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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 09-187

Docket No. 52-010

April 17, 2009

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

Subject: **Supplemental Response to Portion of NRC Request for Additional Information Letter No. 296 Related to ESBWR Design Certification Application – Qualification of batteries for 24 and 72 hour duty cycles - RAI 8.3-64**

Enclosure 1 contains GEH's response to the subject NRC RAIs transmitted via the Reference 1 letter.

Enclosure 1 contains proprietary information as defined in 10CFR2.390. 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 proprietary information in Enclosure 1 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17. A non-proprietary version is contained in Enclosure 2.

If you have any questions about the information provided here, please let me know.

Sincerely,

Richard E. Kingston

Richard E. Kingston
Vice President, ESBWR Licensing

D068
NRO

Reference:

1. MFN 09-052, Letter from U.S. Nuclear Regulatory Commission to Bob Brown, *Request for Additional Information Letter No. 296 Related to ESBWR Design Certification Application*, January 13, 2009

Enclosures:

1. MFN 09-187, Response to Portion of NRC Request for Additional Information Letter No. 296 Related to ESBWR Design Certification Application – Qualification of batteries for 24 and 72 hour duty cycles - RAI 8.3-64 – GEH Proprietary Information

2. MFN 09-187, Response to Portion of NRC Request for Additional Information Letter No. 296 Related to ESBWR Design Certification Application – Qualification of batteries for 24 and 72 hour duty cycles - RAI 8.3-64 and DCD Markups – GEH Non-Proprietary Version

3. Affidavit – David H Hinds – dated April 17, 2009.

cc:

AE Cubbage	USNRC (with enclosures)
JG Head	GEH/Wilmington (with enclosures)
DH Hinds	GEH/Wilmington (with enclosures)
eDRF Section	0000-0096-5031 (RAI 8.3-64)

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Enclosure 2

Response to Portion of NRC Request for Additional Information Letter No. 296 Related to ESBWR Design Certification Application - Qualification of batteries for 24 and 72 hour duty cycles

RAI 8.3-64 and DCD Markup

NRC RAI 8.3-64

The ESBWR DCD, Rev. 5, Section 8.3.2 .2.1 states that the safety-related batteries meet the qualification requirements of IEEE 535, "Standard for Qualification of Class 1E Lead Storage Batteries for Nuclear Power Generating Stations." IEEE Std 535 was written under the assumption of an 8-hour duty cycle. Given that IEEE Std 535 does not apply to duty cycles longer than 8 hours, identify the methodology to be used to qualify these batteries for an extended duty cycle 72-hours. Also, discuss the failure mode(s) for this type of battery for the 72-hour duty cycle .

GEH Response

GEH agrees that IEEE-535 does not apply to duty cycles longer than 8 hours, and ESBWR has a battery duty cycle of 72 hours.

DCD Subsection 3.11.4.1 is changed to reflect that the duty cycle of safety-related batteries in ESBWR is different from the duty cycle basis in IEEE-535. Safety-related batteries are qualified to meet IEEE-535 by type test, with the exception that the duty cycle is 72 hours and supplemental discharge cycle testing is required to meet the harsh environment qualification process of IEEE-323-1974.

ESBWR's equipment qualification process for batteries includes evaluation of significant aging mechanisms that are related to failure mechanisms from radiation exposure, time-temperature aging, and cycle aging; age testing for significant aging mechanisms for a 20-year qualified life; seismic test; and performance testing for the 72-hour duty cycle.

