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Proprietary and Security Notice
This letter forwards proprietary and security-related information in accordance with 10CFR2.390. Upon the removal of Enclosure 1, the balance of the letter may be considered non-Security-Related. Upon the removal of Enclosure 3, the balance of this letter may be considered non-proprietary.

MFN 09-081

Docket No. 52-010

January 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. 260 Related to the ESBWR Design Certification – Control Building Habitability Analysis – RAI Number 6.4-21**

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) sent by NRC letter dated October 21, 2008 (Reference 1). GEH response to RAI Number 6.4-21 is addressed in Enclosure 1. Enclosure 3 contains a Compact Disc (CD) of the RAI-requested Reference 5-6. Enclosure 4 contains the DCD Markups associated with this response.

Enclosure 1 contains Security-Related Figure entitled "Figure 6.4-21-2 Control Building/CRHA Heat Up Calculation Nodalization" identified by the designation "{{{Security-Related Information - Withhold Under 10 CFR 2.390}}}." GEH hereby requests this information be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390. A public version of this figure is provided in Enclosure 2.

Enclosure 3 CD contains entirely GEH proprietary information as defined by 10 CFR 2.390. GEH customarily maintains this information in confidence and withholds it from public disclosure. A public version of this CD is not available.

The affidavit contained in Enclosure 5 identifies that the information contained in Enclosures 1 and 3 has been handled and classified as sensitive and proprietary to GEH. GEH hereby requests that the information of Enclosures 1 and 3 be

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and 3 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

Reference:

1. MFN 08-766, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GEH, *Request For Additional Information Letter No. 260 Related To ESBWR Design Certification Application*, dated October 1, 2008

Enclosures:

1. Response to Portion of NRC Request for Additional Information Letter No. 260 Related to ESBWR Design Certification Application – Control Building Habitability Analysis – RAI Number 6.4-21 – Security-Related Information
2. Response to Portion of NRC Request for Additional Information Letter No. 260 Related to ESBWR Design Certification Application – Control Building Habitability Analysis – RAI Number 6.4-21 – Public Version
3. Response to Portion of NRC Request for Additional Information Letter No. 260 Related to ESBWR Design Certification Application – Control Building Habitability Analysis – Compact Disc (CD) – GEH Proprietary Information
4. Response to Portion of NRC Request for Additional Information Letter No. 260 Related to ESBWR Design Certification Application – Control Building Habitability Analysis – RAI Number 6.4-21 – DCD Markups
5. Affidavit – David H. Hinds – January 30, 2008

cc:	AE Cubbage	USNRC (with enclosures)
	RE Brown	GEH/Wilmington (with enclosures)
	DH Hinds	GEH/Wilmington (with enclosures)
	eDRFs	0000-0096-2608

Enclosure 2

MFN 09-081

Response to Portion of NRC Request for Additional Information Letter No. 260 Related to ESBWR Design Certification Application

Control Building Habitability Analysis

RAI Number 6.4-21

Public Version

Figure 6.4-21-2 Control Building/CRHA Heat Up Calculation Nodalization

{{{Contains Security-Related Information-Withhold Under 10 CFR 2.390}}}

Enclosure 4

MFN 09-081

Response to Portion of NRC Request for Additional Information Letter No. 260 Related to ESBWR Design Certification Application

