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Supplement 2

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Subject: **Response to Portion of NRC Request for Additional Information  
Letter No. 96 – Auxiliary Systems – RAI Numbers 9.5-45 S01 and  
9.5-46 S01**

Enclosure 1 contains GEH's response to the subject NRC RAIs transmitted via Reference 1 which is a supplemental request to the RAIs transmitted via Reference 2. The original RAI responses were submitted to the NRC via Reference 3.

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

*DO68*

*NRO*

Reference:

1. E-mail dated June 8, 2007 from L. Quinones (NRC) to P. Jordan (GEH)
2. MFN 07-231, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 96 Related to the ESBWR Design Certification Application*, April 12, 2007.
3. MFN 07-260, Supplement 1 – Letter from GE to U.S. Nuclear Regulatory Commission, *Response to Portion of NRC Request for Additional Information Letter No. 96 Related to ESBWR Design Certification Application – Auxiliary Systems – RAIs 9.5-45, 46, 48, and 53*, May 11, 2007.

Enclosure:

1. MFN 07-260, Supplement 2- Response to Portion of NRC Request for Additional Information Letter No. 96 – RAI Numbers 9.5-45 S01 and 9.5-46 S01.

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**Enclosure 1**

**MFN 07-260  
Supplement 2**

**Response to Portion of NRC Request for  
Additional Information Letter No. 96  
Related to ESBWR Design Certification**

**Auxiliary Systems**

**RAI Numbers 9.5-45 S01 and 9.5-46 S01**

**For historical purposes, the original text of RAIs 9.5-45 and 9.5-46 and the GE responses are included.**

**RAI 9.5-45**

*Include a COL Action Item for the Fire Hazards Analysis for all areas of the plant that contain SSCs important to safety. The following item should be included in the COL Action Items for the ESBWR fire protection program. A detailed description of this aspect of the ESBWR fire protection program is required to adequately determine that the design meets regulatory requirements. However, the final design for this aspect of the program has not been developed sufficiently at the DCD stage to be described in adequate detail to conclude that the design is acceptable. Fire Hazards Analysis - Provide the final fire hazards analysis for all areas of the plant that contain SSCs important to safety (the DCD includes a COL Action Item for the fire hazards analysis for the yard areas only).*

**GE Response**

DCD Tier 2, Revision 3, Appendix 9A, describes the fire hazard analysis for all areas of the plant that contain safety-related SSCs. DCD Tier 2, Revision 3, Subsection 9.A.5.7, requires the COL applicant to provide the fire hazard analysis for yard areas that are outside the standard ESBWR design. No additional COL Action Item is required.

**DCD Impact**

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

*E-mail dated June 8, 2007, from L. Quinones (NRC) to P. Jordan (GEH)*

**NRC RAI 9.5-45 S01:**

*The GE response does not adequately address RAI 9.5-45. Regulatory Position 1.2, "Fire Hazards Analysis," of RG 1.189, "Fire Protection for Nuclear Power Plants," provides a detailed description of the information that should be provided in a final Fire Hazards Analysis for areas containing SSCs important to safety. The ESBWR DCD has not identified any exceptions to this Regulatory Position, however, the Fire Hazards Analysis provided in Appendix 9A of the ESBWR DCD does not include all of the appropriate information described in the regulatory guide.*

*In addition, GE has included NFPA 804, 2006 Edition, "Standard for Fire Protection for Advanced Light Water Reactor Electric Generating Plants," in Table 1.9-22, "Industrial Codes and Standards Applicable to ESBWR," and has not identified any exceptions to this standard in the DCD. Section 4.4, "Fire Hazards Analysis," of NFPA 804 includes a list of information items that the plant Fire Hazards Analysis "shall document." The ESBWR Fire Hazards Analysis provided in Appendix 9A of the DCD does not include all of the appropriate information required by the standard.*

