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MFN 08-086 Supplement 50

Docket No. 52-010

May 13, 2008

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555-0001

Subject: **Response to Portion of NRC Request for Additional Information Letters No. 126 and 169 Related to ESBWR Design Certification Application ESBWR RAI Numbers 14.3-353, 14.3-354, 14.3-384 (Letter No. 126) and 14.3-352 S01 (Letter No. 169)**


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) and April 8, 2008 (Reference 2). The previous response to RAI 14.3-352 was provided in Reference 3.


Enclosure 1 contains the GEH response to each of the subject RAIs. The enclosed changes will be incorporated in the upcoming DCD Revision 5 submittal.

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

  
NRO

References:

1. MFN 07-718, Letter from U.S. Nuclear Regulatory Commission to James C. Kinsey, GEH, *Request For Additional Information Letter No. 126 Related To ESBWR Design Certification Application*, dated December 20, 2007.
2. MFN 08-352, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GEH, *Request For Additional Information Letter No. 169 Related To ESBWR Design Certification Application*, dated April 8, 2008.
3. MFN 08-086, *Partial GEH Response to NRC Request for Additional Information Letter No. 126 Related to ESBWR Design Certification Application*, dated February 6, 2008.

Enclosure:

1. Response to Portion of NRC Request for Additional Information Letters No. 126 and 169 Related to ESBWR Design Certification Application DCD Tier 1 RAI Numbers 14.3-353, 14.3-354, 14.3-384 (Letter No. 126) and 14.3-352 S01 (Letter No. 169)

Attachment 1, DCD Revision 5 Tier 1 Markups

cc: AE Cabbage	USNRC (with enclosure)
RE Brown	GEH/Wilmington (with enclosure)
DH Hinds	GEH/Wilmington enclosure)
GB Stramback	GEH/San Jose (with enclosure)
eDRF Section	0000-0085-0737

**MFN 08-086, Supplement 50**

**Enclosure 1**

**\*Response to Portion of NRC Request for Additional Information Letter No. 126 Related to ESBWR Design Certification Application RAI Numbers 14.3-353, 14.3-354, 14.3-384 (Letter No. 126) and 14.3-352 S01 (Letter No. 169)**

**\*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 14.3-353**

*NRC Summary: ICS component qualification*

*NRC Full Text:*

*For ITAAC Table 2.4.1-3 Item 5b, the staff requests that the applicant clarify which lines in Table 2.4.1-3 are required to retain their functional capability and under what circumstances (i.e., is it only the Seismic Cat. I equipment).*

**GEH Response**

All components, including piping, identified in Table 2.4.1-1, "ICS Mechanical Equipment", as seismic Category I, must remain functional under seismic design basis loads. ITAAC 5a establishes this design requirement, and states that such equipment will not lose its safety function under seismic design basis loads. Therefore, ITAAC 5b is a redundant entry, applicable only to piping, and will be deleted. In the case of ITAAC 5a, the term "equipment" will be replaced by "components" to signify that piping is included, and the suffix "a" will be dropped from the item number. The term "Functional Capability" is no longer used in the ITAAC for the ICS.

**DCD Impact**

DCD Tier 1, Table 2.4.1-3 will be revised in response to this RAI as shown on the attached markup.

**NRC RAI 14.3-354**

*NRC Summary: GDCS component qualification*

*NRC Full Text:*

*For ITAAC Table 2.4.2-3 Item 5b, the staff requests that the applicant clarify which lines in Table 2.4.1-3 are required to retain their functional capability and under what circumstances (i.e., is it only the Seismic Cat. I equipment).*

**GEH Response**

All components, including piping, identified in Table 2.4.2-1, “GDCS Mechanical Equipment”, as seismic Category I, must remain functional under seismic design basis loads. Design Description (5)a and corresponding ITAAC 5a, establish this functional requirement, and state that such equipment will not lose its safety function under seismic design basis loads. Therefore, Design Description (5)b and ITAAC 5b are redundant entries, applicable only to piping, and will be deleted. In the case of Design Description (5)a and ITAAC 5a, the term “equipment” will be replaced by “components” to signify that piping is included, and the suffix “a” will be dropped from the item numbers. The term “Functional Capability” is no longer used in the design description and ITAAC for the GDCS.