Control Building Habitability Analysis

RAI Number 6.4-21

DCD Markups

Table 3H-12

Room Heat Loads

Rooms	Contain safety-related equipment	Heat Load W (BTU/h)[1]			Remarks
		0 – 2 hr	2 – 24 hr	24 – 72 hr	
18P3A/B/C/D, 18P4A/B/C/D/E/F, 18P5A/B/C, 18PA/B/C	Yes	HELB	HELB	HELB	Rooms bounded by HELB conditions, see Chapter 6
3110, 3120, 3130, 3140	Yes	5720 (19517)	4675 (15952)	3080 (10509)	
3100, 3101	No	0	0	0	No heat loads during a 0 - 72 hour period (heat sink)
CRHA (Figure 3H-1)	Yes	7630 (26035) (Note this does not include the nonsafety-related heat loads. There is a cooling system sized to remove the nonsafety-related heat loads for 2 hr. See Subsection 9.4.1)	7630 (26035)	7630 (26035)	~~200~~ 240 l/s (~~424~~ 509 cfm)of outside air are considered (see Table 9.4-1 for minimum). It is assumed that the control room habitability area is well mixed. Heat load provided for overall CRHA.
(Deleted)					
3200,3203, 3277	No	0	0	0	No heat loads during a 0-72 hour period (heat sink)
3250, 3261	Yes	500 (1706)	500 (1706)	500 (1706)	
3251, 3260	No	0	0	0	No heat loads during a 0-72 hour period (heat sink)
3301, 3302	No	54000 (184256)	0	0	Louver for each room maintains a maximum temperature of 50°C (122°F) during LOOP. See Figures 1.2-4, 1.2-5 and 1.2-11.
3401, 3402, 3403, 3404 & corridors	No	0	0	0	No heat loads during a 0-72 hour period (heat sink)
3406, 3407	Yes	500 (1706)	500 (1706)	500 (1706)	

(1) Heat Loads provided per room except as noted.

Table 3H-14

Input Parameters, Initial Conditions and Assumptions used in Reactor Building and Control Building Heat up Analyses

Parameter	Analytical Value	Design Value
Initial Ground Temperature °C (°F)(1)	30 (86)	15.5 (60)
HELB Temperatures	See Chapter 6 Analysis	See Chapter 6
LOCA Temperatures	See Chapter 6 Analysis	See Chapter 6
Heat Sink Initial Temperature(2)	Table 3H-15	Table 3H-15
CRHA Day and Night Temperature Profile Δ °C (°F)(3)	15 (27)	15 (27)
EFU Outside Air Supply into CRHA l/s (cfm)	~~200~~ 240(~~424~~509) Maximum	~~200 (424)~~See Table 9.4-1 Minimum
Concrete Thermal Conductivity for RB and CB W/m°C (Btu·in/h·ft²·°F)(4)	0.865 (6.00)	1.63 (11.3)
Concrete Specific Heat J/kg·°C (Btu/lb°F)(4)	653.1 (0.156)	879.2 (0.210)
Concrete Density kg/m³ (lb/ft³)(4)	1922.2 (120.00)	2394.8 (149.50)
CRHA Heat Sink Perimeter m (ft)	103 (338)	103 (338)
CRHA Heat Sink Perimeter Wall Thickness in Contact with the Ground m (ft)	0.90 (2.95)	0.90 (2.95)
CRHA Heat Sink Perimeter Wall Thickness in Contact with the Corridor m (ft)	0.50 (1.64)	0.50 (1.64)
CRHA Heat Sink Thickness of Internal Walls and Walls not in contact with the Ground or Corridor m (ft)	0.30 (0.98)	0.30 (0.98)
CRHA Heat Sink Height m (ft)	6.15 (20.2)	6.15 (20.2)
CRHA Heat Sink Ceiling/Floor Area m² (ft²)	443 (4769)	443 (4769)
CRHA Heat Sink Ceiling/Floor Thickness m (ft)	0.50 (1.64)	0.50 (1.64)
CRHA Room Volume m³ (ft³)	2724 (96197)	2724 (96197)

(1) Heat transfer to the ground is not considered once the accident begins. During wintertime conditions the CB calculation uses 15.5°C (60°F) as the initial ground temperature. This temperature is used to set the initial temperature of the concrete heat sink.

(2) The initial temperature considered on surface structures is made equal on both faces and equal to the room temperature when the room temperature is the same on both sides of the wall, floor or ceiling. When rooms have no equal room temperatures on both sides in normal operation, a linear temperature distribution across the wall is used.

