January 13, 2009

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. 296 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 (RAI) is contained in the enclosure to this letter.

If you have any questions or comments concerning this matter, you may contact me at 301-415-6256 or Dennis.Galvin@nrc.gov or you may contact Amy Cubbage at 301-415-2875 or Amy.Cubbage@nrc.gov.

Sincerely,

/RA/

Dennis Galvin, 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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Distribution: See next page

ACCESSION NO.: ML090120486 NRO-002

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SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 296 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION DATED JANUARY 13, 2009

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Requests for Additional Information (RAIs):
ESBWR Design Control Document (DCD) Revision 5

RAI Number	Reviewer	Question Summary	Full Text
9.1-16 S02 (MFN 06-309 S01, May 29, 2007)	Kelly G	Provide assurance that RTNSS Criterion B equipment will be protected against tornado winds and missiles. Revise DCD to assure equipment associated with the dedicated FPS is protected against hurricane and tornado winds and missiles.	In response to RAI 9.1-16 S01, GEH stated that "[a]ll fire protection system (FPS) components located outside the Reactor Building that are needed for fuel and auxiliary pools cooling system (FAPCS) makeup will be designed to seismic Category I standards, and will be designed to withstand tornados and other natural phenomena." However, Section 19.A.8.3, "Augmented Design Standards" of the DCD Tier 2 Revision 5 contradicts this and indicates that RTNSS Criterion B equipment, which includes piping for the FPS connection to the FAPCS for makeup, is only going to be protected against hurricane missiles and not tornado missiles. Please modify Section 19.A.8.3 to state that reliable performance of RTNSS Criterion B equipment subject to "high winds" includes protection against F5 tornado winds and missiles. In addition, the staff and GEH have held several teleconferences to discuss the protection afforded the dedicated portion of the fire protection system designed to provide long term makeup to pools in the reactor building. The staff is concerned that fire hydrants, stand pipes, or other large lines could be attached at some point to the dedicated portion of the FPS and that such equipment might be damaged by hurricane or tornado winds or missiles. For example if a fire hydrant was attached to the dedicated portion of the FPS and the hydrant was sheared off by a hurricane missile, the pool cooling makeup function of the FPS could be compromised. Please provide a clarifying statement in Section 19A.8.4.2 , "FPS Pool Cooing Makeup" of the DCD that makes it clear that any equipment associated with the dedicated portion of the fire protection system will be protected against hurricane or tornado winds and missiles such that the pool cooling makeup function of the FPS would not be compromised.
8.1-20	Pal A	Clarify the offsite and onsite power boundaries.	The response to NRC RAI 14.3-394 S01 states that the ESBWR design complies with GDC 17 and the preferred power supply definition per IEEE 765. In addition, DCD Tier 2, Table 1.9-22 states that IEEE 765 is applicable to the ESBWR design. However, DCD, Tier 1, Figure 8.1-1, "Electrical Power

RAI Number	Reviewer	Question Summary	Full Text
			Distribution System" incorrectly identifies offsite and onsite power boundaries. Clarify the offsite and onsite power boundaries by revising Figure 8.1-1 and DCD Tier 2, Section 8 to be consistent with GDC 17, IEEE 765 and SRP 8.2. Also, modify Tier 1 Section 2.13 as necessary.
8.1-21	Pal A	Clarify SBO procedures and training.	ESBWR DCD Rev.5, Table 8.1-1 indicates that RG 1.155 (NUMARC 8700) is not applicable to offsite power system and AC (onsite) power system. The staff finds that RG 1.155, Section 3.4, "Procedures and Training To Cope with Station Blackout (SBO)," is applicable to passive plants. 10 CFR 50.63 (c) (1) (ii) requires a description of the procedures that will be implemented for station blackout events and recovery therefrom. Procedures include: Station Blackout Response Guidelines, AC Power Restoration, and Severe Weather Guidelines per NUMARC 8700 which is endorsed by RG 1.155. Revise Table 8.1-1 to indicate that RG 1.155 is applicable to offsite power system and AC (onsite) power system with respect to SBO procedures and training. COL applicant should address SBO procedures and training. This should be a COL action item in the DCD.
8.2-15	Pal A	Testing and maintenance of the offsite power system	DCD Table 8.1-1 indicates that GDC 18 is applicable to offsite power system and AC (onsite) power system. Therefore both the COL applicant and the DC Applicant are responsible for the offsite power system. Include a COL item for the testing and maintenance of the offsite power system. Additionally, provide a discussion how the GDC 18 (including testing frequency) will be met for the portion of the offsite system (Motor Operated Disconnect (MOD), Unit Auxiliary Transformer (UAT) high side breaker, UAT, Plant Investment Protection (PIP) bus, 6.9/0.48 kV transformer for normal preferred power supply and MOD, (Reserve Auxiliary Transformer) RAT, PIP bus, 6.9/0.48 kV transformer for alternate preferred power supply) that is with the DCD's scope.
8.2-16	Pal A	Discuss transformer protection.	ESBWR DCD Rev. 5, Section 8.2.4, indicates that COL applicant will address switchyard transformer protection. The main transformer, unit auxiliary transformers (UAT) and reserve auxiliary transformers (RAT) are not located in the switchyard. Per SRP 8.2 and discussed in RAI 8.1-21, these transformers