*The staff assumed that the detailed design for the ESBWR had not progressed to the point where this information could be provided and/or the information would be developed with the programmatic aspects of the Fire Protection Program. That is the basis for RAI 9.5-45. However, GE's response to this RAI indicates that GE does not intend to provide any additional information for the Fire Hazards Analysis for all areas of the plant that contain safety-related SSCs, beyond what is currently in the DCD. It is the staff's position that the information described in RG 1.189, Regulatory Position 1.2 and the information required by Section 4.4 of NFPA 804 is important to the NRC's assessment of the acceptability of the design of the Fire Protection Program for the ESBWR. Consequently, this information should either be provided in the DCD or a COL Action Item should be included to provide the information in the COL application.*

**GEH Response:**

DCD Tier 2, Revision 3, Subsection 9.5.1 and Appendix 9A were reviewed against FHA objectives as stated in Regulatory Position 1.2 of Regulatory Guide 1.189. Appendix 9A of the DCD includes fire zone drawings and tables summarizing the fire hazard and safe shutdown analysis for each individual fire area, including areas containing SSCs important to safety. The fire hazard and safe shutdown analysis tables provided for each fire area include information on potential combustibles, fire detection (primary and backup), fire suppression (primary and backup), effects of inoperable fire protection equipment on safe shutdown. These tables also provide information related to plant operation, radiological release, life safety, manual firefighting and property loss. There is a COL Holder Item in place to revise the existing fire hazard analysis to reflect as-built design or justify any deviations occurring during construction. DCD Tier 2, Revision 3, Subsection 9.5.1.12 provides a COL Holder Item to conduct a compliance review of the as-built design against the assumptions and requirements stated in the FHA. Based on this review, the FHA is updated as necessary. DCD Tier 1, Revision 3 Subsection 2.16.3 provided Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) related to the FHA. Deviations from the FHA described in the DCD and determined under Tier 1 of the DCD, are dispositioned in accordance with the applicant's approved fire protection program.

With respect to the list of information items from NFPA 804, DCD Tier 2, Revision 3, Subsection 9.5.1 and Appendix 9A were reviewed against Section 4.4, Fire Hazard Analysis, of NFPA 804. The DCD contains the items documented under NFPA 804 4.4.2. The DCD contains the appropriate level of detail for design certification required by the Regulatory Guidance 1.206. There is a COL Holder Item in place to revise the existing fire hazard analysis to reflect as-built design and justify any deviations. DCD Tier 2, Revision 3, Subsection 9.5.1.12 requires COL Holder referencing the ESBWR Standard Plant to conduct a compliance review of the as-built design against the assumptions and requirements stated in the FHA. Based on this review, the FHA is updated as necessary. DCD Tier 1, Revision 3 Subsection 2.16.3 provides Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) related to the FHA. Deviations from the FHA described in the DCD and validated under Tier 1 of the DCD, are dispositioned in accordance with the applicant's approved fire protection program.

**DCD Impact:**

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

**RAI 9.5-46**

*Include a COL Action Item for the Special Cases described in DCD Section 9A.6. The following item should be included in the COL Action Items for the ESBWR fire protection program. A detailed description of this aspect of the ESBWR fire protection program is required to adequately determine that the design meets regulatory requirements. However, the final design for this aspect of the program has not been developed sufficiently at the DCD stage to be described in adequate detail to conclude that the design is acceptable. Special Cases - Provide verification that the final Fire Protection Program (FPP) is in accordance with the assumptions and bases for acceptance of each of the Special Cases described in DCD Section 9A.6.*

**GE Response**

The final Fire Protection Program is in accordance with the assumptions and bases for acceptance for each of the Special Cases as described in detail in DCD Tier 2, Revision 3, 9A.6. No additional COL Action Item is required.

