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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 09-411

Docket No. 52-010

June 30, 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. 337 Related to ESBWR Design Certification Application - Auxiliary Systems - RAI Number 9.1-120**

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) response to the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) sent by NRC Letter 337, dated May 14, 2009, Reference 1. GEH response to RAI Number 9.1-120 is addressed in Enclosure 1, which 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 a non-proprietary version that is suitable for public disclosure. Enclosure 3 is the DCD Markups.

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 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

Richard E. Kingston
Vice President, ESBWR Licensing

D068
NRO

Reference:

1. MFN 09-331, Letter from U.S. Nuclear Regulatory Commission to Jerald G. Head, *Request for Additional Information Letter No. 337 Related to ESBWR Design Certification Application*, dated May 14, 2009.

Enclosures:

1. Response to Portion of NRC Request for Additional Information Letter No. 337 Related to ESBWR Design Certification Application - Auxiliary Systems - RAI Number 9.1-120 - Proprietary Version
2. Response to Portion of NRC Request for Additional Information Letter No. 337 Related to ESBWR Design Certification Application - Auxiliary Systems - RAI Number 9.1-120 – Non-Proprietary Version
3. Response to Portion of NRC Request for Additional Information Letter No. 337 Related to ESBWR Design Certification Application - Auxiliary Systems - RAI Number 9.1-120 – DCD Markups
4. MFN 09-411– Affidavit – Larry J. Tucker – June 30, 2009

cc: AE Cubbage USNRC (with enclosures)
JG Head GEH/Wilmington (with enclosures)
DH Hinds GEH/Wilmington (with enclosures)
eDRF section 0000-0102-5605

Enclosure 2

MFN 09-411

Response to Portion of NRC Request for

Additional Information Letter No. 337

Related to ESBWR Design Certification Application

Auxiliary Systems

RAI Number 9.1-120

Public Version

NRC RAI 9.1-120

Clarify that the thermal-hydraulics analysis acceptance criteria in NEDE-33373P Section 5.1.1 are consistent with (1) regulatory guide 1.13, (2) the DCD, and (3) the design of the fuel and auxiliary pool cooling system (FAPCS).

1. RG 1.13 Regulatory Position C.9 states that the spent fuel storage facility should include a system for cooling the pool water in order to maintain a bulk temperature below 60°C (140°F) for all heat load conditions, including full-core offloads during refueling. SRP Section 9.1.2.III.2.1 states that the analysis should show adequate natural circulation of the coolant during all anticipated operating conditions, including full core-offloads during refueling, to prevent nucleate boiling for all fuel assemblies. RG 1.13 Regulatory Position C.11 provides a similar criterion. The two numbered criteria in NEDE-33373P Section 5.1.1 appear to address RG 1.13 Regulatory Position C.9. It is not clear whether the additional criterion in NEDE-33373P Section 5.1.1, i. e., that the local coolant temperature of the fluid exiting the top of the spent fuel storage rack shall not exceed [[ ]], *is consistent with SRP Section 9.1.2.III.2.1 and RG 1.13 Regulatory Position C.11. Justify that the acceptance criteria in NEDE-33373P Section 5.1.1 are consistent with these guidelines, including any assumptions made and summary results of supporting calculations.*

2. DCD Section 9.1.2.5 states that during normal operation the fuel storage racks are designed to provide sufficient natural convection coolant flow through the rack and fuel to remove decay heat without reaching excessive water temperatures (100°C; 212°F). DCD Section 3.8.4.3.3, as shown revised in MFN 09-183, indicates that water in the spent fuel pool boils at 104°C (219°F). The additional criterion in NEDE-33373P Section 5.1.1, that the local coolant temperature of the fluid exiting the top of the spent fuel storage rack shall not exceed [[ ]], *uses a third higher temperature. What is the basis for the* [[ ]] *acceptance criteria? Is this criterion established to prevent boiling within the bundles? What are the assumptions used to determine this value and how are the local conditions at the fuel rod determined from the bulk flow predictions? Clarify which temperature is governing and modify the DCD and LTR as appropriate to be consistent.*