**DCD Impact**

DCD Tier 1, Section 2.4.2 and Table 2.4.2-3, will be revised in response to this RAI as shown on the attached markups.

**NRC RAI 14.3-384**

*NRC Summary: PCCS functional capability*

*NRC Full Text:*

*For ITAAC Table 2.15.4-2 Item 5b, the staff requests that the applicant clarify or indicate which lines in Table 2.15.4-1 are required for functional capability and to provide a definition for what is meant by functional capability and under which conditions.*

**GEH Response**

All components, including piping, identified in Table 2.15.4-1, “Passive Containment Cooling System Mechanical Equipment”, as seismic Category I, must remain functional under seismic design basis loads. Design Description (5)a and corresponding ITAAC 5a, establish this functional requirement, and state that such equipment will not lose its safety function under seismic design basis loads. Therefore, Design Description (5)b and ITAAC 5b are redundant entries, applicable only to piping, and will be deleted. In the case of Design Description (5)a and ITAAC 5a, the term “equipment” will be replaced by “components” to signify that piping is included, and the suffix “a” will be dropped from the item numbers. Additionally, since Table 2.15.4-1 has a column which indicates whether each component is seismic Category I, the tabular column titled “Functional Capability Required” is not required and will also be deleted. The term “Functional Capability” is no longer used in the Design Description and ITAAC for the PCCS.

**DCD Impact**

DCD Tier 1, Section 2.15.4 and Tables 2.15.4-1 and 2.15.4-2 will be revised in response to this RAI as shown on the attached markups.

**NRC RAI 14.3-352 (original response)**

*NRC Summary: SLCS component qualification*

*NRC Full Text:*

*For ITAAC Table 2.2.4-6 Item 14, the staff requests that the applicant clarify which components in Table 2.2.4-4 are required to retain their functional capability and under what circumstances (i.e., is it only the Seismic Cat. I equipment).*

**GEH Response**

The response to RAI 14.3-352 was contained in Enclosure 2 of MFN 08-086, dated February 6, 2008. The entire response consisted of a Change List stating “ Revised Table 2.2.4-4 throughout to include the functional capability of each item listed on the Table” The response also included the markup of Table 2.2.4-4.

**NRC RAI 14.3-352, Supplement 1**

*The RAI observed that ITAAC Table 2.2.4-6, “ITAAC for the Standby Liquid Control System,” Item 14 states that some of the equipment listed in Table 2.2.4-4 must retain its functional capability. The Design Commitment (DC) reads as follows: “Each of the components identified in Table 2.2.4-4 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 DC for ITAAC 2.2.4-6, Item 14 is written such that that an indication of which specific equipment items must remain functional is expected in the equipment table, Table 2.2.4-4. However, no indication is provided. The RAI requested revision to the equipment table to provide clarity on which items must remain functional and under which conditions.*

*In its response GEH modified the equipment table, Table 2.2.4-4 by adding a column labeled “FUNCTIONAL CAPABILITY REQUIRED.” The data provided in the column is a statement of “ACTIVE” or “PASSIVE” which corresponds to the type of equipment listed. Specifically, those components listed which have had “ACTIVE” added would be expected to have moving parts. Those which have the “PASSIVE” label applied do not appear to have moving parts.*

*This information on the type of function each component utilizes may be useful. It does not, however, provide all the information requested in the RAI. The inspector will need to know which equipment in the system must remain functional, that is able to perform its intended safety function after enduring loading: “Normal”, “Seismic” or the combination of both. So that they can review the report and verify that it indicates all of the correct and necessary equipment has been examined and will retain its function. Other equipment may only need to retain its structural integrity to perform its function. The staff requests the applicant to clarify the meaning of “active” and “passive” with respect to functionality in terms of operability and structural integrity. If all of the equipment listed in Table 2.2.4-4 must retain its function after the loading, that the DC should be revised to clearly indicate such.*

