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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 126 Related to ESBWR Design Certification Application, 14.3-168, 14.3-179, 14.3-237, 14.3-251, 14.3-259, 14.3-285, 14.3-287, 14.3-288, 14.3-289, 14.3-306, 14.3-313, 14.3-347 and 14.3-388**

The purpose of this letter is to provide responses to select U.S. Nuclear Regulatory Commission (NRC) Requests for Additional Information (RAIs) contained in NRC Letter No. 126, dated December 20, 2007 (Reference 1).

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

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

James C. Kinsey

James C. Kinsey
Vice President, ESBWR Licensing

D068
NRO

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,* December 20, 2007.

Enclosure:

1. Response to Portion of NRC Request for Additional Information Letter No. 126 Related to ESBWR Design Certification Application, RAI Numbers 14.3-168,14.3-179, 14.3-237, 14.3-251, 14.3-259, 14.3-285, 14.3-287, 14.3-288, 14.3-289, 14.3-306, 14.3-313, 14.3-347 and 14.3-388

cc:	AE Cubbage	USNRC (with enclosure)
	GB Stramback	GEH/San Jose (with enclosure)
	RE Brown	GEH/Wilmington (with enclosure)
	DH Hinds	GEH/Wilmington (with enclosure)
	eDRF Section	0000-0080-4272 Rev 0, RAI 14.3-388 0000-0080-4802 NRC RAIs 14.3-179, 14.3-259, 14.3-237 0000-0080-4821 NRC RAI 14.3-347 0000-0081-0533 NRC RAIs 14.3-168, 14.3-251, 14.3-285, 14.3-287, 14.3-288, 14.3-289, 14.3-306, 14.3-313

Enclosure 1

MFN 08-086 Supplement 5

Response to Portion of NRC Request for Additional Information Letter No. 126 Related to ESBWR Design Certification Application

RAI Numbers

14.3-168, 14.3-179, 14.3-237, 14.3-251, 14.3-259, 14.3-285, 14.3-287, 14.3-288, 14.3-289, 14.3-306, 14.3-313, 14.3-347 and 14.3-388

<u>NRC RAI 14.3-168</u>

NRC Summary:
Editorial comment

NRC Full Text:
Functional Arrangement Item (2) should state as "RC&IS is divided into major functional groups as defined in Tier 1 Table 2.2.1-2, and shown in Figure 2.2.1 1."

<u>GEH Response</u>

Figure 2.2.1-1 will be deleted. The significant items are defined in Table 2.2.1-2. Figure 2.2.1-1 is not referenced in the Design Description or the ITAAC. See GE Letter to NRC MFN 07-645 dated December 7, 2007.

<u>DCD Impact</u>

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

NRC RAI 14.3-179

NRC Summary:
Ambiguous statement related to decay of fission products in RB

NRC Full Text:
DCD Tier 1, Revision 4, Section 2.16.5, Reactor Building, states, in part, that "(4) The RB offers some holdup and decay of fission products that may leak from the containment after an accident. Assuming a LOCA, the offsite dose limits and the control room dose limits are met based on a 50 wt% per day leakage rate from the RB."
"The RB offers some holdup and decay of fission products..." in the above statement is ambiguous. Please provide clarification on item (4) above.

GEH Response

The first sentence in item (4) will be revised to read as follows, "The RB provides holdup which allows time for radioactive decay of fission products that may leak from the containment after an accident."

DCD Impact

Tier 1, Section 2.16.5, Reactor Building, will be revised as shown in the attached DCD markup.

2.16.5 Reactor Building

Design Description

The Reactor Building (RB) houses the reactor system, reactor support and safety systems, concrete containment, essential power supplies and equipment, steam tunnel, and refueling area. On the upper floor of the RB are the new fuel pool and small spent fuel storage area, dryer/separator storage pool, refueling and fuel handling systems, the upper connection to the Inclined Fuel Transfer System and the overhead crane. The Isolation Condenser/Passive Containment Cooling System pools are below the refueling floor.

