February 5, 2009

Mr. Robert E. Brown
Senior Vice President, Regulatory Affairs
GE Hitachi Nuclear Energy
3901 Castle Hayne Road MC A-50
Wilmington, NC 28401

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 302 RELATED TO DESIGN CONTROL DOCUMENT (DCD) REVISION 5

Dear Mr. Brown:

By letter dated August 24, 2005, GE Hitachi Nuclear Energy (GEH) submitted an application for final design approval and standard design certification of the economic simplified boiling water reactor (ESBWR) standard plant design pursuant to 10 CFR Part 52. The Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed design.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter.

Pursuant to 10 CFR 2.390, we have determined that the enclosed RAIs contain proprietary information. We have prepared a non-proprietary version of the RAIs (Enclosure 1) that does not contain proprietary information. The proprietary information is indicated in brackets and underlined in Enclosure 2. We will delay placing this document in the public document room for a period of ten (10) working days from the date of this letter to provide you with the opportunity to comment on the proprietary aspects only. If you believe that any additional information in the enclosure is proprietary, please identify such information line by line and define the basis pursuant to the criteria of 10 CFR 2.390 before the public release date.

If you have any questions or comments concerning this matter, you may contact me at 301-415-3179 or Ilka.Berrios@nrc.gov or you may contact Amy Cubbage at 301-415-2875 or Amy.Cubbage@nrc.gov.

Sincerely,

/RA/

Ilka T. Berrios, Project Manager
ESBWR/ABWR Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket No. 52-010

Enclosure:
1. Request for Additional Information (Non-Proprietary)
2. Request for Additional Information (Proprietary)

cc: See next page (w/o enclosure 2)

If you have any questions or comments concerning this matter, you may contact me at 301-415-3179 or Ilka.Berrios@nrc.gov or you may contact Amy Cubbage at 301-415-2875 or Amy.Cubbage@nrc.gov.

Sincerely,

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Ilka T. Berrios, Project Manager
ESBWR/ABWR Projects Branch 1
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Docket No. 52-010

Enclosure: 1. Request for Additional Information (Non-Proprietary)
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cc: (w/o enclosure 2)

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Requests for Additional Information (RAIs): ESBWR Design Control Document (DCD) Revision 5

RAI Number	Reviewer	Question Summary	Full Text
RAI 6.2-184, Supplement 1 (MFN 08-781, 10/13/2008)	Wagage H	Update the ESBWR DCD to include plots of noncondesable gas mass and void fraction	The GEH response to RAI 6.2-184 shows that providing only noncondensable gas pressure without void fraction is of little use in understanding the behavior of noncondensable gases, including the locations that retain noncondensable gas in the drywell. Provide plots of noncondesable gas mass and void fraction in the DCD.
RAI 6.2-189, Supplement 1 (MFN 08-781, 10/13/2008)	Wagage H	Update the DCD to include Table 6.2-189-1	Update the DCD to include Table 6.2-189-1 on Bounding Estimate of the ESBWR Containment Pressures to clarify how you determined the containment Pressure adjustment as noted in the proposed change to the footnote on Main Steam Line Break, with Containment Pressure adjustment of DCD Tier 2 Table 6.2-5.
RAI 6.2-190, Supplement 1 (MFN 08-781, 10/13/2008)	Wagage H	Provide an ITAAC to confirm that system characteristics conform to the drywell gas recirculation fan characteristics	Part (A) of GEH's response to RAI 6.2-190 states that the detailed design of drywell gas recirculation fans is in process and characteristics required for the PCCS vent fan system to ensure the containment pressures remain below design pressure is described in the response. DCD Tier 1, Revision 5, Table 2.15.4-2, Item 11 provides design characteristics for the fans. Provide an ITAAC to confirm the system characteristics conform to the fan characteristics. For example, confirm that the system head loss under the conditions DCD Tier 1, Revision 5, Table 2.15.4-2, Item 11 will be less than or equal to the head across fan of 5.50 KPa (0.80 psi)
RAI 6.2-194 Supplement 1 (MFN 08-927, 11/24/2008)	Krotiuk W Wagage H	Shield wall annulus pressurization analysis	The staff reviewed GEH response to RAI 6.2-194 in GEH letter MFN-08-927 and found that items A and C are not acceptable. A. Table 1 shows that the total break flow from the FW line into the shield wall annulus obtained from the GEH and NRC calculations using the GEH method described in MFN 178-78 are generally in agreement until the end of the acoustic response period, [[ ]]. Figure 1 also shows general agreement, within about 10%, between TRACE results and the NRC calculation using the MFN

RAI Number	Reviewer	Question Summary	Full Text
			178-78 method. The duration of the acoustic phenomenon, [[ ]], is directly dependent on the pipe length on the RSW side which GEH indicated in a 1/21/2009 telephone conversation to be about 4.4 m. GEH in the response to RAI 6.2-23 in GEH letter MFN 08-270 indicates that the peak pressure in the shield wall annulus following a FW break occurs at [[ ]]. The time for the peak pressure, calculated by GEH using a FW break flow of [[ ]], is relatively close to the calculated end of the acoustic phenomenon at [[ ]] when the flow rate is determined to increase to [[ ]]. Justify that the peak pressure that occur at [[ ]] is bounding despite that the blowdown flow rate increases significantly later (after [[ ]]). C. GEH specifically states in Item 5 of Part D of MFN 06-159 Supplement 1 that the "Volumes are minimized for conservatism and simplicity where necessary." Review of the TRACG input supplied with MFN 06-159 Supplement 1 shows that the volumes inside the shield wall annulus are indeed reduced to reflect the stated conservatism. However, the TRACG input does not include a reduction in the values of the flow areas between volumes in either the circumferential or axial directions. (The values for FA at the models internal flow areas in the TRACG input are all equal to 1.0.) Irreversible flow loss coefficients should also be included for the flow areas which possess flow obstructions. The TRACG input does not include irreversible flow loss coefficients in either the circumferential or axial directions. (The values for FRICP in the TRACG input are all equal to 0.) (i) Provide modeling details of flow obstructions for the flow in

RAI Number	Reviewer	Question Summary	Full Text
			the shield wall annulus. (ii) For the FWLB and RWCU break cases, provide results of the shield wall annulus pressurization analysis accounting for the flow obstructions and the increase in blowdown flowrate for the FWLB as stated under item (A) above.

Table 1: Total Flow from Both Sides of a FW Break in the Shield Wall Annulus

NRC Calculation Using GEH Method from MFN 178-78			
Time Period	[[ ]]	[[ ]]	[[ ]]
Total Break Flow	[[ ]]	[[ ]]	[[ ]]
GEH Calculation from MFN 08-270			
Time Period	[[ ]]		
Total Break Flow	[[ ]]		

[[

]]

Figure 1: Comparisons between NRC and GEH Calculations and TRACE Results

DC GE - ESBWR Mailing List (Revised 02/02/2009)

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