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MFN 08-385

Docket No. 52-010

April 24, 2008

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. 135 Related to ESBWR Design Certification Application – RAI Number 7.1-66**

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) response to the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) sent by NRC letter dated January 14, 2008. The RAI response is included in Enclosure 1.

Verified DCD changes associated with these RAI responses are identified in the enclosed DCD markups by enclosing the text within a black box. The marked-up pages may contain unverified changes in addition to the verified changes resulting from these RAI responses. Other changes shown in the markup(s) may not be fully developed and approved for inclusion in DCD Revision 5.

If you have any questions or require additional information, please contact me.

Sincerely,

James C. Kinsey  
Vice President, ESBWR Licensing

DC08  
NRO

Reference:

1. MFN 08-038, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GE, *Request For Additional Information Letter No. 135 Related To ESBWR Design Certification Application*, dated January 14, 2008

Enclosures:

1. Response to Portion of NRC Request for Additional Information Letter No. 135 Related to ESBWR Design Certification Application - RAI Number 7.1-66
2. Response to Portion of NRC Request for Additional Information Letter No. 135 Related to ESBWR Design Certification Application - RAI Number 7.1-66 DCD Markups

cc:

AE Cabbage            USNRC (with enclosure)  
GB Stramback        GEH/San Jose (with enclosure)  
RE Brown            GEH/Wilmington (with enclosure)

eDRF Sections:

0000- 0080-0505 (RAI 7.1-66)

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**Enclosure 1**

**Response to Portion of NRC Request for Additional  
Information Letter No. 135 Related to ESBWR Design**

**Certification Application –**

**RAI Number 7.1-66**

**NRC RAI 7.1-66**

*DCD Tier 2, Revision 4, Section 7.1.2.4 "Q-DCIS Regulatory Requirements Conformance Summary": Explain why conformance, by the Q-DCIS to BTP 7-10, Guidance on Application of Regulatory Guide (RG) 1.97, was removed. Explain the intent of conformance to all Digital I&C Interim Staff Guidance and list as references. (Example: Cyber Security Program Plan LTR has listed conformance to DI&C-ISG-04, Interim Staff Guidance on Communications Issues.)*

**GEH Response**

*Explain why conformance, by the Q-DCIS to BTP 7-10, Guidance on Application of Regulatory Guide (RG) 1.97, was removed.*

Removal of the reference to BTP HICB-10 from DCD Subsection 7.1.2.4, Q-DCIS Regulatory Requirements Conformance Summary, was incorrect. BTP HICB-10 will be restored to the listing of BTPs associated with the Q-DCIS in DCD Tier 2, Subsection 7.1.2.4. The DCD, Tier 2, Table 7.1-1, Regulatory Requirements Applicability Matrix will be updated to identify BTP HICB-10 as applicable to the Q-DCIS.

*Explain the intent of conformance to all Digital I&C Interim Staff Guidance and list as references. (Example: Cyber Security Program Plan LTR has listed conformance to DI&C-ISG-04, Interim Staff Guidance on Communications Issues.)*

The ESBWR design does not conflict with the guidance provided in the Digital I&C Interim Staff Guidance (ISG) documents. GEH does not intend to assert compliance with the ISG documents explicitly. However, there is one exception. As described in the GEH response to RAI 7.1-80 submitted via MFN-08-169 dated March 13, 2008, Licensing Topical Report NEDE-33295P, Revision 0, ESBWR Cyber Security Program Plan (CSPP) submitted via MFN-07-554 dated October 31, 2007, will be revised to include the attributes of DI&C-ISG-04, Revision 0, Task Working Group #4: Highly-Integrated Control Rooms-Communications Issues (HICRc) that are adopted in the CSPP without stipulating conformance to the entire ISG.

**DCD Impact**

DCD, Tier 2, Subsection 7.1.2.4 and Table 7.1-1 will be revised in Revision 5 as depicted in the Enclosure 2 markups.

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Enclosure 2

**Response to Portion of NRC Request for Additional  
Information Letter No. 135 Related to ESBWR Design  
Certification Application –  
RAI Number 7.1-66 DCD Markups**

Verified DCD changes associated with this RAI response are identified in the enclosed DCD markups by enclosing the text within a black box. The marked-up pages may contain unverified changes in addition to the verified changes resulting from this RAI response. Other changes shown in the markup(s) may not be fully developed and approved for inclusion in DCD Revision 5.

- Regulatory Guides (RGs) 1.22, 1.47, 1.53, 1.62, 1.75, 1.89, 1.97, 1.105, 1.118, 1.151, 1.152, 1.153, 1.168, 1.169, 1.170, 1.171, 1.172, 1.173, 1.180, 1.204, and 1.2094; and
- Branch Technical Positions (BTPs) HICB-1, 8, 9, 10, 11, 12, 14, 16, 17, 18, 19, and 21.