RAI Number	Reviewer	Question Summary	Full Text
			are part of the offsite circuits. Discuss the protection of these transformers and isolated phase bus and non-segregated bus. Additionally, provide the rating of these devices.
8.3-61	Martinez-Navedo T	Clarify applicability of RG 1.6.	RG 1.6, “Independence between Redundant Standby (Onsite) Power Sources and between their Distribution Systems”, addresses the GDC 17 requirement that onsite electrical power systems have sufficient independence to perform their safety functions assuming a single failure. ESBWR DCD, Rev. 5, Section 8.3.2.2.2, indicates that this RG is not applicable to the ESBWR design. This contradicts Table 8.1-1 of the FSAR. Section 8.3.2 describes the DC Power System and RG 1.6 is applicable. Revise the section related to RG 1.6 and discuss how the RG 1.6 positions are met.
8.3-62	Martinez-Navedo T	Applicability of RG 1.128 and RG 1.129 to VLRA batteries.	The ESBWR DCD, Rev. 5, Section 8.3.2 lists the regulatory guides to which the application conforms. Among those regulatory guides, RG 1.128, “Installation Design and Installation of Vented Lead-Acid Storage Batteries for Nuclear Power Plants”, and RG 1.129, “Maintenance, Testing, and Replacement of Vented Lead-Acid Storage Batteries for Nuclear Power Plants” are included. These two regulatory guides are related to vented lead-acid (VLA) batteries not to valve regulated lead acid (VRLA) batteries which are the batteries to be used in this design. Explain how these two standards are applicable to VRLA batteries.
8.3-63	Martinez-Navedo T	Qualification of VLRA batteries.	The ESBWR DCD, Rev. 5, Section 8.3.2.2.1 states that the safety-related batteries meet the qualification requirements of IEEE 535, “Standard for Qualification of Class 1E Lead Storage Batteries for Nuclear Power Generating Stations”. Section 1.1, “Scope”, of IEEE Std 535 states that the standard describes qualification methods for Class 1E vented lead acid batteries and consideration of other type batteries are beyond the scope of the standard. Given that IEEE Std 535 does not apply to VRLA batteries, explain how these batteries are going to be qualified, including both the methods used and the process flow.

8.3-64	Martinez-Navedo T	Qualification of batteries for 24 and 72 hour duty cycles.	The ESBWR DCD, Rev. 5, Section 8.3.2.2.1 states that the safety-related batteries meet the qualification requirements of IEEE 535, “Standard for Qualification of Class 1E Lead Storage Batteries for Nuclear Power Generating Stations.” IEEE Std 535 was written under the assumption of an 8-hour duty cycle. Given that IEEE Std 535 does not apply to duty cycles longer than 8 hours, identify the methodology to be used to qualify these batteries for an extended duty cycle 72-hours. Also, discuss the failure mode(s) for this type of battery for the 72-hour duty cycle.
8.3-65	Martinez-Navedo T		The ESBWR DCD, Rev. 5, Section 8.3.2.1.1 states that the batteries have an expected 20-year service life. The surveillance frequency for SR 3.8.3.6 changes from 24 months to 12 months once the batteries reach 85 percent of the expected life. However, the expected 20 year service life has not been justified. Provide detailed information that supports this statement along with the methodology used to verify the life expectancy.

cc:

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