April 22, 2008

Mr. Robert E. Brown
Senior Vice President, Regulatory Affairs
GE Hitachi Nuclear Energy
3901 Castle Hayne Rd MC A-45
Wilmington NC 28401

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 181 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION

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.

If you have any questions or comments concerning this matter, you may contact me at 301-415-6715 or Bruce.Bavol@nrc.gov or you may contact Amy Cubbage at 301-415-2875 or Amy.Cubbage@nrc.gov.

Sincerely,

/RA/

Bruce Bavol, 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

cc: See next page

April 22, 2008

Mr. Robert E. Brown
Senior Vice President, Regulatory Affairs
GE Hitachi Nuclear Energy
3901 Castle Hayne Rd MC A-45
Wilmington NC 28401

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 181 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION

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.

If you have any questions or comments concerning this matter, you may contact me at 301-415-6715 or Bruce.Bavol@nrc.gov or you may contact Amy Cubbage at 301-415-2875 or Amy.Cubbage@nrc.gov.

Sincerely,

/RA/

Bruce Bavol, 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

cc: See next page
ACCESSION NO. ML081070125

OFFICE	NGE1	NGE1
NAME	BBavol	ACubbage
DATE	04/16/2008	04/22/2008

OFFICIAL RECORD COPY

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 181 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION DATED APRIL 22, 2008

Distribution:
Hard Copy
NGE1 R/F
BBavol
ACubbage

E-Mail:NGE1 Group
RidsAcrsAcnwMailCenter
RidsOgcMailCenter
JLee
CCox

Requests for Additional Information (RAIs)
ESBWR Design Control Document (DCD), Revision 4

RAI Number	Reviewer	Question Summary	Full Text
(These RAIs supersede the ones previously submitted in RAI Letter 152) 15.4-3, Supplement No. 2, (MFN 06-396, Supplement No. 2, MFN 07-100, Supplement No. 2, MFN 07-197, Supplement No. 2, January 25, 2008) & 15.4-4, Supplement No. 2, (MFN 06-396, Supplement No. 2, MFN 07-100, Supplement No. 2, MFN 07-197, Supplement No. 2, January 25, 2008)	Lee, J	Control Room (CR) in-leakage, Instrument Line Break	a) Please add control room unfiltered air in-leakage rates to Tables 15.4-2 and 15.4-11 of DCD, Tier 2, Revision 4 and to Tables15.4-14 and 15.4-17 of DCD, Tier 2, Revision 5 markup copy. b) Please recalculate control room doses using appropriate control room χ/Q values provided in DCD Tier 2, Revision 4, Table 2.0-1, "Envelope of ESBWR Standard Plant Design Parameters," for the normal air intake and unfiltered air intake for each respective design basis accident. c) For all design basis accident events where Control Room (CR) in-leakage value was assumed zero, GEH should increase the in-leakage to the value used in LOCA (12 cfm) and credit the Emergency Filtration Units (EFUs). This affects X/Q values for the unfiltered in-leakage path with the exception of the fuel handling accident (FHAs) which will have a higher X/Q value than LOCA, and will not credit the EFUs. GEH should re-calculate control room doses for all design basis accident events where Control Room (CR) in-leakage value was assumed to be zero. d) For Feedwater Line Break (FWLB), GEH should add in-leakage to CR. e) For Instrument Line Break (ILB), GEH should revise Table 15.4-17 to include release point consistent with the format of all other accident results and input parameter tables.

(This RAI supersedes the one previously submitted in RAI Letter 157) 15.4-26, Supplement No. 1, (MFN 07-299, June 27, 2007)	Forrest, E	RB leakage testing criteria & Section 15.4.4.5.2.3 Revision	a) Please confirm that the leak test criteria will always be less than or equal to the leakage assumed in the design basis analysis. Please state what that leakage is in terms of the units being used for flow rate in the testing for leakage. b) The information provided on testing needs to be related to a flow rate at a differential pressure (such as 750 cfm at 1/4 in wg). The pressure should be established in essentially all areas of the RB and maintained for a period of time such as currently done in existing BWR's. The differential pressure should be reflective of the worst meteorological conditions that could be expected to influence exfiltration from the building. The test procedures should be addressed in RAI 6.2-167 S01 and, or RAI 6.2-165 part B. The testing should be described in the DCD in Section 6.2.3. Please provide the location of the SR and the TS criteria for the test in the DCD. c) Please explain how GEH modeled the 50%/day RB leakage and 40 percent of volume mixing. The revision 4 TS basis is not consistent with the GEH dose analyses. Please revise the TS basis. d) For DCD Tier 2, Section 15.4.4.5.2.3, discuss how GEH converted to scfm. GEH should explain how they modeled the 50%/day RB leakage and 40% of building volume mixing. The Revision 4 Technical Specification (TS) basis is not consistent with the GEH dose analysis. GEH should revise TS bases and clarify in Chapter 15 what assumptions are made so TS bases can be written to be consistent with Chapter 15. These questions are also related to RAI 6.2-165.