The RB structure is integrated with a reinforced concrete containment vessel (RCCV); the RCCV is located on a common basemat with the RB. The RB is a rigid box type shear wall building. The external walls form a box surrounding a large cylindrical containment. The RB shares a common wall and sits on a large common basemat with the Fuel Building. The RB is a safety-related, Seismic Category I structure. The building is partially embedded.

The key characteristics of the RB are as follows:

(1) The RB is designed and constructed to accommodate the dynamic, static and thermal loading conditions associated with the various loads and load combinations, which form the structural design basis. The loads are (as applicable) those associated with:

- Natural phenomena—wind, floods, tornados (including tornado missiles), earthquakes, rain and snow.
- Internal events—floods, pipe breaks including LOCA and missiles.
- Normal plant operation—live loads, dead loads, temperature effects and building vibration loads.

(2) The physical arrangement of the RB is as shown in Figures 2.16.5-1 through 2.16.5-11.

(3) The critical dimensions used for seismic analyses and the acceptable tolerances are provided in Table 2.16.5-1.

(4) The RB ~~offers some~~ provides holdup, which allows time for radioactive ~~and~~ decay, of fission products that may leak from the containment after an accident. Assuming a LOCA, the offsite dose limits and the control room dose limits are met based on a 50 wt% per day leakage rate from the RB.

(5) The RB provides three-hour fire barriers for separation of the four independent safe shutdown divisions.

(6) The RB is protected against external and internal floods. In regards to external flooding, the RB incorporates structural provisions into the plant design to protect the structures, systems and components from postulated flood and groundwater conditions. This approach provides:

a. Wall thicknesses below flood level designed to withstand hydrostatic loads;

b. Water stops provided in all expansion and construction joints below flood and groundwater levels;

<u>NRC RAI 14.3-237</u>

NRC Summary:
Discrepancy in PCCS design pressure given in DCD Tier 1 and Tier 2

NRC Full Text:
DCD Tier 1, Revision 4, Table 2.15.4-2 states that "The pressure boundary of the PCCS retains its integrity under the design pressure of 310 kPa gauge (45 psig)."

However, DCD Tier 2, Revision4 Table 6.2-10 states that the PCCS design pressure as 758.5 kPa gauge (110 psig).
Please correct this apparent discrepancy.

<u>GEH Response</u>

As discussed above, the ITAAC Item 4 as stated is misleading. The intent of the statement in "Design Commitment" for ITAAC Item 4 is to verify that the pressure boundary of the PCCS retains its integrity under the containment design pressure. Therefore, ITAAC Item 4, "Design Commitment" will be revised to read as follows:
"The pressure boundary of the PCCS retains its integrity under the <u>containment</u> design pressure of 310 kPa gauge (45 psig)."
This change will be consistent with the existing requirements of ITAAC Item 8, Table 2.15.1-2, ITAAC For The Containment System.

<u>DCD Impact</u>

Tier 1, Table 2.15.4-2 will be revised as shown in the attached DCD markup.

Table 2.15.4-2
ITAAC For The Passive Containment Cooling System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
3a. Pressure boundary welds in components identified in Table 2.15.4-1 as ASME Code Section III meet ASME Code Section III requirements.	Inspection of the as-built pressure boundary welds will be performed in accordance with the ASME Code Section III.	Report(s) document that a report exists and concludes that the ASME Code Section III requirements are met for non-destructive examination of pressure boundary welds.
b. Pressure boundary welds in piping identified in Table 2.15.4-1 as ASME Code Section III meet ASME Code Section III requirements.	Inspection of the as-built pressure boundary welds will be performed in accordance with the ASME Code Section III.	Report(s) document that a report exists and concludes that the ASME Code Section III requirements are met for non-destructive examination of pressure boundary welds.
4. The pressure boundary of the PCCS retains its integrity under the containment design pressure of 310 kPa gauge (45 psig)	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.	Test results demonstrate compliance to ASME Code Section III, Div 1, NE-3226.

NRC RAI 14.3-251

NRC Summary:
Table 2.2.3-1, Feedwater Control Modes description is not sufficient

NRC Full Text:
Use information in Table 2.2.3-3, to describe the functional arrangement in Table 2.2.3-1 for FWCS Controls.