3. DCD Table 9.1.8 specifies that the design inlet temperature for the FAPCS heat exchangers is 48.9°C (120°F). However, NEDE-33373P Section 5.1.1 identifies during abnormal conditions and DCD Section 9.1.3.2 during maximum heat load conditions the bulk temperature may be as high as [[ ]]. *These numbers are inconsistent and should be clarified.*

GEH Response

1) The Fuel and Auxiliary Pools Cooling System (FAPCS) shall maintain the pool bulk temperature within the limits defined by RG 1.13 Position C.9, however this is beyond the scope of the Thermal-Hydraulic analysis of ESBWR fuel racks. The purpose of the Thermal-Hydraulic analysis is to demonstrate that the requirements of SRP Section 9.1.2.III.2.1 and RG 1.13, Regulatory Position C.11, are met. LTR NEDC-33373P will be revised to address the prevention of nucleate boiling during all anticipated operating conditions, including full core offloads during refueling.

   The two numbered acceptance criteria in Section 5.1.1 of LTR NEDC-33373P were intended to be used as inputs for determination of pool inlet temperatures during normal and abnormal conditions. The LTR will be revised to remove these values as acceptance criteria and clearly identify them as inputs for the analysis purpose described.

   The acceptance limit for the temperature of the coolant exiting the top of the fuel storage rack [[ ]] is not used to demonstrate that nucleate boiling is prevented per SRP Section 9.1.2.III.2.1 and RG 1.13 Regulatory Position C.11. The GEH response to question 2 describes the background and use of this limit.

2) Stress properties of the materials used in fuel rack construction at [[ ]] were used in the dynamic analysis of each fuel rack design (see Tables 1-4, 2-3, and 3-3 of LTR NEDC-33373P). The basis for use of this temperature limit at rack exit is not to prevent boiling within the bundles, but to provide consistency with the dynamic analyses in the LTR.

   The Thermal-Hydraulic analysis results do not warrant consideration of conditions at the fuel rods, as temperatures within the rack are considerably less than the temperature limit.

   The Thermal-Hydraulic analysis section of LTR NEDC-33373P compares the calculated rack exit temperature to this material property temperature limit to demonstrate that rack integrity is maintained consistent with limits used in the dynamic analyses. [[ ]] is the governing temperature for comparison purposes. DCD Tier 1, Section 2.5.6 shall be revised to include this value as the maximum temperature of coolant at the rack exit. Also, this value shall be added to DCD Section 9.1.2.5 to provide clarification.

3) GEH agrees that the temperature does not represent the "design temperature", but is rather a benchmark temperature for the rated heat transfer of 9.6 MW. DCD Tier #2 Table 9.1-8 will be revised to change the phrase "Design Inlet Temperature" to "Rated Inlet Temperature".

DCD Impact

DCD Tier #2, Section 9.1.2.5 and Table 9.1-8, and DCD Tier #1, Section 2.5.6, will be revised as noted in the attached markups.

LTR NEDC-33373P, Rev 1 will be revised as described above.

Enclosure 3

MFN 09-411

Response to Portion of NRC Request for

Additional Information Letter No. 337

Related to ESBWR Design Certification Application

Auxiliary Systems

RAI Number 9.1-120

DCD Markup

Table 9.1-8

Design Parameters for FAPCS System Components

Main Pumps	
Number of Pumps	2
Pump Type	Centrifugal
Drive Unit	Constant Speed Induction Motor
Flow Rate	545.1 m^3/hr (2400 gpm)
NPSH Available	13.0 m (42.65 ft)
Heat Exchangers	
Number of units	2
Heat Removal Capacity	9.6 MW (at design conditions)
Seismic	Category II design and analysis
Heat Exchanger Type	Shell & Tube or Plate
Maximum Pressure (tube side)	2.0 MPag (290 psig)
Performance Data	
(1) Flow (tube side)	545.1 m^3/hr (2400 gpm)
(2) Flow (shell side)	545.1 m^3/hr(2400 gpm)
(3) ~~Design~~ Rated Inlet Temp (tube side)	48.9°C(120°F)
(4) Maximum Inlet Temp (shell side)	35.0°C(95°F)

2.5.6 Fuel Storage Facility

New and spent fuel storage facilities are provided for fuel and associated equipment.