**DCD Impact**

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

*E-mail dated June 8, 2007, from L. Quinones (NRC) to P. Jordan (GEH)*

**NRC RAI 9.5-46 S01**

*The level of information described above [RAI 9.5-45 S01] for a Fire Hazards Analysis that is in accordance with RG 1.189 and NFPA 804 should be provided for the Special Cases to allow the staff to adequately evaluate the acceptability of the ESBWR Fire Protection Program. Section 9A.6 of the ESBWR DCD contains a number of non-specific design descriptions that do not provide sufficient specific information to assess the acceptability of the design. For example, Section 9A.6.2, "Fire Door Deviation," provides no specific of door design and states that "These doors generally have a backup door." The final Fire Hazards Analysis should provide the design details of the special doors, identify which have a backup fire door, provide details of combustible materials on both sides of the doors (type, quantity, and location), etc.*

*Section 9A.6.4.7, "Local Instrumentation and Control Equipment," states that "Multidivisional panel and racks are located in divisional compartments with physical separation between divisions." The Fire Hazards Analysis should identify each case and provide details of the configuration including physical separation. This section also states that "Some areas contain more than one division of instrumentation needed to isolate redundant sets of isolation valves, HVAC, or for some other purpose requiring redundancy." The final Fire Hazards Analysis should identify each area and provide configuration details, potential failures due to fire, etc.*

*In addition, the staff's final acceptance of the deviations taken by GE for the ESBWR of no fixed fire suppression in the rooms surrounding the Main Control Room and beneath the raised floor in the Main Control Room, as well as the exception of no detection in individual electrical cabinets in the Main Control Room, will be based on the Fire Hazards Analysis. The acceptance of these deviations will be based on the staff's evaluation of the quantity and location of combustible materials, access to the interior of the electrical cabinets, ventilation airflow patterns in the control room, plant procedures, etc. These are details that should be included in the Fire Hazards Analysis but are not currently in the analysis provided in the DCD.*

*The detailed fire hazard information for the Special Cases in Section 9A.6 of the DCD should be provided in a revision to the DCD or identified as an action item for the COL applicant to provide.*

**GEH Response:**

Regulatory Guide 1.206 C.III.1, Section 9.5.1.1, Fire Protection Program, states that information may not be available or possible to provide at the time the COL application is submitted. This information includes:

1) The final fire hazards analysis based on purchased materials (type and quantity) and final plant equipment arrangements, including description of access for manual firefighting based on final layouts (typically not available until after COL submittal),

and

2) Final post-fire safe-shutdown analysis based on final plant cable routing and equipment arrangement (typically not available until after COL submittal).

ESBWR detailed design information, such as final plant equipment arrangements and final cable routing is currently not available. Final details associated with the design of any "unqualified fire door" will be qualified by documented analysis, qualification testing in accordance with RG 1.189 and/or use of a vestibule containing a supplemental rated fire door.

The combustible loading and electrical equipment ventilation airflow patterns cannot be provided to the NRC prior to design certification. While final detail information is not available, the DCD includes sufficient information to verify that the design meets the regulatory requirements. DCD Tier 2, Revision 3, Appendix 9A, Table 9A.5-3, Control Building, includes information related to combustibles above ceiling and below floor access, both primary and backup fire detection and impact of inoperable fire protection equipment on safe shutdown.

DCD Tier 2, Revision 3, Subsection 9.5.1.12 provides a COL Holder Item, as described in RG 1.206, to conduct a compliance review of the as-built design against the assumptions and requirements stated in the FHA. Based on this review, the FHA is updated as necessary. DCD Tier 1, Revision 3, Subsection 2.16.3 provides Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) related to the FHA. Deviations from the FHA described in the DCD and validated under Tier 1 of the DCD, are dispositioned in accordance with the applicant's approved fire protection program. Based on the guidance provided in RG 1.206, final detailed design information is not required to be provided at the time the COL application is to be submitted. DCD Tier 2, Revision 3, Subsection 9.5.1 and Appendix 9A provide the regulatory requirements associated with the design of the fire protection system and development of the fire protection program related to the fire hazards analysis. There is a COL Holder Item in place to verify these requirements are met and any deviations are adequately addressed.

**DCD Impact:**

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