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MFN 09-361

Docket No. 52-010

June 1, 2009

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. 335 Related to ESBWR Design Certification Application ESBWR RAI Number 14.3-452.**

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) dated April 30, 2009 (Reference 1).

The GEH response to RAI Number 14.3-452 is in Enclosure 1. The DCD markup associated with this response is in Enclosure 2.

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

Sincerely,

Richard E. Kingston

Richard E. Kingston
Vice President, ESBWR Licensing

Reference:

1. MFN 09-309, *Letter from U.S. Nuclear Regulatory Commission to Jerald G. Head, GEH, Request For Additional Information Letter No. 335 Related To ESBWR Design Certification Application*, dated April 30, 2009.

Enclosures:

1. Response to Portion of NRC Request for Additional Information Letter No. 335 Related to ESBWR Design Certification Application Design Acceptance Criteria ITAAC Closure Process RAI Number 14.3-452

2. MFN 09-292 DCD Tier 2 Appendix 14A.3, Rev 6 Markups

cc:

AE Cubbage	USNRC (with enclosure)
JG Head	GEH/Wilmington (with enclosure)
DH Hinds	GEH/Wilmington (with enclosure)
eDRFSection	0000-0102-1027 RAI 14.3-452

Enclosure 1

MFN 09-361

Response to Portion of NRC Request for

Additional Information Letter No. 335

Related to ESBWR Design Certification Application

Design Acceptance Criteria ITAAC Closure Process

RAI Number 14.3-452

NRC RAI 14.3-452

Question Summary: Tier 2 designation*

Full text:

The staff request that subsections 14.3A.3, Digital Instrumentation and Control Design Acceptance Criteria Closure and 14.3A.4, Human Factors Engineering Design Acceptance Criteria Closure are marked as Tier 2 information.*

Also, in section 14.3A.3, GEH states that "It is expected that information will be made available (e.g., Topical Report) for the NRC review, audit, …." Staff requests that GEH explain the content of information and level of detail that will be made available to the NRC as it pertains to the document requirements of RG 1.206, Section C.III.5.

GEH Response

A. *The staff request that subsections 14.3A.3, Digital Instrumentation and Control Design Acceptance Criteria Closure and 14 3A.4, Human Factors Engineering Design Acceptance Criteria Closure are marked as Tier 2* information.*

Concur. DCD Tier 2, Subsections 14.3A.3 and 14.3A.4 will be revised to be Tier 2* as noted in the attached markup.

B. *Also, in section 14.3A.3, GEH states that "It is expected that information will be made available (e.g., Topical Report) for the NRC review, audit, …." Staff requests that GEH explain the content of information and level of detail that will be made available to the NRC as it pertains to the document requirements of RG 1.206, Section C.III.5.*

Concur. The content of information and level of detail in the documentation that will be made available to the NRC for Design Acceptance Criteria and ITAAC closure for the safety-related distributed information and control system (Q-DCIS) platforms and the nonsafety-related DCIS (N-DCIS) RTNSS-related network segments are described in the software licensing topical reports: ESBWR Software Management Program Manual, NEDE-33226P, and ESBWR Software Quality Assurance Program Manual, NEDE-33245P.

DCD Impact

DCD Tier 2, Subsections 14.3A.3 and 14.3A.4 will be revised as noted in the attached markup.

Enclosure 2

DCD Tier 2 Appendix 14.3A.,

Rev 6 Markups

The ASME Code prescribes certain procedures and requirements that are to be followed for completing the piping design. The piping Design Acceptance Criteria ITAAC includes a verification of the ASME Code design report to ensure that the appropriate code design requirements for each system's safety class have been implemented. The design information (including ASME design reports) will be available to the NRC for review, inspection, and audit as the information becomes available, in order to ensure that the closure of the Design Acceptance Criteria ITAAC can be completed in a timely manner after the Design Acceptance Criteria ITAAC closure notification letter is submitted.

A reconciliation of the applicable safety-related as-built piping systems is covered in an as-built ITAAC to demonstrate that the as-built piping reflects the design, as reconciled. The reconciliation report will be made available for NRC inspection or audit when it is has been completed.

