HITACHI

GE Hitachi Nuclear Energy

Richard E. Kingston
Vice President, ESBWR Licensing

PO Box 780 M/C A-55
Wilmington, NC 28402-0780
USA

T 910 675 6192
F 910 362 6192
rick.kingston@ge.com

MFN 08-663

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Subject: Response to Portion of NRC Request for Additional Information Letter No. 216, Related to ESBWR Design Certification Application - Lighting System - RAI Number 9.5-60 S03

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) response to the U.S. Nuclear Regulatory Commission Request for Additional Information (RAI) sent by NRC Letter 216, dated July 3, 2008 (Reference 1). The GEH response to RAI Number 9.5-60 S03 is addressed in Enclosure 1. The GEH response to RAI 9.5-60 S02 was submitted via Reference 2 in response to Reference 3. The GEH response to RAI 9.5-60 S01 was submitted via Reference 4 in response to Reference 5. The original response was submitted via Reference 6 in response to Reference 7.

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

Sincerely,

Richard E. Kingston

Richard E. Kingston
Vice President, ESBWR Licensing

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NRO

References:

1. MFN 08-575, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 216 Related to ESBWR Design Certification Application,* July 3, 2008.
2. MFN 08-390 - Response to Portion of NRC Request for Additional Information Letter No. 164 Related to ESBWR Design Certification Application - Lighting System - RAI Number 9.5-60 S02, May 2, 2008.
3. MFN 08-237, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 164 Related to ESBWR Design Certification Application,* March 10, 2008.
4. MFN 08-144. Response to Portion of NRC Request for Additional Information Letter No. 119 Related to ESBWR Design Certification Application - Lighting System - RAI Number 9.5-60 S01, February 26, 2008.
5. MFN 07-657, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No.* 119 *Related to the ESBWR Design Certification Application,* December 5, 2007.
6. 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, July 31, 2007.
7. 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 08-663, Response to Portion of NRC Request for Additional Information Letter No. 216 Related to ESBWR Design Certification Application - Lighting System - RAI Number 9.5-60 S03

cc:

AE Cubbage	USNRC (with enclosures)
DH Hinds	GEH (with enclosures)
RE Brown	GEH (with enclosures)
eDRF	0000-0089-9717

Enclosure 1

MFN 08-663

Response to Portion of NRC Request for

Additional Information Letter No. 216

Related to ESBWR Design Certification Application

Lighting System

RAI Number 9.5-60 S03

For historical purposes, the original text of RAI 9.5-60, RAI 9.5-60 S01, and RAI 9.5-60 S02 and the related GE/GEH responses are included. The historical responses do not include any attachments or DCD mark-ups.

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 9.5-60 S01

Clarify remote shutdown area emergency lighting and use of 72-hour safety-related uninterruptible power supply (UPS).

1. In battery packs, sealed beam lighting units." In response to RAI 9.5-60, GEH stated that "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." Provide justification for not providing an emergency lighting capacity of 72 hours at the remote shutdown rooms such that the emergency lighting capability in these rooms is equivalent to that in the main control room. Also, provide a discussion about the emergency lighting in remote shutdown area in DCD Tier 2, Section 9.5.3.3.3.

2. In response to RAI 9.5-60, GEH stated that the 72-hour Class 1E UPS is utilized for safety-related Distributed Control and Information System (DCIS) system, instrumentation required for regulatory compliance and the main control room emergency lighting. However, Tier 2, Revision 4, Sections 9.5.3.3.3 and 9.5.3.3.3.1 indicate that only control room emergency lighting power is supplied from four divisions of 72-hour safety-related UPS.

Clarify the difference.

GEH Response

1. GEH clarifies that emergency lighting in the remote shutdown area is fed from the safety-related UPS for 72-hours similar to the power supply arrangement for the MCR emergency lighting.

2. GEH confirms that safety-related power supplies MCR emergency lighting, Q-DCIS and VDUs for the four safety-related divisions as shown on Figure 8.1-4 of DCD, Chapter 8.

DCD Impact

DCD Tier 2, Subsections 9.5.3.3.3 and 9.5.3.3.3.1 will be revised in Revision 5 as noted in the attached markup.

