HITACHI

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 08-019, Supplement 1
and 08-222, Supplement 1

Docket No. 52-010

May 5, 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 Nos. 150 and 173 Related to the ESBWR Design Certification – Radiation Protection – RAI Number 12.2-9S04**

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 dated February 7, 2008 (Reference 1), and supplemented in NRC RAI Letter 173, dated March 28, 2008 (Reference 2). GEH response to RAI Number 12.2-9S04 is addressed in Enclosure 1. DCD Markups related to this response are provided in Enclosure 2.

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 08-117, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GEH, *Request For Additional Information Letter No. 150 Related To ESBWR Design Certification Application*, dated February 7, 2008.
2. MFN 08-318, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GEH, *Request For Additional Information Letter No. 173 Related To ESBWR Design Certification Application*, dated March 28, 2008

Enclosures:

1. Response to Portion of NRC Request for Additional Information Letter Nos. 150 and 173 Related to ESBWR Design Certification Application – Radiation Protection – RAI Number 12.2-9S04
2. Response to Portion of NRC Request for Additional Information Letter Nos. 150 and 173 Related to ESBWR Design Certification Application – Radiation Protection – RAI Number 12.2-9S04 – DCD Markups

cc:

AE Cubbage	USNRC (with enclosure)
GB Stramback	GEH/San Jose (with enclosure)
RE Brown	GEH/Wilmington (with enclosure)
eDRF	0000-0083-5522

Enclosure 1

MFN 08-019, Supplement 1
and 08-222, Supplement 1

Response to Portion of NRC Request for Additional Information Letter Nos. 150 and 173 Related to ESBWR Design Certification Application

Radiation Protection

RAI Number 12.2-9 S04

NRC RAI 12.2-9 S04:

An evaluation of responses to NRC RAI 12.2-9S02 and S03, contained in MFN 08-019 and MFN 08-222, indicates that offsite dose calculation results need to be revised given the updated gaseous effluent source terms presented in MFN 08-222.

Specifically:

1. Item n. to RAI 12.2-9S02 is not closed, pending GEH's response to update dose calculation results and supporting data presented in DCD Tables 12.2-18a and 12.2-18b. During the NRC/GEH telecon of March 26, 2008, GEH committed to revise the dose calculations confirming compliance with App. I to Part 50, given that the gaseous effluent source terms were revised in light of updated information presented in GEH responses to NRC RAI 12.2-9S02 and 12.2-9S03.

2. The closure of RAI 12.2-9S02 (item n) is also tied to RAI 12.2-25 addressing the inclusion of a qualifier about the basis of long-term atmospheric dispersion and deposition parameters. The parameters are used to calculate doses for Part 50, App. I compliance. Based on a prior NRC/GEH telecon about met data and how this info would be presented in DCD Chapters 2.3.5 and 12.2.2, GEH staff had suggested a statement to the effect that the atmospheric dispersion and deposition parameters noted in Table 12.2-15 reflect typical conditions at existing sites with operating BWR plants.

Accordingly, update DCD Tier 2, Tables 12.2-15, 12.2-18a, and 12.2-18b with revised dose calculations and appropriate qualifiers for met data used in calculating doses for Part 50, Appendix I dose objective compliance.

GEH Response:

The subject offsite annual doses from airborne releases used to demonstrate compliance with 10CFR50 Appendix I requirements as reported in DCD Table 12.2-18b have been recalculated based on data developed to support responses to RAIs 12.2-9 S03 and 2.3-10 S02.

The recalculated doses are in part based on the reevaluation of annual gaseous effluent releases determined in the response to RAI 12.2-9 S03 (MFN 08-222 dated March 22, 2008) and shown on the revised DCD Tier 2 Table 12.2-16 associated with this response. The recalculated doses are also based on the reevaluation and determination of revised meteorological dispersion and deposition parameters performed in response to RAI 2.3-10 S02 (submitted via GEH letter MFN 06-396, Supplement 3, dated April 24, 2008). The response to RAI 2.3-10 S02 provides the updated meteorological dispersion and deposition parameters in the revised DCD Tier 2 Table 12.2-15. The methodology used to calculate the subject doses has not changed from that described in DCD Tier 2 Section 12.2.2.2.

