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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 296 Related to ESBWR Design Certification Application - Auxiliary Systems - RAI Number 9.1-16 S02**

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) response to the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) sent by NRC Letter 296 dated January 13, 2009, Reference 1. The previous supplemented response was submitted via Reference 2 in response to Reference 3. The original RAI response was submitted to the NRC via Reference 4 in response to Reference 5. GEH response to RAI Number 9.1-16 S02 is addressed in Enclosure 1.

If you have any questions or require additional information, please contact me.

Sincerely,

Richard E. Kingston

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Vice President, ESBWR Licensing

References:

1. MFN 09-052, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 296 Related to ESBWR Design Certification Application,* January 13, 2009**.**
2. MFN-06-309 Supplement 1, Response to Portion of NRC Request for Additional Information by e-mail from L. Quinones to P. Jordan, May 3, 2007, Related to ESBWR Design Certification Application - Auxiliary Systems - RAI Number 9.1-16 S01.
3. E-mail from L. Quinones to P. Jordan from U.S. Nuclear Regulatory Commission, *Request for Additional Information Related to ESBWR Design Certification Application,* May 3, 2007.
4. MFN 06-309, Response to Portion of NRC Request for Additional Information Letter No. 54 Related to ESBWR Design Certification Application – Auxiliary Systems – RAI Number 9.1-16, September 8, 2006.
5. MFN 06-302, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 54 Related to ESBWR Design Certification Application,* August 23, 2006.

Enclosure:

1. Response to Portion of NRC Request for Additional Information Letter No. 296 Related to ESBWR Design Certification Application - Auxiliary Systems - RAI Number 9.1-16 S02

cc:	AE Cubbage	USNRC (with enclosure)
	RE Brown	GEH/Wilmington (with enclosure)
	DH Hinds	GEH/Wilmington (with enclosure)
	eDRF	0000-0096-5748

Enclosure 1

MFN 09-177

Response to Portion of NRC Request for

Additional Information Letter No. 296

Related to ESBWR Design Certification Application

Auxiliary Systems

RAI Number 9.1-16 S02

For historical purposes, the original text of RAI 9.1-16 and 9.1-16 S01 with the corresponding GE/GEH responses are included.

NRC RAI 9.1-16

DCD Tier 2, Sections 3.3.2 and 3.5.2 state that safety-related structures, systems, and components listed in DCD Tier 2, Table 3.2-1 are protected within Seismic Category I structures from the effects of tornados. However, DCD Tier 1, Figure 2.6.2-1 indicates that the emergency makeup connections and isolation valves (F211 and F420) in the FAPCS for the SFP and IC/PCCS pools are located in the yard area of the plant outside of Seismic Category I structures. DCD Tier 2, Table 3.2-1 states that the piping and valves performing this function are safety-related. The FPS provides the alternate supply of water to these lines, but DCD Tier 2, Table 3.2-1 states that the FPS, including the water storage tanks and the fire pump house, are not safety-related, and therefore, not located where the components would be protected from the effects of tornados.
The requirements of GDC 2 specify that the safety-related SFP makeup water supplies and the water supplies to the IC/PCC pools be protected from the effects of tornados and other natural phenomena. Provide a detailed description of the features to protect safety-related makeup water lines from the effects of tornados.

GE Response

The only safety-related components of the FAPCS that exist outside of the reactor building are the emergency fill-up valves. These valves are attached to the Reactor Building structure, and are designed to Seismic Category I to withstand tornados and other natural phenomena.
In order to satisfy the requirements of GDC2, the FAPCS primary makeup source will be changed to the primary FPS storage tank. All FPS piping inside the Reactor Building is automatically protected from tornados and natural phenomena by the Seismic Category I structure. All FPS components located outside the Reactor Building that are needed for FAPCS makeup will be designed to Seismic Category I standards and will be designed to withstand tornados and other natural phenomena. By upgrading the source of makeup water to Seismic Category I, the requirements of GDC 2 are satisfied. Additional information regarding this change, as well as the appropriate changes to the DCD are described in more detail in the responses to RAI 9.1-12 and 9.1-13.

DCD Impact

No changes will be made to the DCD as a result of this RAI.

NRC RAI 9.1-16 S01

Received by e-mail from L. Quinones (NRC) to P. Jordan (GE) dated May 3, 2007:

This response is acceptable but is inconsistent with the response to RAI 9.1-12. The fire pump enclosures must also be designed to provide tornado protection. A standard insulated sheet-metal frame building is not adequate for this purpose. Clarify inconsistency.

GE Response

GE concurs that the previous response to RAI 9.1-16 was correct and inconsistent with the response to RAI 9.1-12 regarding tornado protection. The response to RAI 9.1-12 S01 addresses this inconsistency, and no supplemental information is required in this response.

DCD Impact

None.

NRC RAI 9.1-16 S02

In response to RAI 9.1-16 S01, GEH stated that "[a]1l 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.

GEH Response

As stated in response to RAI 9.1-16 S01, 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. These seismic standards required to meet RG 1.13 and Acceptance Criterion II.1.a of SRP 9.1.3 exceed the augmented design standards for RTNSS Criterion B equipment. FPS equipment designed as seismic Category I is credited as functioning during all tornado and extreme wind scenarios as described in response to RAI 19.1-168 (MFN 08-199, dated March 8, 2008). DCD Section 3.5.2 describes that provisions are made to protect the Seismic Category I portions of the Fire Protection System (FPS) and components of Fuel and Auxiliary Pool Cooling System that transport makeup water to Spent Fuel Pool and Isolation Condenser/Passive Containment Cooling Pools from the FPS against tornado missiles. The design basis tornado and applicable missiles are described in DCD Table 2.0-1.

The dedicated line from FPS to FAPCS is not designed to NFPA standards (except for the normally closed isolation valves that interface with the fire protection piping) and will not fulfill a fire protection function. Fire hydrants, stand pipes, or other large lines will not be attached to the dedicated portion of the FPS designed to provide long term makeup to pools in the reactor building. Therefore, the pool cooling makeup function of the FPS cannot be compromised by damaged fire protection equipment such as fire hydrants, stand pipes, or other large lines.

DCD Impact

No changes will be made to the DCD as a result of this RAI.