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Supplement 10

Docket No. 52-010

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Subject: **Response to Portion of NRC Request for Additional Information  
Letter No. 51 – Classification of Structures, Systems and Components  
- RAI Number 3.2-21 S02**

Enclosure 1 contains GEH's response to the subject RAI transmitted via Reference 1, which was a supplemental request to GEH's response submitted via Reference 2. Reference 3 transmitted the first supplemental request to GEH's original response transmitted via Reference 4. The original RAI was transmitted via Reference 5.

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

Sincerely,



James C. Kinsey  
Project Manager, ESBWR Licensing

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References:

1. E-mail dated May 24, 2007 from Chandu Patel (NRC)
2. MFN 06-308, Supplement 5 – Letter from GE to the U.S. Nuclear Regulatory Commission, *Response to Portion of NRC Request for Additional Information Letter No. 51 Related to ESBWR Design Certification Application – Hydraulic Control Unit/Main Steam Piping – RAI Number 3.2-16 S01 and 3.2-21 S01*, April 18, 2007
3. E-mail dated March 6, 2007 from Larry Rossbach (NRC)
4. MFN 06-308 – Letter from GE to the U.S. Nuclear Regulatory Commission, *Response to Portion of NRC Request for Additional Information Letter No. 51 Related to ESBWR Design Certification Application – Classification of Structures, Systems and Components – RAI Number 3.2-1 through 3.2-62*, September 8, 2006
5. MFN 06-277 – Letter from U.S. Nuclear Regulatory Commission to David H. Hinds, *Request for Additional Information Letter No. 51 Related to ESBWR Design Certification Application*, August 8, 2006.

Enclosure:

1. MFN 06-308, Supplement 10, Response to Portion of NRC Request for Additional Information Letter No. 51 RAI Number 3.2-21 S02

cc:	AE Cubbage	USNRC (with enclosures)
	RE Brown	GEH/Wilmington (with enclosures)
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	eDRF	0000-0072-0213

**Enclosure 1**

**MFN 06-308  
Supplement 10**

**Response to Portion of NRC Request for  
Additional Information Letter No. 51  
Related to ESBWR Design Certification Application**

**Hydraulic Control Unit**

**RAI Number 3.2-21 S02**

***For historical purposes, the original text and the GE response to RAI 3.2-21 and 3.2-21 S01 are included. For clarity, the attachments to RAI 3.2-21 S01 have not been included.***

**NRC RAI 3.2-21**

*Table 3.2-1, Component C12, Item 3: The Table provides no quality group designation for the Hydraulic Control Unit (HCU) and subcomponents. Table footnote (8) states that for the HCU, the quality groups are not considered applicable to the "specialty" subcomponent parts therein. However, consistent with SRP 3.2.2 and RG 1.26 guidance regarding components designed for reactor shutdown, these should be Quality Group B components. It is the staff position that, because of the safety importance of the reactivity control function, all HCU assemblies and subcomponents, must be designated Quality Group B components. Please revise the Table and footnote (8) accordingly.*

**GE Response**

The HCU classifications specified in Table 3.2-1, including Table footnote (8) relating to quality group, are identical to the HCU classifications that have been well established and accepted for many decades. This includes the entire BWR operating fleet and the ABWR certified design. Previous NRC acceptance of GE's position is evident by the approval of these plant designs. Because the function and design of the ESBWR HCU is the same as the previous designs, GE believes the same classification is appropriate and correct for the ESBWR and consistent with accepted industry practice.

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

**NRC RAI 3.2-21 S01**

*The response to RAI 3.2-21 identified that the hydraulic control unit (HCU) classifications have been well established and accepted for many decades for both the entire BWR operating fleet and the ABWR certified design. GE believes that the same classification is appropriate for the ESBWR and is consistent with industry practice. The staff concurs that the HCU classification has been standard industry practice that has been accepted by the NRC and no change in classification is required, but this industry practice should be specifically identified as an exception to RG 1.26 in DCD Tier 2 Section 1.9. GE is requested to clarify in DCD Tier 2 Table 1.9-21b that this represents an exception to RG 1.26.*

**GE Response**

GE agrees and will identify the Hydraulic Control Unit (HCU) quality group classification as an exception to RG 1.26 in DCD Tier 2 Table 1.9-21b.

**DCD Impact**

DCD Tier 2 Tables 1.9-21b and 17.0-1 will be revised as noted in the attached markups.

