



GE Energy

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Subject: **Response to Portion of NRC Request for Additional Information  
Letter Number 65, Related to ESBWR Design Certification  
Application – RAI Numbers 8.5-7, 8.5-8, 8.5-9, 8.5-10, 8.5-11, 8.5-12,  
and 8.5-15**

Enclosure 1 contains GE's response to a portion of the subject NRC RAIs transmitted via the Reference 1 letter.

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

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Reference:

1. MFN 06-353, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 65 Related to the ESBWR Design Certification Application*, September 27, 2006

Enclosure:

1. MFN 07-161, Response to Portion of NRC Request for Additional Information Letter Number 65 Related to ESBWR Design Certification Application – RAI Numbers 8.5-7, 8.5-8, 8.5-9, 8.5-10, 8.5-11, 8.5-12, and 8.5-15

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eDRF 0000-0066-1365

**MFN 07-161**

**Enclosure 1**

**Response to Portion of NRC Request for Additional  
Information Letter Number 65 Related to ESBWR Design  
Certification Application**

**RAI Numbers 8.5-7, 8.5-8, 8.5-9, 8.5-10, 8.5-11, 8.5-12,  
and 8.5-15**

**NRC RAI 8.5-7**

*Confirm that no ac or dc power will be required following depletion of the batteries.*

**GE Response**

As discussed with the Staff in the teleconference conducted March 20, 2007, the Staff has a better understanding why GE concluded that the ESBWR safety-related batteries are designed and sized to provide the design bases load for at least 72 hours. After 72 hours, the batteries will be recharged utilizing the standby diesel generators as a power source in accordance with the RTNSS (Regulatory Treatment of Non-safety Systems) criteria as defined in NRC SECYs 94-084 and 95-132. The standby diesel generators have been determined to be a RTNSS components/system. This evaluation for RTNSS applicability was performed and documented in the response to NRC RAI 19.1.0-2. This response was transmitted to the NRC by letter MFN 07-066, dated January 30, 2007.

**DCD Impact**

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

**NRC RAI 8.5-8**

*Describe the basis for the minimum time the plant will remain safe without any ac or dc power.*

**GE Response:**

The simultaneous loss of all ac and dc is outside the design basis of the ESBWR. The ESBWR is designed to have dc power for at least 72 hours, the safety-related, Class 1E DC system is comprised of four totally separate and independent divisions. In accordance with the NRC's single failure criteria, the ESBWR can fail one division and still meet the requirements of a design basis accident. After 72 hours, ac power is available from the RTNSS category standby diesel generators (see response to RAI 8.5-7 and RAI 19.1.0-2).

**DCD Impact:**

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

**NRC RAI 8.5-9**

*SBO Power Supply. DCD Tier 2, Rev. 1, Appendix 8B, Realistic Station Blackout Evaluation, Assumption 8b, assumes the CRD pumps are available. Identify the power source for the CRD pumps.*

**GE Response:**

Appendix 8B was deleted from Chapter 8 in revision 2 of the Tier 2 DCD. This deletion was performed since the analysis was duplicated and in conflict with subsection 15.5.5. Subsection 15.5.5. is correct and acknowledges the CRD pumps are not available during a SBO (Station Blackout) and are not credited for mitigation of the SBO event. The CRD pumps power supplies are the PIP (Plant Investment Protection) buses A & B (see Figure 8.1-1, sheets 2 & 3 of the DCD).

**DCD Impact:**

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

**NRC RAI 8.5-10**

*On page 8B-1, DCD Tier 2, Rev. 1, Section 8B.3, "Analysis Assumptions," states that the CRD pumps are one of the systems assumed available for initial vessel inventory and pressure control, containment/temperature control and suppression pool temperature control. This description is in conflict with information provided in DCD Tier 2, Rev. 1, Section 15.5.5.2, "Analysis Assumptions," which states that the CRD pumps are assumed unavailable due to loss of all ac power. Clarify the apparent discrepancy.*

**GE Response:**

Appendix 8B was deleted from Chapter 8 in Revision 2 of the Tier 2 DCD. This deletion was performed since the analysis was duplicated and in conflict with Subsection 15.5.5. Subsection 15.5.5. is correct and acknowledges the CRD pumps are not available during a SBO (Station Blackout) and are not credited for mitigation of the SBO event.

