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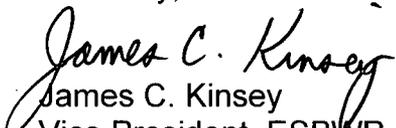
Subject: Response to Portion of NRC Request for Additional Information
Letter No. 126 Related to ESBWR Design Certification Application,
RAI Numbers 14.3-242, 14.3-257 and 14.3-368

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 by NRC letter dated December 20, 2007 (Reference 1). RAI Numbers 14.3-242, 14.3-257 and 14.3-368 are addressed in Enclosure 1.

Verified DCD changes associated with this RAI response 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 this RAI response. 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

*DC08
NRC*

Reference:

1. MFN 07-718, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request For Additional Information Letter No. 126 Related To ESBWR Design Certification Application*, dated December 20, 2007

Enclosure:

1. Response to Portion of NRC Request for Additional Information Letter No. 126 Related to ESBWR Design Certification Application, DCD Tier 1, RAI Numbers 14.3-242, 14.3-257 and 14.3-368

cc: AE Cabbage USNRC (with enclosure)
GB Stramback GEH/San Jose (with enclosure)
RE Brown GEH/Wilmington (with enclosure)
DH Hinds GEH/Wilmington (with enclosure)
eDRF 0000-0081-3372 NRC RAI 14.3-242
0000-0081-3372 NRC RAI 14.3-257
0000-0080-8462/1 NRC RAI 14.3-368

Enclosure 1

***MFN 08-086, Supplement 25**

Response to Portion of NRC Request for

Additional Information Letter No. 126

Related to ESBWR Design Certification Application

DCD Tier 1

RAI Numbers 14.3-242, 14.3-257 and 14.3-368

***Verified DCD changes associated with this RAI response 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 this RAI response. Other changes shown in the markup(s) may not be fully developed and approved for inclusion in DCD Revision 5.**

NRC RAI 14.3-242

NRC Summary:

Deviation from the 10 CFR 50.55; IEEE-603 1991 definition

NRC Full Text:

The definition for the word "division" is inconsistent from that identified in 10 CFR 50.55a which references standard IEEE-603.

GEH Response

The definition of division given in DCD, Tier 1, Subsection 1.1.1 Definitions, is consistent with the definition in IEEE 603-1991. From IEEE 603-1991: "division: The designation applied to a given system or set of components that enables the establishment and maintenance of physical, electrical, and functional independence from other redundant sets of components."

The difference between the definitions is attributed to their intended uses. IEEE 603-1991 establishes design criteria for a future design. The DCD, Tier 1, Subsection 1.1.1 definition applies to the completed design in which the division is independent and does not enable the establishment and maintenance of independence.

DCD Impact

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

NRC RAI 14.3-257

NRC Summary:

Commitment 2 appears to conflict with Commitment 3

NRC Full Text:

Commitment 2 defines the limited list of controls as listed in Table 2.2.6-1. Commitment 3 refers to the DAC related ITAAC which should identify what additional manual controls and VDU controls are forthcoming. Commitment No. 2 should be deleted.

GEH Response

Commitment 2 in Table 2.2.6-3, Item 2 is the list of Remote Shutdown System (RSS) controls. Commitment 3 in Table 2.2.6-3, Item 3 is the RSS minimum inventory of alarms, displays, controls and status indications. Commitments 2 and 3 serve two distinct purposes as described below.

DCD, Rev 4., Table 2.2.6-3, ITAAC For The Remote Shutdown System, Item 2, references Table 2.2.6-2. The RSS controls defined in Table 2.2.6-2 pertain to the physical devices on the RSS panel (i.e., the Div 1 and Div 2 Manual Scram Controls, the Div 1 and Div 2 Manual MSIV Isolation Controls, the Div 1 and Div 2 Safety-Related VDU displays, and the nonsafety-related VDU displays). Table 2.2.6-2 defines the minimum level of diversity to be provided in the hardware design of each RSS to ensure compliance with GDC 19.

Table 2.2.6-3, Item 3, references Tier 1, Section 3.3 and the HFE process producing the HSI design implemented on the VDU displays and confirms the acceptability of the physical design. The combination of RSS redundancy, defined in Table 2.2.6-1, and minimum level of diversity, defined in Table 2.2.6-2, ensures VDU reliability is not compromised as a result of a common cause failure.