The revised annual doses from airborne releases are shown in the revised and attached markup DCD Tier 2 Table 12.2-18b. DCD Tier 2 Table 12.2-18a is unchanged.

DCD Impact:

DCD Tier 2, Table 12.2-18b will be revised as noted on the attached markup in DCD Tier 2, Revision 5.

Enclosure 2

MFN 08-019, Supplement 1
and 08-222, Supplement 1

Response to Portion of NRC Request for
Additional Information Letter No. 173
Related to ESBWR Design Certification Application

Radiation Protection

RAI Number 12.2-9 S04

DCD Markups

Table 12.2-18b

ESBWR Annual Average Doses from Airborne Releases

	Annual Dose (mSv/year)							
PATHWAY	**T. BODY**	**GI-TRACT**	**BONE**	**LIVER**	**KIDNEY**	**THYROID**	**LUNG**	**SKIN**
PLUME	1.82E-03 7.73E-03	1.82E-03 7.73E-03	1.82E-03 7.73E-03	1.82E-03 7.73E-03	1.82E-03 7.73E-03	1.82E-03 7.73E-03	1.86E-03 7.86E-03	5.31E-03 2.08E-02
GROUND	2.55E-03 5.00E-04	2.55E-03 5.00E-04	2.55E-03 5.00E-04	2.55E-03 5.00E-04	2.55E-03 5.00E-04	2.55E-03 5.00E-04	2.55E-03 5.00E-04	2.98E-03 5.87E-04
VEGET								
ADULT	9.17E-04 1.29E-03	7.21E-04 1.25E-03	1.64E-03 5.56E-03	1.21E-03 1.37E-03	6.87E-04 1.32E-03	3.22E-02 2.75E-02	2.88E-04 1.14E-03	1.94E-04 1.12E-03
TEEN	9.89E-04 2.00E-03	8.72E-04 1.96E-03	2.63E-03 9.12E-03	1.86E-03 2.19E-03	1.04E-03 2.11E-03	4.16E-02 3.60E-02	4.71E-02 1.84E-03	3.04E-04 1.81E-03
CHILD	1.39E-03 4.55E-03	1.09E-03 4.43E-03	6.23E-03 2.21E-02	3.26E-03 4.96E-03	1.86E-03 4.80E-03	7.89E-02 6.89E-02	9.49E-04 4.38E-03	7.00E-04 4.33E-03
MEAT								
ADULT	1.28E-04 4.29E-04	3.44E-04 4.71E-04	3.56E-04 2.05E-03	1.56E-04 4.35E-04	1.08E-04 4.27E-04	6.44E-04 8.96E-04	7.39E-05 4.17E-04	6.66E-05 4.16E-04
TEEN	8.85E-05 3.56E-04	2.09E-04 3.80E-04	2.99E-04 1.73E-03	1.25E-04 3.65E-04	8.72E-05 3.58E-04	4.73E-04 6.97E-04	6.17E-05 3.51E-04	5.50E-05 3.49E-04
CHILD	1.34E-04 6.61E-04	1.83E-04 6.70E-04	5.57E-04 3.25E-03	1.89E-04 6.72E-04	1.40E-04 6.63E-04	7.33E-04 1.18E-03	1.09E-04 6.54E-04	1.01E-04 6.53E-04
MILK								
ADULT	5.20E-04 5.67E-04	1.88E-04 4.99E-04	7.09E-04 2.32E-03	7.32E-04 6.24E-04	4.05E-04 5.85E-04	1.66E-02 1.40E-02	1.35E-04 4.76E-04	7.92E-05 4.66E-04
TEEN	6.16E-04 9.70E-04	2.71E-04 8.89E-04	1.28E-03 4.27E-03	1.27E-03 1.12E-03	7.01E-04 1.06E-03	2.64E-02 2.23E-02	2.52E-04 8.67E-04	1.40E-04 8.47E-04
CHILD	8.30E-04 2.21E-03	4.20E-04 2.09E-03	3.08E-03 1.05E-02	2.21E-03 2.52E-03	1.23E-03 2.41E-03	5.25E-02 4.46E-02	4.99E-04 2.09E-03	3.29E-04 2.06E-03
INFANT	1.28E-03 4.51E-03	1.06E-03 4.38E-03	5.54E-03 2.04E-02	4.31E-03 5.22E-03	2.11E-03 4.85E-03	1.28E-01 1.08E-01	9.76E-04 4.34E-03	6.74E-04 4.28E-03
INHALE								
ADULT	2.84E-05 5.32E-05	3.68E-05 6.40E-05	9.23E-06 2.43E-05	3.55E-05 7.62E-05	3.71E-05 9.64E-05	1.14E-03 5.56E-03	8.85E-05 1.06E-04	2.00E-05 3.45E-05