**DCD Impact:**

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

**NRC RAI 8.5-11**

*It is stated in DCD Tier 2, Rev. 1, Appendix 1D, Criterion A, that the duration of a station blackout for the ESBWR is assumed to be 8 hours. Provide an analysis based on Regulatory Guide 1.155/NUMARC 8700 guidance for determining coping duration. In addition, state whether the plant utilizes an ac independent approach or an alternate ac power source approach for demonstrating capability to cope for the period of coping duration. If an ac independent approach is utilized, do the Class 1E dc systems have sufficient capacity to supply dc loads during a SBO event for the entire duration without the charger support? What kind of margin will be available in the Class 1E batteries? Provide a list of loads with power requirements and duration.*

**GE Response:**

As discussed with the Staff in the teleconference conducted March 20, 2007, the Staff now more clearly understands that Appendix 1D has been deleted from Chapter 1 of the Tier 2 DCD in Revision 3 and this information will be addressed by Chapter 19 (PRA). This issue was addressed as part of the response to NRC RAI 19.1.0-2 on RTNSS. The response to RAI 19.1.0-2 was transmitted to the NRC by letter MFN 07-066, dated January 30, 2007. The SBO (10CFR 50.63) criteria are addressed on page 5, Criteria A2, Station Blackout Assessment of that transmittal. The capability of the ESBWR to cope with a SBO event is 72 hours, independent of AC power. The SBO coping capability is more than four times the maximum possible (16 hours) required by Regulatory Guide 1.155, Table-2.

The design loading of the batteries will be confirmed by ITAAC # 3 in Table 2.13.3-1 of the DCD, Tier 1.

The battery load is a single DC/AC inverter with 200 to 300 VDC input range and 120 VAC output. The AC loads are the DCIS, a string of MCR lights and a 0.5 horsepower vent fan in the MCR, as explained to the Staff. It was understood and clarified that previous RAIs have discussed the Battery capacity. The ESBWR battery load is almost a flat load as there are no large rotating loads that must start and be maintained for safe shutdown.

**DCD Impact:**

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

**NRC RAI 8.5-12**

*In DCD Tier 2, Rev. 1, Section 8B, it is stated that CRD pump, Safety Relief Valves, Depressurization Valves, and Gravity-Driven Cooling System squib valves will be available for initial vessel inventory and pressure control, containment pressure/temperature control and suppression pool temperature control. Please provide the power supply and power requirements and duration for the above-mentioned pumps and valves.*

**GE Response:**

As discussed with the Staff in the teleconference conducted March 20, 2007, the Staff more clearly understands why GE concluded that DCD Tier 2, Revision 2, deleted Section 8B due to redundancy with Subsection 15.5.5. Station Blackout is described in Subsection 15.5.5.

Revision 2 of Subsection 15.5.5.2, 8<sup>TH</sup> bullet, stated that CRD pumps are not available during SBO due to loss of all AC power.

DCD Tier 2, Chapters 7 and 8, Revisions 2 and 3, have explained the power supply questioned by this RAI. The only safety-related loads for the safety-related batteries are the safety-related DCIS for all safe shutdown monitoring, logic, and actuation functions and control room emergency lighting and ventilation, of which can be provided by any two of the four divisions.

**DCD Impact:**

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

**NRC RAI 8.5-15**

*It is the staff's understanding that recovery of offsite ac power and diesel generators could take longer than 72 hours. Provide a discussion how the required SBO loads (i.e., battery charger, UPS, instrumentations, indicating lights etc.) will be powered beyond the 72 hours.*

**GE Response:**

As discussed with the Staff in the teleconference conducted March 20, 2007, the Staff more clearly understands why GE concluded that it is the belief of the ESBWR Electrical Group that this question is outside the scope of the Design Basis.

The standby diesel generators have been reviewed for Regulatory Treatment of Non-Safety Systems (RTNSS) consideration as defined in SECYs 94-084 and 95-132. This evaluation for RTNSS applicability was performed and documented in the response to NRC RAI 19.1.0-2 (MFN 07-066, January 20, 2007).

Components and systems not required for the first 72 hours following an event, as described in the above SECYs, may be non-safety-related components/systems. The ESBWR safety-related batteries are designed and sized to provide the design bases load for at least 72 hours. After 72 hours, the batteries will be recharged utilizing the non-safety-related standby diesel generators as a power source, in accordance with the RTNSS criteria defined in SECYs 94-084 and 95-132.

**DCD Impact:**

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