## **NRC RAI 3.2-21 S02**

*RAI 3.2-21 S02: Comment on response to RAI 3.2-21 Supplement 1 (MFN 06-308):*

*The response to RAI 3.2-21 Supplement 1 clarified that the classification of the Hydraulic Control Unit (HCU) is an exception to RG 1.26 and DCD Tier 2 Tables 1.9-21b and 17.1-1 will be revised accordingly. Although staff recognizes that the HCU classification has been standard industry practice, the applicant is requested to provide technical justification that this is an acceptable alternative to Quality Group B and ASME Section III Class 2 Code requirements identified in RG 1.26. Justification should include information such as alternative equivalent industry standards, supplemental NDE, inservice inspection, quality assurance practices and operating experience to demonstrate the reliability of the HCU pressure boundary.*

### **GEH Response**

As shown in DCD Tier 2 Figure 4.6-8, the HCU isolation valves at the interface between the HCU and the scram insert piping are classified Quality Group B. Per standard BWR practice, Quality Group D is applicable to the balance of the HCU as described in Note 8 of DCD Tier 2 Table 3.2-1. The following information provides the requested technical information to demonstrate the reliability of the HCU pressure boundary and the appropriateness of the standard classifications. This information is based on the ABWR HCU but is representative of the ESBWR HCU design and the BWR/6 HCU design.

#### **A. Industry Standards**

The pressure boundary components of the HCU are designed and analyzed to the following industry standards.

For the scram insert line isolation valves:

- ASME Code Section III, Division I, Subsection NC, Class 2 components
- ASME Code Section II, Material Specifications, Parts A, B, C
- ASME Code Section IX, Welding and Brazing Qualifications
- ASME Code Section V, Nondestructive Examination
- ASME Code Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components

For the accumulator and nitrogen gas bottle:

- ASME Code Section VIII, Division I
- ASME Code Section II, Material Specifications, Parts A, B, C
- ASME Code Section IX, Welding and Brazing Qualifications
- ASME Code Section V, Nondestructive Examination

For the non-Code items in the balance of the HCU:

- ANSI B31.1, Power Piping
- ANSI B16.5, Pipe Flanges and Flanged Fittings
- ANSI B16.11, Forged Steel Fittings, Socket-Welding and Threaded
- ANSI B16.34, Valves – Flanged, Threaded and Welding End

## **B. Supplemental NDE**

All pressure retaining components and welds are nondestructively examined in accordance with the requirements of ASME Code Section V.

Ultrasonic testing (UT), liquid penetrant (PT) and magnetic particle (MT) examinations are in accordance with ASME Code Section III.

All machined surfaces of valve pressure retaining parts are examined by PT or MT (except for the inner diameter of small diameters).

Areas to be welded are examined by NDE. PT or MT is performed on the bare surface prior to welding, the root pass and finished weld surface. PT or MT is performed on valve ends and 25 mm beyond the weld end preps prior to installation.

Valve stems are examined by UT and either MT or PT after final machining.

A component hydrostatic test is performed on the accumulator and nitrogen gas bottle prior to installation in the HCU assembly. Following final assembly, a hydrostatic test is performed on the complete HCU assembly.

## **C. Inservice Inspection**

The scram insert line isolation valves are designed to facilitate inservice inspection in accordance with ASME Code Section XI.

## **D. Quality Assurance Practices**

The HCU is manufactured under a controlled program in accordance with Code of Federal Regulations 10 CFR 50 Appendix B and ASME NQA-1-1983, Quality Assurance Program Requirements for Nuclear Facilities.

## **E. Operating Experience**

Based on a review of operating plants, the ABWR HCU has exhibited acceptable and sound operating experience to date. There have been no issues relating to the integrity of the ABWR HCU pressure boundary.

For the BWR/6 HCU design there was a pressure boundary leakage issue documented to the utilities in GE Rapid Information Communication Services Information Letter

(RICSIL) No. 056 dated March 8, 1991. At a plant located in the United States leakage was observed in one HCU charging water riser. The leak was caused by a through-wall crack in the ½ inch stainless steel pipe nipple adjacent to the fillet weld that connects this pipe segment to the HCU accumulator riser coupling. This pipe segment and the connecting piping are used to recharge and maintain the HCU accumulator scram pressure. The issue was limited to BWR/6 plants. RICSIL No. 056 provided recommendations for inspection and repair of affected pipe segments. Other than the plant that reported the issue, GEH is not aware of any other BWR/6 plants that were affected. There have been no subsequent manifestations of this problem reported to GE since the RICSIL was issued. GEH is aware that one foreign BWR/6 took action beyond the recommendations of the RICSIL and independently implemented a design change to reduce the chances of any potential leakage occurring at this piping connection; however, GEH does not have information on the details of the change. The ESBWR HCU, which is the same as the ABWR HCU, has a configuration similar to the BWR/6 HCU at the location where the charging water riser connects to the accumulator riser coupling. Liquid penetrant examination (PT) of the weld at this connection is required for all HCUs. Because the original problem appears to have been isolated to the one BWR/6 plant and the ABWR HCU operating experience has shown no concerns with this area of the design, similar problems are not anticipated with the ESBWR design.

GEH is not aware of any other pressure boundary integrity issues related to the BWR/6 and pre-BWR/6 HCU designs.

Based on the information provided above, GEH believes the ESBWR HCU classification assures acceptable and reliable pressure boundary integrity and is consistent with standard industry practice. This is confirmed by the many years of plant operating experience with the pre-BWR/6, BWR/6 and ABWR HCU designs.

#### **DCD Impact**

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