No conflicts exist between Commitments 2 and 3 of Table 2.2.6-3 and, therefore, Commitment 2 will not be deleted.

DCD Impact

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

NRC RAI 14.3-368

NRC Summary:

FAPCS seismic Category I qualification

NRC Full Text:

For ITAAC Table 2.6.2-2, Items 5i) and 5ii), there is inconsistency between DC, ITA, and AC in that the DC refers to "equipment and piping" and the ITA and AC refer only to "equipment." The staff requests that the applicant revise the ITA and AC to be consistent with the DC. In addition, the ITA refers to "type tests and/or analyses" and the staff requests that the applicant modify to "type tests and analyses".

GEH Response

ITAAC Table 2.6.2-2, Items 5i) and 5ii) will be revised to conform to the format of ICS DCD Tier 1, 2.4.1, ITAAC Item 5 and GDCS DCD Tier 1, 2.4.2, ITAAC Item 5. Item 5 in the Design Description will also be revised to agree with Design Commitment in Table 2.6.2-2 Item 5a and 5b. These changes will make these sections consistent within the DCD.

The specific changes to Section 2.6.2 Design Description is as follows:

Change Item 5 to:

- (5) a. The Seismic Category I equipment identified in Table 2.6.2-1 can withstand seismic design basis loads without loss of safety function.
- b. Each of the lines identified in Table 2.6.2-1 for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its functional capability.

The specific changes to Table 2.6.2-2 Item 5 are listed below:

DC: Changed existing text to 5a and added 5b as follows:

"Each of the lines identified in Table 2.6.2-1 for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its functional capability."

ITA: Deleted the existing text and added the following for 5a and 5b:

- i) Inspection will be performed to verify that the seismic Category I equipment and valves identified in Table 2.6.2-1 are located in a seismic Category I structure.
- ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed.

iii) Inspection will be performed for the existence of a report verifying that the as-installed equipment including anchorage is seismically bounded by the tested or analyzed conditions.

Inspection will be performed for the existence of a report verifying that the as-built piping meets the requirements for functional capability.

AC: Deleted the existing text and added the following for 5a and 5b:

i) The seismic Category I equipment identified in Table 2.6.2-1 is located on a seismic Category I structure.

ii) A report exists and concludes that the seismic Category I equipment can withstand seismic design basis loads without loss of safety function.

iii) A report exists and concludes that the as-installed equipment including anchorage is seismically bounded by the tested or analyzed conditions.

Report(s) document that a report exists and concludes that each of the as-built lines identified in Table 2.6.2-1 for which functional capability is required meets the requirements for functional capability.

DCD Impact

DCD Tier #1, Section 2.6.2, Item 5 and Table 2.6.2-2, Items 5a and 5b will be revised as noted in the attached markup.

2.6.2 Fuel And Auxiliary Pools Cooling System

Design Description

The Fuel and Auxiliary Pools Cooling System (FAPCS) provides cooling and cleaning of pools located in the containment, reactor building and fuel building, during normal plant operation. The FAPCS provides flow paths for filling and makeup of these pools during normal plant operation and under post-accident condition. The FAPCS provides suppression pool cooling and LPCI as active backup of the passive containment heat removal systems.

The FAPCS is as shown in Figure 2.6.2-1.

- (1) The functional arrangement of the FAPCS is as described in the Design Description of this Subsection 2.6.2 and as shown in Figure 2.6.2-1.
- (2) ASME Code Section III
 - a. The components ~~and piping~~ identified in Table 2.6.2-1 as ASME Code Section III are designed, fabricated, installed, and inspected ~~and constructed~~ in accordance with ASME Code Section III requirements.
 - b. The piping identified in Table 2.6.2-1 as ASME Code Section III are designed, fabricated, installed, and inspected in accordance with ASME Code Section III requirements.
- (3) Pressure Boundary Integrity
 - a. Pressure boundary welds in components ~~and piping~~ identified in Table 2.6.2-1 as ASME Code Section III meet ASME Code Section III requirements.
 - b. Pressure boundary welds in piping identified in Table 2.6.2-1 as ASME Code Section III meet ASME Code Section III requirements.
- (4) The components and piping identified in Table 2.6.2-1 as ASME Code Section III retain their pressure boundary integrity ~~under internal pressure that will be experienced during service~~ at their design pressure.
- (5)

