December 19, 2007

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 120 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.

To support the review schedule, you are requested to provide the requested additional information within 45 days of the date of this letter.

If you have any questions or comments concerning this matter, you may contact me at 301-415-3207 or saw8@nrc.gov or you may contact Amy Cubbage at 301-415-2875 or aec@nrc.gov.

Sincerely,

/RA/

Shawn Williams, 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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Senior Vice President, Regulatory Affairs
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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.

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Sincerely,
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Shawn Williams, Project Manager
ESBWR/ABWR Projects Branch 1
Division of New Reactor Licensing
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Docket No. 52-010
Enclosure: Request for Additional Information
cc: See next page
Distribution: See next page

ADAMS ACCESSION NO. ML073270008

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SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 120 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION

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

RAI Number	Reviewer	Question Summary	Full Text
6.2-164, Supplement No. 1 (MFN 07-538, 11/13/07)	Drozd A	Provide details of the analysis for the submerged structures	In response to RAI 6.2-164, GEH provided reference to structures response to containment loads. The staff, however, cannot find details of the analysis for the submerged structures. In particular, the staff is concerned with the ability of the PCCS vent pipe to withstand postulated hydrodynamic loads and maintain its submergence depth, which is an essential condition for the long term containment cooling. Please indicated if such an analysis was performed and provide an appropriate reference.
6.3-1, Supplement No. 1 (MFN 06-225, July 18, 2006)	Razzaque M	Submit Rev. 2 of NEDC-33082P, "ESBWR Scaling Report," and reference it in the DCD.	Submit Revision 2 of NEDC-33082P, “ESBWR Scaling Report,” to include the information in MFN 06-225, “Response to NRC Request for Additional Information Letter No. 4 Related to ESBWR Design Certification Application – ESBWR Scaling Analysis – RAI Number 6.3-1,” July 18, 2006. Reference Rev. 2 of NEDC-33082P in the next revision of the DCD. This request is necessary because staff relied on the additional information in MFN 06-225 to come to the conclusion that the scaling analysis is acceptable.
6.3-47, Supplement No. 1 (MFN 07-049, March 20, 2007)	Wang W	Incorporate Table 6.3-46-1 in the RAI response in the DCD	Please incorporate the table in the RAI response, Table 6.3-46-1, "Summary of Emergency Core Cooling System Line Breaks," in the DCD.
21.6-71 Supplement No. 1, (MFN 07-382, July 11, 2007)	Haider S	Address questions concerning nodalization to address noncondensable gases	According to the GEH's response to RAI 21.6-71, the TRACG model (DCD Tier 2, Revision 3, Section 6.2) included "*finer nodalization for the lower drywell and two-pipe connection between the GDCS airspace and the DW*", and "*The new nodalization results in quicker and more complete clearing of noncondensable gases from the lower drywell, and complete purging of residual noncondensable gases in the GDCS airspace*." Please address the following: A. DCD Tier 2, Revision 4, Figure 6.2-13d1 shows a significant noncondensable (NC) gas pressure of about 40 kPa in the drywell head (Level 35, Ring 1) at 72 hours, for the feed water line break

RAI Number	Reviewer	Question Summary	Full Text
			(FWLB) (when compared with the maximum DW pressure, 351.7 kPa, as reported in Table 6.2-5). Please describe why TRACG does not completely purge NC gases from the drywell (DW) to the wetwell (WW) at 72 hours, as described in DCD Tier 2, Revision 4, Table 6A-1, Item 6. What impact would this additional NC gas have on the WW pressure at 72 hours? B. DCD Tier 2, Revision 4, Figure 6.2-7shows the NC gas pressure plots for only a few DW and gravity driven cooling system (GDCS) levels (L30, L34, and L35). The staff is unable to find any plots in the DCD that would show that the NC gases are effectively purged from the lower DW (L21, L22). Please add the lower DW NC gas simulation plots to the DCD to demonstrate that the NC gases are effectively purged from the lower DW. C. DCD Tier 2, Revision 4, Figure 6.2-13d1 also shows a GDCS NC gas pressure of about 10 kPa (Level 34, Ring 7) at 72 hours. Does this mean that the 2-pipe connection between the GDCS and the DW does not purge all the GDCS airspace for low GDCS pool levels such as in the FWLB? Moreover, in response to RAI 6.2-98 (MFN 07-312 dated June 20, 2007), Figure 6.2-98-12 reveals that GDCS gas space Level 33 shows no effect of the two-pipe connection. There is over 700 kg of air in the GDCS at 72 hours. Please describe what impact the additional NC gas in the GDCS will have on the WW pressure at 72 hours. D. DCD Tier 2, Revision 4, Figure 6.2-14d1 shows a sudden drop of various DW and GDCS NC gas pressures to zero around 18 hours, for the main steam line break (Bounding Case). What is the physical explanation behind the sudden drop of various DW and GDCS NC gas pressures?