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DCD Impact

DCD Tier 2, Subsections 3.11.1.1 and 3.11.4.1 will be revised as noted in the attached markups.

e. IEEE-535-1986 (R1994), "Standard for Qualification of Class 1E Lead Storage Batteries for Nuclear Power Generating Stations." Except that duty cycle is 72 hours.

f. IEEE-603-1991, "Standard Criteria for Safety Systems for Nuclear Power Generating Stations."

g. (Deleted)

h. IEEE-638-1992, "Standard for Qualification of Class 1E Transformers for Nuclear Power Generating Stations."

i. IEEE-649-1991 (R2004), "Standard for Qualifying Class 1E Motor Control Centers for Nuclear Power Generating Stations."

j. IEEE-650-1990 (R1998), "Standard for Qualification of Class 1E Static Battery Chargers and Inverters for Nuclear Power Generating Stations."

k. IEEE-382-1996 (R2004), "Standard for Qualification of Actuators for Power Operated Valve Assemblies with Safety-Related Functions for Nuclear Power Plants."

l. (Deleted)

m. IEEE-572-1985 (R2004), "Standard Qualification of Class 1E Connection Assemblies for Nuclear Power Generating Stations".

n. IEEE-634-2004, "Standard Cable-Penetration Fire Stop Qualification Test".

o. IEEE-323-1974, "Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations."

p. IEEE-334-1994 (R1999), "IEEE Standard for Qualifying Continuous Duty Class 1E Motors for Nuclear Power Generating Stations."

q. IEEE-344-1987 (R1993), "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations."

r. IEEE-497-2002, "IEEE Standard Criteria for Accident Monitoring Instrumentation for Nuclear Power Generating Stations."

s. IEEE-7-4.3.2-2003, "IEEE Standard Criteria for Digital Computers in Safety Systems of Nuclear Power Generating Stations."

t. IEEE-1202-2006, "IEEE Standard for Flame Testing of Cables for Use in Cable Tray in Industrial and Commercial Occupancies."

(3) American Society of Mechanical Engineers (ASME):

a. ASME Boiler and Pressure Vessel (B&PV) Code Section III-2001, "Rules for Construction of Nuclear Power Plant Components."

b. ASME NQA-1, Addenda NQA-1a-1999, "Quality Assurance Requirements for Nuclear Facility Applications."

(4) U.S. Nuclear Regulatory Commission (NRC) Regulatory Guides:

a. Regulatory Guide 1.63, "Electric Penetration Assemblies in Containment Structures for Nuclear Power Plants."

results of test data, operating experience, and condition indicators. Analysis of data and tests for material properties, equipment rating, and environmental tolerance can be used to demonstrate qualification. However, analysis alone is not used to demonstrate the initial qualification for safety-related electrical equipment in a harsh environment.

EQ safety-related mechanical equipment qualified by analysis is consistent with ASME B&PV Code Section III-2001, "Rules for Construction of Nuclear Power Plant Components."

Active EQ safety-related mechanical equipment is qualified by the qualification methods of IEEE 323.

EQ equipment located in harsh environments may be qualified by combinations of type test, operating experience, and analysis. For example, if a type test of a complete assembly is not possible, component testing supplemented by analysis may be used.

The ESBWR equipment qualification program meets the guidance of RG 1.89, "Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants." ~~The ESBWR equipment qualification program meets the requirements of RG 1.89 for safety-related electrical equipment in harsh environments.~~ RG 1.89 endorses IEEE 323-1974. EQ equipment is qualified using the qualification methods of IEEE 323-1974.

The effects of chemical spray must be addressed. Containment spray, emergency core cooling initiation, and recirculation system operation are included in the qualification tests. The ESBWR SLCS injects borated water into the Reactor Pressure Vessel (RPV) during DBA LOCA. Containment spray is not caustic; therefore the effect of the demineralized water spray is included in the equipment qualification.

The equipment qualification program includes safety-related mechanical equipment, in harsh environment areas and verifies that they are designed to be compatible with postulated environmental conditions, including those associated with LOCA. Active safety-related mechanical equipment is qualified using test, analysis, or a combination of test and analysis.

In some instances, mechanical equipment loading under normal service is more severe than loading under DBA. The loading under normal service is documented with test and/or analysis. The loading and capability under DBA conditions is analyzed in the equipment qualification process to establish the suitability of materials, parts, and equipment needed for safety-related functions, and to verify that the design of such materials, parts, and equipment is adequate. The qualification of mechanical equipment includes materials that are sensitive to environmental effects (e.g., seals, gaskets, lubricants, fluids for hydraulic systems, and diaphragms), required operating time, non-metallic subcomponents of such equipment; the environmental conditions and process parameters for which this equipment must be qualified; non-metallic material capabilities; and the evaluation of environmental effects.