TEEN	2.86E-05~~5.74E-05~~	3.86E-05~~6.88E-05~~	1.27E-05~~3.39E-05~~	4.12E-05~~9.17E-05~~	4.34E-05~~1.19E-04~~	1.48E-03~~7.14E-03~~	1.23E-04~~1.44E-04~~	2.03E-05~~3.48E-05~~
CHILD	2.50E-05~~5.43E-05~~	2.81E-05~~5.24E-05~~	1.70E-05~~4.56E-05~~	3.77E-05~~8.52E-05~~	3.92E-05~~1.09E-04~~	1.82E-03~~8.57E-03~~	1.03E-04~~1.21E-04~~	1.79E-05~~3.08E-05~~
INFANT	1.46E-05~~3.37E-05~~	1.51E-05~~2.87E-05~~	1.19E-05~~3.45E-05~~	2.66E-05~~6.58E-05~~	2.39E-05~~6.81E-05~~	1.65E-03~~7.82E-03~~	7.19E-05~~8.68E-05~~	1.03E-05~~1.77E-05~~
TOTAL	**Annual Dose (mSv/year)**							
ADULT	5.96E-03~~1.06E-02~~	5.66E-03~~1.05E-02~~	7.09E-03~~1.82E-02~~	6.50E-03~~1.07E-02~~	5.60E-03~~1.07E-02~~	5.50E-02~~5.62E-02~~	4.99E-03~~1.05E-02~~	8.65E-03~~2.34E-02~~
TEEN	6.09E-03~~1.16E-02~~	5.76E-03~~1.15E-02~~	8.59E-03~~2.34E-02~~	7.67E-03~~1.20E-02~~	6.24E-03~~1.19E-02~~	7.43E-02~~7.44E-02~~	5.32E-03~~1.16E-02~~	8.81E-03~~2.44E-02~~
CHILD	6.75E-03~~1.57E-02~~	6.09E-03~~1.55E-02~~	1.42E-02~~4.41E-02~~	1.01E-02~~1.65E-02~~	7.64E-03~~1.62E-02~~	1.38E-01~~1.31E-01~~	6.07E-03~~1.56E-02~~	9.44E-03~~2.85E-02~~
INFANT	5.66E-03~~1.28E-02~~	5.44E-03~~1.26E-02~~	9.92E-03~~2.87E-02~~	8.70E-03~~1.35E-02~~	6.50E-03~~1.31E-02~~	1.34E-01~~1.24E-01~~	5.46E-03~~1.28E-02~~	8.98E-03~~2.57E-02~~

Annual beta air dose = ~~1.32E-02 mGy~~3.77E-03 mGy
Annual gamma air dose = ~~1.16E-02 mGy~~2.49E-03 mGy