

RAI Followup questions for ESBWR DCD Chapter 7 and 9

The staff has determined that supplementary information is required to complete its review of ESBWR design control document (DCD) Tier 2, Chapters 7 and 9. Please provide supplementary RAI responses for the following RAIs:

Reference:

- GE Response to RAI letter 6 MFN - 06-097 dated April 27, 2006
- GE Response to RAI letter 6 MFN - 06-146 dated May 25, 2006
- GE Response to RAI letter 6 MFN - 06-283 dated August 21, 2006
- GE Response to RAI letter 34 MFN - 06-216, Supp. 1 dated April 25, 2007
- GE Response to RAI letter 54 MFN - 06-309 dated September 8, 2006
- GE Response to RAI letter 62 MFN - 06-417, Supp. 2 dated May 9, 2007
- GE Response to RAI letter 76 MFN - 07-015 dated February 12, 2007

RAI number	Reviewer	Summary	Full Text
7.1-1 Supplement 1	Beacom R	Describe <i>resolution</i> of USIs and GSIs applicable to I&C systems	<p>RAI 7.1-1, Supplement 1 (MFN-06-097, April 27, 2006)</p> <p>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 <i>examples</i> where <i>resolution</i> should be discussed;</p> <ul style="list-style-type: none"> - 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. <p>All <i>resolution</i> of items should be addressed, which have not</p>

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			<p>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 <i>resolution</i> of USIs and GSIs applicable to I&C systems.</p>
7.2-1 Supplement 1	Beacom R	Provide the ESBWR safety system design basis as outlined in IEEE Std. 7-4.3.2.	<p>RAI 7.1-2, Supplement 1 (MFN-06-146, May 25, 2006) DCD, Tier 2, Rev. 3, Section 7.1.6.4 now provides a more abbreviated response. This section, as does the RAI response, references the software design process LTRs which are currently under revision to be submitted. Equipment qualification (EQ) requirements referenced in the response as part of the Software Management Plan do not include an EQ testing with the computer functioning. Provide description of compliance to IEEE std 7.4-3-2.</p>
7.2-2 Supplement 1	Beacom, R	Detailed interface information for each of these systems which interface with the reactor protection system.	<p>RAI 7.2-2, Supplement 1 (MFN-06-283, August 21, 2006) The response provides that NEDO-33251,"ESBWR I&C Defense-In-Depth and Diversity Report." discusses the requested interface information available "at this phase" of the design process.</p> <p>This report does not provide, nor should it, the necessary interface information between these systems and the RPS. This report only references "isolation" between safety divisions and safety to non-safety communication. The report offers that ESBWR power and DCIS are "functionally" separated and division 1 & 2 HCU solenoid circuits are "further subdivided" without providing procedure or hardware information. If this information will not be included in the DCD, this item should remain open until sufficient ITAAC(s) are developed.</p>

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7.2-4 Supplement 1	Beacom R	Provide information related to each system, per the criteria identified by BTP HICB-16, Section B.3.3	<p>RAI 7.2-4, Supplement 1 (MFN-06-146, May 25, 2006)</p> <p>The staff did not update BTP HICB because RG 1.206 (DG-1145) essentially superceded it . However, the material to be provided remains the same which are:</p> <p>1) system features provided to meet the requirements of 10 CFR 50.34(f) “Conformance with TMI action plan requirements”. The staff does not consider the TMI Action Items have been adequately addressed. It should be substantiated how each requirement is met. In most cases, each section states that “The design conforms to this requirement” Example; I.D.3 Bypass and Inoperable Status Indication. “The RPS design of bypass and inoperable status indication conforms to these requirements”; II.F.3 Instrumentation for Monitoring Plant Conditions following Core Damage “The Post Accident Monitoring Instrumentation meets the intent of this requirement. The Post Accident Monitoring Instrumentation design meets the intent of RG 1.97.” II.E.4.2 Containment Isolation Systems, example, “Conformance: GDCS complies with this requirement.”</p> <p>2) System characteristics that the online system testing will detect to indicate computer failures should be submitted. Examples would include type of failures which require immediate operator attention.</p> <p>These two items, conformance to TMI requirements and system characteristics tested while on line are open items.</p>
7.2-41 Supplement 1	Beacom R	Describe the Bypass function shown in Figure 7.2.1. Please identify the inputs and the outputs of the bypassed units	<p>RAI 7.2-41, Supplement 1 (MFN-07-015, February 12, 2007)</p> <p>The response did not address the “inputs and outputs of the bypass units”. Such as if the sensor bypass is enabled what is the output of the TLU? Is the division out of service at this point? Is that the same output as for the TLU bypass? Is the TLU placed in “inop” in both cases? Isn’t the division bypassed when either bypass is enabled?</p>

RAI number	Reviewer	Summary	Full Text
RAI 9.3-5 Supplement 2	Parks B	Update DCD to discuss the approach to compliance with GDC 4.	<p>RAI 9.3-5, Supplement 2 (MFN-06-216 Supp. 2, April 25, 2007)</p> <p>GE's supplemental response to RAI 9.3-5 is unacceptable. The staff specifically indicated that a reference to GDC 4 and an indication of compliance therewith is necessary in the DCD. If the path of the standby liquid control system (SLCS) injection line has not yet been determined, the staff can resolve this issue under one of the following two circumstances:</p> <p>(1) The applicant establishes acceptance criteria to establish that "appropriate distance is provided between the SLC system and other high energy piping systems," (quote from DCD Tier 2 Rev 3 9.3.5.3 and establishes a corresponding ITAAC, or</p> <p>(2) Confirmation that the SLCS injection line is "routed and analyzed in order to prevent or mitigate the potential dynamic effects from high-energy piping systems in order to satisfy the requirements of GDC 4" as a COL action item (applicant/holder as necessary).</p> <p>Update DCD to discuss the approach to compliance with GDC 4.</p>