15.4-2, Supplement No. 2, (MFN 07-100, Supplement No. 1, MFN 07-456, November 16, 2007)	Lee, J	Main Steam Line diameter changes	GEH should update reference to Main Steam Line diameter changes (from 24 inch to 30 inch outside diameter) in DCD.
15.4-6, Supplement No. 1, (MFN 07-523, November 30, 2007)	Lee, J	AS1 as a bounding case	a) GEH has proposed to use AS1 as a bounding case rather than AS2 and should provide justification. GEH should reference NUREG-1465 and revise the AS-1 discussion and dose consequences in the DCD. b) DCD Tier 2, Section 15.4.4.5.2.1 should refer to the LTR NEDE-33279P Revision 1, Section 4.3.1. c) For DCD Tier 2, Section 15.4.4.5.4, verify that LTR NEDE-33279P is consistent with the DCD.
15.4-7, Supplement No. 1, (MFN 07-523, November 30, 2007)	Lee, J	Table 15.4-5 B, Section 15.4.4.2.1 revision	a) In DCD Tier 2, Table 15.4-5 B, GEH should add a footnote to explain the point after which no credit is taken for fission product removal (for AS-1, if limiting) and the basis for the cutoff. b) In DCD Tier 2, Section 15.4.4.2.1, GEH should appropriately re-word this section based upon making AS-1 bounding.
15.4-8, Supplement No. 1, (MFN 07-523, November 30, 2007)	Lee, J	Section 15.4.3, Section 15.4.4, Section 15.4.4.2.1 revision	a) GEH should emphasize in DCD Tier 2, Section 15.4.3, that it has been demonstrated in DCD Tier 2, Section 6.3 Emergency Core Cooling (ECCS) that no fuel melting occurs in a LOCA. The dose evaluation in Section 15.4.4 will need to be re-worded to invoke assumed fuel melting.

			b) In DCD Tier 2, Section 15.4.4, GEH should include words from 10 CFR 52.47 – "evaluate accidents that could result in the release of significant quantities of radioactive fission products." c) In DCD Tier 2, Section 15.4.4.2.1, GEH should delete both paragraphs in their entirety and include additional verbiage for the AS-1 LOCA scenario.
15.4-17, Supplement No. 1, (MFN 07-523, November 30, 2007)	Lee, J	Section 15.4.4.2.1 revision	a) In DCD Tier 2, Section 15.4.4.2.1, GEH should move the first two sentences to Section 15.4.3. In Table 15.4-5, add a footnote (or other method) to explain the point after which no credit is taken for fission product removal (for AS-1 if limiting) and the basis for the cutoff. b) In DCD Tier 2, Section 15.4.4.2.1 appropriately re-word this section based upon making AS-1 bounding.
15.4-22, Supplement No. 1, (MFN 07-523, November 30, 2007)	Lee, J	Section 15.4.4.5.2.3, Section 15.4.4.5.1.1 revision	a) In DCD Tier 2, Section 15.4.4.5.2.3, GEH should explain why the VTT report was not used in the analyses? b) In DCD Tier 2, Section 15.4.4.5.1.1, reference 15.4-12, GEH should remove the reference to BWROG methodology, which is based on source term from TID-14844. c) GEH should add a reference to fission product removal LTR NEDE-33279P for detailed analysis modeling. d) In Table 4.3 of LTR NEDE-33279P, for the conversion of MSIV leakage to SCFM, what containment conditions (temperature) are used to convert? GEH should add a row to the table, such that both the RADTRAD volumetric flow rate, and flow rate at standard conditions (for TS) are provided in Chapter 15.

			e) GEH should justify 20% air mixing in the condenser and an iodine removal rate of 99.5%. Include 20% air mixing in the condenser as an item to be verified in the ITAAC table.
15.4-24, Supplement No. 1, (MFN 07-523, November 30, 2007)	Lee, J	Tables 15.4-4 a-d, Section 15.4.4.2.1 revision	a) GEH should replace or supplement DCD Tier 2, Tables 15.4-4 a-d (MELCOR Seq. of Events) with descriptive text. b) In DCD Tier 2, Section 15.4.4.2.1, appropriately re-word this section based upon making AS-1 bounding.
15.4-31, Supplement No. 1, (MFN 08-023, February 15, 2008)	Lee, J	Fuel Building and Reactor Building accidents	a) GEH should revise this response to clarify that the two dose calculations are provided for in Fuel Building and Reactor Building accidents. b) GEH should explain why different atmospheric dispersion factors (X/Q) are used for Fuel Handling Accident (FHA).

cc:

Ms. Michele Boyd
Legislative Director
Energy Program
Public Citizens Critical Mass Energy
and Environmental Program
215 Pennsylvania Avenue, SE
Washington, DC 20003

Mr. Ray Ganthner
Senior Vice President
AREVA, NP, Inc. 3315
Old Forest Road
P.O. Box 10935
Lynchburg, VA 24506-0935

