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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 66 Related to ESBWR Design Certification Application – Safety Analyses – RAI Number 15.5-8**

Enclosure 1 contains GE-Hitachi Nuclear Energy Americas (GEH) response to the subject NRC RAI transmitted via Reference 1. Enclosure 2 contains the DCD Markup associated with this response.

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

Sincerely,

Kathy Sedney for

James C. Kinsey
Vice President, ESBWR Licensing

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NRO

Reference:

1. MFN 06-377 – Letter from US Nuclear Regulatory Commission (NRC) to David H. Hinds, *Request for Additional Information Letter No. 66 Related to ESBWR Design Certification Application,* dated October 10, 2006

Enclosures:

1. Response to NRC Request for Additional Information Letter No. 66 Related to ESBWR Design Certification Application – Safety Analyses, RAI Number 15.5-8
2. DCD Markups

cc: AE Cubbage USNRC (with enclosures)
GB Stramback GEH /San Jose (with enclosures)
RE Brown GEH /Wilmington (with enclosures)
eDRF 0073-7051

Enclosure 1

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Response to Portion of NRC Request for Additional Information Letter No. 66 Related to ESBWR Design Certification Application

Safety Analyses

RAI Number 15.5-8

NRC RAI 15.5-8:

Regulatory position 3.2.7 of RG 1.155 states that the ability to maintain appropriate containment integrity during a loss of all ac power should be addressed. The applicant addresses containment integrity in terms of design limits on pressures and temperatures. Please add a discussion to section 15.5 of the ESBWR DCD explaining what provisions are present to assure valve position indication and closure for containment isolation valves that may be in the open position at the onset of a station blackout.

GE Response:

Section 15.5 DCD Tier 2 describes various aspects of the ESBWR Station Blackout Evaluation. The section will be revised to include a statement explaining what provisions are present to assure valve position indication and closure for containment isolation valves that may be in the open position at the onset of a station blackout. The changes are as indicated on the attached revised DCD Section.

Section 6.2.4.2, "System Design" (for Containment Isolation Function) states "Power-operated containment isolation valves have position indicating switches in the control room to show whether the valve is open or closed. Power for valves used in series originates from physically independent sources without cross ties to assure that no single event can interrupt motive power to both closure devices."

Section 8.3.2.1.1 "Safety-Related Station Batteries and Battery Chargers," further addresses the SBO requirements for the power to the position indication and closure for these valves.

DCD Impact:

DCD Tier 2, Section 15.5.5, " Station Blackout", will be revised as noted on the attached markup.

Enclosure 2

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DCD Markup

15.5.5 Station Blackout

The performance evaluation for Station Blackout (SBO) show conformance to the requirements of 10 CFR 50.63 and is presented in this subsection.

15.5.5.1 Acceptance Criteria

The design meets the following acceptance criteria:

- **Reactor Vessel Coolant Integrity** - Adequate reactor coolant inventory is maintained such that reactor water level is maintained above the core (i.e., top of active fuel).
- **Hot Shutdown Condition** - Achieve and maintain the plant to those shutdown conditions specified in plant Technical Specifications as Hot Shutdown.
- **Containment Integrity** - If containment isolation is involved, the maximum containment and suppression pool pressures and temperatures are maintained below their design limits.
- **Containment Isolation Valve Position Indication and Closure** – As described in Section 8.3.2.1.1, "Safety-Related Batteries and Battery Charger" SBO requirements related to the required power for valve position indication and containment isolation closure verification are met.

15.5.5.2 Analysis Assumptions

The analysis assumptions and inputs are summarized below.

- Reactor is operating initially at 102% of rated power/100% rated nominal core flow, nominal dome pressure and normal water level at L4. The reactor has been operating at 102% of rated power for at least 100 days.
- The nominal ANSI/ANS 5.1-1994 decay heat model is assumed with an initial core power of 102%.
- SBO starts with loss of all alternating current (AC) power, which occurs at time zero. Auto bus transfer is assumed to fail.
- Loss of AC power trips reactor, feedwater, condensate and circulating water pumps, and initiates a turbine load rejection.
- The reactor scrams occurs at 2.0 seconds due to loss of power supply to feedwater pumps. When feedwater flow is lost, there is a scram signal with a delay time of 2.0 seconds.
- BPV open on load rejection signal.
- Closure of all Main Steam Isolation Valves (MSIVs) is automatically initiated when the reactor water level reaches Level 2 after 30 second time delay. The valves are fully closed at 5.0 seconds after signal.
- CRD pumps are not available due to loss of all AC power. The systems available for initial vessel inventory and pressure control, containment pressure/temperature control and suppression pool temperature control are: