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MFN 06-097, Supplement 2

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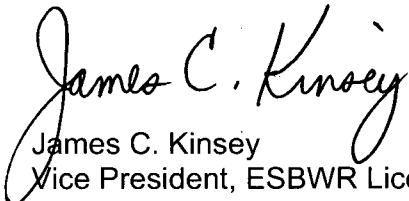
Subject: Response to NRC Request for Additional Information Related to ESBWR Design Certification Application - RAI Number 7.1-1 Supplement 1

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 via email from Lauren Quinones dated June 26, 2007 (see Reference 1). The supplemental RAI response is included in Enclosure 1. The original NRC RAI 7.1-1 was sent via the Reference 2 letter and the response was submitted via the Reference 3 letter.

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

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NRW

References:

1. Email from Lauren Quinones (U.S. Nuclear Regulatory Commission) to GE, sent June 26, 2007, RAI 7.1-1 Supplement 1
2. MFN 06-045, Letter from U.S. Nuclear Regulatory Commission to David H. Hinds, GE, *Request for Additional Information Letter No. 6 Related to ESBWR Design Certification*, dated January 31, 2006
3. MFN 06-097, Letter from David H. Hinds, GE to U.S. Nuclear Regulatory Commission, *Partial Response to NRC Request for Additional Information Letter No. 6 Related to ESBWR Design Certification Application – Instrumentation and Control Systems – RAI Numbers 7.1-1 through 7.1-5 and 7.4-1*, dated April 27, 2006

Enclosures:

1. Response to NRC Request for Additional Information Related to ESBWR Design Certification Application - RAI Number 7.1-1 Supplement 1
2. DCD Markups – RAI 7.1-1 Supplement 1

cc:

AE Cabbage	USNRC (with enclosure)
GB Stramback	GEH/San Jose (with enclosure)
RE Brown	GEH/Wilmington (with enclosure)
eDRF Section	0000-0078-4827 (RAI 7.1-1 Supplement 1)

Enclosure 1

MFN 06-097, Supplement 2

**Response to NRC Request for Additional
Information Related to ESBWR Design**

Certification Application –

RAI Number 7.1-1, Supplement 1

For historical purposes, the original text of NRC RAI 7.1-1 with the GE response is included.

NRC RAI 7.1-1

With respect to level of detail for design certification application under 10 CFR Part 52, Section B.3.2 of BTP HICB-16 describes material that should be provided in addition to that identified by Reg. Guide 1.70. In DCD Section 7.1, describe the resolution of unresolved and generic safety issues applicable to the instrumentation and control (I&C) systems.

GE Response

Unresolved and generic safety issues applicable to the ESBWR design are described in DCD Tier 2, Subsection 1.11. There are several new generic issues that are related to ESBWR I&C systems, such as failure of protective devices on essential equipment, Electromagnetic pulse, identification of protection system instrument sensing lines, and protection system testability that are also addressed in that section.

NRC RAI 7.1-1 S01

The response provides the same response as in all Chapter 7 sections of the DCD; "In DCD Section 1.11, unresolved and generic safety-related issues are discussed." The staff finds the following examples where resolution should be discussed;

- Action Plan Item A-19, in table 1.11.1 of Rev.3 of the DCD, Digital Computer Protection System, merely states; "See Chapter 7 for details."*
- Issue 50 Reactor Vessel Level Instrumentation in BWRs, includes temperature effects causing decalibration and flashing. (GL 84-23); Response; "See generic footnote" but not addressed in Tier 2.*
- Issue 64 Identification of Protection System Instrumentation Sensing lines; (discuss relative to IEEE-603) Response: "See generic footnote" but not addressed in Tier2*
- Issue 101 BWR Water Level Redundancy Response: See generic foot note. This is not addressed anywhere in Tier 2.*

All resolution of items should be addressed, which have not being dropped by NUREG-933, other than applying the footnote "Generically resolved with No New requirements, and thus, if required, would be address elsewhere in Tier 2". Describe resolution of USIs and GSIs applicable to I&C systems.

GEH Response

GEH will add information to the four referenced items in Table 1.11-1 as shown in the attached markup.

Also, for Issue 64, Identification of Protection System Instrumentation Sensing Lines, IEEE Std. 603 Section 5.11 is addressed in DCD, Tier 2, Subsection 7.1.6.6.1.2 and Table 7.1-2.

DCD Impact

DCD Tier 2, Chapter 1, Table 1.11-1 will be revised in DCD Revision 5 to add the text shown in the Enclosure 2 markup.

Enclosure 2

MFN 06-097, Supplement 2

DCD Markups – RAI 7.1-1 Supplement 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.

Table 1.11-1 (continued)

Action Plan Item/Issue Number	Description	Associated Tier 2 Location(s) and/or Technical Resolution
A-19	Digital Computer Protection System	(5) <u>Addressed by compliance with RG 1.152. As noted in Table 1.9-21, the ESBWR Standard Plant design complies with RG 1.152. See Chapter 7 for further details.</u>
A-20	Impacts of the Coal Fuel Cycle Description	(5)
A-21	Main Steam Line Break Inside Containment – Evaluation of Environmental Conditions for Equipment Qualification	(3)
A-22	PWR Main Steam Line Break – Core, Reactor Vessel, and Containment Building Response	(1) These are PWR issues that do not apply to the ESBWR design.
A-23	Containment Leak Testing	(5) Subsection 6.2.6
A-24	Qualification of Class 1E Safety-Related Equipment	(8) Section 3.11. This issue is considered resolved through compliance with 10 CFR 50.49. As noted in Subsection 3.11.32.2, the ESBWR Standard Plant design meets the requirements of 10 CFR 50.49. Section 3.11 documents the qualification methods and procedures employed to demonstrate the capability of electrical equipment to perform their required functions when exposed to the environmental conditions in their respective locations. Limiting design conditions include normal operating, abnormal operating, test, accident, and post-accident conditions.