#### 7.1.2.5 Q-DCIS Testing and Inspection Requirements Summary

The Q-DCIS integrated hardware and software functions, including the network parameters and data status, are checked and tested together. The Analog-to-Digital (A/D) converters ~~(also the Digital-to-Analog (D/A) converters if used)~~ in the RMUs are the only components requiring periodic calibration checks. Some of the key diagnostics include:

- The ~~C~~entral ~~P~~rocessing ~~U~~nit (CPU) status check~~s~~;
- Parity checks, watchdog timer status~~s~~;
- Voltage level in controllers~~s~~;
- Data path integrity and data validation checks~~s~~;
- Data cycling time~~s~~; and
- Processor clock time.

#### 7.1.2.6 Q-DCIS Operator Interface Requirements Summary

The Q-DCIS VDUs support operator monitoring and manual control of the safety-related systems. The VDUs present process and diagnostic alarm information. When one of the two power supplies or communications paths within a division fails, the division and VDU operation continues automatically, without operator intervention. Failures in three divisions are required before there is a loss of a safety-related function.

The ~~following~~ Q-DCIS indications and alarms provided in the MCR (IEEE Std. 603, Section 5.8), as a minimum, are ~~provided in the MCR (IEEE Std. 603, Section 5.8)~~:

- Q-DCIS MCR alarms for Division 1, 2, 3, and 4 trouble; and
- Q-DCIS MCR indications for Division 1, 2, 3, and 4 diagnostic displays.

#### 7.1.2.7 Q-DCIS Boundary Summary

There are no Q-DCIS components in the N-DCIS. The Q-DCIS does not include the sensors or the sensor wiring to the RMUs or the RMU output wiring to the actuators.

#### 7.1.2.8 Q-DCIS Major Systems Description Summary

The Q-DCIS systems and components ~~are safety-related entities of the DCIS; include~~ ~~—~~ ~~the RPS,~~ is the designated reactor trip system, ~~—~~ ~~and~~ ~~the SSLC/ESF,~~ is the designated ESF actuation system. The automatic decision-making and trip logic functions associated with the safety-related RPS and ESF actuation system are accomplished by independent, separate, and diverse

**Table 7.1-1  
Regulatory Requirements Applicability Matrix**

		System																											
Applicable Criteria Guidelines: SRP NUREG-0800, Section 7.1	Reference Standard	RPS (Q)	NMS (Q)	SPTM Function (Q)	ADS (Q)	GDGS (Q)	LD&IS (Q)	CRHS (Q)	SSLC /ESF (Q)	SLC (Q)	RSS (Q & N)	RWCU /SDC (N)	IGS (Q)	PAM (Q & N)	CMS (Q & N)	PRMS (Q & N)	ARMS (N)	Interlock Systems (Q & N)	NBS (Q)	RC&IS (N)	FWCS (N)	PAS (N)	SB&PC (N)	NMS (N)	CIS(N)	DPS(N) ATWS/SLC (Q)	Q-DCIS (Q)	N-DCIS (N)	
BTP HICB-8	Refer to RG 1.22	X	X	X	X	X	X	X	X	X			X														X	X	
BTP HICB-9	Refer to RG 1.153	X																										X	
BTP HICB-10	Refer to RG 1.97		X	X										X		X												X	X
BTP HICB-11	Refer to RG1.75 RG 1.153	X	X	X	X	X	X	X	X	X	X		X		X	X		X	X								X	X	X
BTP HICB-12	Refer to RG 1.105	X	X	X	X	X	X	X	X	X			X		X	X		X	X								X	X	X
BTP HICB-13	Refer to RG 1.153	N/A																											
BTP HICB-14*	Refer to RG 1.152	X	X	X	X	X	X	X	X		X		X		X	X		X	X								X	X	X
BTP HICB-16		X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BTP HICB-17*	Refer to RG 1.22, 1.47, 1.53, 1.118, 1.152 & 1.153	X	X	X	X	X	X	X	X		X		X		X	X		X	X								X	X	X
BTP HICB-18*	Refer to RG 1.152	X	X	X	X	X	X	X	X		X		X		X	X		X	X								X	X	X
BTP HICB-19*	NUREG/CR-6303	X	X	X	X	X	X	X	X										X		X						X	X	X
BTP HICB-21*	NUREG/CR-6083	X	X	X	X	X	X	X	X		X		X		X	X		X	X								X	X	X

Notes:  
 Q=Q-DCIS Safety-related, N=Nonsafety-related-DCIS  
 X = The code or regulation is applicable to the specified system.  
 N/A = The code or regulation is not applicable to the ESBWR design.  
 (\*) = Parts or all of this code or regulation are voluntarily invoked for the specified system.  
 \*These criteria are addressed with the digital computer-related functions of the Q-DCIS  
 †Interlocks are embedded within system logic  
 ††N-DCIS hardware uses industrial methods for EMI/EMF compliance  
 †††Initiates the 10 CFR 50.62 ARI, SLC and FW runback and trip functions as described in Section 7.8.