GEH Response

The functional arrangement of the FWCS as credited in the Chapter 15 Safety Analyses is that the controller exists and is highly reliable because it is a triple redundant digital controller. Tables 2.2.3-2 and 2.2.3-3 define the specific functions and controls that the equipment defined in Table 2.2.3-1 must perform. See ITAAC Design Commitments 2 and 3.

DCD Impact

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

NRC RAI 14.3-259

NRC Summary:
Reinsert Figure 2.2.7-1 from Revision 3

NRC Full Text:
Explain why the basic configuration drawing of the RPS has been deleted. With lack of text and figures describing the signal path from sensors to scram pilot solenoids, the Tier 1 portion, which should be a subset of Tier 2 of the RPS, has insufficient information to make a reasonable determination on how the system is to operate.

GEH Response

The basic configuration drawing (Figure 2.2.7-1) for RPS in ESBWR DCD Revision 3 contained details that were not appropriate for the ESBWR Tier 1 document. The detailed final design for the RPS hardware is being completed under the Design Acceptance Criteria (DAC) for digital I&C equipment, and because of the DAC ITAAC closure process, changes to the specifics of the configuration are allowed. The Tier 1 RPS design requirements and functional performance requirements, which cannot be changed, are defined in Tier 1 Tables 2.2.7-1, 2.2.7-2, and 2.2.7-3.

DCD Tier 2 shows the most current design configuration that meets the design and functional requirements. The final design of the RPS, which will be available following completion of the digital I&C DAC, will also meet these requirements. Tier 2 will then be updated using an appropriate change process.

This RAI response was discussed by the NRC staff and GEH during the February 14, 2008, meeting. The NRC staff agreed that DCD Tier 1 Revision 5 does not require any changes due to this RAI.

DCD Impact

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

NRC RAI 14.3-285

NRC Summary:
Design Choke Flow

NRC Full Text:
Section 2.1.2, Nuclear Boiler System, Design Description (12): For clarity, the staff requests the applicant to specify the value for the design choke flow.

GEH Response

The value for design choke flow is included in Acceptance Criteria column of ITAAC T2.1.2-3, Item 12:

> Report(s) document that the throat diameter of each MSL flow restrictor is less than or equal to 355 mm (14 in.).

This is consistent with NRC guidance in SRP 14.3:

> Numeric performance values and key parameters in safety analyses should be specified in the design descriptions based on their safety significance; however, numbers for all parameters need not be specified unless there is a specific reason to include them (e.g., important to be maintained for the life of the facility).
>
> *See* NUREG-0800, Section 14.3, Page 14.3-17.
>
> Numeric performance values for SSCs are specified as ITAAC acceptance criteria when values consistent with the design commitments are possible, or when failure to meet the stated acceptance criterion would clearly indicate a failure to properly implement the design or meet the safety analysis.
>
> *See* NUREG-0800, Section 14.3, Page 14.3-19.

This RAI was discussed with the NRC Staff during a meeting held February 14, 2008, and the NRC found this approach acceptable because the value was included in the Acceptance Criteria.

DCD Impact

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

NRC RAI 14.3-287

NRC Summary:
Combined steamline volume

NRC Full Text:
Section 2.1.2, Nuclear Boiler System, Design Description (14): For clarity, the staff requests that the applicant provide a value for the combined steamline volume.

GEH Response

The value for combined steamline volume is included in Acceptance Criteria column of ITAAC T2.1.2-3, Item 14:

> Report(s) document that the combined steamline volume is greater than or equal to 135 m^3 (4767 ft^3).

This is consistent with NRC guidance in SRP 14.3:

> Numeric performance values and key parameters in safety analyses should be specified in the design descriptions based on their safety significance; however, numbers for all parameters need not be specified unless there is a specific reason to include them (e.g., important to be maintained for the life of the facility).
>
> *See* NUREG-0800, Section 14.3, Page 14.3-17.
>
> Numeric performance values for SSCs are specified as ITAAC acceptance criteria when values consistent with the design commitments are possible, or when failure to meet the stated acceptance criterion would clearly indicate a failure to properly implement the design or meet the safety analysis.
>
> *See* NUREG-0800, Section 14.3, Page 14.3-19.