### **GEH Response**

All components, including piping and tanks, identified in Table 2.2.4-4, "SLC System Mechanical Equipment", as seismic Category I, must remain functional under seismic design basis loads. Functional Requirement 13 and ITAAC 13, establish this functional requirement, and state that such equipment will not lose its safety function under seismic design basis loads. Therefore, Functional Requirement 14 and ITAAC 14, are redundant entries, applicable only to piping and tanks, and therefore will be deleted. In the case of Functional Requirement (13) and ITAAC 13, the term "equipment" will be replaced by "components" to signify that piping is included. Additionally, since Table 2.2.4-4 has a column which indicates whether each component is seismic Category I, the tabular column titled "Functional Capability Required", which was included in the markups in the prior response (MFN 08-086, dated February 6, 2008), has been retracted, and will not appear in DCD, revision 5. The term "Functional Capability" is no longer used in the design description and ITAAC for the Standby Liquid Control system.

### **DCD Impact**

DCD Tier 1, Section 2.2.4 and Table 2.2.4-6 will be revised in response to this RAI as shown on the attached markups.

The Table 2.2.4-4 column titled "Functional Capability Required", that was included in the markups in the original RAI 14.3-352 response, has been retracted, and will not be included in DCD, revision 5.

## **Attachment 1**

### **DCD Revision 5 Tier 1 Markups**

#### RAI 14.3-352 S01

Section 2.2.4 Standby Liquid Control System  
Table 2.2.4-6 ITAAC For The Standby Liquid Control System

#### RAI 14.3-353

Table 2.4.1-3 ITAAC For The Isolation Condenser System

#### RAI 14.3-354

Section 2.4-2 Emergency Core Cooling System - Gravity-Driven Cooling System  
Table 2.4.2-3 ITAAC For The Gravity-Driven Cooling System

#### RAI 14.3-384

Section 2.15.4 Passive Containment Cooling System  
Table 2.15.4-1 Passive Containment Cooling System Mechanical Equipment  
Table 2.15.4-2 ITAAC For The Passive Containment Cooling System

- b. Pressure boundary welds in piping identified in Table 2.2.4-4 as ASME Code Section III meet ASME Code Section III requirements.

(12) Pressure boundary integrity

- a. The components identified in Table 2.2.4-4 as ASME Code Section III retain their pressure boundary integrity at ~~under internal pressures that will be experienced during service~~ their design pressure.
- b. The piping identified in Table 2.2.4-4 as ASME Code Section III retains its pressure boundary integrity at its design pressure.

(13) The Seismic Category I ~~equipment components~~ identified in Tables 2.2.4-4 and 2.2.4-5 can withstand seismic design basis loads without loss of safety function.

(14) ~~Each of the components identified in Table 2.2.4-4 for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its functional capability~~ Deleted.

(15) Each of the SLC System divisions (or safety-related loads/components) identified in Tables 2.2.4-4 and 2.2.4-5 is powered from its respective safety-related division.

(16) In the SLC System, independence is provided between safety-related divisions, and between safety-related divisions and nonsafety-related equipment.

(17) ~~Each mechanical train of the SLC System is physically separated from the other trains outside of the Containment~~ Deleted.

(18) Re-positionable (not squib) valves designated in Table 2.2.4-4 as having an active safety-related function open, close, or both open and close under differential pressure, fluid flow, and temperature conditions.

(19) The pneumatically operated valve(s) designated in Table 2.2.4-4 fail in the mode listed if either electric power to the valve actuating solenoid is lost, or pneumatic pressure to the valve(s) is lost.

(20) Check valves designated in Table 2.2.4-4 as having a safety-related function open, close, or both open and close under system pressure, fluid flow, and temperature conditions.

