HITACHI

GE Hitachi Nuclear Energy

Richard E. Kingston
Vice President, ESBWR Licensing

P.O. Box 780 M/C A-65
Wilmington, NC 28402-0780
USA

T 910.675.6192
F 910.362.6192
rick.kingston@ge.com

MFN 09-521 Docket No. 52-010

August 11, 2009

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. 344 Related to ESBWR Design Certification Application - Radiation Protection - RAI Number 12.5-8 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) 12.5-8 S01 sent by NRC Letter 344, Reference 1. The response to RAI Number 12.5-8 was previously submitted to the NRC via Reference 2 in response to Reference 3.

GEH response to RAI Number 12.5-8 S01 is addressed in Enclosure 1. Enclosure 2 contains the DCD markup associated with this response.

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

Sincerely,

Richard E. Kingston

Richard E. Kingston
Vice President, ESBWR Licensing

References:

1. MFN 09-336, Letter from U.S. Nuclear Regulatory Commission to Jerald G. Head, *Request for Additional Information Letter No. 344 Related to ESBWR Design Certification Application*, May 18, 2009
2. MFN 07-654, Response to Portion of NRC Request for Additional Information Letter Number No. 60 Related to ESBWR Design Certification Application – Radiation Protection - RAI Number 12.5-8, December 12, 2007
3. MFN 06-342, Letter from U.S. Nuclear Regulatory Commission to David H. Hinds, *Request for Additional Information Letter No. 60 Related to ESBWR Design Certification Application*, September 18, 2006

Enclosures:

1. Response to Portion of NRC Request for Additional Information Letter No. 344 Related to ESBWR Design Certification Application - Radiation Protection - RAI Number 12.5-8 S01
2. Response to Portion of NRC Request for Additional Information Letter No. 344 Related to ESBWR Design Certification Application - Radiation Protection - RAI Number 12.5-8 S01 – DCD Markup

cc:	AE Cubbage	USNRC (with enclosures)
	JG Head	GEH/Wilmington (with enclosures)
	DH Hinds	GEH/Wilmington (with enclosures)
	eDRF Section	0000-0105-3192

Enclosure 1

MFN 09-521

Response to Portion of NRC Request for Additional Information Letter No. 344 Related to ESBWR Design Certification Application

Radiation Protection

RAI Number 12.5-8 S01

NRC RAI 12.5-8 S01

In a Feb. 12, 2008 telecom with GEH regarding staff concerns with GEH's responses to RAIs 12.5-1 and 12.5-8, GEH stated that they would revise the entire DCD Tier 2, Section 12.4 (Dose Assessment) in response to staff RAI 12.5-1. GEH further stated that they would reissue their response to RAI 12.5-8 (submitted to the NRC on December 12, 2007) to address identified staff concerns if the revised DCD Section 12.4 did not address these concerns. After reviewing the revised DCD Tier 2, Section 12.4, the staff noted that not all of the staff's concerns with GEH's response to RAI 12.5-8 were addressed by this revision.

a. In GEH's response to RAI 12.5-8, GEH listed several tasks associated with the ESBWR that represented significant reductions from historical typical BWR figures. Verify whether these percentage reductions listed are for reductions in person-hours or for reductions in collective dose. State if the percentage reductions listed in your response to RAI 12.5-8 are still valid, now that DCD Section 12.4 has been revised, and, if these percentage reductions are not still valid, provide updated percentage reductions for these categories for the ESBWR design.

b. DCD Tier 2, Section 12.4.6 states that the Safety Relief Valve (SRV) design does not vary significantly from past designs. On the basis of this statement, justify your statement in response to RAI 12.5-8 that SRV work in the drywell represents a 60% reduction from typical BWRs.

GEH's response to RAI 12.5-8 states that the overall total projected annual collective dose (person-rem) for the ESBWR represents a 35% reduction. Provide the basis for this statement.

GEH Response

Item a

The percentages reported in GEH's response to RAI 12.5-8 (transmitted to the NRC via MFN 07-654, December 12, 2007) were based on reductions in person-hours. The revision to DCD Section 12.4 was based on an occupational radiation dose assessment that addressed the requirements in Regulatory Guide 8.19 and Chapter 12.4 of Regulatory Guide 1.70. Some of the estimates have changed since the issuance of the prior response to this RAI. Not all of the previously reported percentage reductions are still valid.

The revised percentage reduction values based on current person-hour estimates for the requested categories for the ESBWR design are as follows:

Drywell – MSIV Repair – 20% reduction
Drywell – SRV Work – 83% reduction
Drywell – In-service Inspections (ISI) – 61% reduction
Drywell - Misc. Valves – 25% reduction
Reactor Bldg – Refueling – 75% reduction
Fuel Bldg – Refueling – 50% reduction
Overall Total Projected Annual Collective Dose (person-rem) – 13 % reduction

Item b

A reduction in personnel exposure required for ESBWR safety relief valve (SRV) work in the drywell is attributed to the natural recirculation core flow and consequent elimination of the recirculation piping which will reduce maintenance exposure doses. Maintaining SRVs consists of minor maintenance and/or removal of SRVs to a maintenance facility. Overhead tracks and in-place removal equipment is provided in the ESBWR for removal/replacement of the SRVs to an external maintenance facility resulting in a reduction in person-hours required for SRV work in the drywell relative to operational BWRs. This work is estimated to require 100 person-hours per year (or 200 person-hours per 24 month outage schedule). It should be noted that the estimated percentage reduction in person-hours required for SRV work has been increased from the previously reported 60% to 83% as presented in the response to item a.

Item c

The basis for this statement that the overall total projected annual collective dose (person-rem) for the ESBWR represented a 35% reduction is based on comparison of collective dose determined using the reduced person-hour estimates in GEH's response to RAI 12.5-8 (transmitted to the NRC via Letter MFN 07-654, December 12, 2007) compared to historical typical BWR total projected annual collective dose data.

The overall total projected annual collective dose has recently been updated for reasons not related to this RAI, and will be reported to be 0.808 person-Sv/year in DCD Tier 2 Chapter 12, Revision 6, Table 12.4-1 (as shown in Enclosure 2). Using the revised value for overall total projected annual collective dose compared to historical typical BWR data, the percent reduction is 13%.

<u>DCD/LTR Impact</u>

Although no DCD change is directly attributable to this response, markups to Table 12.4-1 as discussed above are provided in Enclosure 2 for reference.

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

Enclosure 2

MFN 09-521

Response to Portion of NRC Request for Additional Information Letter No. 344 Related to ESBWR Design Certification Application

Radiation Protection

RAI Number 12.5-8 S01

DCD Markup

Table 12.4-1

Projected ESBWR Total Occupational Radiation Exposure Estimates Based on 24-Month Refueling Cycle

Activity	Estimated Annual Time (person-hours)	Projected Annual Collective Dose person-Sv/year (man-rem/year)	Percent of Total
Reactor Operations and Surveillances (See Table 12.4-2)	4,923	0.101 (10.14)	12.75
Routine Inspection and Maintenance (See Table 12.4-3)	8,010	0.158 (15.81)	19.689
Waste Processing (See Table 12.4-4)	04,024	0.134 (13.40)	16.684
Refueling (See Table 12.4-5)	3,350	0.04734 (4.73.40)	5.84.28
Inservice Inspection (See Table 12.4-6)	766	0.033 (3.29)	4.13
Special Maintenance (See Table 12.4-7)	22,858	0.335 (33.48)	41.42.11
Total	43,931	0.808795 (80.8279.49)	100%