[*For completing the pipe break analysis Design Acceptance Criteria ITAAC, the analyses will document that structures, systems, and components (SSCs) which are required to be functional during and following a safe shutdown earthquake have adequate high-energy and moderate-energy pipe break mitigation features. The pipe break analysis report verifies that the criteria used to postulate pipe breaks, the analytical methods used to analyze pipe breaks, and the method to confirm the adequacy of the results of the pipe break analyses are appropriate. The pipe break analysis report provides assurance that the high-energy and moderate-energy line break analyses have been completed. The content of the report is discussed in Subsection 3.6.2.5 of the ESBWR Tier 2 DCD.*]*

Following NRC review of the report and the supporting analyses, the NRC may review plans for the protection features that are determined necessary to mitigate the consequences of a pipe break. Information will be made available to the NRC so that, if appropriate, issues that may be identified by the NRC may be resolved prior to the final as-built installation of the protective features. Upon completion of the installation of the protective features, the as-built verification ITAAC will be performed. The Pipe Break Analysis Report shall conclude that, for each postulated piping failure, the reactor can be shut down safely and maintained in a safe shutdown condition (Stable Shutdown Mode) without offsite power.

The piping design completed for the first standard ESBWR plant will be available to subsequent standard ESBWR plants under the "one issue, one review, one position" approach for closure. The as-built ITAAC for reconciliation and as-built verification will be performed following completion of the Design Acceptance Criteria ITAAC and installation of the piping system component and mitigation features for pipe break.

Text sections that are bracketed and italicized with an asterisk following the brackets are designated as Tier 2. Prior NRC approval is required to change.

14.3A.3 DIGITAL INSTRUMENTATION AND CONTROL DESIGN ACCEPTANCE CRITERIA ITAAC CLOSURE

[*NRC guidance in RG 1.206, Section C.III.5, describes a phased Design Acceptance Criteria ITAAC process for digital I&C. The set of ESBWR digital I&C Design Acceptance Criteria ITAAC establishes a phased Design Acceptance Criteria ITAAC closure process for the digital I&C design. The set of digital I&C Design Acceptance Criteria ITAAC identifies the process*

and requirements necessary to develop the design information and acceptance criteria for the various stages of design and subsequent construction and testing. By following the set of digital I&C Design Acceptance Criteria ITAAC, the COL Licensee should have sufficient information to determine which elements of the design are necessary for each phase of the digital I&C Design Acceptance Criteria ITAAC closure.

According to NRC guidance, based on the Design Acceptance Criteria ITAAC, the COL Licensee should develop procedures and test programs necessary to demonstrate that the Design Acceptance Criteria ITAAC requirements are met at each phase. The COL Licensee should certify to the NRC that the design through each phase is in compliance with the certified design. It is expected that information will be made available (e.g., Topical Report) for the NRC to review, audit, and inspect the work to confirm that the COL Licensee has adequately implemented commitments of the Design Acceptance Criteria ITAAC at the various phases. The "phased" digital I&C Design Acceptance Criteria ITAAC process consists of a set of sequential steps or phases that require successful completion, as described in NRC guidance in RG 1.206, C.III.5.

According to NRC guidance, a COL Licensee is not required to certify that each phase is completed sequentially. However, if the NRC determines that a phase of the digital I&C Design Acceptance Criteria ITAAC was not successfully completed, the design process may need to be repeated to meet the Design Acceptance Criteria ITAAC acceptance criteria. It is expected that information will be made available (e.g., Topical Report) for the NRC to conduct reviews, inspections, and audits throughout the process in order to identify any concerns with the various phases of design completion in a timely manner so that adjustments may be made as the process proceeds. With early NRC interactions, the licensee should be able to avoid or limit unnecessary rework.

The first of any standard ESBWR may complete the digital I&C Design Acceptance Criteria ITAAC actions. Each subsequent standard ESBWR using the standard approach may use the summary reports or design completion elements that are developed to complete the first of a standard ESBWR digital I&C Design Acceptance Criteria ITAAC under the "one issue, one review, one position" approach. In this manner, a group of standard ESBWR plants may be based on the same set of results summary reports and design elements for digital I&C.