RAI number	Reviewer	Summary	Full Text
RAI 9.3-9 Supplement 2	Parks B	Update the DCD to discuss the SLCS monitoring in greater detail.	<p>RAI 9.3-9, Supplement 2 (MFN-06-216 Supp. 2, April 25, 2007)</p> <p>GE's supplemental response to RAI 9.3-9 is unacceptable. The staff requested that the applicant "update the DCD to discuss the capability to detect, collect, and control system leakage." The staff also requested that the applicant "update the DCD to discuss the capability to isolate portions of the system in case of excessive leakage or malfunctions."</p> <p>Upon review of the referenced section of the DCD, the staff has determined that the depth of discussion required to support resolution of this RAI does not appear in the DCD; therefore, the DCD lacks the adequate technical basis for the staff to reach a conclusion with regards to leak isolation/suppression/detection.</p> <p>Update the DCD to discuss the SLCS monitoring in greater detail. Include any alarms associated with SLCS monitoring to support the conclusion that "existence of either of these conditions would be investigated and corrected by the operator." Also discuss the Equipment and Floor Drain System (EFDS) or provide a cross-reference to the appropriate DCD section in Section 9.3.5.</p>

RAI number	Reviewer	Summary	Full Text
RAI 9.1-8 Supplement 1	Hernandez J	Provide additional information regarding the steam generated by the pool.	<p>RAI 9.1-8, Supplement 1 (MFN-06-309, September 8, 2006)</p> <p>In its response to RAI 9.1-8, the applicant stated that the steam generated by the spent fuel pool (SFP) is released to the atmosphere through a relief panel in the Fuel Building. The applicant also stated that the water inventory is sufficient to ensure that the core will be covered for 72 hours, and that there are no engineered safety feature atmosphere cleanup systems in the Fuel Building. Please, provide the following information:</p> <p>(1) Discuss under what conditions are these relief panels expected to open.</p> <p>(2) If the relief panels open (under normal or accident conditions), will there be any radioactive releases to the environment? If so, how are these monitored in accordance with GDC 64, and accounted for in the design basis accident.</p> <p>(3) Are these relief panels safety-related? How are they tested?</p> <p>(4) Verify that the water inventory is sufficient to provide adequate shielding with the SFP loaded to maximum capacity. What is the expected level of water relative to the top of active fuel at 72 hours.</p> <p>(5) Discuss the rationale for not providing a safety-related atmospheric cleanup system.</p>

RAI number	Reviewer	Summary	Full Text
RAI 9.1-26 Supplement 1	Shum D	Describe how industry codes and standards identified in DCD Tier 2, Rev 3, Table 9.1-5 apply to specific components in the light and overhead heavy load handling systems.	RAI 9.1-26, Supplement 1 (MFN-06-309, September 8, 2006) DCD Tier 2, Section 9.1.4.1 states that, where applicable, DCD Tier 2, Table 9.1-5 provides the appropriate ASME, American National Standards Institute (ANSI), Industrial and Electrical Codes are identified. Describe how industry codes and standards identified in DCD Tier 2, Rev 3, Table 9.1-5 apply to specific components in the light and overhead heavy load handling systems.

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RAI 9.2-8 Supplement 2	Li C	Clarify where in the DCD says that it requires continuous radiation monitoring.	<p>RAI 9.2-8, Supplement 2 (MFN-06-417, Supp. 2, May 9, 2007)</p> <p>In RAI 9.21-8 S01, the NRC staff indicated that the radiation monitoring and sampling provisions in the DCD are not consistent with SRP Section 11.5 with respect to the continuous radiation monitoring/sampling for the service water system.</p> <p>GE response states the DCD requires continuous effluent monitoring, but it can be either directly on the effluent of PSWS or another downstream process effluent. It discussed the reasons that the radioactive leakage into PSWS is highly unlikely. Further, it states that the PSWS design includes provisions for obtaining a grab sample in the event that there is a RCCWS radiation monitor alarm; and that the COL holder will also provide provisions for monitoring, sampling, or analyzing the cooling tower blowdown to ensure monitoring prior to release to the environment. The markups of COL applicant item in Section 9.2.4 and COL holder item in Section 11.5.7.3 of the DCD Tier 2 are provided.</p> <p>The staff reviewed the response including the DCD markups for Section 9.2.4 and 11.5.7.3, but still can not confirm in the revised DCD on the statement in GE response that it requires continuous radiation monitoring either directly on the effluent of PSWS or another downstream process effluent. Clarify where in the DCD says that it requires continuous radiation monitoring.</p>

RAI number	Reviewer	Summary	Full Text
RAI 9.2-13 Supplement 2	Li C	Clarify the third method. Is it the grad sampling method following a high level alarm from the surge tank?	<p>RAI 9.2-13, Supplement 2 (MFN-06-417, Supp. 2, May 9, 2007)</p> <p>In the RAI response (page 4 of 6), GE intended to restate RAI 9.2-13 and its initial response, but misused the content from RAI 9.2-9 instead of RAI 9.2-13.</p> <p>Clarify the third method. Is it the grad sampling method following a high level alarm from the surge tank?</p>