This RAI was discussed with the NRC Staff during a meeting held February 14, 2008, and the NRC found this approach acceptable because the value was included in the Acceptance Criteria.

DCD Impact

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

NRC RAI 14.3-288

NRC Summary:
Fast-closing

NRC Full Text:
Section 2.1.2, Nuclear Boiler System, Design Description (15): For clarity, the staff requests that the applicant provided a definition (value) for "fast closing."

GEH Response

DCD Tier 2, Section 5.4.5.2, explains that the MSIVs have two closing speeds:

- Slow closing for testing during normal plant operation
- Fast closing on various automatic signals indicating abnormal plant conditions (design function)

GEH considers "fast closing" as being adequately explained in Tier 2. There is no need to define fast closing in Tier 1. This is consistent with NRC guidance on ITAAC. NUREG-0800, Section 14.3, discusses that supporting information in Tier 2 may be relied upon for explaining in more detail the information in Tier 1 (*see* NUREG-0800, section 14.3, pages 14.3-19 and 14.3-20). However, Tier 2 is not referenced in Tier 1.

In addition, the range for "fast closing" of the MSIVs is given in the Acceptance Criteria for ITAAC T2.1.2-3, Item 15:

> Report(s) document that testing demonstrates MSIVs are capable of fast closure in not less than 3 seconds and not more than 5 seconds.

This is consistent with NRC guidance in SRP 14.3:

> Numeric performance values for SSCs are specified as ITAAC acceptance criteria when values consistent with the design commitments are possible, or when failure to meet the stated acceptance criterion would clearly indicate a failure to properly implement the design or meet the safety analysis.
>
> *See* NUREG-0800, Section 14.3, Page 14.3-19.

This RAI was discussed with the NRC Staff during a meeting held February 14, 2008, and the NRC found this approach acceptable because the range for "fast closing" was included in the Acceptance Criteria.

DCD Impact

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

NRC RAI 14.3-289

NRC Summary:
Combined leakage through MSIVs

NRC Full Text:
Section 2.1.2, Nuclear Boiler System, Design Description (16): For clarity, the staff requests that the applicant provide a value for the assumed design basis value for combined leakage through the MSIVs for all four main steam lines.

GEH Response

The value for combined leakage through the MSIVs is included in Acceptance Criteria column of ITAAC T2.1.2-3, Item 16:

> Report(s) document that, when all MSIVs are closed, the combined leakage through the MSIVs for all four MSLs is less than or equal to a total combined leakage (corrected to standard conditions) of ~0.0623 m^3/minute (~2.2 ft^3/minute) for post-LOCA leakage.

This is consistent with NRC guidance in SRP 14.3:

> Numeric performance values and key parameters in safety analyses should be specified in the design descriptions based on their safety significance; however, numbers for all parameters need not be specified unless there is a specific reason to include them (e.g., important to be maintained for the life of the facility).
>
> *See* NUREG-0800, Section 14.3, Page 14.3-17.
>
> Numeric performance values for SSCs are specified as ITAAC acceptance criteria when values consistent with the design commitments are possible, or when failure to meet the stated acceptance criterion would clearly indicate a failure to properly implement the design or meet the safety analysis.
>
> *See* NUREG-0800, Section 14.3, Page 14.3-19.

This RAI was discussed with the NRC Staff during a meeting held February 14, 2008, and the NRC found this approach acceptable because the value was included in the Acceptance Criteria.

DCD Impact

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

NRC RAI 14.3-306

NRC Summary:
Pre-operational conditions

NRC Full Text:
In ITAAC Table 2.1.2-3, for clarity in ITAAC #11, the staff requests that the applicant justify the acceptability of testing of installed check valves under pre-operational pressure, fluid flow, and temperature conditions. There is an inconsistency in the ITA in that it is not clear how testing at preoperational conditions will verify the DC which specifies check valve functioning under design conditions.

