GE Hitachi Nuclear Energy

James C. Kinsey
Vice President, ESBWR Licensing

PO Box 780 M/C A-55
Wilmington, NC 28402-0780
USA

T 910 675 5057
F 910 362 5057
jim.kinsey@ge.com

MFN 08-440

Docket No. 52-010

May 2, 2008

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Subject: **Response to Portion of NRC Request for Additional Information Letter No. 179 Related to ESBWR Design Certification Application - Auxiliary Systems - RAI Number 9.1-46 S01**

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 179 dated April 8, 2008, Reference 1. The GEH response to RAI Number 9.1-46 S01 is addressed in Enclosure 1. The original response was submitted via Reference 2 in response to Reference 3.

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

Sincerely,

James C. Kinsey

James C. Kinsey
Vice President, ESBWR Licensing

D068
NRO

References:

1. MFN 08-364, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 179 Related to the ESBWR Design Certification Application,* April 8, 2008
2. MFN 08-225, Response to Portion of NRC Request for Additional Information Letter No. 124 Related to ESBWR Design Certification Application – *Auxiliary Systems – RAI Number 9.1-46,* March 8, 2008
3. MFN 08-029, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No.* 124 *Related to the ESBWR Design Certification Application,* January 14, 2008

Enclosure:

1. Response to Portion of NRC Request for Additional Information Letter No. 179 Related to ESBWR Design Certification Application – Auxiliary Systems - RAI Number 9.1-46 S01

cc:	AE Cubbage	USNRC (with enclosure)
	RE Brown	GEH/Wilmington (with enclosure)
	DH Hinds	GEH/Wilmington (with enclosure)
	GB Stramback	GEH/San Jose (with enclosure)
	eDRF	0000-0080-9022, Revision 2

Enclosure 1

MFN 08-440

Response to Portion of NRC Request for

Additional Information Letter No. 179

Related to ESBWR Design Certification Application

Auxiliary Systems

RAI Number 9.1-46 S01

For historical purposes, the original text of RAI 9.1-46 and the GEH response is included.

NRC RAI 9.1-46

With regards to the spent fuel pool (SFP), provide the following information:

(1) What is the depth of water above the top of active fuel in the pool if the pool is drained to the bottom of the transfer gates?

(2) What is the volume of water in the SFP when the level is at the bottom of the gates?

(3) What is the time to fuel uncovery if the pool contains the design-basis spent fuel heat load plus one full core offload, there is no forced cooling available, and the pool level is at the bottom of the transfer gates?

GEH Response

During a 2/27/2008 telecon, GEH requested clarification regarding the specific concern to be addressed by this RAI. It was understood by GEH that the concern is related to the worst-case loss of spent fuel pool (SFP) water through a leak in the transfer gates to the adjacent pools.

There are two small pools connected to the SFP: the lower fuel transfer pool and the cask pool. These pools are usually filled, and it's expected that there would be very little, if any, leakage through the gates if they were to be drained for maintenance. It would be an extraordinarily unlikely scenario to have a full SFP including a full core offload, in conjunction with a loss of cooling, in conjunction with a failure of the transfer gates, at a time when these pools are empty.

GEH has evaluated this scenario where the level in the SFP was reduced by water spilling into the two adjacent empty pools. By examining the geometries of these pools, GEH was able to estimate the amount of water that is redistributed. In a simple calculation, the volume of water available in each of the pools was added together to determine the total amount of coolant available for boil-off. Although the margin is reduced, there is still sufficient water to accommodate 72 hours of heat-up and boiling without uncovering the fuel assuming the design basis heat loads.

DCD Impact

No DCD changes will be made in response to this RAI.

NRC RAI 9.1-46 S01

The staff reviewed the response to RAI 9.1-46. As a result of a telephone conference on 4/9/08, the staff agreed to supplement this RAI to provide a clarification of the requested information. Hence, the former three questions related to this RAI should be replaced by the following two:

1) DCD Tier 2, Rev. 4, Section 9.1.2 states that the bottoms of the pool gates are higher than the minimum water level required over the spent fuel storage racks to provide adequate shielding and cooling. Per SRP 9.1.2, the minimum level for shielding is 10 feet. Provide the actual distance between the top of active fuel and the bottom of the transfer gates. If this information cannot be provided at this time, confirm that asssuming [sic assuming] a gross failure of the transfer gate seals (with the other pools empty) there will be at least 10 feet of water above the top of the fuel.

2) Assuming loss of forced cooling and gross failure of the transfer gate seals, how much water will be there above TAF at 72 hours?

GEH Response

1) The precise geometry of the fuel pool transfer gates has not yet been determined. Assuming a gross failure of the transfer gates when the adjacent pools are empty, the margin above the TAF remains greater than 10 ft.
2) Assuming a loss of FAPCS cooling occurs simultaneously with a failure of the transfer gates (when the adjacent pools are empty), immediately after a full core offload has been placed in the SFP, it can be shown that there is sufficient inventory to keep the TAF covered for 72 hours. The margin at the end of 72 hours is 0.056 m (2.2 inches).

DCD Impact

No DCD changes will be made in response to this RAI.