April 8, 2008

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 169 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION

Dear Mr. Brown:

By letter dated August 24, 2005, GE-Hitachi Nuclear Energy Americas, LLC (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 301-415-2375 or leslie.perkins@nrc.gov or you may contact Eric Oesterle at (301) 415-1365 or eric.oesterle@nrc.gov.

Sincerely,

/RA/
Leslie T. Perkins, Project Manager
ESBWR/ABWR Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket No. 52-010

Enclosure:
Request for Additional Information

cc: See next page

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Leslie T. Perkins, Project Manager
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Enclosure:
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cc: See next page

Distribution: See next page

ADAMS Accession No: ML080770452 NRO-002

OFFICE	PM:NGE2:DNRL	PM:NGE1:DNRL	BC:NGE1:DNRL
NAME	LPerkins:	EOesterle:	MShuaibi
DATE	3/18/2008	3/27/2008	4/8/2008

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DATED APRIL 8, 2008

Distribution:
PUBLIC
Hard Copy
NGE1 R/F
LPerkins, NRO
DGalvin, NRO
ACubbage, NRO
EOesterle, NRO
MShuaibi, NRO
E-Mail
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Requests for Additional Information (RAIs)
ESBWR Design Control Document (DCD), Revision 4

RAI Number	Reviewer	Question Summary	Full Text
14.3-131 S02	Hsia A	Piping Design Acceptance Criteria (DAC) and ITAAC	In its letter of November 29, 2007, GEH provided revisions to DCD Chapter 14 to address Piping DAC in response to a discussion on the same topic from a meeting with the NRC on October 18, 2007. NRC staff met with GEH on February 14, 2008 to discuss the changes. During this meeting, staff explained three points that would be needed to address DAC in the DCD: 1) a description of the subject area for which DAC is being used and the approach to be taken to complete the design in Tier 2 of the DCD; 2) Design ITAAC; and 3) marking of the methodology to be used as Tier 2* prior to certification. Considering the need for the aforementioned three points to address DAC and after reviewing the proposal provided in the response to RAI 14.3-131 S01, the NRC has the following supplemental questions: 1. In its letter of November 29, 2007, GEH responded to NRC RAI 14.3-131 S01 by stating that all ASME piping and components are designed, fabricated, installed and tested in accordance with the requirements in ASME Code, Section III. GEH also stated that DCD Tier 1, Section 3.1, Design Descriptions, will be clarified to address additional DAC scope as discussed with the NRC staff on October 18, 2007. In reviewing the content of the aforementioned Tier 1, Section 3.1, as attached to the above GEH letter, the staff did not find information on how components associated with piping will be considered when completing the work to close the piping DAC. 2. In its letter of November 29, 2007, GEH responded to NRC RAI 14.3-131 S01 by stating that a review of DCD (Revision 4) Tier 2, Section 3.9.2 and Section 3.9.3 indicates that the details for DAC closure as related to attached components are adequately addressed in these two sections. In reviewing DCD Tier 2, Section 3.9.2 and Section 3.9.3, however, the staff could not locate where

RAI Number	Reviewer	Question Summary	Full Text
			such details for DAC closure are addressed. Further, similar details are not provided for the piping design and pipe break hazard analysis. GEH is requested to provide such information and to revise Tier 2 to address DAC closure. 3. In its letter dated November 29, 2007, GEH responded to NRC RAI 14.3-131 S01 pertaining to pipe break hazards analysis. GEH stated that ESBWR DCD Section 3.6.5 contains COL Information Item 3.6.5-1-A requiring the applicant to provide a pipe break evaluation report as discussed in Section 3.6.2.5. GEH also stated that the information required by the COL Information Item 3.6.5-1-A is met and satisfied by the closure of Tier 1, Table 3.1-1 ITAAC criteria and the COL Information Item 3.6.5-1-A is deleted. Subsequently, during the discussion with the NRC staff in a meeting on February 14, 2008, GEH indicated that the staff's concerns raised in RAI 14.3-212 concerning the deletion of COL Information Item 3.6.5-1-A by the closure of Tier 1, Table 3.1-1 ITAAC criteria is therefore, addressed. In its response to RAI 14.3-212 dated March 20, 2008, GEH modified ITAAC 3.1-1 Item 3 to apply to the "as-designed" rather than the "as-built" pipe analysis. The write-up refers to ITAAC 1 through 6, but only five ITAACs were included. Based on its review of the information provided by the applicant, the staff determined that the ITAAC, as provided in the March 20, 2008, response should state "as-designed pipe break analysis results," as opposed to "pipe analysis." This change should also be made under Inspections, Tests, and Analysis to refer to the report call out in Section 3.6.2.5 of the DCD. Further, Item 6 should remain and be modified to address reconciliation with the report called out in Section 3.6.2.5. Furthermore, the staff disagreed with the applicant's response to a related RAI 14.3-210. The staff maintains that either a description of the as-designed pipe break hazards analysis completion