Table 1.11-1 (continued)

Action Plan Item/Issue Number	Description	Associated Tier 2 Location(s) and/or Technical Resolution
Issue 41	BWR Scram Discharge Volume Systems	(1) In the ESBWR Fine Motion Control Rod Drive (FMCRD) design, described in Section 4.6, the water which scrams the control rod discharges into the reactor vessel and does not require a scram discharge volume, thus eliminating a potential source for common mode scram failure. Therefore, this issue is not applicable to the ESBWR Standard Plant design.
Issue 42	Combination Primary/Secondary System LOCA	(1) This PWR issue is covered by TMI Action Plan Item I.C.1. The ESBWR is a direct cycle plant.
Issue 43	Reliability of Air Systems	(8)
Issue 44	Failure of Saltwater Cooling System	(4, 6) Remaining generic issue covered by Issue 43. No new requirements for other parts of this issue.
Issue 45	Inoperability of Instrumentation Due to Extreme Cold Weather	(8) This issue is considered resolved through compliance with SRP Sections 7.1, 7.5 and 7.7 and Regulatory Guide (RG) 1.151. As noted in Table 1.9-7, the ESBWR Standard Plant design complies with SRP Sections 7.1, 7.5 and 7.7. Also, as noted in Table 1.9-21 and Section 7.1, the ESBWR Standard Plant design complies with RG 1.151.
Issue 46	Loss of 125 Volt DC Bus	(6) This issue is covered by Issue 76.
Issue 47	The Loss of Offsite Power	(4)
Issue 48	LCO for Class 1E Vital Instrument Buses in Operating Reactors	(6) Integrated into the resolution of Issue 128.
Issue 49	Interlocks and LCOs for Class 1E Tie-Breakers	(6) Integrated into the resolution of Issue 128.
Issue 50	Reactor Vessel Level Instrumentation in BWRs	(4) <u>Issue addressed under TMI Action Plan Item II.F.2 in Table 1A-1.</u>

Table 1.11-1 (continued)

Action Plan Item/Issue Number	Description	Associated Tier 2 Location(s) and/or Technical Resolution
Issue 58	Containment Flooding	(3)
Issue 59	Technical Specification Requirements for Plant Shutdown When Equipment for Safe Shutdown Is Degraded or Inoperable	(5)
Issue 60	Lamellar Tearing of Reactor Systems Structural Supports	(6) This issue is addressed as a subtask of Item A-12.
Issue 61	SRV Line Break Inside the BWR Wetwell Airspace of Mark I and II Containments	(4)
Issue 62	Reactor Systems Bolting Applications	(6) This issue was integrated into the resolution of Issue 29.
Issue 63	Use of Equipment Not Classified as Essential to Safety in BWR Transient Analysis	(3)
Issue 64	Identification of Protection System Instrument Sensing Lines	(4) <u>Addressed by compliance with RG 1.151. As noted in Table 1.9-21, the ESBWR Standard Plant design complies with RG 1.151.</u> <u>Refer to Table 7.1-1 for additional information on compliance with IEEE 603 and RG 1.151.</u>
Issue 65	Probability of Core-Melt Due to Component Cooling Water System Failures	(1, 6) Incorporated into the resolution of Issue 23. The ESBWR does not rely on component cooling water systems to prevent core melt.
Issue 66	Steam Generator Requirements	(1) There are no steam generators in the ESBWR design.
Issue 67	<u>Steam Generator Staff Actions</u>	(1) There are no steam generators in the ESBWR design, so in general this issue is not applicable. See rows below for discussion of various subtasks.

Table 1.11-1 (continued)

Action Plan Item/Issue Number	Description	Associated Tier 2 Location(s) and/or Technical Resolution
Issue 96	RHR Suction Valve Testing	(1, 6) PWR issue that has been integrated into resolution of Issue 105.
Issue 97	PWR Reactor Cavity Uncontrolled Exposures	(1) This is a PWR issue that is not applicable to ESBWR.
Issue 98	CRD Accumulator Check Valve Leakage	(3)
Issue 99	RCS/RHR Suction Line Valve Interlock on PWRs	(1) This is a PWR issue that is not applicable to ESBWR.
Issue 100	Once-Through Steam Generator Level	(1) This is a PWR issue that is not applicable to ESBWR.
Issue 101	BWR Water Level Redundancy	(4) <u>Issue resolved in conjunction with operator training and procedures.</u>
Issue 102	Human Error in Events Involving Wrong Unit or Wrong Train	(4)
Issue 103	Design for Probable Maximum Precipitation	(8) The maximum flood level for the ESBWR design is 0.3 m (1 foot) below grade, which is consistent with the NRC recommendation. The developed NOAA/NWS procedures from Generic Letter 89-22 will be used for determining PMP for a specific site. Therefore, this issue is resolved for the ESBWR Standard Plant design.
Issue 104	Reduction of Boron Dilution Requirements	(1) This is a PWR issue that is not applicable to the ESBWR design.
Issue 105	Interfacing Systems LOCA at LWRs	(4) Subsection 7.6.1 describes high pressure/low pressure interlocks to prevent overpressurization of low pressure systems which are connected to high pressure systems. Portions of the GDCS piping are considered part of the reactor coolant boundary and portions of the piping connect to the low pressure GDCS pools. A positive means is provided in the system design to prevent reactor pressure from being transmitted to