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Supplement 1

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**Subject: Response to Portion of NRC Request for Additional Information
Letter No. 65 Related to ESBWR Design Certification Application –
DCD Section 8.1 –Electric Power - RAI Numbers 8.1-5 S01, 8.1-6 S01,
8.1-7 S01, 8.1-14 S01**

Enclosure 1 contains a supplemental response to the subject RAI resulting from a January 8, 2007 e-mail request from the NRC (Reference 1). GE's original response was transmitted via the Reference 2 letter.

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

Sincerely,

James C. Kinsey
Project Manager, ESBWR Licensing

Reference:

1. Email from U.S. Nuclear Regulatory Commission, *Staff Comments - Responses to Letter #65*, dated 1/8/2007
2. MFN 06-451 - *Response to Portion of NRC Request for Additional Information Letter No. 65 – Electric Power – RAI Numbers 8.1-1 through 8.1-14*, dated November, 21, 2006
3. MFN 06-353, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 65 Related to ESBWR Design Certification Application*, September 26, 2006

Enclosure:

1. MFN 06-451, Supplement 1, Response to NRC Request for Additional Information Supplement Related to ESBWR Design Certification Application – DCD Section 8.1 – RAI Numbers 8.1-5 S01, 8.1-6 S01, 8.1-7 S01, 8.1-14 S01,

cc: AE Cabbage USNRC (with enclosures)
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**MFN 06-451
Supplement 1**

Enclosure 1

**Response to NRC Request for Additional Information
Supplements Related to
ESBWR Design Certification Application –
DCD Section 8.1**

**RAI Numbers 8.1-5 S01, 8.1-6 S01, 8.1-7 S01,
and 8.1-14 S01**

For historical purposes, the original text of RAIs 8.1-5 S01, 8.1-6 S01, 8.1-7 S01, and 8.1-14 S01 and the GE responses are included preceding each supplemental response. Any original attachments or DCD mark-ups are not included to prevent confusion.

NRC RAI 8.1-5

In Section 8.1.5.2.4, the DCD states that the standby diesel generators are not safety-related, and by inference, that RG 1.9 (and therefore Institute of Electrical and Electronics Engineers Standard 387 (IEEE 387)) does not apply to the ESBWR. If the ESBWR design will not commit to the requirements of IEEE 387 and the guidance in RG 1.9 to demonstrate the capacity and capability of the standby diesel generators, identify what industry consensus standard will be used to demonstrate the availability and reliability of the standby diesel-generator units. (Note that Regulatory Guide (RG) 1.108 was withdrawn in 1993 and the original content of RG 1.108 was assumed into RG 1.9, Selection, Design, Qualification and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Emergency Power Systems At Nuclear Power Plants, Rev. 3.)

GE Response

The standby diesel generators will be manufactured, tested, installed and operated in accordance with recognized standards such as: Diesel Engine Manufacturers Association (DEMA), Standard Practices for Low and Medium Speed Stationary Diesel and Gas Engines and National Electrical Manufacturers Association (NEMA), NEMA MG 1 Motors and Generators.

Additionally, the COL licensee will review all plant SSCs (structures, systems and components) for Maintenance Rule (10 CFR 50.65) applicability (see Subsection 8.3.4.15 of DCD Tier 2, Rev. 2). The diesel generators will be classified per this review. The appropriate monitoring, testing, predictive/preventative maintenance and post-maintenance testing will be determined and the results trended. These results will be monitored against licensee-established goals, in a manner sufficient to provide reasonable assurance that such structures, systems, and components, are capable of fulfilling their intended functions. Such goals shall be established commensurate with safety and, where practical, take into account industry-wide operating experience.

DCD Impact

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

NRC RAI 8.1-5 Supplement 1:

The response should clarify that standby power system (SPS) for the post accident monitoring (PAM) system and the battery chargers (BC) required to recharge the 72

hour batteries should have defined reliability and availability goals consistent with the maintenance rule (10 CFR 50.65) as well as surveillance and test standards similar to those parts of regulatory guide 1.9 and IEEE 387 applicable to the ESBWR requirements for the SPS under the regulatory treatment of non-safety systems (RTNSS) program.

GE Response

As discussed and understood by the Staff in the teleconference conducted March 20, 2007, the COL holder will implement the maintenance rule (10 CFR 50.65) by reviewing the plant systems for applicability. The COL holder will include the standby diesel generator system in this review as required by 10 CFR 50.65 and regulatory guide 1.160. The COL holder will establish goals as appropriate and required by 10 CFR 50.65 for the standby diesel generator system. See Chapter 1, Tables 1.9-8 and 1.9-21 for COL holder responsibility for the maintenance rule.

