizes another source of variability.

- **Training test participants** (See NEDE-33276P, revision 2, section 5.4.5.3 for details.)

  Because integrated system testing requires comprehensive knowledge of the systems included in the test, test participants receive formal classroom and simulator training. At the conclusion of training, the selected test participants have completed sufficient ESBWR specific training to exhibit an acceptably stable level of performance across trials. A result of this training is the reduction of human performance variability, which allows for a smaller sample size.

- **Conducting pilot studies** (See NEDE-33276P, revision 2, section 5.4.6 for details.)

  Pilot studies conducted prior to integrated system validation provide V&V personnel with an opportunity to estimate performance measurement parameters based on pilot test performance.

Because the pilot tests are representative of the integrated system validation scenarios, it can be inferred that performance on a pilot test should be a strong indicator of performance during an actual test scenario. Thus, pilot tests can provide additional test data that can be used to aid in the interpretation of integrated system validation test results and, because pilot tests may use personnel that differ from those used as test participants during integrated system validation tests, this can increase test result generalizability.

Pilot studies can be used to support that sample size is sufficient given the predicted performance values, or to anticipate that a larger amount of data may be needed to compensate for small sample size.

DCD/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.

MFN 09-017

Enclosure 3

Affidavit

GE-Hitachi Nuclear Energy Americas LLC

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 09-017, Mr. Richard E. Kingston to U.S. Nuclear Regulatory Commission, entitled *Response to Portion of NRC Request for Additional Information Letter No. 263 Related to ESBWR Design Certification Application – Human Factors Engineering - RAI Number 18.11-21 S03,* dated January 20, 2009. The GEH proprietary information in Enclosure 1, which is entitled *Submittal of Response to NRC Request Related to ESBWR Design Certification Application Chapter 18 - Human Factors Engineering - RAI Number 18.11-21 S03 – Proprietary Version,* 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, entitled *Submittal of Response to NRC Request Related to ESBWR Design Certification Application Chapter 18 - Human Factors Engineering - RAI Number 18.11-21 S03 – Public 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 design information. GE utilized prior design information and experience from its fleet with significant resource allocation in developing the system 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 20th day of January 2009.

David H. Hinds
GE-Hitachi Nuclear Energy Americas LLC