



GE Energy

Security Notice

This letter forwards Security-Related information in accordance with 10CFR2.390. Upon removal of Enclosure 1, the balance of this letter may be considered non-Security-Related.

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MFN 07-048

Docket No. 52-010

May 25, 2007

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

Subject: Partial Response to RAI Letter No 60 Related to ESBWR Design Certification Application – Radiation Protection – RAI Number 12.4-24

Enclosure 1 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 contained in Enclosure 2

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

James C. Kinsey
Project Manager, ESBWR Licensing

D068

1. MFN 06-342, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 60 Related to ESBWR Design Certification Application*, September 18, 2006

Enclosures:

1. MFN 07-048 – Request for Additional Information Letter No. 60 Related to ESBWR Design Certification Application, Radiation Protection – RAI 12.4-24 - Security-Related Information
2. MFN 07-048 – Request for Additional Information Letter No. 60 Related to ESBWR Design Certification Application, Radiation Protection – RAI 12.2-24 - Public Version

cc: AE Cubbage USNRC (with enclosures)
GB Stramback GE/San Jose (with enclosures)
RE Brown GE/Wilmington (with enclosures)
eDRF 0063-3105

ENCLOSURE 2

MFN 07-048

**Partial Response to RAI Letter No 60
Related to ESBWR Design Certification Application**

Radiation Protection

RAI Number 12.4-24

Public Version

RAI 12.4-24:

Indicate the location of the filtration units for the Reactor Building, the Radwaste Building, and the Fuel Building, on plant layout drawings. Describe the maximum radiation source term in the filter or adsorption media, for each and give associated radiation dose rates in adjacent areas. Describe design features to ensure that the radiation exposures resulting from maintenance (filter change out) of these systems is ALARA.

GE Response:

1. Location of the Filters

The filtration units for the Reactor Building, the Radwaste Building, and the Fuel Building are located as follows:

Reactor Building

- RWCU demineralizers: Rooms 1251, 1252, 1261 and 1262 at elevation -6400.

Fuel Building

- FAPCS demineralizers: Rooms 2251 and 2261 at elevation -6400.

Radwaste Building

- Radwaste stream demineralizers. These demineralizers have not been considered because they are included in the mobile station and details will be available at a later stage of the project.

The attached Figure 2 shows the location of the filters on the plant layout drawing.

2. Radiation source term in the filters.

The radiation source term in the RWCU demineralizers is shown in DCD Table 12.2-7.

The radiation source term in the FAPCS demineralizers is shown in DCD Table 12.2-8a.

3. Associated radiation dose rates in adjacent areas

The areas adjacent to the RWCS demineralizers and their dose contributions are as follows:

- | | | |
|--------|---|----------------|
| ▪ 1130 | HCU Room B | 1 μ Sv/hr |
| ▪ 1196 | Interior Stairwell B | <1 μ Sv/hr |
| ▪ 1206 | Lower Drywell Equipment Hatch Access Room | <1 μ Sv/hr |
| ▪ 1230 | Division III Battery Room | <1 μ Sv/hr |
| ▪ 1152 | RWCU Cooling Pump Room A (lower room) | 6 μ Sv/hr |
| ▪ 1106 | Process Sampling Monitoring Room (lower room) | 6 μ Sv/hr |

- 1306 Filter/Demineralizer Access Room (upper room) 65 $\mu\text{Sv/hr}$

The areas adjacent to the FAPCS demineralizers and their dose contributions are as follows:

- 2200 Control Rod Drive Maintenance Equipment Room <1 $\mu\text{Sv/hr}$
- 2191 Commodity Chase 3 $\mu\text{Sv/hr}$
- 2150 FAPCS Pump/HX Room A (lower room) 9 $\mu\text{Sv/hr}$
- 2301 Filter/Demineralizer Access Room (upper room) 3 $\mu\text{Sv/hr}$

Figures 1 through 3 show the areas adjacent to the RWCS and the FAPC demineralizer rooms.

Provisions to Ensure ALARA

The following design features and provisions are included in the design to ensure that the radiation exposures resulting from maintenance (filter change out) of these systems is ALARA:

- The demineralizer filling, draining, backwashing, and resin transfer operations are automated. These operations are controlled and monitored from a local control panel located outside the demineralizer room.
- Each demineralizer is located in a separate room, which contains only the demineralizer and piping. Other system equipment, valves and controls are arranged on the outside of a shielding wall so that all operations except maintenance may be conducted from outside via a local control panel.
- In order to maintain the exposure from filter maintenance ALARA, the shielding wall thickness between filter cubicles is dimensioned so that the dose contribution in any cubicle from the filter in the adjacent one does not exceed 250 $\mu\text{Sv/hr}$.
- The thickness of the upper and lower slabs of the RWCU filter cubicles have also been dimensioned so that the radiation doses from the filters do not exceed the values shown above

DCD Impact:

These figures will be reflected in Revision 4 to the Tier 2 DCD.

{{{Security-Related Information – Withhold Under 10 CFR 2.390}}}

Fig. 1

{{{Security-Related Information – Withhold Under 10 CFR 2.390}}}

Fig. 2

{{{Security-Related Information – Withhold Under 10 CFR 2.390}}}

Fig. 3