(21) The SLC System injection squib valve will open as designed.

(22) The equivalent natural boron concentration at cold shutdown conditions for the total solution injection volume is based on the liquid inventory in the RPV at the main steam line nozzle elevation plus the liquid inventory in the reactor shutdown cooling piping and equipment of the RWCU/SDC system.

(23) SLC software is developed in accordance with the software development program described in Section 3.2.

### Inspections, Tests, Analyses and Acceptance Criteria

Table 2.2.4-6 defines the inspections, tests, and/or analyses, together with associated acceptance criteria for the SLC system.

**Table 2.2.4-6  
ITAAC For The Standby Liquid Control System**

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>13. <u>The seismic Category I equipment components identified in Tables 2.2.4-4 and 2.2.4-5 can withstand seismic design basis loads without loss of safety function.</u></p>	<p>a.</p> <p>i) <del>Inspection will be performed to verify that the seismic Category I equipment and valves identified in Tables 2.2.4-4 and 2.2.4-5 are located in a seismic Category I structure on the Nuclear Island.</del></p> <p>b. ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed.</p> <p>c. 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.</p>	<p>a. Report(s) document that:</p> <p>i) <del>The seismic Category I equipment identified in Tables 2.2.4-4 and 2.2.4-5 is located on a seismic structure in a seismic Category I structure.</del></p> <p>b. __</p> <p>ii) A report exists and concludes that the seismic Category I equipment can withstand seismic design basis loads without loss of safety function.</p> <p>c.</p> <p>iii) A report exists and concludes that the as-installed equipment including anchorage is seismically bounded by the tested or analyzed conditions.</p>
<p>14. <del>Each of the components identified in Table 2.2.4-4 for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its functional capability.</del><u>Deleted</u></p>	<p><del>Inspection will be performed for the existence of a report verifying that the as-built piping meets the requirements for functional capability.</del><u>Deleted</u></p>	<p><del>Report(s) document that a report exists and concludes that each of the as-built lines identified in Table 2.2.4-4 for which functional capability is required meets the requirements for functional capability.</del><u>Deleted</u></p>

**Table 2.4.1-3  
ITAAC For The Isolation Condenser System**

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>5a. The seismic Category I equipment components identified in Tables 2.4.1-1 and 2 can withstand seismic design basis loads without loss of safety function.</p>	<ul style="list-style-type: none"> <li>i) Inspection will be performed to verify that the seismic Category I equipment and valves identified in Tables 2.4.1-1 and 2 are located <del>on the Nuclear Island</del> <u>in a seismic Category I structure.</u></li> <li>ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed.</li> <li>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.</li> </ul>	<p>Report(s) document that:</p> <ul style="list-style-type: none"> <li>i) The seismic Category I equipment identified in Tables 2.4.1-1 and 2 is located in <del>a seismic structure</del> <u>in a seismic Category I structure.</u></li> <li>ii) A report exists and concludes that the seismic Category I equipment can withstand seismic design basis loads without loss of safety function.</li> <li>iii) A report exists and concludes that the as-installed equipment including anchorage is seismically bounded by the tested or analyzed conditions.</li> </ul>
<p>b. <del>Each of the lines identified in Table 2.4.1-1 for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its functional capability.</del></p>	<p><del>Inspection will be performed for the existence of a report verifying that the as-built piping meets the requirements for functional capability.</del></p>	<p><del>Report(s) document that a report exists and concludes that each of the as-built lines identified in Table 2.4.1-1 for which functional capability is required meets the requirements for functional capability.</del></p>

## 2.4.2 Emergency Core Cooling System - Gravity-Driven Cooling System

### Design Description

Emergency core cooling is provided by the Gravity-Driven Cooling System (GDCS) located within containment in conjunction with the ADS in case of a LOCA.