The RTNSS evaluation of the ESBWR has been completed and submitted to the NRC as the response to RAI 19.1.0-2 (see letter MFN 07-066, dated January 30, 2007). The standby diesel generator system has been classified as a RTNSS system and the level of regulatory oversight for this function should be Regulatory Availability Specifications. These availability specifications will define the periodic surveillance and testing that will be performed. These specifications will be submitted to the NRC as part of the ESBWR's Chapter 19, Appendix-A submittal. Regulatory Guide 1.9 and IEEE 387 will be considered as input when developing these specifications, but will not be viewed as regulatory requirements, since they address safety-related emergency diesel generators and the ESBWR standby diesel generators are non safety-related.

DCD Impact:

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

NRC RAI 8.1-6

In Section 8.1.5.2.4, identify what limits will be placed on the standby diesel-generators for use other than powering the plant investment protection (PIP) buses. Describe what effects the use of the standby diesel units for peaking service will have on their availability and reliability. The response to branch technical position (BTP) ICSB-8, Use of Diesel-Generator Units for Peaking, implies that the standby diesel-generator units will be used for peaking.

GE Response

The standby diesel generators may be utilized to supply power to house load (PIP) buses during times the grid is under heavy loads and requires maximum generation. This would allow the main generator to supply the grid with this additional power to help maintain grid stability. ICSB-8 states, "In particular, emergency power diesel-generator sets should not be used for peaking service." ICSB references IEEE 308 and Regulatory Guide 1.32 in support of this conclusion. These standards address Class 1E safety-related diesel generators, which supplied the required AC power required by active safety-related system plants during an event with a loss of offsite power. Additionally, these power sources were required to be available (up to speed and ready to be loaded) in a very short duration (less than 10 seconds) from the start of the event. This was required by the accident analysis to enable the active safety-related systems to fulfill their mission and meet the requirements of the design and licensing basis.

The ESBWR passive safety-related systems design relies on stored energy and requires no AC power to perform the required mission for the first 72 hours. It is for this reason that the standby diesel can be used for peaking. Specifically, if during peaking, a design basis event occurs and a standby diesel protective trip and lockout were to occur, the operators would have ample time to review and reset the lockout during the 72 hour period before the diesels would be needed to be placed in service. Therefore, the active safety-related system plants would not be able to meet their design basis for the 10-second time required for the safety-related diesel involved, whereas, the ESBWR can.

DCD Impact

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

NRC RAI 8.1-6 Supplement 1:

The staff agrees with using the plant investment protection (PIP) standby power system (SPS) to power onsite house loads during periods of grid stress but does not agree with paralleling the SPS as peaking units during periods of high grid loading when the grid is more vulnerable and could provide an unnecessary challenge to the SPS. The response

should reflect the staff's position or should provide justification to permit the SPS to be used as peaking units during high grid loading.

GE Response:

As discussed with the Staff in the teleconference conducted March 20, 2007, the Staff better understands why GE maintains the position that during periods of high grid load the standby diesel generators are designed to provide power generation that may be used to support the grid.

The diesel generators are protected from grid fault and degraded voltage as shown in Subsection 8.3.1.1.6, "Circuit Protection," at the 6.9 kV incoming circuit breakers from the normal or alternate sources of offsite power. Subsection 8.3.1.1.8, "Standby Onsite AC Power Supply System", under "Protection Systems for Diesel Generators" lists ten conditions that will open the diesel generator circuit breaker and trip the diesel. The ESBWR will trip the diesel or the PIP bus to protect the plant equipment and the diesels from grid fault, therefore the diesels have been designed to act as an alternate power source that is safe to use during periods of high grid stress. These protection circuits will be conservatively set to protect the diesel, since unlike previous active plants, who have a demand to be running and start loading in 10 seconds, the ESBWR as a passive safety design has 72 hours to be running and start loading to fulfill its design basis mission. This is ample time to manually reset a protective trip or lockout if one were to occur during peaking and restart a diesel.