(3) During summertime conditions the maximum CB design temperature is used 47.2°C (117°F), during wintertime conditions the minimum CB design temperature is used – 40°C/°F.

(4) Combinations of thermal concrete properties were used for the RB calculation. The most limiting value is presented in the results.

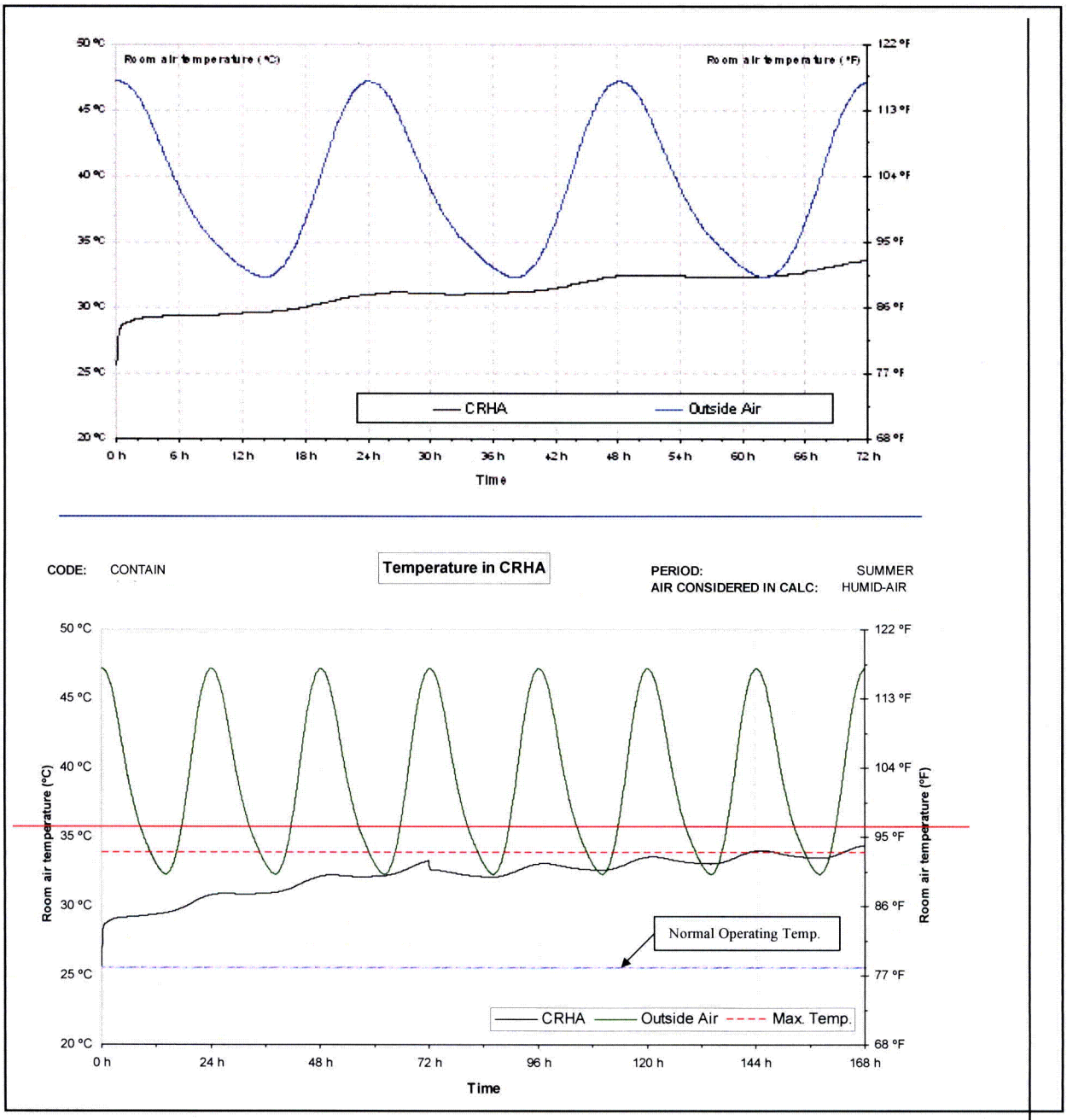

Figure 3H-2. Control Room Habitability Area Heat up – 0% Exceedance Maximum Temperature Case

