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Subject: **Revised Response to Portion of NRC Request for Additional Information Letter No. 391 Related to Design Control Document (DCD) Revision 6 - RAI Number 8.3-67**

Enclosure 1 contains the revised GE Hitachi Nuclear Energy (GEH) response to the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) 8.3-67 (Reference 1). The original response for this RAI was transmitted in Reference 2. This revision is in response to NRC staff questions on the original response.

If you have any questions about the information provided, please contact me.

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Sincerely,

Richard E. Kingston

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Vice President, ESBWR Licensing

References:

1. MFN 09-725, Letter from the U.S. Nuclear Regulatory Commission to Jerald G. Head, Request for Additional Information Letter No. 391, Related To Design Control Document (DCD) Revision 6, dated November 9, 2009
2. MFN 09-743, Letter from Richard E. Kingston to the U.S. Nuclear Regulatory Commission, "*Response to Portion of NRC Request for Additional Information Letter No. 391 Related to Design Control Document (DCD) Revision 6 - RAI Number 8.3-67*" dated November 24, 2009.

Enclosure:

1. MFN 09-743, Revision 1, Revised Response to Portion of NRC Request for Additional Information Letter No. 391 Related to Design Control Document (DCD) Revision 6 - RAI Number 8.3-67

cc:

AE Cubbage	USNRC (with enclosures)
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PM Yandow	GEH/Wilmington (with enclosures)
eDRF Section	0000-0111-0065

Enclosure 1

MFN 09-743, Revision 1

Revised Response to Portion of NRC Request for

Additional Information Letter No. 391

Related to Design Control Document (DCD) Revision 6

RAI Numbers 8.3-67

NRC RAI 8.3-67

DCD Section 8.3.3.2 does not address the use of underground cables or cables in a wetted environment. Operating experience has shown that cross-linked polyethylene (XLPE) or high-molecular-weight polyethylene insulation materials are most susceptible to water tree formation. Cable failures have a variety of causes: manufacturing defects, damaged caused by shipping and installation and exposure to electrical transients or abnormal environmental conditions during operation. Electrical cables in nuclear power plants are usually located in dry environments, but some cables are exposed to moisture from condensation and wetting in inaccessible locations such as buried conduits, cable trenches, cable troughs, above ground and underground duct banks, underground vaults, and direct buried installations. Since underground cables are susceptible to moisture, identify the cables that are inaccessible or routed underground that support equipment and other systems that are within the scope of 10 CFR 50.65 (the Maintenance Rule). Indicate whether there are any plans to implement a program for inaccessible or underground power, control, and instrumentation cables for testing and inspection in accordance with Generic Letter 2007-01; and indicate the frequency for such testing and inspection or provide justification for not developing such program.

GEH Response

Maintenance Rule and Generic Letter 2007-01 are both addressed to holders of operating licenses for nuclear power plants. New plants are covered by the COL activities during the formation of their Maintenance Rule applicability matrix for components and systems determined to be within the Rule for the new design.

ESBWR standard plant design cables are routed in tunnels and raceway designed to remain dry and not be susceptible to flooding and moisture intrusion. The cables in the buried conduit routed from the cable tunnels between the Electric Building and the Turbine, Control and Reactor buildings that branch off from the tunnel to the Fire Protection Building are in sealed metal conduit, buried in a poured concrete raceway with no manholes. Therefore flooding is not an issue.

The standard ESBWR plant design will have its principal plant structures, as listed in Section 1.2.1, connected by a series of tunnel structures that will enable the routing of cables and raceway in areas not subject to water intrusion. For other ESBWR structures not listed in Section 1.2.1 as well as site specific structures requiring electric power, the detail design is owners yard scope, not considered part of the standard plant design and is covered by the COL applicants. An example is; Section 9.2.1.2 Summary Description of the plant service water system (PSWS) third sentence states, ”The portions of PSWS that are not part of the ESBWR Standard Plant consist of the heat rejection facilities (NPHS and AHS), which are dependent on actual site conditions.” Figure 9.2-1 shows the PSWS Simplified Diagram that is outside the scope of the standard plant.

This will include such items as piping, cables and their raceway that connect to the outlying systems and structures that are outside the standard plant design and within the owner yard scope.

Cable insulation that was used during the 1960's, 70's and 80's for low and medium voltage cables was found to have been subject to water-tree formation. Cables now being manufactured for low and medium voltage usage in nuclear power plant duct banks are of new designed insulation material that has a water-tree formation retardant additive added. Medium voltage and low voltage cables used in duct banks also have a metallic sheath to prevent moisture ingress into the cable insulation. Further advances in cable insulation curing now use a dry cure process instead of the past practice of steam curing that lead to further aggravating the water-treeing process which lead to early cable failure in a flooded location.

FSAR Section 8.2.1.2, in response to COLA RAI 8.2-29 (Dominions), has committed to using dry-cured and sheathed cables as well as manhole inspection. The PSWS duct banks and associated manholes are considered a continuous part of the owners yard scope of duct banks and cables.

Monitoring of the low and medium voltage cables that are in a potentially wetted environment due to manholes are in the owners yard scope and covered by the COL Applicant per the Maintenance Rule. ESBWR RTNSS systems, components and functions are within the scope of the Maintenance Rule and have "Maintenance Rule availability controls per Table 19A-2 (Note)". COL Applicant responsibilities as stated in DCD Subsection 8.1.5.2.4 for RG 1.160; "Maintenance Rule is addressed in Table 1.9-21 and Subsection 13.5.2 for Operating and Maintenance Procedures." In summary, the issues discussed in GL 2007-01 are best addressed by the COL applicants as seen in (Dominions) FSAR Section 8.2 and are not directly applicable to the ESBWR standard design as explained above and therefore require no further DCD changes to the standard design.

DCD Impact

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