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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 100 Related to ESBWR Design Certification Application – Auxiliary Systems– RAI Numbers 9.5-58 through 9.5-64**

Enclosure 1 contains GEH's response to the subject NRC RAIs transmitted via Reference 1.

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

Sincerely,

/Kathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

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NRO

Reference:

1. MFN 07-327, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 100 Related to the ESBWR Design Certification Application*, May 30, 2007.

Enclosure:

1. MFN 07-401 - Response to Portion of NRC Request for Additional Information Letter No. 100 – RAI Numbers 9.5-58 through 9.5-64.

cc:	AE Cubbage	USNRC (with enclosure)
	BE Brown	GEH/Wilmington (with enclosure)
	LE Fennern	GEH/San Jose (with enclosure)
	GB Stramback	GEH/San Jose (with enclosure)
	eDRF:	0000-0070-2401

Enclosure 1

MFN 07-401

Response to Portion of NRC Request for Additional Information Letter No. 100 Related to ESBWR Design Certification Application

Auxiliary Systems

RAI Numbers 9.5-58 through 9.5-64

NRC RAI 9.5-58:

Section 9.5.3.3.3.2, states that each emergency lighting unit is capable of supplying sealed beam lamps for 8-hours without the charger. However, there are two-hour rated units and 90-minute rated units in different applications. Please clarify the discrepancy. Clarify that each emergency lighting unit is capable of supplying sealed beam lamps for 8-hours without the charger.

GEH Response:

The 90-minute rated units are used for "exit signs" only and the 8-hour rated units are used in areas outside the main control room. As stated in the 4th paragraph of DCD Subsection 9.5.3.3.3.2, these units (emergency lighting) are capable of supplying power for 8-hours without the charger. The two-hour rated units are not used in any area of the plant.

DCD Impact:

DCD Tier 2, Revision 3, Subsection 9.5.3.3.3.2, first bullet is to be revised to delete the use of two-hour rated units in response to this RAI.

- Areas required for power restoration / recovery to comply with the requirement of Reg. Guide 1.189.

NRC RAI 9.5-59:

DCD Tier 2, Revision 3, Subsection 9.5.3.3.3.2, states, "Two-hour rated units as a minimum are used in other areas of the plant." It is unclear where the two-hour rated units will be used. Please clarify where the two-hour rated units will be used.

GE Response:

As stated in response to RAI 9.5-58, the two-hour rated units are not used in any area of the plant.

DCD Impact:

Refer to the response of RAI 9.5-58.

NRC RAI 9.5-60:

Provide justification for not using emergency lighting supplied by 72-hour Class 1E uninterruptible power supply (UPS) system in remote shutdown area.

GE Response:

The 72-hour Class 1E uninterruptible power supply (UPS) system is utilized for safety-related DCIS system, instrumentation required for regulatory compliance and the main control room emergency lighting. This conservative ESBWR design feature helps conserve battery power by limiting battery loading.

Emergency lighting in areas outside the main control room such as remote shutdown room is accomplished by 8-hour, self-contained, battery pack, sealed-beam lighting units. These units are nonsafety-related and provide illumination for safe ingress / egress of personnel and shutdown activities and are powered from diesel backed busses upon loss of normal AC power.

DCD Impact:

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

NRC RAI 9.5-61:

Main control room emergency lighting is supplied from Class 1E UPS. The lighting fixtures, switches, and associated cables are non-Class 1E. Discuss isolation devices to be used between Class 1E power supply and non-Class 1E circuits.

GEH Response:

As shown in Figures 8.1-3 and 8.1-4 of DCD, Tier 2, Revision 3, the Class 1E power supply and the non-Class 1E circuits are isolated through series of breakers that are coordinated for proper isolation during detail design phase of the project.

DCD Impact:

Refer to the response of RAI 9.5-63. DCD Tier 2, Revision 3, Subsection 9.5.3.3.3.1, is to be revised in its entirety for clarity and to add a new sentence to read as follows:

"The safety-related UPS and the MCR emergency lighting circuitry are isolated by a series of circuit breakers that is coordinated for isolation."