Table 3H-15

Analytical Room Environmental Temperatures

Rooms	Temperature °C (°F)			
	Normal Operation (Analytical)[1]	72 hrs	168 hrs	Max Qualification Temperature
IC/PCCS pools ICS pools instrumentation Rooms No 18P3A/B/C/D, 18P4A/B/C/D/E/F, 18P5A/B/C, 18P6A/B/C Accident Conditions	43 (109)	Chapter 6 Analysis	Chapter 6 Analysis	112 (234)
Control Room Habitability Area Main control room panels Figure 3H-1 Summertime Conditions	25.56 (78)	33.~~3~~6 (92.5)	~~34.4~~ (~~94~~)<33.9 (93)	8.33 (15.0) Max Increase for 72 hrs
Control Room Habitability Area Main control room panels Figure 3H-1 Wintertime Conditions	22.78 (73)[2]	16 (61)[3]	13 (55)	Unspecified
Div 1, 2, 3 and 4 electrical rooms Safety-related DCIS panels Rooms No 3110, 3120, 3130 and 3140	27 (81)[2]	39 (102)	Safe Shutdown	45 (113)
Safety-related portions of CRHA Ventilation Subsystem Rooms No 3406, 3407	40 (104)[2]	44 (112)	Safe Shutdown	50 (122)
Electrical Chases Room No 3250, 3261	27 (81)[2]	38 (114)	Safe Shutdown	110 (230)

(1) All rooms in the RB and CB are evaluated at higher than expected normal operating temperatures unless otherwise shown in the table to be at normal operating temperatures. The HVAC equipment rooms start at a temperature of 40°C (104°F) as stated in Subsection 9.4.1.

(2) During winter conditions the CB room initial temperatures, with the exception of the CRHA, are set to 18.3°C (65°F).

(3) The CRHA heat loads considered during this period is 2821 Watts (9626 BTU/h).

Table 6.4-1

Design Parameters for CRHAVS

Operation periods:	Normal plant operation, plant startup, and plant shutdown
Outside Air Design Conditions:	
For CRHAVS (0% Exceedance values)	Summer: 47.2°C (117°F) Dry Bulb 26.7°C (80°F) Wet Bulb (Coincident)
	Winter: -40.0°C (-40°F) Dry bulb
Inside Design temperatures and humidity:	
CRHA (normal operation)	22.8°C (73°F) to 25.6°C (78°F) and 25% to 60% RH
CRHA (SBO and Accident Conditions)	Maximum 8.3°C (15°F) rise above normal operating temperature for the first 72 hours into the event, RH not controlled
Pressurization	> 31 Pa (⅛ inch w.g.) positive differential
CRHAVS EFUs:	
CRHAVS Breathing air supply capacity	9.5 l/s/ (20 cfm) person for up to 21 persons (200 l/s total) (424 cfm total) for 72 hours Note: CRHA heat up analysis assumes ~~5~~ 11 control room occupants for CRHA thermal loading (Table 3H-12)
Quantity	2 - 100% capacity each
Capacity	Flow – 200 l/s per unit (424 cfm)
Type	Metal housing containing medium efficiency pre-filter, HEPA filter, carbon filter, and post filter
Medium efficiency filter minimum ASHRAE efficiency	40%
HEPA filter minimum efficiency	99.97% DOP
Post-filter minimum efficiency	95% DOP
Carbon Adsorber Requirements	10.2 cm (4 inch) minimum bed depth Minimum air residence time of 0.5 seconds Decontamination efficiency of 99%

