



GE Energy

Security Notice

*This letter forwards Security-Related information in accordance with 10CFR2.390. Upon removal of Enclosure 2, the balance of this letter may be considered non-Security-Related.*

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MFN 06-512, Supplement 1 and  
MFN 06-528, Supplement 1

Docket No. 52-010

June 7, 2007

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. 60 - Radiation Protection - RAI Numbers 12.4-4S01  
through 12.4-6S01**

Enclosure 1 contains GE's response to the subject NRC RAIs originally transmitted via the Reference 1 letter and supplemented by NRC requests for clarification.

Enclosure 2, "DCD Markup for RAI 12.4-4S01," contains Security-Related information identified by the designation "{{{Security-Related Information - Withhold Under 10 CFR 2.390}}}" GE hereby requests this information be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390. A public version is not available as it would be a blank page.

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

Sincerely,

James C. Kinsey  
Project Manager, ESBWR Licensing

DO68

Reference:

1. MFN 06-342, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 60 Related to the ESBWR Design Certification Application*, July 7, 2006

Enclosures:

1. MFN 06-512, Supplement 1 and MFN 06-528, Supplement 1 - Response to Portion of NRC Request for Additional Information Letter No. 60 - Related to ESBWR Design Certification Application - Radiation Protection - RAI Numbers 12.4-4S01 through 12.4-6S01
2. MFN 06-512, Supplement 1 and MFN 06-528, Supplement 1 - Response to Portion of NRC Request for Additional Information Letter No. 60 - Related to ESBWR Design Certification Application - Radiation Protection - RAI Numbers 12.4-4S01 through 12.4-6S01 DCD Markups for RAI 12.4-4S01 - Security-Related Information
3. MFN 06-512, Supplement 1 and MFN 06-528, Supplement 1 - Response to Portion of NRC Request for Additional Information Letter No. 60 - Related to ESBWR Design Certification Application - Radiation Protection - RAI Numbers 12.4-4S01 through 12.4-6S01 DCD Markups for RAI 12.4-6S01 - No Security Related Information

cc: AE Cabbage USNRC (with enclosures)  
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**Enclosure 1**

**MFN 06-512, Supplement 1 and  
MFN 06-528, Supplement 1**

**Response to Portion of NRC Request for  
Additional Information Letter No. 60  
Related to ESBWR Design Certification Application**

**Radiation Protection**

**RAIs 12.4-4S01 through 12.4-6S01**

**NRC RAI No. 12.4-4 S01:**

*From an email received from Marlayna Vaaler on March 6, 2007:*

*Reference: GE response Letter MFN-06-512, dated December 22, 2006, which addressed NRC RAI Letter No. 60*

- 1. Page 12.3-7 of the DCD mark-up has an incorrect conversion from SV to rem.*
- 2. The mark-up to Figure 12.3-20 is still missing the radiation zoning designations for several rooms (6171, 6172, 7103, 6282, 61044, and 6105) in the Rad Waste Building.*
- 3. RAI responses 12.4-4, 12.4-5, and 12.4-6 refer to information to be supplied by the COL applicant. Revise the DCD to identify these as a COL Action Items.*
- 4. The RAI 12.4-4 list of high radiation areas (greater than 100 rad/hr) is not consistent with the zoning for rooms 6107 - 6161 depicted on Figure 12.3-19 of the DCD.*

**GE Response:**

Responses are provided to the items designated in the RAI above:

1. The DCD markup in the response to RAI 12.4-4 (MFN 06-512, dated December 22, 2006, Enclosure 1, Page 8 of 37) does show an incorrect conversion from Sv (5 Sv) to rem (0.5 rem). However, DCD Tier 2, Revision 3, page 12.3-8 does provide the correct conversion (5 Sv converted to 500 rem).
2. The radiation zone designations for Radwaste Building rooms 6171, 6172, 6103 (it is assumed that the intention of the RAI was to identify room 6103, as there is no room 7103 in the Radwaste Building), 6104 (there is no room 61044 - it is assumed that room 6104 is being requested), and 6105 are provided in DCD Tier 2, Revision 3, Figure 12.3-19. They are not provided on DCD Tier 2, Revision 3, Figure 12.3-20, as these rooms originate on Radwaste Building elevation -9350. The radiation zone designation for room 6282 is provided in DCD Tier 2, Revision 3, Figure 12.3-20.
3. The response to RAI 12.4-4 (MFN 06-512, dated December 22, 2006) states "Radwaste Building at Elevation 4650 will also have areas with dose rates >100 rads/hr during normal operation of mobile plants. The COL holder will provide detailed zoning of these radiation areas." This response is in error with respect to the dose rate value. DCD Tier 2, Figure 12.3-21 designates the mobile systems area (room 6381) as having an operational dose rate of greater than 100 mrem/hr (mrad/hr), not 100 rad/hr.