- (1) The functional arrangement of the GDCS is as listed in Table 2.4.2-1 and shown on Figure 2.4.2-1.
- (2) ASME Code Section III
  - ~~(2)~~a. Components identified in Table 2.4.2-1 as ASME Code Section III are designed, fabricated, installed, and inspected in accordance with the ASME Code, Section III requirements.
  - b. Piping identified in Table 2.4.2-1 as ASME Code Section III are designed, fabricated, installed, and inspected in accordance with the ASME Code, Section III requirements.
- (3) Pressure Boundary Welds
  - a. Pressure boundary welds in components identified in Table 2.4.2-1 as ASME Code Section III meet ASME Code Section III requirements.
  - b. Pressure boundary welds in piping identified in Table 2.4.2-1 as ASME Code Section III meet ASME Code Section III requirements.
- (4) Pressure Boundary Integrity
  - a. ~~The Each~~ components identified in Table 2.4.2-1 as ASME Code Section III retains their pressure boundary integrity at under internal pressures that will be experienced during service ~~their design pressure~~.
  - b. The piping identified in Table 2.4.2-1 as ASME Code Section III retains its pressure boundary integrity at design pressure.
- (5) The seismic Category I equipment components identified in Table 2.4.2-1 can withstand seismic design basis loads without loss of safety function.
  - ~~a.b. Each of the lines identified in Table 2.4.2-1 for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its functional capability.~~
- (6) The minimum set of displays, alarms and controls, based on the applicable codes and standards, including HFE evaluations and emergency procedure guidelines, is available in the main control room. ~~The minimum set of displays, alarms and controls, based on the applicable codes and standards, including HFE evaluations and emergency procedure guidelines, is available in the main control room~~
- (7) The equipment qualification of GDCS components is addressed in Tier 1 Section 3.8.
- (8) The GDCS injections lines provide sufficient flow to maintain water coverage one meter above TAF for 72 hours following a design basis LOCA.
  - a. The GDCS equalizing lines provide sufficient flow to maintain water coverage one meter above TAF for 72 hours following a design basis LOCA.

**Table 2.4.2-3  
ITAAC For The Gravity-Driven Cooling System**

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>5a. The seismic Category I <u>equipment components identified in Table 2.4.2-1</u> can withstand seismic design basis loads without loss of safety function.</p>	<ul style="list-style-type: none"> <li>i) Inspection will be performed to verify that the seismic Category I equipment and valves identified in Table 2.4.2-1 <u>are located in a seismic Category I structure.</u></li> <li>ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>i) Report(s) document that the seismic Category I equipment identified in Table 2.4.2-1 is located <del>on a seismic structure</del> <u>in a seismic Category I structure.</u></li> <li>ii) A report exists and concludes that the seismic Category I equipment can withstand seismic design basis loads without loss of safety function.</li> <li>iii) A report exists and concludes that the as-installed equipment including anchorage is seismically bounded by the tested or analyzed conditions.</li> </ul>
<p>b. Each of the lines identified in Table 2.4.2-1 for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its functional capability.</p>	<p>Inspection will be performed for the existence of a report verifying that the as-built piping meets the requirements for functional capability.</p>	<p>A report exists and concludes that each of the as-built lines identified in Table 2.4.2-1 for which functional capability is required meets the requirements for functional capability.</p>

## 2.15.4 Passive Containment Cooling System

### Design Description

The Passive Containment Cooling System (PCCS), in conjunction with the suppression pool, maintains the containment within its pressure limits for DBAs such as a LOCA, by condensing steam from the Drywell atmosphere and returning the condensed liquid to the Gravity Driven Cooling System (GDCCS) pools. The system is entirely passive, with no moving parts.

The PCCS consists of six low pressure, independent sets of two steam condenser modules (passive containment cooling condensers) that condense steam on the tube side and transfer heat from the drywell to water in a large cooling pool (IC/PCC pool) located outside the primary containment, which is vented to atmosphere.