RAI Number	Reviewer	Question Summary	Full Text
21.6-106	Haider S	Reconfim that the 0.9 m submergence depth is still valid, and the final PCCS vent system would adequately condense steam and lead to saturated steam	This RAI is concerning staff's evaluation of Confirmatory Item No.19 In NEDC-33083P-A, "TRACG Application for ESBWR," March 2005. The pre-application SER "TRACG Application for ESBWR" (NEDC-33083P) reports the following under PIRT item WW3, on page 39. *"Based on available test data, GENE concluded that any steam entering the SP through the PCCS vent, based on the design presented for this review, will be condensed within the SP during the blowdown period of the accident."* The staff's acceptance of the above statement during the pre-application phase was based on its review of the supplemental information including relevant experimental data provided by GEH through RAI 314.1 (MFN 03-115) regarding the PCCS performance during the blow-down. However, the staff is aware that even though there have been changes in the plant design since the pre-application (e.g., power level changed from 4000 MW to 4500 MW, possible use of spargers), the same 0.9 m PCCS vent submergence depth as specified in NEDE-32176P Rev. 1 also appears in the latest Rev. 3. Please reconfirm that the 0.9 m submergence depth is still valid, and the final PCCS vent system would adequately condense steam and lead to saturated steam, and not superheated steam, above the suppression pool.
21.6-107	Haider S	Justify the removal of the figures, or include the updated figures and associated description back into the report	This RAI is concerning Confirmatory Item No.4 in NEDC-33083P-A, "TRACG Application for ESBWR," March 2005: GEH had taken the entire Section 7.11 (Containment Components) out of the "Component Model" section in Licensing Topical Report, TRACG Model Description (NEDE-32176P), Rev. 1. As a result, the information on Drywell, Wetwell Air Space, Suppression Pool, and Main Vents, such as included in Table 6.5-3 in Rev.1, was not present in Rev. 2. Though, GEH has put back Section 7.11 in Rev. 3., the Rev. 1 sub-section "Model Assessment" has been significantly shortened to "7.11.7.7 Model Applicability" in Rev. 3, by removing three figures (Figure 7.11-5. Pressure Suppression Test Facility; Figure 7.11-6. Drywell Pressure Response; and Figure 7.11-7. Vent Flow

RAI Number	Reviewer	Question Summary	Full Text
			Transient), and the related description. The staff considers these figures to be important as they showed the facility schematics and dimensions; and compared the TRACG predictions with the measured drywell pressure and vent flow rate data. Please justify the removal of these figures, or include the updated figures and associated description back into the report.
21.6-108	Gilmer J	Demonstrate that the uncertainty in PIRT Items C1BX and C1CX is still applicable or bounding when applying the new PANAC11 physics methods	For PIRT Items C1BX and C1CX cited in Table 4.4-1 (High Ranked Model Parameters for AOO Analysis) in Topical Report NEDC-33083P-A, "TRACG Application for ESBWR", provide information demonstrating that the uncertainty is still applicable or bounding when applying the new PANAC11 physics methods.
21.6-109	Talbot F Yarsky P	Inform staff when TRACG04 freezes and provide information to the staff sufficient for the staff to review and approve the version of TRACG04	During an audit conducted at the GEH facility in January 2007, the NRC audit team found that GEH controlled changes to TRACG04P PL 52 code under a level 2R code change control process to support code development that did not have QA controls for independent verification and validation (V&V) of code calculations. Considering planned model revisions disclosed during the audit, the final ESBWR DCD revision will likely be based on a later TRACG code revision that the staff has not reviewed. After changes to the TRACG04P code are complete, GEH is required to place the TRACG04 code under a QA approved code change control process (such as Level 2) where independent V&V is performed in accordance with 10 CFR Part 50, Appendix B, Criterion III, Design Control. Inform the staff when GEH places the TRACG04 code under a QA approved code change control process and provide sufficient information for the staff to review and approve the version of TRACG04 used to develop the final ESBWR DCD submittal.

RAI Number	Reviewer	Question Summary	Full Text
21.6-110	Weidong W	Submit information contained in MFN-05-105 as a reference to DCD	Submit MFN 05-105, Hinds, D.H., General Electric, Letter to U.S. Nuclear Regulatory Commission, “TRACG LOCA SER Confirmatory Items (TAC # MC868), Enclosure 2, Reactor Pressure Vessel (RPV) Level Response for the Long Term PCCS Period, Phenomena Identification and Ranking Table, and Major Design Changes from Pre-Application Review Design to DCD Design,” as either an new LTR or as a supplement to NEDC-33083P-A. Please modify the DCD to incorporate the new or supplemental LTR by reference. This request is necessary because staff relied on the additional information in MFN 05-105 to evaluate and come to conclusions on the status of Confirmatory Item No. 1 and Confirmatory Item No. 20 of Section 4.0, "Confirmatory Items," in NEDC-33083P-A.

cc:

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