February 29, 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. 158 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 301-415-3179 or ixb3@nrc.gov or you may contact Amy Cubbage at (301) 415-2875 or aec@nrc.gov.

Sincerely,

/RA/

Ilka Berrios, 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 w/encl: See next page

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SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 158 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION DATED FEBRUARY 29, 2008

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Request for Additional Information (RAI)
ESBWR Design Control Document (DCD)

RAI Number	Reviewer	Question Summary	Full Text
9.1-15 S02	Hernandez, J	Provide additional information regarding spent fuel pool liner drop analysis	The response to RAI 9.1-15S01 states that an analysis of the pool liner was performed for the ESBWR and the resulting conclusion demonstrated that a liner thickness of 10.80 mm or greater is sufficient to resist damage from a dropped fuel bundle. During an audit performed on January 30, 2008, the staff reviewed the applicant's drop analysis on the spent fuel pool (and reactor buffer pool) liner. The staff requests that the applicant responds to the following: 1) What is the basis for the equation used to calculate the required liner thickness? 2) Describe how the material properties of the liner were considered. 3) Describe the type of impact model is assumed (e.g., is all the energy absorbed by the liner)? 4) How is the liner assumed to fail (i.e., fracture, plastic deformation, etc.)? 5) How was operational experience considered during the evaluation? (See INPO Significant Event Report (SER) 15-95, "Spent Fuel Pool Liner Punctured by Dropped Equipment")
9.1-49	Hernandez, J	Revise DCD to include spent fuel pool details	The responses to RAI 9.1-44 and RAI 9.1-9 S02 reference GEH's Spent Fuel Pool (SFP) Boil-Off Analysis (0000-0038-9392 R3) and Buffer Pool Boil-off & Make Up Capacity analysis (0000-0076-3483) respectively. The staff found the responses to RAI 9.1-44 and 9.1-9S02 acceptable. However, during an audit performed on January 30, 2008, the staff reviewed the applicant's SFP boil-off analysis, and determined that some of the information presented in the analysis should be included in the DCD. Revise DCD Tier 2 and Tier 1 to include the following: 1) The normal water level of the SFP and the reactor buffer pool 2) The water level above the top of active fuel in both pools 72 hours following a loss of forced cooling without makeup

RAI Number	Reviewer	Question Summary	Full Text
			3) A detailed drawing of the spent fuel pool and the buffer pool including critical dimensions
9.1-50	Hernandez, J	Revise DCD to include shielding requirements	DCD Tier 2, Rev. 4, Section 9.1.4.5 states that there are interlocks in the refueling machine to ensure that the grapple, in its retracted position, provides sufficient water shielding over the active fuel during transit. Please revise DCD Tier 2 to include the actual height of water above the top of active fuel that will be provided by the interlocks to ensure adequate shielding.
9.4-29 S01	Forrest E	EFU air flow distribution in MCR	In the response to RAI 9.4-29 (letter number MFN 07-687) the addition of a discharge path from the CRHA partially addresses the concern but does not necessarily guarantee adequate mixing of air in the CRHA or that the fresh air will reach the operator breathing areas. The supply and return registers in the ceiling and floor plenums were designed to distribute 11,000 cfm from the recirculation air handling units. In addition to the MCR area, the shift supervisor office and other rooms draw air from this plenum. Please provide additional information on how the 424 cfm emergency air filtration unit supply will be distributed in the absence of the air handling unit operation. Specifically, will most of the flow go through the first few registers leaving other areas in the MCR and offices with little or no fresh air flow, or is there some mechanism which will evenly distribute the flow or proportion the flow to the most needed areas?
9.4-30 S01	Forrest E	CR controlled leakage path.	In the response to RAI 9.4-30 (letter number MFN 07-687) the addition of a discharge path from the CRHA partially addresses the concern but needs to be fully described in the DCD. Please state how the leakage will be controlled (such as by a differential pressure monitor, relief damper, control damper, etc.) In addition, the recirculation of air in the CRHA has not been fully addressed. Please provide information on how the fresh air from the EFU is prevented from short circuiting the major areas of the CRHA and passing directly out through the discharge path without refreshing the CRHA air as a whole. Please coordinate the response with the response to RAI 9.4-29S1.
9.4-43 S01	Forrest E	Hydrogen buildup, exhaust post-accident	In your response to RAI 9.4-43, it was stated that there was no hydrogen build up post accident because the batteries do not generate hydrogen while discharging. However, safety-related batteries either would or could be charged by the station diesels post-accident and hydrogen would be generated under these circumstances. Please address hydrogen monitoring and exhaust of the battery rooms while charging the batteries post-accident.

RAI Number	Reviewer	Question Summary	Full Text
			If the battery room exhaust is used post-accident, has it been considered as part of the potential leak path from the reactor building and included in building leakage testing. It was also stated in your response to RAI 9.4-43 that passive cooling for the battery rooms is used. Please provide an analysis that shows the adequacy of passive cooling considering potential heat loads from other rooms, summer and winter design conditions, and the battery heat loads. Please identify the surveillance requirements which will assure the initial conditions of the passive heat load sink are being maintained including the frequency of the surveillance.
9.4-46 S01	Forrest E	Safety Related building isolation dampers and smoke purge dampers	In the table 9.4-9 provided with the response to 9.4-46, the dampers were not designated as safety related. The reactor building has a defined maximum leakage rate used in the design basis analysis. Failure of these dampers to close or be closed tightly could affect the building leakage rate post accident. Please state that these dampers are safety related in the DCD or provide a basis for classifying them as non-safety.
9.4-47 S01	Forrest E	Monitoring of releases	The response to 9.4-47 provided by GE did not address post accident releases from the reactor building. GDC 64 requires that means shall be provided for monitoring the reactor containment atmosphere, spaces containing components for recirculation of loss-of-coolant accident fluids, effluent discharge paths, and the plant environs for radioactivity that may be released from normal operations, including anticipated operational occurrences, and from postulated accidents. For the specific case of postulated accidents (i.e., LOCA), there can be migration of contaminants from the contaminated areas to clean areas. Although there are some barriers separating the clean areas from the contaminated areas, these barriers have not been identified on drawings or shown to be leak tight which leads the staff to believe that there can be some contamination in the clean areas. How does the ESBWR comply with GDC 64 with respect to monitoring releases from the reactor building?

DC GE - ESBWR Mailing List (Revised 02/07/2008)

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