Each PCCS condenser is located in a subcompartment of the IC/PCC pool. The IC/PCC pool subcompartments on each side of the reactor building communicate at their lower ends to enable full use of the collective water inventory, independent of the operational status of any given PCCS condenser.

Each condenser, which is an integral part of the containment, contains a drain line to one of the three GDCCS pools, and a vent discharge line the end of which is submerged in the pressure suppression pool.

The PCCS condensers loops are driven by the pressure difference created between the containment drywell and the suppression pool during a LOCA, and as such require no sensing, control, logic or power actuated devices for operation.

- (1) The functional arrangement for the PCCS is as described in the Design Description in this Section 2.15.4, Table 2.15.4-1 and Figure 2.15.4-1.
- (2) ASME Code Section III
  - a. The components identified in Table 2.15.4-1 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 2.15.4-1 as ASME Code Section III is designed, fabricated, installed, and inspected~~and constructed~~ in accordance with ASME Code Section III requirements.
- (3) Pressure Boundary Welds
  - a. Pressure boundary welds in components identified in Table 2.15.4-1 as ASME Code Section III meet ASME Code Section III requirements.
  - b. Pressure boundary welds in piping identified in Table 2.15.4-1 as ASME Code Section III meet ASME Code Section III requirements.
- (4) The pressure boundary of the PCCS retains its integrity under the design pressure of 310 kPa gauge (45 psig).
- (5) a. The seismic Category I equipment components identified in Table 2.15.4-1 can withstand seismic design basis loads without loss of safety function.

~~b. Each of the lines identified in Table 2.15.4-1 for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its functional capability.~~

- (6) ~~Each mechanical train of the PCCS (A, B, C, D, E & F)\* is physically separated from the other trains. \*As indicated on Figure 2.15.4-1. Physical separation is not required in the Primary Containment~~~~Deleted.~~
- (7) The PCCS together with the pressure suppression containment system will limit containment pressure to less than its design pressure for 72 hours after a LOCA.
- (8) The equipment qualification of PCCS components is addressed in Tier 1 Section 3.8.
- (9) In order to ensure the PCCS can maintain the drywell to wetwell differential pressure to a limit less than the value that causes pressure relief through the horizontal vents, the vent line discharge point is submerged at an elevation below low water level but above the uppermost horizontal vent.
- (10) The PCCS will be designed to limit the fraction of containment leakage through the condensers to an acceptable value.
- (11) The PCCS vent fans flow rate is sufficient to meet beyond 72 hours containment cooling requirements.
- (12) The PCCS vent fans can be remotely operated from the MCR.

#### **Inspections, Tests, Analyses and Acceptance Criteria**

Table 2.15.4-2 provides a definition of the inspections, tests and/or analyses, together with associated acceptance criteria for the Passive Containment Cooling System.

Table 2.15.4-1

Passive Containment Cooling System Mechanical Equipment

Equipment Name (Description)	Equipment Identifier see Figure 2.15.4-1	ASME Code Section III	Seismic Cat. I	RCPB Component	Containment Isolation Valve	Remotely Operated Valve	Loss of Motive Power Position	Functional Capability Required
PCC Heat Condenser	PCC Condenser	Yes	Yes	No	-	-	-	Yes
PCC Inlet Line	P-1(A <sup>1</sup> )	Yes	Yes	No	-	-	-	Yes
Condensate Drain Line	P-2(A <sup>1</sup> )	Yes	Yes	No	-	-	-	Yes
<u>Vent Fan Check Valve</u>	<u>Check Valve</u>	<u>Yes</u>	<u>No</u>	<u>No</u>	=	=	=	
Non-Condensables Vent Line	P-3(A <sup>1</sup> )	Yes	Yes	No	-	-	-	Yes
<u>Vent Fan</u>	<u>Vent Fan</u>	<u>Yes</u>	<u>No</u>	<u>No</u>	=	=	=	
<u>Non-Condensables Vent Line Sparger</u>	<u>Sparger</u>	<u>Yes</u>	<u>Yes</u>	<u>No</u>	=	=	=	
<u>PCCS Inlet Pipe Debris Filter</u>	<u>N/A</u>	<u>Yes</u>	<u>Yes</u>	<u>No</u>	=	=	=	
<u>PCCS Vent Fan Line</u>	<u>P-4 (A<sup>1</sup>)</u>	<u>Yes</u>	<u>No</u>	<u>No</u>	=	=	=	

Note: A dash means not applicable.