<ol style="list-style-type: none"> a. <u>The Seismic Category I equipment and piping identified in Table 2.6.2-1 can withstand seismic design basis loads without loss of structural integrity and safety function.</u> b. <u>Each of the lines identified in Table 2.6.2-1 for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its functional capability.</u>
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- (6) The containment isolation portions of the FAPCS are addressed in Tier 1, Subsection 2.15.1.
- (7) The FAPCS performs the following nonsafety-related functions:
 - a. Suppression pool cooling mode
 - b. Low-pressure coolant injection mode.
 - c. External connection for emergency water to IC/PCC pool and Spent Fuel Pool.

Table 2.6.2-2

ITAAC For The Fuel and Auxiliary Pools Cooling Cleanup System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>4. The components and piping identified in Table 2.6.2-1 as ASME Code Section III retain their pressure boundary integrity at their design pressure.</p>	<p>i) A hydrostatic or pressure test will be performed on the components <u>and piping</u> required by the ASME Code Section III to be tested.</p> <p>ii) Impact testing will be performed on the containment and pressure-retaining materials in accordance with the ASME Code Section III to confirm the fracture toughness of the materials.</p>	<p>i) An <u>ASME Code</u> report exists and documents concludes that the results of the pressure test of the components <u>and piping</u> identified in Table 2.6.2-1 as ASME Code Section III conform <u>comply</u> with the requirements of the ASME Code Section III.</p> <p>ii) An <u>ASME Code</u> report exists and documents concludes that the containment and pressure-retaining penetration materials conform <u>comply</u> with fracture toughness requirements of the ASME Code section III.</p>
<p>5a. The seismic Category I equipment and piping identified in Table 2.6.2-1 can withstand seismic design basis loads without loss of structural integrity and safety function.</p>	<p>i) <u>Inspection will be performed to verify that the seismic Category I equipment and valves identified in Table 2.6.2-1 are located in a seismic Category I structure.</u> i) Type tests and/or analyses of seismic Category I equipment and piping will be performed.</p>	<p><u>Report(s) document that:</u></p> <p>i) <u>The seismic Category I equipment identified in Table 2.6.2-1 is located in a seismic Category I structure. A report exists and documents that the seismic Category I equipment and piping can withstand seismic design basis dynamic loads without loss of structural integrity and safety function.</u></p>

Table 2.6.2-2

ITAAC For The Fuel and Auxiliary Pools Cooling Cleanup System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
	<p>ii) <u>Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed. Inspections will be performed for the existence of a report verifying that the as-installed equipment and piping including anchorage is seismically bounded by the tested or analyzed conditions.</u></p> <p>iii) <u>Inspection will be performed for the existence of a report verifying that the as-installed equipment including anchorage is seismically bounded by the tested or analyzed conditions</u></p>	<p>ii) <u>A report exists and concludes that the seismic Category I equipment can withstand seismic design basis loads without loss of safety function. The as-built equipment and piping including anchorage is seismically bounded by the tested or analyzed conditions.</u></p> <p>iii) <u>A report exists and concludes that the as-installed equipment including anchorage is seismically bounded by the tested or analyzed conditions.</u></p>
<p>b. <u>Each of the lines identified in Table 2.6.2-1 for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its functional capability.</u></p>	<p><u>Inspection will be performed for the existence of a report verifying that the as-built piping meets the requirements for functional capability.</u></p>	<p><u>Report(s) document that a report exists and concludes that each of the as-built lines identified in Table 2.6.2-1 for which functional capability is required meets the requirements for functional capability.</u></p>
<p>6. The containment isolation portions of the FAPCS are addressed in Tier 1, Subsection 2.15.1.</p>	<p>See Tier 1 Subsection 2.15.1.</p>	<p>See Tier 1 Subsection 2.15.1</p>
<p>7. The FAPCS performs the following nonsafety-related functions:</p>	<p>Perform a test to confirm the flow path between the FAPCS to the suppression</p>	<p>Test report(s) document that the cooling flow path is demonstrated and confirmed</p>