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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 70 Related to ESBWR Design Certification Application – Tier 1, Instrumentation and Controls – RAI Numbers 14.3-72, 14.3-73, 14.3-76 and 14.3-80**

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

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

Sincerely,

Kathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

D068

Reference:

1. MFN 06-382, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 70 Related to ESBWR Design Certification Application,* October 10, 2006

Enclosure:

1. MFN 07-276 – Response to Portion of NRC Request for Additional Information Letter No. 70 Related to ESBWR Design Certification Application – Tier 1, Instrumentation and Controls – RAI Numbers 14.3-72, 14.3-73, 14.3-76 and 14.3-80

cc:	AE Cubbage	USNRC (with enclosures)
	DH Hinds	GE (with enclosures)
	RE Brown	GE (w/o enclosures)
	eDRF	0000-0067-6986

ENCLOSURE 1

MFN 07-276

Response to Portion of NRC Request for

Additional Information Letter No. 70

Related to ESBWR Design Certification Application

Tier 1, Instrumentation and Controls

RAI Numbers 14.3-72, 14.3-73, 14.3-76 and 14.3-80

NRC RAI 14.3-72

DCD Tier 1, Revision 1, Section 2.2.3 stated that upon receipt of an ATWS trip signal from the ATWS logic cards of Safety System Logic and Control (SSLC) System, FWCS initiates a runback of feedwater pump feedwater demand to zero and closes the LFCV and the RWCU/SDC overboard flow control valve. It is the staff's understanding that the SSLC is a safety-related system, while the ATWS logic is a non-safety-related system, why does this Tier 1 document state that "ATWS logic cards of Safety System Logic and Control (SSLC)?" Discuss the interface between the ATWS system, the SSLC, and the FWCS.

GE Response

The statement in DCD Tier 1, Revision 1, Subsection 2.2.3 referenced above has been revised as follows:

"Upon receipt of an Anticipated Transient Without Scram (ATWS) trip signal from the DPS, FWCS initiates a runback of feedwater pump feedwater demand to zero and closes the LFCV and the RWCU/SDC Overboard flow control valve." (Note: There is no more reference to "ATWS logic cards of Safety System Logic and Control (SSLC)". Instead the discussion has been updated to be consistent with the current design and describes the Diverse Protection System (DPS) as the source of the feedwater runback (FWRB) signal to the FWCS.).

The ATWS mitigation logic is implemented with both safety-related and nonsafety-related portions. The reference to SSLC in Subsection 2.2.3 was removed since the DPS is used to process the different FRWB inputs. With reference to the discussion on the interface between the (safety-related and nonsafety-related portions of the) ATWS mitigation logic, the DPS and the FWCS, refer to the Design Description (DD) under Subsection 2.2.14 (Diverse Instrumentation and Controls) in DCD Tier 1 Revision 3. The term "SSLC" in reference to ATWS mitigation logic was eliminated to avoid confusion, since "SSLC" had previously referred to three diverse and independent safety-related logic platforms, one of which (i.e., ATWS/SLC) provided ATWS mitigation logic.

For additional discussion on the ATWS mitigation logic interface with the DPS and the FWCS, refer to the response to NRC RAI 7.1-32 transmitted to NRC through MFN 06-482, dated December 31, 2006.

DCD Impact:

No additional change will be made to DCD Tier 1, as a result of RAI 14.3-72.

NRC RAI 14.3-73

DCD Tier 1, Revision 1, Section 2.2.3, Table 2.2.3-2: In the Acceptance Criteria column, item 4 stated that "The certified design commitment is met." In the Design Commitment column, item 4 stated that "The FWCS configuration, monitored variables, trip functions and interfaces are as described in Section2.2.3, Table 2.2.3-1 and Figure 2.2.3-1." This type of blank statement is difficult to verify under provision of 10 CFR 52.103(g). The acceptance criteria should be objective, and unambiguous, in order to prevent misinterpretation.

GE Response

In Revision 3, DCD Tier 1 Table 2.2.3-2, Item 5 addresses the RAI concern. However, for better clarity and prevent ambiguity, Table 2.2.3-2, Item 5 will be revised, as shown in the attached page, in Revision 4.

DCD Impact:

DCD Tier 1, Table 2.2.3-2, Item 5 will be revised in Revision 4, as shown on the attached markup.

NRC RAI 14.3-76

DCD Tier 1, Revision 1, Table 2.2.1-1: Please provide a detailed explanation of the term "Dedicated Operators Interface" (DOI). This should include if this can be a specific hardware device, dedicated display terminal, a page on a display, element or section of a particular display page, etc. The explanation should also include the possible types of signal connections to the device or dispels. Also why this particular entity is used in the RC & IS system only.

