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MFN 08-897

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

Subject: **Submittal of Portion of Response to NRC Request for Additional Information (RAI) Letter 252 - Related to ESBWR Design Certification Application - Chapter 14.3 - RAI Number 14.3-431**

The purpose of this letter is to submit the response to Nuclear Regulatory Commission (NRC) Request Additional Information (RAI) number 14.3-431.

This response to RAI 14.3-431 is provided based on the request in NRC Letter 252 (Reference 1).

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

Sincerely,

Richard E. Kingston

Richard E. Kingston
Vice President, ESBWR Licensing

D068
NRO

Reference:

1. MFN 08-722 – Letter from Nuclear Regulatory Commission to Robert E. Brown (GEH) "*Request for Additional Information Letter No. 252 Related to ESBWR Design Certification Application*", dated September 16, 2008

Enclosure:

1. MFN 08-897 – Response to Portion of NRC Request for Additional Information Letter No. 252 Related to ESBWR Design Certification Application - DCD Tier 1 - RAI Number 14.3-431

cc:

| | |
|---|---|
| AE Cubbage | USNRC (with enclosure) |
| RE Brown | GEH/Wilmington (with enclosure) |
| DH Hinds | GEH/Wilmington (with enclosure) |
| RM Wachowiak | GEH/Wilmington (with enclosure) |
| eDRF | 0000-0093-4569 |

# Enclosure 1

# MFN 08-897

# Response to Portion of NRC Request for Additional Information Letter No. 252 Related to ESBWR Design Certification Application DCD Tier 1

# RAI Number 14.3-431

* Verified DCD changes associated with this RAI response are identified in the enclosed DCD markups by enclosing the text within a black box. The marked-up pages may contain unverified changes in addition to the verified changes resulting from this RAI response. Other changes shown in the markup(s) may not be fully developed and approved for inclusion in DCD Revision 6.

**NRC RAI 14.3-431**

*SRP Section 14.3 appendix C provides electrical systems review checklist, which includes utilization voltage adequacy. The staff requests that GEH consider adding the following in Table 2.13.5-2 design commitment and ITAAC to address utilization voltage adequacy:*

*Design commitment - Safety-related UPS system supplies an operating voltage at the terminals of the safety-related utilization equipment that is within the utilization equipment's voltage tolerance limits.*

*Inspection, test, analyses - (a) Analyses for the as built safety-related UPS system to determine voltage drops will be performed. (b) Tests of the as-built safety-related UPS system will be conducted by operating connected Safety-related loads at their analyzed minimum voltage.*

*Acceptance Criteria - (a) Analyses for the as-built safety-related UPS system exist and conclude that the analyzed operating voltage supplied at the terminals of the safety-related utilization equipment is within the utilization equipment's voltage tolerance limits, as determined by their nameplate ratings. (b) Connected safety-related loads at their analyzed minimum voltage, as determined by the voltage drop analyses.*

**GEH Response**

An ITAAC is added to address utilization voltage adequacy for loads on the safety-related UPS 120 volt buses. The as-built safety-related UPS 120 volt distribution system will be analyzed to confirm the voltage at the terminals of the utilization equipment (loads) is within the utilization equipment voltage tolerance limits. Factory testing will document that the utilization equipment functions properly at the established maximum and minimum terminal voltage.

**DCD Impact**

DCD Tier # 1, Subsection 2.13.5 will be revised in Revision 6 as noted in the attached markup.

MFN 08-897

Markup for

RAI 14.3-431

DCD Revision 6 Markup DCD Tier 1

2.13.5 Uninterruptible AC Power Supply

Table 2.13.5-2 ITAAC For The Uninterruptible AC Power Supply

## 2.13.5 Uninterruptible AC Power Supply

### Design Description

The Uninterruptible AC Power Supply (UPS) is divided into two subsystems, the safety-related UPS and the nonsafety-related UPS.

The nonsafety-related UPS system and the nonsafety-related Technical Support Center UPS system are not part of the plant safety design basis, and are independent and separated from the safety-related UPS system.

The safety-related UPS system provides four divisions of 120 VAC power to safety-related loads during normal, upset and accident conditions.

(1) The functional arrangement of the safety-related UPS system is as described in Subsection 2.13.5 and Table 2.13.5-1 and is as shown on Figure 2.13.5-1.

(2) The functional arrangement of the nonsafety-related UPS system is as described in Subsection 2.13.5 and as shown on Figure 2.13.5-2.

(3) The safety-related UPS system equipment identified in Table 2.13.5-1 conforms to Seismic Category I requirements and is housed in Seismic Category I structures.

(4) The safety-related UPS system provides four independent and redundant safety-related divisions.

(5) Separation is provided between safety-related divisions, and between safety-related divisions and nonsafety-related equipment, as required by Regulatory Guide 1.75.

(6) Each safety-related UPS inverter is capable of supplying its AC load.

(7) The Uninterruptible AC Power Supply minimum inventory of alarms, displays, controls, and status indications in the main control room are addressed in Section 3.3.

(8) Environmental qualification of the safety-related UPS system is addressed in DCD Tier 1 Section 3.8.

(9) The safety-related UPS rectifiers are designed to prevent their AC source from becoming a load on the 250 VDC safety-related batteries when the AC power source is de-energized or has degraded voltage.

(10) The safety-related UPS inverter high DC input voltage trip setpoint and time delay are greater than the associated battery charger and UPS rectifier high DC output voltage trip setpoint and time delay.

(11) The safety-related UPS system supplies a voltage at the terminals of the safety-related utilization equipment that is within the equipment voltage tolerance limits.

### Inspections, Tests, Analyses and Acceptance Criteria

Table 2.13.5-2 provides a definition of the inspections, tests, and/or analyses, together with associated acceptance criteria for the Uninterruptible AC Power Supply.

## Table 2.13.5-2

## ITAAC For The Uninterruptible AC Power Supply

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 11. The safety-related UPS system supplies a voltage at the terminals of the safety-related utilization equipment that is within the equipment voltage tolerance limits. | i.) Analyses of the as-built safety-related UPS 120 volt distribution system are performed to determine the voltage at the safety-related utilization equipment terminals. | i.) Report(s) exist and conclude the as-built safety-related UPS system supplies a voltage at the terminals of the safety-related utilization equipment that is within the utilization equipment voltage tolerance limits. |
| | ii) Type tests will be performed to confirm the safety-related utilization equipment functions properly at the established maximum and minimum terminal voltage tolerance limits. | ii) Report(s) exist and conclude the safety-related utilization equipment functions properly at the established maximum and minimum terminal voltage tolerance limits. |