GEH Response

We agree with the NRC that the wording is inconsistent and changes are made as described below. Regarding preoperational test conditions, because ITAAC testing must be completed before operation of the nuclear power plant, normal system conditions may not be achievable for many – if not most – systems with safety-related functions and which are subject to ITAAC. Accordingly, preoperational tests are conducted at preoperational conditions. This is reflected in the NRC example ITAAC (NUREG-0800, Section 14.3, at 14.3-61) upon which standard ITAAC T2.1.2-3, Item 11, is based:

Design Description	Inspections, Tests, Analyses	Acceptance Criteria
Check valves designated in Section __ as having an active safety-related function open, close, or both open and also close under differential pressure, fluid flow, and temperature conditions.	Tests of installed valves for opening, closing, or both opening and also closing, will be conducted under system preoperational differential pressure, fluid flow, and temperature conditions.	Based on the direction of the differential pressure across the valve, each CV opens, closes, or both opens and also closes, depending upon the valve's safety function.

The Initial Test Program (ITP) is described in Section 14.2 of the Design Control Document and discusses the preoperational test conditions for each system. NRC guidance regarding the ITP reflects the purpose of testing at preoperational conditions and explains that the testing confirms, to the extent practicable, that this testing confirms the structures, systems, or components tested meet performance requirements and design criteria:

> The ITP addresses the applicant's plan for preoperational and initial startup testing. The test program consists of preoperational and initial startup tests, as described in Regulatory Guide (RG) 1.68. Preoperational tests consist of those tests conducted following completion of construction and construction-related inspections and tests, but before fuel loading.

> *Such tests demonstrate, to the extent practicable, the capability of structures, systems, and components (SSCs) to meet performance requirements and design criteria.* Initial startup tests include those test activities scheduled to be performed during and following fuel activities. Testing activities include fuel loading, precritical tests, initial criticality, low-power tests, and power ascension tests that confirm the design bases and demonstrate, to the extent practicable, that the plant will operate in accordance with its design and is capable of responding as designed to anticipated transients and postulated accidents.

DCD Impact

Section 2.1.2, Design Description, Item 11, is modified as follows:

(11) Check valves designated in Table 2.1.2-1 as having an active safety-related function open, close, or both open and also close under ~~design~~ system pressure, fluid flow, and temperature conditions.

The Design Commitment in Table 2.1.2-3 ITAAC 11 is modified as follows:

11. Check valves designated in Table 2.1.2-1 as having an active safety-related function open, close, or both open and also close under ~~design~~ system pressure, fluid flow, and temperature conditions.

2.1.2 Nuclear Boiler System

Design Description

The NBS generates steam from feedwater and transports steam from the RPV to the main turbine.

(1) The functional arrangement of the NBS System is as described in the Design Description of this Subsection 2.1.2, Tables 2.1.2-1 and 2.1.2-2, and Figures 2.1.2-1, 2.1.2-2, and 2.1.2-3.

(2) ASME Code Section III

a. The components identified in Table 2.1.2-1 as ASME Code Section III are designed and constructed in accordance with ASME Code Section III requirements.

b. The piping identified in Table 2.1.2-1 as ASME Code Section III is designed and constructed in accordance with ASME Code Section III requirements.

(3) Pressure Boundary Welds

a. Pressure boundary welds in components identified in Table 2.1.2-1 as ASME Code Section III meet ASME Code Section III requirements.

b. Pressure boundary welds in piping identified in Table 2.1.2-1 as ASME Code Section III meet ASME Code Section III requirements.

(4) Pressure Boundary Integrity

a. The components identified in Table 2.1.2-1 as ASME Code Section III retain their pressure boundary integrity at internal pressures that will be experienced during service.

b. The piping identified in Table 2.1.2-1 as ASME Code Section III retains its pressure boundary integrity at its design pressure.