GE Response

The RC&IS does have a Dedicated Operator Interface (DOI) Video Display Unit (VDU) that is only used for the RC&IS and cannot be used for any other system or function.

The RC&IS DOI provides summary information to the plant operator with respect to control rod positions, FMCRD and RC & IS status and HCU status. The RC&IS DOI is used to perform normal rod movement functions, bypassing of major RC&IS subsystems, performing CRD surveillance tests (except the FMCRD holding brake testing performed during a refueling outage), resetting RC&IS trips and most abnormal status conditions.

In addition, the Rod Action and Position Information (RAPI) panel RAPI-A includes the RAPI DOI, which displays the same information that is available on the RC & IS DOI in MCR. The RAPI DOI also serves as a backup for the RC&IS DOI control capabilities, should the RC&IS DOI become unavailable. A hard switch located in the RAPI-A panel is used to change the selection of DOI control operation capability between the RC&IS DOI and the RAPI DOI (that is only one of these DOIs can be selected for control capability at any given time). Normally, the RC&IS DOI is selected for control functions instead of the RAPI DOI.

The information for the RC&IS DOI is discussed in DCD Tier 2 Revision 03, Subsection 7.7.2.2.1.

DCD Impact:

No additional change will be made to DCD Tier 1 or Tier 2, as a result of RAI 14.3-76.

NRC RAI 14.3-80

DCD Tier 1, Revision 1, Section 2.1.2, Nuclear Boiler System, should identify guidelines for identification and physical separation of Class 1Eelectical equipment. ITAAC should be created for inspection of Class 1E raceways from the main control room through other areas of the plant. The scope of this inquiry is limited to instrumentation and control (limited energy content cables). However, this should include separation between Class 1E divisions and non-Class 1E equipment.

GE Response

DCD Tier 1, Subsection 2.1.2 was written to address the mechanical equipment ITAAC and was not intended to address or identify the guidelines for identification and physical separation of safety-related electrical equipment in the Nuclear Boiler System. These issues are generic and are applicable to all safety-related electrical systems, and therefore are addressed in the electrical Subsections of Tier 2 and Tier 1.

The following Subsections of DCD Tier 2, specifically discuss the information requested in the above RAI in detail.

Subsection 8.3.1.1.5 **"Safety-Related Electric Equipment Considerations"** – which provides guidelines utilized for safety-related equipment for **"Physical separation and Independence"**.

Subsection 8.3.1.3 **"Physical identification of Safety-Related Equipment"** – which provides the physical identification of **"Power, Instrumentation and Control Systems"** for "Equipment Identification", "Cable Identification" and "Raceway Identification".

Subsection 8.3.1.4 **"Independence of Redundant Systems"** – which discusses in detail the physical independence (which meets the requirements of IEEE 384, GDC 17, and NRC RG 1.75).

Section 8.3.2 **"DC Power Systems"** discusses in detail the DC systems, including the physical separation of the equipment, cabling, and instrumentation essential to plant safety.

Tier 1 ITAAC Section 2.13 covers separation and physical independence. For example, see Tier 1 Tables 2.13.1-1, 2.13.2-1, 2.13.3-1, 2.13.5-1, and 2.13.8-1. Section 2.2 addresses any Instrumentation and Control requirements related to these criteria.

DCD Impact:

No change will be made to DCD Tier 1 or Tier 2, as a result of this RAI.

Table 2.2.3-2

ITAAC For Feedwater Control System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
5. The FWCS configuration, monitored variables, trip functions and interfaces are as described in Subsection 2.2.3, Table 2.2.3-1 and Figure 2.2.3-1.	5. **DAC** a. Inspections will be performed on the FWCS configuration to verify that it is as described in Subsection 2.2.3, Table 2.2.3-1 and Figure 2.2.3-1.	5. a. Inspection report(s) document that the FWCS conforms to the configuration as described in Subsection 2.2.3, Table 2.2.3-1 and Figure 2.2.3-1.
	b. Using simulated signals, testing will be performed on the FWCS to verify that FWCS monitored variables, trip functions and interfaces are as described in Subsection 2.2.3, Table 2.2.3-1 and Figure 2.2.3-1.	b. Test report(s) conclude(s) that FWCS monitored variables, trip functions and interfaces are as described in Subsection 2.2.3, Table 2.2.3-1 and Figure 2.2.3-1.