DCD Impact:

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

NRC RAI 8.1-7

Identify the reliability goals for the standby diesel-generators and describe how these goals will be monitored and maintained. (Reference: NUREG/CR 0660, Enhancement of Onsite Diesel Generator Reliability)

GE Response

The COL licensee will review all plant SSCs (structures, systems and components) for Maintenance Rule (10 CFR 50.65) applicability (see Subsection 8.3.4.15 of DCD Tier 2, Rev. 2). The standby diesel-generators will appropriately be classified per this review. The appropriate monitoring, testing, predictive/preventative maintenance and post-maintenance testing will be determined and the results trended. These results will be monitored against licensee-established goals, in a manner sufficient to provide reasonable assurance that such structures, systems, and components, are capable of fulfilling their intended functions. Such goals shall be established commensurate with safety and, where practical, take into account industry-wide operating experience.

DCD Impact

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

NRC RAI 8.1-7 Supplement 1:

The response should include a DCD COL item related to the reliability goals for the standby diesel generators.

GE Response:

As discussed with the Staff in the teleconference conducted March 20, 2007, the Staff has a better understanding why GE concludes that the COL holder will implement the maintenance rule (10 CFR 50.65) by reviewing the plant systems for applicability. The COL holder will include the standby diesel generator system in this review as required by 10 CFR 50.65 and regulatory guide 1.160. The COL holder will establish goals as appropriate and required by 10 CFR 50.65 for the standby diesel generator system. See Chapter 1, Tables 1.9-8 and 1.9-21 for COL holder responsibility for the maintenance rule.

The RTNSS evaluation of the ESBWR has been completed and submitted to the NRC as the response to RAI 19.1.0-2 (see letter MFN 07-066, dated January 30, 2007). The standby diesel generator system has been classified as a RTNSS system and the level of regulatory oversight for this function should be Regulatory Availability Specifications.

These availability specifications will define the periodic surveillance and testing that will be performed. These specifications will be submitted to the NRC as part of the ESBWR's Chapter 19, Appendix-A submittal.

DCD Impact:

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

NRC RAI 8.1-14

Compliance of Regulatory Requirements and Guidelines (DCD Tier 2, Rev. 1). Section 8.1.6.3 states in part that ... "Several criteria pertaining to safety-related diesel generators and of Ac power systems are not applicable for the ESBWR because the ESBWR does not require Ac power to achieve safe shutdown, and its two diesel generators are not safety related. However, defense-in-depth principles such as redundancy and diversity are incorporated in the design and integration of ESBWR systems." To obtain defense-in-depth, the reliability of the Ac power system and the standby diesel generators should be demonstrated through surveillance testing. Since surveillance requirements for these systems are not included in Section 3.8 of the technical specifications, nor licensing conditions specified to monitor the performance or condition of these systems against established goals in accordance with 10 CFR 50.65(a)(1), please explain how the defense-indepth philosophy is validated?

GE Response

Refer to the responses in RAI 8.3-16 and RAI 8.1-5.

DCD Impact

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

NRC RAI 8.1-14 S01:

Refer to comments on RAIs 8.1-5 and 8.3-16 regarding surveillance requirements for the diesel generators.

GE Response

As discussed with the Staff in the teleconference conducted March 20, 2007, the Staff better understands why GE concludes the following is consistent with the responses to RAI Supplements 8.1-5 S01 and 8.3-16 S01:

An evaluation was performed of the ESBWR design in accordance with 10 CFR 50.36. This evaluation determined the SSCs requiring inclusion in the ESBWR Technical Specifications. The results of this evaluation did not require inclusion of the standby diesel generators into the ESBWR Technical Specifications (see RAI 16.0-1, transmitted to the NRC by letter MFN 06-263, dated August 8, 2006).

The COL holder will implement the maintenance rule (10 CFR 50.65) by reviewing the plant systems for applicability. The COL holder will include the standby diesel generator system in this review as required by 10 CFR 50.65 and regulatory guide 1.160. The COL holder will establish goals as appropriate and required by 10 CFR 50.65 for the standby diesel generator system. See Chapter 1, Tables 1.9-8 and 1.9-21 for COL holder responsibility for the maintenance rule.

The RTNSS evaluation of the ESBWR has been completed and submitted to the NRC as the response to RAI 19.1.0-2 (see letter MFN 07-066, dated January 30, 2007). The standby diesel generator system has been classified as a RTNSS system and the level of regulatory oversight for this function should be Regulatory Availability Specifications. These availability specifications will define the periodic surveillance and testing that will be performed. These specifications will be submitted to the NRC as part of the ESBWR's Chapter 19, Appendix-A submittal. Regulatory Guide 1.9 and IEEE 387 will be considered as input when developing these specifications, but will not be viewed as regulatory requirements, since they address safety-related emergency diesel generators and the ESBWR standby diesel generators are nonsafety-related.

DCD Impact:

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