



GE Energy

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**Subject: Response to Portion of NRC Request for Additional Information
Letter Nos. 65 and 76– Auxiliary Systems – RAI Numbers 9.5-25
through 9.5-32 and 9.5-43**

Enclosure 1 contains GE's response to 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 for

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 26, 2006
2. MFN 06-388, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No.76 Related to the ESBWR Design Certification Application*, October 11, 2006

Enclosures:

1. MFN 07-068 – Response to Portion of NRC Request for Additional Information Letter Nos. 65 and 76 – Auxiliary Systems – RAI Numbers 9.5-25 through 9.5-32 and 9.5-43

cc: AE Cabbage USNRC (with enclosures)
GB Stramback/GE/San Jose (with enclosures)
eDRF 0060-0701

Enclosure 1

MFN 07-068

**Response to Portion of NRC Request for
Additional Information Letter Nos. 65 and 76
Related to ESBWR Design Certification Application**

Auxiliary Systems

RAI Numbers 9.5-25 through 9.5-32 and 9.5-43

NRC RAI 9.5-25:

Generic Letter, GL 89-15, Emergency Response Data System identifies that certain parameters need to be provided to the NRC on an accurate and timely manner. Please discuss whether the ESBWR's communication system has the capability to perform these functions. DCD, Tier2, Section 9.5.2 should address GL 89-15 issue and identify COL action requirements.

GE Response:

ESBWR's communication system shall be designed, as described in GL 89-15, to facilitate data communication and exchange with Technical Support Center (TSC), Emergency Operation Facility (EOF) and nuclear plant data link (NDL) to provide the following parameters from the licensee computer to the federal, state, and local agencies in a timely manner:

- Core and coolant system conditions
- Conditions inside the Containment Building
- Radiation Monitoring System parameters
- Data from the meteorological tower

As described in Subsection 7.9.3, the COL applicant shall be responsible for providing communication protocol and infrastructure from the NDL to the federal, state, and local agencies. The plant communication system description is provided in DCD Tier 2 Subsection 9.5.2.2.

DCD Impact:

No Tier 2 changes will be made in response to this RAI

NRC RAI 9.5-26:

DCD, Tier 2, Revision 1, Section 9.5-2, Communications Systems should address design basis of the system that includes:

Quality of components and modules

Software quality

Performance of protocol selected

Reliability - potential hazards, error recovery, self-testing

Control of access

Single-failure-criterion

Independence

Failure modes

EMI/RFI susceptibility

GE Response:

The communication system for a standard ESBWR is a non safety-related system, thus has no safety-related design basis. Power generation design bases are listed in Rev. 2, Subsection 9.5.2.1 of the DCD, which include, EMI/RFI susceptibility, independence, single failure criteria and loss of off-site power. As described in Subsection 9.5.2.2 of the DCD, data communication, between the plant simulator, the Emergency Operations Facility (EOF), and the Technical Support Center (TSC) is provided by the plant non-Essential Distributed Control and Instrumentation System (NE-DCIS) firewall via high speed dedicated data lines. Refer to Chapter 7, Subsection 7.9.2.1.2 of the Tier 2, DCD, which describes the requirements for software quality and reliability of NE-DCIS systems.

DCD Effect:

No Tier 2 change will be made in response to this RAI.

NRC RAI 9.5-27:

Clarify how the three independent voice communication systems will be powered from the two separate standby diesel-generator-backed power supplies.

GE Response:

The three independent voice communication systems, namely, Plant Page/Party Line (PA/PL), Private Automatic Branch Exchange (PABX), and Plant radio system are physically independent systems which are powered from non-safety related power supplies. These power supplies are backed by either of the redundant Standby AC Diesel Generators. These three independent voice communication systems shall be designed and constructed such that no single event can cause a complete loss of intraplant voice communication (refer to Subsection 9.5.2.2 of the DCD, Tier 2, Rev. 2).

The Electric Power Distribution System for a standard ESBWR plant is designed such that each redundant Standby AC Diesel Generator feeds the Plant Investment Protection (PIP) buses which in turn feed the low voltage power centers. These low voltage power centers feed the three independent voice communication systems. The three independent voice communication systems are not fed from the same low voltage power centers or the same PIP buses.

DCD Impact:

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

NRC RAI 9.5-28:

- (1) Describe the communication systems available in the Emergency Operations Facility and the Plant Simulator*
- (2) Describe the communication links available with the grid transmission operator.*

GE Response:

- 1) Subsection 9.5.2.2 of the DCD, Tier 2, Rev. 2, Paragraphs 3 and 4 describe the communication system availability in the Emergency Operations Facility (EOF) and Plant Simulator (refer to the response to RAI 9.5-25).
- 2) The COL applicant shall address the communication links availability with the grid transmission operator.