Table 9.4-1

Design Parameters for the CBVS

CRHAVS and CBGAVS		
Operating periods:	Normal plant operation, plant startup, and plant shutdown	
Outside Air Design Conditions:		
For CRHAVS and EFUs (Limiting values)	Summer: Winter:	47.2°C (117°F) Dry Bulb 26.7°C (80°F) Wet Bulb (Coincident) -40.0°C (-40°F) Dry bulb
For CBGAVS: (1% Exceedance values)	Summer: Winter:	37.8°C db (100°F) 26.1°C wb (79°F) (coincident), -23.3°C (-10°F) Dry bulb
Inside Design temperatures and humidity:		
CRHA (normal operation)	22.8°C (73°F) to 25.6°C (78°F) and 25% to 60% relative humidity (RH)	
CRHA (Loss of normal AC power)	Maximum 8.3°C (15°F) rise above normal operating temperature, RH not controlled	
DCIS rooms/miscellaneous areas	18.3°C (65°F) to 25.6°C (78°F), RH not controlled	
Safety-related DCIS rooms (Loss of normal AC power)	50°C (122°F) maximum	
HVAC equipment room:	10°C (50°F) to 40°C (104°F), RH not controlled	
Pressurization:	CBGAVS > atmospheric pressure CRHAVS > 31 Pa (1/8" w.g.) positive differential	
CBGAVS	18.3°C (65°F) to 25.6°C (78°F), RH not controlled	
CRHAVS Breathing air supply capacity:	9.5 l/s (20 cfm) per person for up to 21 persons (200 l/s or 424 cfm total) for 72 hours (Ref. 9.4.1-1) Note: CRHA heatup analysis assumes 115 control room occupants for CRHA thermal loading (Table 3H-12)	

Enclosure 5

MFN 09-081

Affidavit

David H. Hinds

January 30, 2009

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 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 "*Response to NRC Request for Additional Information Letter No. 260 Related to the ESBWR Design Certification Application" – Control Building Habitability Analysis – RAI Number 6.4-21,*" dated January 30, 2009. The information in Enclosure 3, which is entitled "*Response to NRC Request for Additional Information Letter No. 260 Related to the ESBWR Design Certification Application" – Control Building Habitability Analysis – RAI Number 6.4-21 – Compact Disc (CD)" – GEH Proprietary Information,* contains proprietary information, and is identified by [[dotted underline inside double square brackets$^{(3)}$]]. 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;

GE-Hitachi Nuclear Energy Americas LLC

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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;

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.

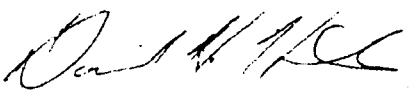
The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

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 January 2009.



David H. Hinds
GE-Hitachi Nuclear Energy Americas LLC

Enclosure 3

MFN 09-081

Response to Portion of NRC Request for Additional Information Letter No. 260 Related to ESBWR Design Certification Application

Control Building Habitability Analysis

RAI Number 6.4-21

Compact Disc (CD)

GEH Proprietary Information

PROPRIETARY INFORMATION NOTICE

This CD contains proprietary information of GE Hitachi Nuclear Energy Americas (GEH), and is furnished in confidence solely for the purpose(s) stated below in the notice regarding the contents of this report. No other use, direct or indirect, of the CD or the information it contains is authorized. Furnishing this CD does not convey any license, express or implied, to use any patented invention or, except as specified above, any proprietary information of GEH disclosed herein or any right to publish or make copies of the CD without prior written permission of GEH

GEH proprietary information within text, and (usually within) tables is identified by a dark red font with a dotted underline, placed within double square brackets. [[This sentence is an example.{3}]] GEH proprietary information in figures, large equation objects, and some tables is identified with double square brackets before and after the object. In all cases, the superscript notation {3} refers to Paragraph (3) of the enclosed affidavit, which provides the basis for the proprietary determination.