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			schedule or an action item to provide the schedule as part of the COL application is needed because of the proposed deletion of COL Information Item 3.6.5-1-A from ESBWR DCD. If the COL information item remains and since the delay is related to piping DAC, the applicant will either have to provide the requested information, in accordance with RG 1.206 Section C.III.5.1, or to provide the NRC with a schedule for completion of the detailed design and propose a method for final closure, in accordance with Section C.III.4.3. GEH is, therefore, requested to include information for both as-designed and as-built pipe break hazards analysis in ITAAC Table 3.1-I, and to provide a description pertaining to the closure schedule of the as-designed pipe break hazards analysis in DCD Tier 2 section and a similar description for the piping design given the deletion of the COL information item related to design reports and specifications. 4. In its letter dated November 29, 2007, GEH responded to NRC RAI 14.3-131 S01 by revising the ITAAC. In ITAACs 1 and 2 in Table 3.1-1, GEH modified the ITA and AC columns to include ASME Code Design Reports in lieu of the ASME Code Certified Stress Report. For clarification, in order to meet the Code requirements, the ITAACs should state that the ASME Code Design Reports are in accordance with the requirements of ASME Section III, Subarticle NCA-3550.

RAI Number	Reviewer	Question Summary	Full Text
14.2-81 S01	Talbot F	Revise ESBWR DCD Section 14.2-10, "COL Information," COL Action Item 14.2-1-H to be consistent with requiring the COL applicant to provide the SAM	In RAI 14.2-81, the staff requested additional information regarding the construction test objectives contained in Subsection 14.2.1.1 of DCD Tier 2. Specifically, a staff review of DCD Section 14.2.1 indicated that the objectives of construction tests do not consider the possibility of field engineering changes to SSCs and does not identify how such changes will be documented and reflected in the conduct of field tests and test acceptance criteria. Accordingly, the staff requested that the applicant update the DCD to include a description of the process that will be used to address how field engineering design changes to SSCs will be documented and reflected in the conduct of initials test to ensure that the as-built plant will be built and will be operated in accordance with the design certification and compliance with NRC regulations. In its July 24, 2007, response to this RAI, the applicant stated "the process of controlling and resolving problems encountered during plant testing phases is to be controlled by the quality process described in the Quality Assurance Program Document (QAPD) established by the COL applicant and maintained by the COL holder. Problems uncovered in testing will be tied to the QAPD through a link in the startup administration manual and will be added to the list of the items this manual will provide." Based on the response above, the applicant stated that a change will be made in DCD Tier 2, Revision 3 by adding a bullet to the content requirements of the startup administrative manual. Specifically, the statement read: > Identifies the quality process to be used to control the resolution of test failures, deficiencies and oversights discovered in the ITP. This program will address the control of any plant modifications required to resolve these deficiencies. The statement resided under the other six requirements shown for the startup administration manual. These requirements were located in DCD Subsection 14.2.9.1 but were relocated to DCD Subsection 14.2.2.1, Revision 4, under the topic title - Startup Administration Manual.