<sup>1</sup> Train A; Typical for Trains B, C, D, E & F.

Table 2.15.4-2

ITAAC For The Passive Containment Cooling System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>4. The pressure boundary of the PCCS retains its integrity under the <u>containment design</u> pressure of 310 kPa gauge (45 psig)</p>	<p>A containment Structural Integrity Test (SIT) will be conducted per ASME requirement at a test pressure of 1.15 times the design pressure. The first prototype containment structure will be instrumented to measure strains per ASME Code Section III, Div 1, NE-6320.</p>	<p>Test results demonstrate compliance to ASME Code Section III, Div 1, NE-3226.</p>
<p>5a. The seismic Category I <del>equipment</del> <u>components identified in Table 2.15.4-1</u> can withstand seismic design basis loads without loss of safety function.</p>	<p>i) Inspection will be performed to verify that the seismic Category I equipment identified in Table 2.15.4-1 are located <del>on the Nuclear Island</del> <u>in a seismic Category I structure.</u></p> <p>ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed.</p> <p>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.</p>	<p>Report(s) document that:</p> <p>i) The seismic Category I equipment identified in Table 2.15.4-1 is located <del>on a seismic structure</del> <u>in a seismic Category I structure.</u></p> <p>ii) A report exists and concludes that the seismic Category I equipment can withstand seismic design basis loads without loss of safety function.</p> <p>iii) A report exists and concludes that the as-installed equipment including anchorage is seismically bounded by the tested or analyzed conditions.</p>

Table 2.15.4-2

ITAAC For The Passive Containment Cooling System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p><del>b. Each of the lines identified in Table 2.15.4-1 for which functional capability is required is designed to withstand combined normal and seismic design basis loads without a loss of its functional capability.</del></p>	<p>Inspection will be performed for the existence of a report verifying that the as-built piping meets the requirements for functional capability.</p>	<p>Report(s) document that a report exists and concludes that each of the as-built lines identified in Table 2.15.4-1 for which functional capability is required meets the requirements for functional capability.</p>
<p>6. Each mechanical train of the PCCS (A, B, C, D, E &amp; F)* is physically separated from the other trains.</p> <p>*As indicated on Figure 2.15.4-1. Physical separation is not required in the Primary Containment.<del>Deleted</del></p>	<p>Inspections of the as-built PCCS will be performed.<del>Deleted</del></p>	<p>Report(s) document that the each mechanical train of the PCCS is physically separated from other mechanical trains of the system by structural and/or fire barriers (with the exception of portions in Primary Containment).<del>Deleted</del></p>
<p>7. The PCCS together with the pressure suppression containment system will limit containment pressure to less than its design pressure for 72 hours after a LOCA.</p>	<p><u>Using prototype test data and as-built PCC unit information, an analysis will be performed to establish the heat removal capability of the PCC unit.</u><del>An analysis will be performed using similar or more conservative performance characteristics than those of a test unit of established performance capability.</del></p>	<p><u>Test(s) and analysis(es) reports exist and document conclude that analyzed containment pressure for 72 hours after a LOCA is less than containment design pressure, and that the PCC unit heat removal capacity is no less than 11 MWt given the following conditions:</u></p> <ul style="list-style-type: none"> <li>• <u>Pure saturated steam in the tubes at 308 kPa (44.7 psi) absolute and 134°C (273°F)</u></li> <li>• <u>IC/PCC pool water temperature is at atmospheric pressure and 102°C (216°F).</u><del>Analyzed containment</del></li> </ul>