The EQ equipment in a harsh environment has a maximum qualified life of 60-years. The qualified life is verified using methods and procedures of qualification and documentation as stated in IEEE-323 and as addressed herein.

The duty cycle of safety-related batteries in ESBWR is different from the duty cycle basis in IEEE-535. Safety-related batteries are qualified to meet IEEE-535, with the exception that the duty cycle is 72 hours and supplemental discharge cycle testing is required to meet the harsh environment qualification process of IEEE-323-1974.

ESBWR's equipment qualification type test process for batteries includes evaluation of significant aging mechanisms that are related to failure mechanisms from radiation exposure, time-temperature aging, and cycle aging; age testing for significant aging mechanisms for a 20-year qualified life; seismic test; and performance testing for the 72-hour duty cycle.

3.11.4.2 Mild Environment Qualification

EQ safety-related equipment located in a mild environment is qualified as follows:

To assure EQ safety-related equipment located in a mild environment meets its safety-related functional requirements during normal environmental conditions and AOOs, the environmental design basis for normal environmental conditions and AOO requirements is specified in the design/purchase specifications. A qualified life is not required for equipment located in a mild environment that has no significant aging mechanisms.

For all EQ safety-related equipment, excluding EQ safety-related computer-based I&C systems, a Certificate of Conformance from the vendor of the safety-related equipment to be located in a mild environment needs to certify performance to the environmental design basis for normal environmental conditions and AOO requirements for the equipment location for the time that the safety-related function is required.

3.11.4.3 Computer-based Instrumentation and Control Systems

EQ safety-related computer-based I&C systems comply with RG 1.209. For all EQ safety-related computer-based I&C systems, located in a mild environment, type testing is the preferred qualification method to demonstrate performance to the environmental design basis for normal environmental conditions and AOO requirements for the equipment location for the time that the safety-related function is required.

Type tests may be separate laboratory or manufacturer's tests that document performance to the applicable service conditions with due consideration for synergistic effects, if applicable.

When computer-based I&C systems type testing is performed:

- The system under test functions and performs with safety-related software that has been validated and verified and is representative of the software to be installed in the nuclear power plant.
- Testing demonstrates performance of safety-related functions at the specified environmental service conditions, including AOOs.
- Testing exercises all portions of the system under test that are necessary to accomplish the safety-related functions and those portions whose operation or failure could impair the safety-related functions.
- Testing confirms the response of digital interfaces and verifies that the design accommodates the potential impact of environmental effects on the overall response of the system.
- Testing of a complete system is preferred.
- When testing of a complete system is not practical, confirmation of the dynamic response to the most limiting environmental and operational conditions is based on type testing of

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Enclosure 3

Affidavit

GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

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

(1) I am 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 09-187, Mr. Richard Kingston to Nuclear Regulatory Commission, *Response to Portion of NRC Request for Additional Information Letter No. 296 – Qualification of batteries for 24 and 72 hour duty cycles – RAI Number 8.3-64* dated April 17, 2009. The proprietary information in Enclosure 1, *Response to Portion of NRC Request for Additional Information Letter No. 296 – Qualification of batteries for 24 and 72 hour duty cycles – RAI Number 8.3-64,* 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.

(3) In making this application for withholding of proprietary information of which it is the owner or License, 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 2.790(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 contains the process that will be used to qualify batteries to longer duty cycles than previously exist which GEH has developed, and applied to perform this qualification process for the ESBWR.

The development of the testing 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.

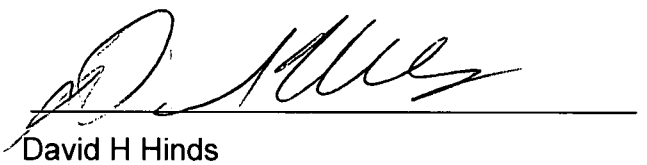
The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

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 17th day of April 2009.



David H Hinds
GE-Hitachi Nuclear Energy Americas LLC