GE Hitachi Nuclear Energy

Richard E. Kingston
Vice President, ESBWR Licensing

PO Box 780 M/C A-65
Wilmington, NC 28402-0780
USA

T 910 819 6192
F 910 362 6192
rick.kingston@ge.com

MFN 09-295 Docket No. 52-010

May 4, 2009

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Subject: **Response to Portion of NRC Request for Additional Information Letter No. 326 Related to ESBWR Design Certification Application – Technical Specifications – RAI Number 16.2-33 S02**

Enclosures 1 and 2 contain the GE Hitachi Nuclear Energy (GEH) response to the subject NRC RAI transmitted via the Reference 1 letter.

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

Sincerely,

Richard E. Kingston

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Vice President, ESBWR Licensing

Reference:

1. MFN 09-248, Letter from U.S. Nuclear Regulatory Commission to Jerald G. Head, *Request for Additional Information Letter No. 326 Related to ESBWR Design Certification Application, April 8*, 2009

Enclosures:

1. MFN 09-295 – Response to Portion of NRC Request for Additional Information Letter No. 326 Related to ESBWR Design Certification Application – Technical Specifications – RAI Number 16.2-33 S02
2. MFN 09-295 – DCD Markups for RAI Number 16.2-33 S02

cc:	AE Cubbage	USNRC (with enclosures)
	JG Head	GEH (with enclosures)
	DH Hinds	GEH (with enclosures)
	eDRF	100-8784

Enclosure 1

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Response to Portion of NRC Request for

Additional Information Letter No. 326

Related to ESBWR Design Certification Application

- Technical Specifications -

RAI Number 16.2-33 S02

NRC RAI 16.2-33 S02

The response to RAI 16.2-33S01 (MFN 07-024 Supplement 4, Oct 7, 2008) states that when the FWCS is in manual mode, the requirements of TS 3.2.2 are not met because a basic assumption of the OLMCPR as defined in the COLR would not be met. The response then states that, "In this case, Specification 3.2.2 includes appropriate actions requiring restoration of automatic control of the FWCS or to reduce thermal power of the unit to less than 25% of rated thermal power, as necessary." Without clarifications in the Bases, it is unlikely that anyone, other than a trained licensed operator, would know that the MCPR LCO is not met when FWCS is in manual mode. In addition, the Actions do not explicitly address restoring FWCS to automatic mode.

Revise the Bases for GTS 3.2.2 to explicitly state that meeting the LCO on minimum critical power ratio (MCPR) requires the feedwater control system (FWCS) to be in automatic mode (automatic feedwater control) because this is a basic assumption of the operating limit MCPR (OLMCPR) as specified in the COLR and which is based on the safety analysis of the inadvertent isolation condenser initiation event. Also, revise the bases to explicitly state that the LCO is not met while FWCS is in manual mode (controlling feedwater manually).

GEH Response

The Bases for GTS 3.2.2, MCPR, will be revised to state that an assumption in the transient analyses is that the Feedwater Control System is in automatic mode, and that if the Feedwater Control System is in manual mode then the LCO is not met.

DCD Impact

DCD Tier 2, Chapter 16, Section B 3.2.2 will be revised as shown in Enclosure 2.

Enclosure 2

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DCD Markups for

RAI Number 16.2-33 S02

B 3.2 POWER DISTRIBUTION LIMITS

B 3.2.2 MINIMUM CRITICAL POWER RATIO (MCPR)

BASES

BACKGROUND

MCPR is a ratio of the fuel assembly power that would result in the onset of boiling transition to the actual fuel assembly power. The Fuel Cladding Integrity Safety Limit (FCISL) is established as greater than 99.9% of the fuel rods in the core would be expected to avoid boiling transition (refer to the Bases for SL 2.1.1.2). The operating limit MCPR is established to ensure that no fuel damage results during anticipated operational occurrences (AOOs). Although fuel damage does not necessarily occur if a fuel rod actually experiences boiling transition (Ref. 1), the critical power at which boiling transition is calculated to occur has been adopted as a fuel design criterion.

The onset of transition boiling is a phenomenon that is readily detected during the testing of various fuel bundle designs. Based on these experimental data, correlations have been developed to predict critical bundle power (i.e., the bundle power level at the onset of transition boiling) for a given set of plant parameters (e.g., reactor vessel pressure, mass flux, and subcooling). Because plant operating conditions and bundle power levels are monitored and determined relatively easily, monitoring the MCPR is a convenient way of ensuring that fuel failures due to inadequate cooling do not occur.

APPLICABLE SAFETY ANALYSES

The analytical methods and assumptions used in evaluating the AOOs to establish the operating limit MCPR are presented in Chapter 4. To ensure that the FCISL is not exceeded during any transient event that occurs with moderate frequency, limiting transients have been analyzed to determine the critical power ratio (CPR) transient uncertainty. The types of transients evaluated are decrease in core coolant temperature, increase in reactor pressure, increase in reactor coolant inventory, decrease in reactor coolant inventory. The steady-state and CPR transient uncertainties and the uncertainties in monitoring and simulating the core operating state are incorporated by the statistical model (Ref. 2) to determine the required operating limit MCPR. The transient analyses assume that the feedwater control system is in automatic mode; therefore, if the feedwater control system is in manual mode, then the MCPR LCO is not met.