No detailed zoning of this area is required by the COL applicant, as it currently is zoned for a dose rate of greater than 100 mrem/hr.

4. Upon further review of DCD Tier 2, Figure 12.3-19, GE discovered that several of the radiation zone designations are incorrect. The zone designations are to be changed in DCD Revision 4 for the following rooms:

Figure 12.3-19 Room #	DCD Revision 3 Radiation Zone	DCD Revision 4 Radiation Zone
6103	F	E
6104	F	E
6105	F	E
6106	F	G
6107	F	H
6108	F	I
6109	F	B
6150	F	B
6160	F	B
6161	F	H
6184	D	C

The revision to DCD Tier 2, Figure 12.3-19 is included in this RAI response.

**DCD Impact:**

DCD Tier 2, Figure 12.3-19 will be revised as noted on the attached markup.

**NRC RAI No. 12.4-5 S01:**

*From an email received from Marlayna Vaaler on March 6, 2007:*

*Reference: GE response Letter MFN-06-528, dated December 22, 2006, which addressed NRC RAI Letter No. 71*

*RAI responses 12.4-4, 12.4-5, and 12.4-6 refer to information to be supplied by the COL applicant. Revise the DCD to identify these as a COL Action Items.*

**GE Response:**

The response to RAI 12.4-5 (MFN 06-528, dated December 22, 2006) states "A site-specific definition and identification of the personnel access/egress routes and access controls will be provided by the COL holder in the plant specific Health Physics Program." A site-specific definition and identification of the personnel access/egress routes and access controls is provided in accordance with the COL applicant radiation protection program as described in Section 12.5 of the COL FSAR. The requirement for a COL radiation protection program already exists in DCD Tier 2, Revision 3, Subsection 12.5.4.1.

**DCD Impact:**

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

**NRC RAI No. 12.4-6 S01:**

*From an email received from Marlayna Vaaler on March 6, 2007:*

*Reference: GE response Letter MFN-06-512, dated December 22, 2006, which addressed NRC RAI Letter No. 60*

- 1. RAI responses 12.4-4, 12.4-5, and 12.4-6 refer to information to be supplied by the COL applicant. Revise the DCD to identify these as a COL Action Items.*
- 2. In the response to RAI 12.4-6, the units for marked-up Table 12.3-8 indicate the values to be in meters of concrete. Verify that the correct units for these tables are centimeters (e.g., 150 cm of concrete instead of 150 meters of concrete).*

**GE Response:**

Responses are provided to the items designated in the RAI above:

1. The response to RAI 12.4-6 (MFN 06-512, dated December 22, 2006) states "Shielding walls and floors are reinforced concrete structures. If required, special shielding features using other materials such as lead blankets, lead curtains, etc., will be defined later by the COL holder." Determination of special shielding features is in accordance with the COL applicant radiation protection program as described in Section 12.5 of the COL FSAR. The requirement for a COL radiation protection program already exists in DCD Tier 2, Subsection 12.5.4.1.
2. The correct units for DCD Tier 2, Table 12.3-8 are centimeters, not meters. The proposed changes for the next DCD revision are attached.

**DCD Impact:**

DCD Tier 2, Table 12.3-8 will be revised as noted in the attached markup.

**Enclosure 3**

**MFN 06-512, Supplement 1 and  
MFN 06-528, Supplement 1**

**Response to Portion of NRC Request for  
Additional Information Letter No. 60  
Related to ESBWR Design Certification Application**

**Radiation Protection**

**DCD Markups for RAI 12.4-6S01**



**Table 12.3-8**  
**Shielding Geometry in Centimeters**

Elev.	Room	Room Name	North	East	South	West	Floor	Ceiling
<b>Nuclear Island</b>								
-11500	1151	RWCS Heat Exchanger Room A	75	111	100	100/75	Ground	70
-11500	1152	RWCS Pump Room A	60	55	55	60/40	Ground	90
-11500	1161	RWCS Heat Exchanger Room B	75	100	100/75	111	Ground	70
-11500	1162	RWCS Pump Room B	60	60	70	35	Ground	70
-11500	2102	FAPCS Backwash Tank Room	70	80	90	110	Ground	90
-11500	2150	FAPCS Pump/Heat Exchanger Room A	35	70	60	30	Ground	70
-11500	2151	FAPCS Filter/Demineralizer Vault 1	90	105	70	95	Ground	70
-11500	2160	FAPCS Pump/Heat Exchanger Room B	35	30	60	35	Ground	70
-11500	2161	FAPCS Filter/Demineralizer Vault 2	70	105	70	95	Ground	70
-6400	1250	RWCS Heat Exchanger Room A	111	111	100	100	70	70
-6400	1251	RWCS Filter/Demineralizer Vault A1	135	150	40	135	110	90
-6400	1252	RWCS Filter/Demineralizer Vault A2	40	150	40	135	110	90
-6400	1260	RWCS Heat Exchanger Room B	111	100	100	100	70	70
-6400	1261	RWCS Filter/Demineralizer Vault B1	135	40	150	40	110	90
-6400	1262	RWCS Filter/Demineralizer Vault B2	135	40	150	70	110	90
-6400	2251	Backwash Transfer Pump Room A	90	70	30	90	70	70
-6400	2261	FAPCS Filter/Demineralizer Vault 2	30	70	115	90	70	70
<b>Radwaste Building</b>								
-9350	6104	Equipment Drain Collection Tank Room B	70	60	60	80	Ground	80
-9350	6105	Equipment Drain Collection Tank Room C	60	60	80	80	Ground	80
-9350	6161	Low Activity Sludge Phase Separator Room B	100	60	70	40	Ground	80
-2350	6103	Equipment Drain Collection Tank Room A	70	60	60	60	80	80
-2350	6106	Condensate Resin Holdup Tank Room	90	40	80	60	80	80

**Table 12.3-8**  
**Shielding Geometry in Centimeters**

Elev.	Room	Room Name	North	East	South	West	Floor	Ceiling
-2350	6107	Low Activity Resin Holdup Tank Room	100	80	60	100	80	80
-2350	6108	High Activity Resin Holdup Tank Room	70	90	70	100	80	80
-2350	6109	Concentrated Waste Tank Room	70	90	90	100	80	80
-2350	6150	Floor Drain Collection Tank Room A	70	80	60	60	80	80
-2350	6151	Low Activity Sludge Phase Separator Room A	100	90	70	40	80	80
-2350	6160	Floor Drain Collection Tank Room B	60	80	80	60	80	80
-2350	6171	Floor Drain Sample Tank Room	30	35	30	30	80	80
-2350	6172	Equipment Drain Sample Tank Room	30	35	30	30	80	80
<b>Turbine Building</b>								
-1400	4108	Off-Gas Charcoal Absorber Vessel Vault	150	150	120	120	Ground	-
-1400	4186	Main Condenser Area	60	40	70	120	Ground	-
-1400	4199	Pipe Chase	50	50	50	60	Ground	65
-1400	41F1A	Condensate Hollow Fiber Filter Vault A	50	50	30	60	Ground	65
-1400	41F1B/E	Condensate Hollow Fiber Filter Vault B/E	30	50	30	60	Ground	65
-1400	41F1F	Condensate Hollow Fiber Filter Vault F	30	50	50	60	Ground	65
-1400	41F2	Condensate Hff Backwash Receiving Vault	50	50	60	60	Ground	60
-1400	41F6	Condensate D/B Resin Receiving Tank Vault	50	100	50	80	Ground	60
-1400	41F8/9	Condensate D/B Demin. Resin Storage Tank Vault A/B	50	100	65	80	Ground	60
4650	4204	Feedwater Heaters IA/B/C Drain Cooler Room	65	120	110	85	70	90/130
4650	4205	Condensate Drains Tank Room	100	100	110	120	100	120
4650	4206	Steam Jet Air Ejector Room A	120	100	100	120	70	30
4650	4207	Steam Jet Air Ejector Room B	100	100	100	120	100	120
4650	4293	Steam And Feedwater Piping Area	110	150	150	150	150	120/150
4650	42F1A	Condensate Deep Bed Demineralizer Vault A	65	65	50	55	60	70

**Table 12.3-8**  
**Shielding Geometry in Centimeters**

Elev.	Room	Room Name	North	East	South	West	Floor	Ceiling
4650	42F1B/G	Condensate Deep Bed Demineralizer Vault B/G	50	75	50	55	60	70
4650	42F1H	Condensate Deep Bed Demineralizer Vault H	50	75	65	55	60	70
12000	4303	Feedwater Heaters 6A/B & 7A/B (Channel Side) Room	150	150	110	90	150	-
12000	4381	H2 Recombiner And Cooler Room A	120	80	60	120	30	120
12000	4382	H2 Recombiner And Cooler Room B	60	120	90	30	30	120
12000	4390	Main Steam Piping Area	0	115	150	115	-	-
12000	4391	Turbine Extr. Steam And Cross Around Piping Area A	110	90	110	0	-	120/-
12000	4392	Turbine Extr. Steam And Cross Around Piping Area B	110	-	110	150	-	120/-
12000	4393	Turbine Building Steam Tunnel	150	150	150	150	-	-
20000	4401	Feedwater Heaters 3A/B/C & 4A/B/C Shell Side Room	60	150	100	90	-	115
28000	4503	Feedwater Heater 5 & Feedwater Storage Tank Room	90	120	80	80	115	115
28000	4504	Turbine Gland Steam Seal Evaporator Room	80	60	60	80	115	115
28000	4506	Moisture Separator And Reheater Room A	135	80	115	-	-	130
28000	4507	Moisture Separator And Reheater Room B	135	-	115	150	-	130