Design Description

(1) New fuel storage racks are designed to withstand a design bases seismic event.

(2) Spent fuel storage racks are designed to withstand a design bases seismic event.

(3) Deleted.

(4) Deleted.

(5) The maximum spent fuel rack water coolant flow temperature at the rack exit shall be ≤ 121~~00~~°C (250~~12~~°F).

(6) The maximum stresses in the spent fuel racks do not exceed ASME Code, Section III, design allowable during accident conditions.

Inspections, Tests, Analyses and Acceptance Criteria

Table 2.5.6-1 provides a definition of the inspections, tests, and/or analyses, together with associated acceptance criteria for the new and spent fuel storage racks.

Table 2.5.6-1

ITAAC For The Fuel Storage ~~Racks (Spent and New)~~Facility

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. New fuel storage racks are designed to withstand a design bases seismic event.	An inspection and analysis of the new fuel storage racks configuration will be performed to ensure the design conforms to the seismic analyses.	~~Report(s) document~~Inspection and analysis report(s) exist ~~inspection results and analysis results that demonstrate~~ and conclude~~(s)~~ that the new fuel racks can withstand seismic design basis dynamic loads, and that the as-built configuration conforms to the analyses.
2. Spent fuel storage racks are designed to withstand a design bases seismic event.	An inspection and analysis of the spent fuel storage racks configuration will be performed to ensure the design conforms to the seismic analyses.	~~Report(s) document(s) inspection results and analysis results that demonstrate~~Inspection and analysis report(s) exist and conclude~~(s)~~ that the spent fuel racks can withstand seismic design basis dynamic and that the as-built configuration conforms to the analyses.
3. Deleted.		
4. Deleted.		
5. The maximum spent fuel rack water coolant flow temperature at the rack exit shall be ≤ 121~~00~~°C (250~~12~~°F).	Analyses will be performed to determine the maximum temperature of the spent fuel racks.	~~Analysis records~~Report(s) exist and conclude that analyses confirm ~~that~~ the maximum temperature in the spent fuel racks is < 121~~00~~°C (250~~12~~°F) at rack exit under normal operating conditions.

Enclosure 4

MFN 09-411

Affidavit

Larry J. Tucker

June 30, 2009

GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, Larry J. Tucker, state as follows:

(1) I am Manager, ESBWR Engineering, GE-Hitachi Nuclear Energy Americas LLC ("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 to be discussed and sought to be withheld is delineated in the letter from Mr. Richard E. Kingston to U.S. Nuclear Regulatory Commission, entitled "*MFN 09-411 Response to Portion of NRC Request for Additional Information Letter No. 337 Related to ESBWR Design Certification Application - Auxiliary Systems - RAI Number 9.1-120*", dated June 30, 2009. The information in Enclosure 1, which is entitled "*Response to Portion of NRC Request for Additional Information Letter No. 337 Related to ESBWR Design Certification Application - Auxiliary Systems - RAI Number 9.1-120 - Proprietary Version*" contains proprietary information, and is identified by [[dotted underline inside double square brackets$^{\{3\}}$]]. Figures and other large 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 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 contains computer code analysis inputs and assumptions used by GEH for analyzed transients using the TRACG computer model. Development of these inputs and assumptions and the TRACG computer code was achieved at a significant cost to GEH, and is considered 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 30th day of June 2009.

Larry J. Tucker
GE-Hitachi Nuclear Energy Americas LLC