Notwithstanding the standard bases established by the first standard ESBWR, the fleet may identify through operating experience changes that may be made in accordance with the appropriate change process. As with any other elements of the standard ESBWR design certification, a generic change to the digital I&C design process may also be the subject of a design certification amendment. In that case, the amendment would address whether the digital I&C Design Acceptance Criteria ITAAC are to be amended and whether any of the results summary reports or design elements would need to be modified.

Following completion of the Design Acceptance Criteria ITAAC, other ITAAC that address implementation of the design will be performed to verify that the systems have been constructed and installed consistent with the design.]*

Text sections that are bracketed and italicized with an asterisk following the brackets are designated as Tier 2. Prior NRC approval is required to change.

14.3A.4 HUMAN FACTORS ENGINEERING DESIGN ACCEPTANCE CRITERIA ITAAC CLOSURE

[NRC guidance in RG 1.206, Section C.III.5, describes a phased Design Acceptance Criteria ITAAC process for HFE. The Tier 1 Design Descriptions and Design Acceptance Criteria ITAAC delineate the process and requirements to develop the design information required in each area of HFE, as described in NRC guidance document NUREG-0711, "Human Factors Engineering Program Review Model." The Design Commitments specify certain actions that are taken in accordance with an associated ESBWR HFE implementation plan. These HFE implementation plans are reviewed as part of the design certification review and are designated as Tier 2 information.*

Each element of the phased process established by the HFE Design Acceptance Criteria ITAAC results in a summary report of the specific activity. Acceptance Criteria are specified in Tier 1 for the development process at various stages of detailed design, with an ITAAC for verifying the final as-built condition through subsequent construction and testing. Acceptance Criteria for HFE Design Acceptance Criteria ITAAC consist of a series of results summary reports that are developed and which verify that the specific associated Design Commitment is met.

As the Design Acceptance Criteria closure process proceeds, procedures and test programs are developed as necessary to demonstrate that the Design Acceptance Criteria requirements are met at each stage. These procedures and test programs will be available for NRC review and inspection as they become available.

The Design Acceptance Criteria ITAAC closure process for HFE is a "phased" process because it consists of a set of sequential steps or phases that require successful completion. As each phase of the HFE Design Acceptance Criteria ITAAC process is completed, the supporting documentation will be available for the NRC to review and inspect to ensure that the design through that phase is in compliance with the certified design information that describes the HFE elements. The information will be made available throughout the phased process so that the NRC may review, audit, and inspect the work to confirm that the Design Acceptance Criteria ITAAC commitments have been adequately implemented for the various phases. NRC guidance discusses that it is not necessary that each phase be completed sequentially. However, if the NRC identifies a concern that a Design Acceptance Criteria ITAAC, or an element thereof, was not successfully met, the design process may need to be repeated to meet the Design Acceptance Criteria ITAAC before final as-built activities are completed.

The first of any standard ESBWR will complete the HFE Design Acceptance Criteria ITAAC actions. Each subsequent standard ESBWR may use the summary reports that are developed to complete the first of a standard ESBWR HFE Design Acceptance Criteria ITAAC. In this manner, a group of standard ESBWR plants may be based on the same set of results summary reports for HFE.

Notwithstanding the standard bases established by the first standard ESBWR, the fleet may identify through operating experience changes that may be made in accordance with the appropriate change process. As with any other elements of the standard ESBWR design certification, a generic change to the HFE process may also be the subject of a design certification amendment. In that case, the amendment would address whether the HFE Design

Acceptance Criteria ITAAC are to be amended and whether any of the results summary reports would need to be modified.

Following completion of the Design Acceptance Criteria ITAAC, other ITAAC that address implementation of the design will be performed to verify that the systems have been constructed and installed consistent with the design.]*

Text sections that are bracketed and italicized with an asterisk following the brackets are designated as Tier 2. Prior NRC approval is required to change.

14.3A.5 COL INFORMATION

14.3A-1-1 Establish a Schedule for Design Acceptance Criteria ITAAC Closure

Each COL Applicant will provide a Design Acceptance Criteria ITAAC closure schedule in the COL application and identify whether the standard approach will be used (Subsection 14.3A.1).

14.3A.6 REFERENCES

None.