NRC RAI 9.5-62:

In DCD Tier 2, Rev3, Section 9.5.3.3.3.1, it is stated that Main Control Room (MCR) emergency lighting is supplied from four divisions of 72-hour Class 1E UPS. Discuss the separation requirement between four divisions of UPS supplies and cables outside MCR

GEH Response:

Separation of a redundant system or portions of the system is such that no single active failure can prevent initiation and completion of safety-related functions.

The four divisions of 72-hour Class 1E UPS are independent, located in separate rooms, cannot be inter-connected, and their circuits are routed in dedicated, physically separated raceways. This level of electrical separation prevents the failure or unavailability of a single battery, battery charger, or inverter from adversely affecting a redundant division. Refer to DCD, Tier 2, Subsection 8.3.1.4 for detail description of separation criteria and applicable codes and standards.

DCD Impact:

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

NRC RAI 9.5-63:

DCD Tier 2, Rev 3, Section 9.5.3.4, it is stated that the MCR emergency lighting system is safety-related and classified as Class 1E. Also, in Section 9.5.3.1, it is stated that MCR emergency lighting system is Class 1E, however, in Section 9.5.3.3.3.1, it is stated that both the standby and emergency lighting fixtures, switches and associated cables used in the control room are non-Class 1E. Please clarify the discrepancy. Clarify that MCR emergency lighting system is safety-related and classified as Class 1E.

GEH Response:

The MCR emergency lighting system is safety-related. The power source for the MCR emergency lighting, switches, associated cables and the lighting fixtures are safety-related. Raceways carrying cables up to the lighting fixtures as well as the lighting fixtures for both emergency and standby lighting inside the MCR utilize seismic Category I supports.

DCD Impact:

DCD Tier 2, Revision 3, Subsection 9.5.3.3.3.1, is to be revised as follows:

9.5.3.3.3.1 Control Room Emergency Lighting

The control room emergency lighting power is supplied from the four divisions of 72-hour safety-related Uninterruptible AC power supply system (UPS). The safety-related UPS and the MCR emergency lighting circuitry are isolated by a series of circuit breakers that is coordinated for isolation. The MCR emergency lighting system including the switches, associated cables and the lighting fixtures are safety-related. Raceways carrying cables to the lighting fixtures as well as the lighting fixtures for both standby and emergency lighting inside the MCR utilize Seismic Category I support. The MCR emergency lighting complies with the human factor requirements by utilizing semi-indirect, low-glare lighting fixtures.

NRC RAI 9.5-64:

In DCD Tier 2, Rev 3, Section 9.5.3, there is no design description regarding panel lighting in the MCR at the safety panels. Provide a design description of panel lighting in the MCR or if not providing, provide a technical basis as to the reason for not providing.

GEH Response:

The ESBWR Main Control Room (MCR) is designed using Human Factor Engineering principles (HFE) as described in DCD, Chapter 18. The configuration of the MCR is significantly different than that of a conventional BWR in that it does not have panels located in areas behind the main console. The three "panels" inside the MCR are the Wide Display Panel, Main Control Console and the Shift Supervisor Console. The emergency lighting provides a minimum of 108 lux (10 foot-candles) illumination at the consoles in the event of loss of normal lighting. Additionally, the Wide Display Panel has lights powered from the nonsafety-related power source and are mounted inside the console. The supports for the lighting fixtures are seismic Category I.

DCD Impact

New Subsection 9.5.3.3.3.3 is to be added to the DCD Tier 2 as follows:

9.5.3.3.3.3 Panel Lighting

Panel lighting is designed to provide lighting for interior maintenance of the panels as described below.

- Panel lighting consists of lighting fixtures located inside the Wide Display Panel in the main control room. The fixtures are powered from nonsafety-related power source and are normally off.
- Raceways carrying cables up to the lighting fixtures as well as the lighting fixtures are supported by Seismic Category I support.