RAI Number	Reviewer	Question Summary	Full Text
			The NRC staff determined that the COL applicant will provide this information in the Startup Administration Manual (SAM). The staff found that RAI 14.2-81 was partially resolved in that closure of this issue will be accomplished by NRC review of the SAM during the COL application review phase. In accordance with SRP 14.2 and RG 1.206, the COL applicant is required to provide the administrative controls governing the ITP. As currently written, the ESBWR DCD is not consistent with SRP 14.2 and RG 1.206 in that it requires the COL holder to provide this information. The staff requests in RAI 14.2-81, Supplement 1, that the DC applicant revise ESBWR DCD Section 14.2-10, "COL Information," COL Action Item 14.2-1-H to be consistent with requiring the COL applicant to provide the SAM.
16.2-110 S03	Harbuck C	Editorial improvements to proposed GTS 3.6.1.8 Bases, and GTS 3.10.9 Action A	Regarding the proposed GTS for containment oxygen concentration: • Revise Bases for GTS 3.6.1.8 to use "containment" instead of "primary containment;" and revise proposed GTS 3.6.1.8 Bases LCO discussion by adding, or replacing it with, the STS LCO 3.6.3.2 Bases LCO discussion. • Revise Condition A of GTS 3.10.9 to say: THERMAL POWER > 15% RTP with containment oxygen concentration ≥ 4.0 volume percent with operation > 120 EFPD. • Revise required Action A.1 of GTS 3.10.9 to say: "Enter Condition A of LCO 3.6.1.8."
RAI 7.2-66	P. Yarsky	AFIPs needed to conduct SR 3.3.1.4.4	This RAI refers to the GEH submitted Licensing Topical Reports (LTR) NEDE-33197P, Revision 1, Gamma Thermometer System for LPRM Calibration and Power Shape Monitoring. Identify the number and distribution of automated fixed in-core probe (AFIP) sensors needed to conduct SR 3.3.1.4.4 as described in the technical specification bases, DCD Revision 4, Tier 2, Chapter 16B. Provide the bases for these values. This information should be placed into the revision to NEDE-33197P or the DCD.

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RAI-14.3-352 S01	Herrity T		The RAI observed that ITAAC Table 2.2.4-6, “ITAAC for the Standby Liquid Control System,” Item 14 states that some of the equipment listed in Table 2.2.4-4 must retain its functional capability. The Design Commitment (DC) reads as follows: “Each of the components identified in Table 2.2.4-4 for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its functional capability.” The DC for ITAAC 2.2.4-6, Item 14 is written such that that an indication of which specific equipment items must remain functional is expected in the equipment table, Table 2.2.4-4. However, no indication is provided. The RAI requested revision to the equipment table to provide clarity on which items must remain functional and under which conditions. In its response GEH modified the equipment table, Table 2.2.4-4 by adding a column labeled “FUNCTIONAL CAPABILITY REQUIRED.” The data provided in the column is a statement of “ACTIVE” or “PASSIVE” which corresponds to the type of equipment listed. Specifically, those components listed which have had “ACTIVE” added would be expected to have moving parts. Those which have the “PASSIVE” label applied do not appear to have moving parts. This information on the type of function each component utilizes may be useful. It does not, however, provide all the information requested in the RAI. The inspector will need to know which equipment in the system must remain functional, that is able to perform its intended safety function after enduring loading: “Normal”, “Seismic” or the combination of both. So that they can review the report and verify that it indicates all of the correct and necessary equipment has been examined and will retain its function. Other equipment may only need to retain its structural integrity to perform its function. The staff requests the applicant to clarify the meaning of “active” and “passive” with respect to functionality in terms of operability and structural integrity. If all of the equipment listed in Table 2.2.4-4 must retain its function after the loading, that the DC should be revised to clearly indicate such.

RAI Number	Reviewer	Question Summary	Full Text
RAI-14.3-380 S01	Herrity T		The RAI requested revision of the ITAAC Table 2.15.1-2 “ITAAC For The Containment System,” Item 9. Specifically, the RAI requested that the Design Commitment (DC) be revised to indicate what the design is committed to comply with, a citation of the code section. Additionally, the staff requested that the Acceptance Criteria (AC) be revised to give the specific design pressure required to demonstrate compliance. In the response GEH has removed the design pressure from the DC, but not added a design code commitment. The revision states merely that the system “… retains its integrity when subject to design pressure.” Additionally the AC is revised to say, “Test report documents that a pressure at or above 310 kpa gauge (45 psig) does not affect containment integrity.” Per DCD Paragraph 2.15(8) that is the design pressure. While this does observe the request of adding the specific design pressure to the AC, it is such that it could be misinterpreted as the test pressure. If that were to happen, the test pressure would be in conflict with the ITA requirements as stated because ASME Section III, Division 2 article CC- 110 states the test pressure shall be 1.15 times the design pressure. The DC is not clearly stated, when combined with the revised AC, there is not a clearly acceptable point to demonstrate compliance and allow closure of this ITAAC. GEH is requested to revise the ITAAC to clearly state the DC and the AC.

DC GE - ESBWR Mailing List (Revised 04/01/08)

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

DC GE - ESBWR Mailing List

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)
craig.conklin@dhs.gov (Craig Conklin)
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)

DC GE - ESBWR Mailing List

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)
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)

DC GE - ESBWR Mailing List

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