(5) Seismic Capability

a. The seismic Category I equipment identified in Tables 2.1.2-1 and 2.1.2-2 can withstand seismic design basis loads without loss of safety function.

b. Each of the lines identified in Table 2.1.2-1 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) Each of the NBS System safety-related divisions identified in Table 2.1.2-2 is powered from its respective safety-related division

a. Separation is provided between NBS System safety-related divisions, and between safety-related divisions and nonsafety-related cable.

(7) Each mechanical train of safety-related NBS equipment located in the Reactor Building outside the drywell is physically separated from the other trains.

(8) Instrumentation and Control

a. Control Room alarms, displays, and/or controls provided for the NBS System are defined in Table 2.1.2-2.

b. The MSIVs close upon any of the following conditions:
   - Main Condenser Vacuum Low (Run mode)
   - Turbine Area Ambient Temperature High
   - MSL Tunnel Ambient Temperature High
   - MSL Flow Rate High
   - Turbine Inlet Pressure Low
   - Reactor Water Level Low

(9) Repositional valves (not including the DPVs (squib-activiated valves)) designated in Table 2.1.2-2 as having an active safety-related function open, close, or both open and also close under design differential pressure, fluid flow, and temperature conditions.

(10) The pneumatically operated valve(s) shown in Figure 2.1.2-2 closes (opens) if either electric power to the valve actuating solenoid is lost, or pneumatic pressure to the valve(s) is lost.

(11) Check valves designated in Table 2.1.2-1 as having an active safety-related function open, close, or both open and also close under system ~~design~~ pressure, fluid flow, and temperature conditions.

(12) The throat diameter of each MSL flow restrictor is sized for design choke flow requirements.

(13) Each MSL flow restrictor has taps for two instrument connections to be used for monitoring the flow through each MSL.

(14) The combined steamline volume from the RPV to the main steam turbine stop valves and steam bypass valves is sufficient to meet the assumptions for AOOs and infrequent events.

(15) The MSIVs are capable of fast closing under design differential pressure, fluid flow and temperature conditions.

(16) When all MSIVs are closed by normal means, the combined leakage through the MSIVs for all four MSLs will be less than or equal to the design bases assumption value.

(17) The opening pressure for the SRVs mechanical lift mode satisfies the overpressure protection analysis.

(18) The opening time for the SRVs (in the overpressure operation of self-actuated or mechanical lift mode) from when the pressure exceeds the valve set pressure to when the valve is fully open shall be less than or equal to the design opening time.

(19) The steam discharge capacity of each SRV satisfies the overpressure protection analysis.

(20) The opening pressure for the SVs satisfies the overpressure protection analysis.

(21) The opening time for the SVs from when the pressure exceeds the valve set pressure to when the valve is fully open shall be less than or equal to the design opening time.

Table 2.1.2-3

ITAAC For The Nuclear Boiler System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
10. The pneumatically operated valve(s) shown in Figure 2.1.2-2 closes (opens) if either electric power to the valve actuating solenoid is lost, or pneumatic pressure to the valve(s) is lost.	Tests will be conducted on the as-built valve(s).	Report(s) document that the pneumatically operated valve(s) shown in Figure 2.1.2-2 closes (opens) when either electric power to the valve actuating solenoid is lost, or pneumatic pressure to the valve(s) is lost.
11. Check valves designated in Table 2.1.2-1 as having an active safety-related function open, close, or both open and also close under ~~design~~ system pressure, fluid flow, and temperature conditions.	Tests of installed valves for opening, closing, or both opening and also closing, will be conducted under system preoperational pressure, fluid flow, and temperature conditions.	Report(s) document that, based on the direction of the differential pressure across the valve, each CV opens, closes, or both opens and also closes, depending upon the valve's safety functions.
12. The throat diameter of each MSL flow restrictor is sized for design choke flow requirements.	Inspection of the as-built MSL flow restrictor will be performed and measurements taken.	Report(s) document that the throat diameter of each MSL flow restrictor is less than or equal to 355 mm (14 in.).
13. Each MSL flow restrictor has taps for two instrument connections to be used for monitoring the flow through each MSL.	Inspections of the as-built installation of the MSL flow restrictor will be conducted to verify that it provides for two instrument connections.	Report(s) document that the as-built MSL flow restrictor provides for two instrument connections.
14. The combined steamline volume from the RPV to the main steam turbine stop valves and steam bypass valves is sufficient to meet the assumptions for AOOs and infrequent events.	Analyses/calculations will be performed using the as-built dimensions of the steamlines to determine the combined steam line volume. The calculational results will be documented in a report.	Report(s) document that the combined steamline volume is greater than or equal to 135 m^3 (4767 ft^3).

