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Subject:       **Response to Portion of NRC Request for Additional Information  
Letter No. 42 Related to ESBWR Design Certification Application –  
DCD Fire Protection - RAI Numbers 15.5-1, 15.5-2 and 15.5-4**

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

If you have any questions about the information provided here, please let me know.

Sincerely,

David H. Hinds  
Manager, ESBWR

Enclosure:

1. MFN 06-279 - Response to Portion of NRC Request for Additional Information Letter No. 42 Related to ESBWR Design Certification Application – DCD Fire Protection - RAI Numbers 15.5-1, 15.5-2 and 15.5-4

Reference:

1. MFN 06-233, Letter from U. S. Nuclear Regulatory Commission to Mr. David Hinds, *Request for Additional Information Letter No. 42 Related to ESBWR Design Certification Application*, July 13, 2006

cc: WD Beckner USNRC (w/o enclosures)  
AE Cubbage USNRC (with enclosures)  
LA Dudes USNRC (w/o enclosures)  
GB Stramback GE/San Jose (with enclosures)  
eDRFs 0000-0041-8945

**ENCLOSURE 1**

**MFN 06-279**

**Response to Portion of NRC Request for**

**Additional Information Letter No. 42**

**Related to ESBWR Design Certification Application**

**DCD Fire Protection**

**RAI Numbers 15.5-1, 15.5-2 and 15.5-4**

NRC RAI 15.5-1

*BTP 9.5-1 Section 6.3 notes that in evaluating the capability to accomplish post-fire safe shutdown, offsite power may or may not be available and consideration should be given to both cases. Verify that in the event offsite power is not lost, the consequences of the safe shutdown fire will not be greater.*

GE Response

Safe shutdown requirement with offsite power is dependent on the availability of normal operating systems. If the Main Condenser is available, it can be used for decay heat removal and reactor vessel depressurization. A number of modes of the Fuel and Auxiliary Pools Cooling System (FAPCS) and Reactor Water Cleanup/Shutdown Cooling (RWCU/SDC) system, and Isolation Condenser System (ICS) are also available to remove decay heat. Reactor coolant inventory makeup can be provided by the ICS, Control Rod Drive (CRD) system and/or the FAPCS low pressure coolant injection (LPCI) mode. If feedwater is available throughout the event and no other system perturbation has caused an automatic initiation of the reactor protection system (RPS), it still may be necessary to manually shutdown the reactor. The Turbine Bypass System (TBS), Main Condenser and Condensate and Feedwater System (C&FS) combination can be used to maintain reactor coolant inventory and manual depressurize of the reactor vessel. CRD pump flow and the ICS can also be used to maintain coolant inventory and control reactor vessel pressure.

A slightly more severe case results if the main condenser is not available. Scram occurs on closure of main steam isolation valves (MSIVs) or turbine stop valve due to loss of condenser vacuum. Overpressure protection is provided by the ICS and SRVs. FAPCS, RWCU/SDC and ICS are available to remove decay heat. If feedwater is not available, the CRD pump flow and ICS flow will maintain coolant inventory. The C&FS and FAPCS LPCI mode could also be available for vessel injection.

A more limiting case is a fire with shutdown based on loss of offsite power (LOOP). Tier 2 Subsection 15.5.6 considers the worst scenario that a fire occurs in the main control room (MCR), requiring operator evacuation. Per RG 1.189, Subsection 5.6.2 (Control Room Fire), LOOP shall be assumed for the bounding analysis for a fire in MCR. Thus, the analysis assumption for LOOP in Tier 2 Subsection 15.5.6 is consistent with the regulatory guidance in RG 1.189.

No Tier 2 change will be made in response to this RAI.

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Enclosure 1

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NRC RAI 15.5-2

*While the acceptance criteria in the safe-shutdown fire analysis (DCD Tier 2, Section 15.5.6) do not include reactor pressure control, the analysis assumptions identifies systems that will be available for "vessel inventory and pressure control". Should pressure control be included in the acceptance criteria?*

GE Response

The Safe Shutdown Fire acceptance criteria to achieve and maintain (first) hot shutdown and (later) cold shutdown, as defined in Subsection 1.2.1 of Tier 1, already include pressure control.

No Tier 2 change will be made in response to this RAI.

NRC RAI 15.5-4

*Paragraph 5.5.2.1 of NFPA 804, 2001 Edition, states that "operator actions necessary to achieve FSSD [fire-safe shutdown] of the reactor shall be kept to a minimum." The NRC has issued specific regulatory expectations and guidelines for crediting operator actions in the event of a fire. That guidance is provided in RIS 2005-30 and draft Regulatory Issue Summary 2006-XX, "Regulatory Expectations for Appendix R Paragraph III.G.2 Operator Manual Actions." Confirm that operator manual action credited by the ESBWR for post-fire, safe shutdown analyses are in compliance with the regulatory expectations described in these generic communications.*

GE Response

Appendix R reads:

**"Appendix R to Part 50--Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979**

**I. Introduction and Scope**

This appendix applies to licensed nuclear power electric generating stations that were operating prior to January 1, 1979, except to the extent set forth in § 50.48(b) of this part. With respect to certain generic issues for such facilities it sets forth fire protection features required to satisfy Criterion 3 of Appendix A to this part."

Therefore, Appendix R does not directly apply to the ESBWR.

The only operator action credited in the analysis is manual scram of the reactor before evacuation from MCR, which is the only operator action allowed in RG 1.189 Section 5.6.2. After the operator regains the control in the remote shutdown panel (RSP), the manual action may be necessary to control Isolation Condenser System (ICS) to assure the maximum cooldown rated not exceeding 100°F/hr. Because the controls in RSP are identical to those in MCR, the systems can be fully controlled from RSP as in MCR. Therefore, operator action is kept to a minimum for ESBWR post-fire safe shutdown, which is in compliance with the regulatory expectations.

No Tier 2 change will be made in response to this RAI.