October 6, 2008

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. 264 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 U.S. 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 is contained in the enclosure to this letter.

If you have any questions or comments concerning this matter, you may contact me at 301-415-6590 or David.Misenhimer@nrc.gov or you may contact Amy Cubbage at (301) 415-2875 or Amy.Cubbage@nrc.gov.

Sincerely,

/RA/

David Misenhimer, 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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David Misenhimer, Project Manager
ESBWR/ABWR Projects Branch 1
Division of New Reactor Licensing
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ADAMS ACCESSION NO.: ML NRO-002

OFFICE	PM:NRO:DNRLNGE1	LA:NRO/DNRL:NGE1	PM:NRO:DNRL: NGE1
NAME	DMisenhimer	SGreen	ACubbage
DATE	10/06/2008	10/06/2008	10/06/2008

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SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 264 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION DATED OCTOBER 6, 2008

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Request for Additional Information (RAI)
ESBWR Design Control Document (DCD) Revision 5

RAI Number	Reviewer	Question Summary	Full Text
19.1-174 S01	Pohida M	Missing Shutdown Fire Risk Insights from DCD, Tier 2, Table 19.2-3	As stated in DCD Tier 2, Revision 5, Section 19.1.2, "The results and insights of the PRA are used to support other programs as follows: • Support the process used to demonstrate whether the Regulatory Treatment of Non Safety Systems (RTNSS) is sufficient and, if appropriate, identify the structures, systems, and components (SSCs) included in RTNSS. • Support, as a minimum, regulatory oversight processes, and programs that are associated with plant operations, e.g., Technical Specifications, reliability assurance, human factors, and Maintenance Rule (10 CFR 50.65) implementation." The staff has reviewed GEH's response to 19.1.174. The staff agrees that RTNSS requirements for RCCW and PSW for fires in F4100, turbine building general area are not key PRA assumptions. Fires in the turbine building general area (fire area F4100) are assumed to result in a complete failure of the service air system due to cable failures, which results in the closure of all RWCU containment isolation valves outside the containment. However, shutdown fires in the Service Water and Water Treatment Building (SF/WT) were shown to be risk significant without separation and protection of the PSW cables (which are required under the RTNSS program). Therefore, the separation of the PSW cables in the SF/WT should be included in DCD Tier 2, Table 19.2-3, "Risk Insights and Assumptions" or it should be justified why it should not be included in the Table.

22.5-5 S02	Shum D	Provide design descriptions and ITAACs to ensure that RTNSS systems protection against internal and external flooding, internal missiles and extreme wind and missiles	In a request for additional information (RAI 22.5-5), the staff requested GEH to address how RTNSS systems will be protected: • from flood-related effects associated with both high and moderate-energy fluid piping and component failures inside and outside containment. • from flood-related effects associated with both natural phenomena and system and component failures. • against postulated piping failures in fluid systems outside containment. • against the aforementioned missiles. In the response to RAI 22.5-5, dated April 17, 2008, GEH provided two tables, Table 19A-3, "Structure Housing RTNSS Functions," and Table 19A-4, "Capability of RTNSS Related Structures." In Table 19A-3, GEH identified the RTNSS together with their associated RTNSS criteria, locations (buildings), and building category. In Table 19A-4, GEH identified how the RTNSS in each area (building) are protected from internal flooding, external flooding, internal missiles and extreme wind and missiles. However, GEH did not provide sufficient details about the design of RTNSS with respect to the protection for RTNSS systems from internal and external flooding. Subsequently, in a supplement RAI (RAI 22.5-5 S01), the staff requested GEH to provide detailed description of the design/installation of each RTNSS and discuss how this design/installation will provide the protection for the RTNSS SSCs from the effects of internal flooding and/or external flooding. In the response to RAI 22.5-5 S01, GEH stated that: • RTNSS components are located and installed above the maximum analyzed flood levels in each of the buildings referenced This requirement is incorporated in the Design Specifications and implemented during the detailed design to ensure protection of the RTNSS components against internal flooding.

			• The maximum flood level for the ESBWR is 1 ft below the finished grade per DCD Tier 2 Rev. 5 Table 2.0-1. The maximum groundwater level is 2 ft below the finished grade. The PSW system located outdoors is designed with protection from water intrusion if installed below the maximum flood and groundwater levels. This includes designing for hydrostatic loading and provision of cell enclosures. These requirements are incorporated in the Design Specifications and implemented during detailed design. Also, in DCD Tier 2, Revision 5, Section 14.3.7.3, GEH stated that RTNSS systems shall have Tier 1 inputs that include design descriptions and ITAACs. The staff finds that ESBWR DCD Tier 1, Section 2.0, "Design Descriptions and ITAAC," does not include design descriptions and ITAACs, as stated in DCD Tier 2, Revision 5, Section 14.3.7.3, to ensure that RTNSS systems will be protected against internal flooding, external flooding, internal missiles (inside and outside containment) and extreme wind and missiles. Therefore, provide ITAACs in DCD Tier 1, Section 2.0, "Design Descriptions and ITAAC," to ensure that RTNSS systems will be protected against: • flood-related effects associated with both high and moderate-energy fluid piping and component failures inside and outside containment. • flood-related effects associated with both natural phenomena and system and component failures. • postulated piping failures in fluid systems outside containment. • the internally generated missiles (inside and outside containment). • externally generated missiles.
22.5-9 S02	Jardaneh M	Justify the use of FEMA 361 missile as the appropriate hurricane generated missile for the design of RTNSS SSCs (DCD Section 19A.8.3)	GEH's response to Supplement 1 to RAI 22.5-9 did not include the information provided in the DCD as requested. This information represents design criteria and must be included in the DCD. Additionally, the missile spectrum proposed by GEH is not adequately justified. The staff requests the following: 1. Include the 195 mph, 3-second gust as the design wind speed associated with Category 5 hurricanes in the DCD. 2. Justify the use of the FEMA 361 2x4 wood stud as an appropriate missile for the design of a nuclear facility. This justification must address the following: a. FEMA 361 adopted the 2x4 wood stud missile based on field observations of residential communities after severe wind phenomena.

			Justify how the 2x4 wood stud would represent common objects that could be found in the vicinity of nuclear power plants and could become a missile in the path of a wind storm. b. FEMA 361 does not contain mathematical formulas to calculate an equivalent force to represent the effect of missile impact on objects. Provide the models which will be used to quantify that effect and justify the adequacy of the models for use with the 2x4 missile considering missile's mechanical properties. c. FEMA 361 does not contain load combinations to combine the effect of the missile impact with other loads present on the impacted object at the time of impact. Provide load combinations to assess the effects of this loading condition and justify their use. d. FEMA 361's conclusions are based on experiments conducted for wall panel compositions and configurations representative of residential construction. Justify the applicability of these conclusions to the construction materials, wall compositions, and structural arrangements used in ESBWR design. Otherwise, assume that the hurricane missile spectrum is consistent with the tornado missile spectrum indentified in DCD Tier 2, Rev. 5, Table 2.0-1, which is also consistent with the staff's implementation of SECY-96-128 delineated in the staff's memorandum to the Commission dated June 23, 1997 and titled "Implementation of Staff Position in SECY-96-128, Policy and Key Technical Issues Pertaining to the Westinghouse AP600 Standard Pressurized Reactor Design", Related to post-72 Hour Actions." 3. Provide the design criteria associated with hurricane missiles in the DCD.

DC GE - ESBWR Mailing List (Revised 09/29/2008)

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