



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 10-054, Supplement 2

Docket No. 52-010

March 22, 2010

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

Subject: **Transmittal of ESBWR DCD Tier 2, Chapter 12 Markups (Part 3)
Related to GEH Internal Corrective Action**

The purpose of this letter is to submit markups to the ESBWR DCD, Tier 2, Chapter 12, Revision 6, which are the result of GEH internal review. These markups will be incorporated into the DCD, Revision 7 and are in addition to those provided in References 1 and 2. The markup pages are contained in Enclosure 1. The changes are summarized below.

Affected Section	Description of Change
Table 12.2-18b	Doses revised to correctly reflect 30-year midpoint of plant operating life. Note that these markups are in addition to those revising annual average doses from airborne releases based on changes to reactor coolant design basis concentrations as discussed in GEH response to RAI 12.2-28. See Reference 3.

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

Sincerely,

Richard E. Kingston
Vice President, ESBWR Licensing

References:

1. MFN 10-054, Transmittal of ESBWR DCD Tier 2, Chapter 12 Markups Related to GEH Internal Corrective Action, February 8, 2010
2. MFN 10-054, Supplement 1, Transmittal of ESBWR DCD Tier 2, Chapter 12 Additional Markups Related to GEH Internal Corrective Action, March 3, 1010
3. MFN 09-786, Supplement 1, Partial Response (Part 2) to NRC Request for Additional Information Letter No. 394 Related to ESBWR Design Certification Application - Dose Rates - RAI Number 12.2-28, January 19, 2010

Enclosure:

1. Transmittal of ESBWR DCD Tier 2, Chapter 12 Markups (Part 3) Related to GEH Internal Corrective Action – DCD Markups

cc: AE Cubbage USNRC (with enclosure)
JG Head GEH/Wilmington (with enclosure)
DH Hinds GEH/Wilmington (with enclosure)
TL Enfinger GEH/Wilmington (with enclosure)
eDRF Section 0000-0082-2130 R3

Enclosure 1

MFN 10-054, Supplement 2

**Transmittal of ESBWR DCD Tier 2, Chapter 12 Markups
(Part 3) Related to GEH Internal Corrective Action**

DCD Markups

Table 12.2-18b
ESBWR Annual Average Doses from Airborne Releases

PATHWAY	Annual Dose (mSv/year)							
	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
PLUME	<u>2.20E-03</u> 8.15E-03	<u>2.20E-03</u> 8.15E-03	<u>2.20E-03</u> 8.15E-03	<u>2.20E-03</u> 8.15E-03	<u>2.20E-03</u> 8.15E-03	<u>2.20E-03</u> 8.15E-03	<u>2.23E-03</u> 8.27E-03	<u>5.38E-02</u> 1.94E-02
GROUND	<u>2.82E-03</u> 2.04E-03	<u>2.82E-03</u> 2.04E-03	<u>2.82E-03</u> 2.04E-03	<u>2.82E-03</u> 2.04E-03	<u>2.82E-03</u> 2.04E-03	<u>2.82E-03</u> 2.04E-03	<u>2.82E-03</u> 2.04E-03	<u>3.30E-03</u> 2.38E-03
VEGETABLE								
ADULT	<u>7.58E-04</u> 7.07E-04	<u>5.62E-04</u> 5.59E-04	<u>1.24E-03</u> 1.44E-03	<u>1.02E-04</u> 9.25E-04	<u>5.63E-04</u> 5.52E-04	<u>3.44E-02</u> 2.89E-02	<u>1.84E-04</u> 2.36E-04	<u>9.97E-04</u> 1.67E-04
TEEN	<u>7.88E-04</u> 7.87E-04	<u>6.59E-04</u> 6.93E-04	<u>1.97E-03</u> 2.32E-03	<u>1.58E-03</u> 1.43E-03	<u>8.56E-04</u> 8.48E-04	<u>4.44E-02</u> 3.73E-02	<u>3.13E-04</u> 3.95E-04	<u>1.62E-04</u> 2.72E-04
CHILD	<u>1.03E-03</u> 1.18E-03	<u>7.30E-04</u> 9.40E-04	<u>4.69E-03</u> 5.51E-03	<u>2.72E-03</u> 2.57E-03	<u>1.49E-03</u> 1.56E-03	<u>8.40E-02</u> 7.09E-02	<u>6.14E-04</u> 8.34E-04	<u>3.88E-04</u> 6.50E-04
MEAT								
ADULT	<u>9.04E-05</u> 1.07E-04	<u>2.09E-04</u> 2.23E-04	<u>2.26E-04</u> 3.42E-04	<u>1.12E-04</u> 1.26E-04	<u>7.00E-05</u> 9.12E-05	<u>6.57E-04</u> 5.81E-04	<u>4.37E-05</u> 6.78E-05	<u>3.75E-05</u> 6.25E-05
TEEN	<u>5.98E-05</u> 7.66E-05	<u>1.27E-04</u> 1.41E-04	<u>1.89E-04</u> 2.88E-04	<u>9.02E-05</u> 1.03E-04	<u>5.67E-05</u> 7.48E-05	<u>4.80E-04</u> 4.28E-04	<u>3.73E-05</u> 5.74E-05	<u>3.14E-05</u> 5.25E-05
CHILD	<u>8.59E-05</u> 1.22E-04	<u>1.09E-04</u> 1.45E-04	<u>3.52E-04</u> 5.38E-04	<u>1.33E-04</u> 1.61E-04	<u>8.96E-05</u> 1.25E-04	<u>7.36E-04</u> 6.66E-04	<u>6.55E-05</u> 1.04E-04	<u>5.89E-05</u> 9.82E-05
MILK								
ADULT	<u>4.31E-04</u> 3.93E-04	<u>1.23E-04</u> 1.44E-04	<u>5.38E-04</u> 6.14E-04	<u>6.13E-04</u> 5.48E-04	<u>3.31E-04</u> 3.15E-04	<u>1.78E-02</u> 1.49E-02	<u>9.19E-04</u> 1.11E-04	<u>4.16E-05</u> 6.96E-05
TEEN	<u>4.92E-04</u> 4.77E-04	<u>1.76E-04</u> 2.17E-04	<u>9.71E-04</u> 1.11E-04	<u>1.07E-03</u> 9.59E-03	<u>5.78E-04</u> 5.52E-04	<u>2.82E-02</u> 2.37E-02	<u>1.77E-04</u> 2.10E-04	<u>7.59E-05</u> 1.27E-05