NRC RAI 9.5-60 S02

In response to RAI 9.5-60 SO1, GEH stated that emergency lighting in the remote shutdown area is fed from the safety-related UPS for 72-hours similar to the power supply arrangement for the MCR emergency lighting. As a result, ITAAC for the lighting power supply (Section 2.13.8) needs to be revised to indicate that emergency lighting in the remote shutdown station (RSS) is fed from the safety-related UPS for 72-hours. ITAAC Table 2.13.8-1 items 1 thru 4 shall be modified to include RSS emergency lighting. Design Description of Section 2.13.8 shall be modified to indicate control room and RSS emergency lighting. Additionally, an ITAAC item for electrical isolation between safety-related power supply and nonsafety-related emergency lighting in MCR and RSS shall be provided.

GEH Response

The emergency lighting in the remote shutdown station (RSS) and main control room (MCR) is fed from the safety-related UPS. ITAAC for the lighting power supply (subsection 2.13.8) will be revised to state the source of emergency lighting power as safety-related UPS. Design description of subsection 2.13.8 and description of ITAAC Table 2.13.8, items 1 thru 4 will be updated to include MCR and RSS emergency lighting. In addition to the above change, new item number 6 will be added ITAAC Table 2.13.8-1 to state that electrical isolation between nonsafety-related control room and RSS emergency lighting circuits from the safety-related UPS is accomplished by the use of two series isolation devices.

DCD Impact

DCD Tier 1, Subsection 2.13.8, Table 2.13.8-1, and DCD Tier 2, Subsection 9.5.3.3.3.1 will be revised in Revision 5 as noted in the attached markup.

NRC RAI 9.5-60 S03

In response to RAI 9.5-60 S01, GEH stated that emergency lighting in the remote shutdown area is fed from the safety-related UPS for 72-hours similar to the power supply arrangement for the MCR emergency lighting. However, DCD, Revision 5 indicates that Division 1 and 2 UPS provides power to the emergency lighting in the remote shutdown area for 72 hours. The MCR emergency lighting is supplied from all four divisions of UPS for 72 hours. Both Divisions 1 and 2 may not be available under certain conditions (Division 1 is under maintenance and Division 2 is lost due to single failure). Provide an explanation why the emergency lighting from divisions 1 and 2 UPS is acceptable in the remote shutdown area.

GEH Response

The RSS panels are each provided with Division 1 and Division 2 (72 hour battery and ancillary diesel backed) lighting and PIP A and PIP B lighting (derived from their respective diesels). Other than the manual scram and the isolation switches, the only controls or instrumentation on each of the RSS panels are a Division 1 and Division 2 VDU (for control and monitoring of the respective divisions) and a PIP A and PIP B VDU (for control and monitoring of the PIP/RTNSS and BOP functions as power is available and for monitoring of all divisional information).

If Division 1 and Division 2 power from UPS is not available, then only PIP A and PIP B functionality is retained, which is sufficient to scram the plant and bring it to safe shutdown. Lighting derived from PIP A and PIP B is sufficient to operate the PIP A and PIP B VDUs. The situation is the same in the reverse direction. If PIP A and B lighting is lost, so will the PIP A and B VDUs, however, the Division 1 and Division 2 UPS lighting is sufficient to operate the Division 1 and Division 2 VDUs.

Based on the explanation above, power supply from Division 3 and Division 4 is not necessary for remote shutdown area lighting as it is provided by the eight hour battery powered lights and nonsafety-related power originating from the PIP buses.

If the concern is that there are only two safety divisions on each RSS, note that (because of PIP capability) the ESBWR design meets the RSS requirement that loss of offsite power, control room evacuation and single additional failure will leave enough capability to bring the plant to cold shutdown even if Division 1 and Division 2 were out of service. This can be better understood by noting that a main control room fire/evacuation does not affect the functionality of the N-DCIS or Q-DCIS equipment rooms nor the automatic or manual functionality of the systems they control.

DCD Impact

No DCD revision will be made in response to this RAI supplement.