DCD Impact:

DCD Tier 2, Revision 2, Subsection 9.5.2.5 will be revised to state: "The COL applicant shall address the communication links availability with the grid transmission operator."

NRC RAI 9.5-29:

Clarify if there is any need for restricting the use of aluminum fixtures in containment.

GE Response:

The ESBWR design does not allow the use of aluminum fixtures in the containment structure. This requirement is based on RG 1.7, "Control of Combustible Gas Concentration in Containment Following a Lost of Coolant Accident". Compliance to Regulatory Guide 1.7 is described in DCD Tier 2, Subsection 6.2.5.1.

DCD Impact:

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

NRC RAI 9.5-30:

Lighting is required during all modes of plant operation. Provide a discussion on which lighting system will provide the adequate illumination in areas required for fire fighting?

GE Response:

Per Subsection 9.5.3.3.2 of the DCD, Tier 2, Rev. 2, self-contained battery-powered units that are backed by normal or standby power provide adequate illumination to access routes for fire fighting. Additionally, suitable sealed-beam battery powered portable hand lights shall be provided for emergency use by the fire brigades and other operations personnel required to achieve safe plant shutdown and fire fighting. The COL applicant shall address this matter in its Fire Hazards Analysis.

DCD Impact:

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

NRC RAI 9.5-31:

*Clarify when the diesel generators are required to be connected to recharge the batteries.
(See related RAI in Section 8.3 (8.3-11))*

GE Response:

The batteries will be charged (after 72 hours) through the battery chargers shown on Figure 8.1-3. The chargers will also supply the required direct current load demand of the dc system, as well as the load demand of the Class 1E UPS 120 VAC system. Isolation Power Centers will supply the 480 VAC power to the battery chargers. The Isolation Power Centers are powered by the nonsafety-related PIP buses, which are supplied power from the nonsafety-related Standby Diesel Generators during a loss of offsite power. The Standby Diesel Generators will be in RTNSS program to ensure availability when required.

DCD Impact:

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

NRC RAI 9.5-32:

Although the diesel generators are identified as non-safety-related, they are defined as Plant Investment Protection (PIP). Confirm that the diesel generator systems will adhere to IEEE 387 or identify what standards will be used to maintain diesel generator reliability, availability, functionality and operability.

GE Response:

The Standby Onsite AC Diesel Generators for an ESBWR Standard Plant do not perform any safety functions and as such are defined as “non safety-related.” IEEE 387 applies to Standby Diesel Generators used as Class 1E in Nuclear Power Stations and does not apply to Standby Onsite AC Diesel Generators designed for an ESBWR Standard Power Plant. Standby Onsite AC Diesel Generators installed in an ESBWR Standard Power Plant shall be manufactured and tested in accordance with Diesel Engine Manufacturers Association (DEMA), Standard Practices for Low and Medium Speed Stationary Diesel and Gas Engines, and National Electrical Manufacturers Association for MG1 Motors and Generators.

Refer to responses to RAI Numbers 8.1-5 (Letter MFN 06-451 dated November 21, 2006 and 8.3-16 (Letter MFN 06-449 dated November 21, 2006).

DCD Effect:

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

NRC RAI 9.5-43:

IE Bulletin 80-15, Possible Loss of Emergency Notification System (ENS) with Loss of Offsite Power, addresses concerns that the ENS station package is located at the site and is served by on-site power and has not been backed by emergency power. DCD, Tier 2, Revision 1, Section 9.5-2 and Table 1C-1 should be updated to address IE Bulletin 80-15 concerns.

GE Response:

ESBWR standard design incorporates the recommendations outlined in IEB 80-15. The ENS package is located inside the Technical Support Center (TSC) and is normally powered from the 480VAC power center bus through 480/120VAC transformer. Two dedicated UPS are also provided for the TSC. Power for each TSC UPS is normally supplied from the 480VAC power center with the standby on-site AC power providing backup power should a failure of the normal power supply occur. Emergency power from 125VDC batteries is provided should loss of both normal and standby on-site AC power source occur. Reference to Chapter 8, Fig 8.1-5 for normal and backup power supply one line diagram.

Bulletin 80-15 has been inserted into Table 1C-1 of DCD, Tier 2, Revision 2.

DCD Effect:

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