Table 12.2-18b

ESBWR Annual Average Doses from Airborne Releases

PATHWAY	Annual Dose (mSv/year)							
	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
			03	04	04		04	04
CHILD	<u>6.10E-04</u> 6.75E-04	<u>2.55E-04</u> 3.72E-04	<u>2.33E-03</u> 2.69E-03	<u>1.85E-03</u> 1.70E-03	<u>1.00E-03</u> 9.98E-04	<u>5.60E-02</u> 4.71E-02	<u>3.38E-04</u> 4.35E-04	<u>1.85E-04</u> 3.10E-04
INFANT	<u>9.06E-04</u> 1.09E-03	<u>6.40E-04</u> 8.88E-04	<u>4.13E-03</u> 4.92E-03	<u>3.62E-03</u> 3.34E-03	<u>1.70E-03</u> 1.75E-03	<u>1.36E-01</u> 1.14E-01	<u>6.59E-04</u> 8.67E-04	<u>3.86E-04</u> 6.43E-04
INHALE								
ADULT	<u>1.45E-05</u> 2.62E-05	<u>1.49E-05</u> 2.50E-05	<u>1.22E-05</u> 2.14E-05	<u>2.38E-05</u> 4.24E-05	<u>2.37E-05</u> 4.09E-05	<u>1.42E-03</u> 2.23E-03	<u>1.18E-04</u> 2.17E-04	<u>2.31E-06</u> 4.32E-06
TEEN	<u>1.40E-05</u> 2.50E-05	<u>1.59E-05</u> 2.64E-05	<u>1.70E-05</u> 2.97E-05	<u>3.14E-05</u> 5.59E-05	<u>3.13E-05</u> 5.40E-05	<u>1.85E-03</u> 2.92E-03	<u>1.71E-04</u> 3.16E-04	<u>2.33E-06</u> 4.36E-06
CHILD	<u>1.12E-05</u> 1.98E-05	<u>9.74E-06</u> 1.69E-05	<u>2.28E-05</u> 3.98E-05	<u>2.96E-05</u> 5.26E-05	<u>2.89E-05</u> 4.95E-05	<u>2.28E-03</u> 3.60E-03	<u>1.39E-04</u> 2.57E-04	<u>2.06E-06</u> 3.85E-06
INFANT	<u>6.64E-06</u> 1.15E-05	<u>4.80E-06</u> 8.70E-06	<u>1.58E-05</u> 2.73E-05	<u>2.35E-05</u> 4.16E-05	<u>1.83E-05</u> 3.13E-05	<u>2.08E-03</u> 3.28E-03	<u>9.09E-04</u> 1.66E-04	<u>1.19E-06</u> 2.22E-06
TOTAL**	Annual Dose (mSv/year)							
ADULT	<u>4.11E-03</u> 3.27E-03	<u>3.73E-03</u> 2.99E-03	<u>4.83E-03</u> 4.45E-03	<u>4.59E-03</u> 3.68E-03	<u>3.81E-03</u> 3.04E-03	<u>5.71E-02</u> 4.87E-02	<u>3.26E-03</u> 2.67E-03	<u>3.48E-03</u> 2.69E-03
TEEN	<u>4.17E-03</u> 3.40E-03	<u>3.80E-03</u> 3.11E-03	<u>5.97E-03</u> 5.78E-03	<u>5.59E-03</u> 4.59E-03	<u>4.34E-03</u> 3.56E-03	<u>7.78E-02</u> 6.64E-02	<u>3.52E-03</u> 3.01E-03	<u>3.57E-03</u> 2.84E-03
CHILD	<u>4.55E-03</u> 4.04E-03	<u>3.92E-03</u> 3.51E-03	<u>1.02E-02</u> 1.08E-02	<u>7.55E-03</u> 6.51E-03	<u>5.43E-03</u> 4.77E-03	<u>1.46E-01</u> 1.24E-01	<u>3.97E-03</u> 3.67E-03	<u>3.94E-03</u> 3.45E-03
INFANT	<u>3.73E-03</u> 3.14E-03	<u>3.46E-03</u> 2.93E-03	<u>6.96E-03</u> 6.98E-03	<u>6.46E-03</u> 5.42E-03	<u>4.53E-03</u> 3.81E-03	<u>1.41E-01</u> 1.20E-01	<u>3.57E-03</u> 3.07E-03	<u>3.69E-03</u> 3.03E-03

Annual beta air dose = ~~1.14E-02~~3.23E-03 mGy

Annual gamma air dose = ~~1.24E-02~~3.36E-03 mGy

** Total doses correspond to the organ doses from all pathways of exposure (excluding the plume pathway) due to radioactive iodine and radioactive material in particulate form in accordance with 10 CFR 50, Appendix I, Section II.C