Email

aec@nrc.gov (Amy Cubbage)
APH@NEI.org (Adrian Heymer)
art.alford@ge.com (Art Alford)
awc@nei.org (Anne W. Cottingham)
bennettS2@bv.com (Steve A. Bennett)
bevans@enercon.com (Bob Evans)
bob.brown@ge.com (Robert E. Brown)
BrinkmCB@westinghouse.com (Charles Brinkman)
chris.maslak@ge.com (Chris Maslak)
CumminWE@Westinghouse.com (Edward W. Cummins)
cwaltman@roe.com (C. Waltman)
dan1.williamson@ge.com (Dan Williamson)
david.hinds@ge.com (David Hinds)
david.lewis@pillsburylaw.com (David Lewis)
David.piepmeyer@ge.com (David Piepmeyer)
dennis.chin@ge.com (Dennis Chin)
dlochbaum@UCSUSA.org (David Lochbaum)
don.lewis@ge.com (Don Lewis)
erg-xl@cox.net (Eddie R. Grant)
Eugene_Grecheck@dom.com (Eugene S. Grecheck)
frankq@hursttech.com (Frank Quinn)
Frostie.white@ge.com (Frostie White)
gcesare@enercon.com (Guy Cesare)
GEH-NRC@hse.gsi.gov.uk (Geoff Grint)
george.honma@ge.com (George Honma)
george.stramback@gene.ge.com (George Stramback)
george.wadkins@ge.com (George Wadkins)
GovePA@BV.com (Patrick Gove)
greshaja@westinghouse.com (James Gresham)
gzinke@entergy.com (George Alan Zinke)
hickste@earthlink.net (Thomas Hicks)
james.beard@gene.ge.com (James Beard)
jcurtiss@winston.com (Jim Curtiss)
jeff.waal@ge.com (Jeff Waal)
jgutierrez@morganlewis.com (Jay M. Gutierrez)
jim.kinsey@ge.com (James Kinsey)
jim.riccio@wdc.greenpeace.org (James Riccio)
jim.rogers@ge.com (Jim Rogers)
JJNesrsta@cpsenergy.com (James J. Nesrsta)
joel.Friday@ge.com (Joel Friday)
John.O'Neill@pillsburylaw.com (John O'Neill)
john.sorensen@ge.com (John Sorensen)
Joseph_Hegner@dom.com (Joseph Hegner)
junichi_uchiyama@mnes-us.com (Junichi Uchiyama)

kathy.sedney@ge.com (Kathy Sedney)
kathy.warnock@ge.com (Kathy Warnock)
kenneth.ainger@exeloncorp.com (Kenneth Ainger)
kimberly.milchuck@ge.com (Kimberly Milchuck)
KSutton@morganlewis.com (Kathryn M. Sutton)
kurt.schaefer@ge.com (Kurt Schaefer)
kwaugh@impact-net.org (Kenneth O. Waugh)
laura.bello@ge.com (Laura Bello)
lou.lanese@ge.com (Lou Lanese)
Marc.Brooks@dhs.gov (Marc Brooks)
maria.webb@pillsburylaw.com (Maria Webb)
mark.beaumont@wsms.com (Mark Beaumont)
Marvin.Smith@dom.com (Marvin L. Smith)
matias.travieso-diaz@pillsburylaw.com (Matias Travieso-Diaz)
media@nei.org (Scott Peterson)
mgiles@entergy.com (M. Giles)
mike_moran@fpl.com (Mike Moran)
MSF@nei.org (Marvin Fertel)
mwetterhahn@winston.com (M. Wetterhahn)
nirsnet@nirs.org (Michael Mariotte)
PAC2@nrc.gov (Peter Cochran)
pareez.golub@ge.com (Pareez Golub)
Pat.Woodfin@ge.com (Pat Woodfin)
patriciaL.campbell@ge.com (Patricia L. Campbell)
paul.gaukler@pillsburylaw.com (Paul Gaukler)
Paul@beyondnuclear.org (Paul Gunter)
peter.jordan@ge.com (Peter Jordan)
phinnen@entergy.com (Paul Hinnenkamp)
pshastings@duke-energy.com (Peter Hastings)
randy.newton@ge.com (Randy Newton)
RJB@NEI.org (Russell Bell)
RKTemple@cpsenergy.com (R.K. Temple)
roberta.swain@ge.com (Roberta Swain)
sandra.sloan@areva.com (Sandra Sloan)
SauerB@BV.com (Robert C. Sauer)
sfrantz@morganlewis.com (Stephen P. Frantz)
sharon.lyons@ge.com (Sharon Lyons)
steven.hucik@ge.com (Steven Hucik)
steven.stark@ge.com (Steven Stark)
tom.miller@hq.doe.gov (Tom Miller)
trsmith@winston.com (Tyson Smith)
Vanessa.quinn@dhs.gov (Vanessa Quinn)
VictorB@bv.com (Bill Victor)
Wanda.K.Marshall@dom.com (Wanda K. Marshall)
waraksre@westinghouse.com (Rosemarie E. Waraks)

wayne.cutright@ge.com (Wayne Cutright)
wayne.marquino@ge.com (Wayne Marquino)
whorin@winston.com (W. Horin)