NRC RAI 14.3-313

NRC Summary:
SRV discharge capacity

NRC Full Text:
In ITAAC Table 2.1.2-3, the staff requests that the applicant provide a justification as to why there is a differentiation in the ITA for ITAAC #19 and #20 when there are apparent similarities in the valve certifications.

GEH Response

Table 2.1.2-3 contains three separate ITAAC for the SRVs (safety relief valves), which address verification of the mechanical lift set pressure (ITAAC 17), the opening time for the overpressure operation mode (ITAAC 18), and the steam discharge capacity (ITAAC 19).

Table 2.1.2-3 contains three separate ITAAC for the safety valves (SVs) , which address verification of the opening pressure (ITAAC 20), the opening time (ITAAC 21), and the steam discharge capacity (ITAAC 22).

While the SRVs and the SVs are related and perform similar functions for overpressure protection, the SRVs and the SVs are not the same design and do not have the same discharge capacity. Tier 2, Table 5.2-2, provides the valve settings and capacities of these valves as reflected in the Tier 1 ITAAC.

This RAI was discussed with the NRC Staff during a meeting held February 14, 2008, and the NRC found this approach acceptable.

DCD Impact

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

RAI 14.3-347

NRC Summary:
Functional Groups

NRC Full Text:
For *ITAAC Table 2.2.1-6 Item 2, the staff requests that the applicant modify the AC for consistency with the DC (i.e., "Test and inspection report(s) document that the as-built system is divided into major functional groups as defined Table 2.2.1-2). As written, the AC currently verifies the function of the major functional groups, however, this verification appears to be the subject of the other ITAAC in this table.*

GEH Response

GEH agrees that Table 2.2.1-6, Item 2, Acceptance Criteria should be modified for consistency with the Design Commitment. GEH will revise the Table 2.2.1-6, Item 2, Acceptance Criteria as requested.

DCD Impact

DCD Tier 1, Table 2.2.1-6, item 2 will be revised as shown in the attached markup.

Table 2.2.1-6

ITAAC For Rod Control and Information System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. RC&IS functional arrangement is defined in Table 2.2.1-1.	Test(s) and inspection(s) of the as-built system will be performed.	Test and inspection report(s) document that the as-built system conforms with the functional arrangement defined in Table 2.2.1-1.
2. RC&IS is divided into major functional groups as defined in Table 2.2.1-2.	Test(s) and inspection(s) of the as-built system will be performed.	Test and inspection report(s) document that the as-built system is divided into major functional areas groups functions as defined in Table 2.2.1-2.
3. RC&IS automatic functions, initiators, and associated interfacing systems are defined in Table 2.2.1-3.	Test(s) and type test(s) will be performed on the as-built system using simulated signals.	Test and type test report(s) document the system is capable of performing the functions defined in Table 2.2.1-3.
4. RC&IS rod block functions and the permissive conditions under which the rod block is active are defined in Table 2.2.1-4.	Test(s) and type test(s) will be performed using simulated signals and manual actions to confirm that the rod withdrawal and insertion commands are blocked as defined in Table 2.2.1-4.	Test and type test report(s) document that the rod block functions defined in Table 2.2.1-4 are performed in response to simulated signals and manual actions.
5. RC&IS controls, interlocks, and bypasses are defined in Table 2.2.1-5.	Inspection(s), test(s) and type test(s) will be performed on the as-built system using simulated signals and manual actions.	Inspection, test and type test report(s) document that the system controls, interlocks, and bypasses exist, can be retrieved in the main control room, or are performed in response to simulated signals and manual actions as defined in Table 2.2.1-5.

NRC RAI 14.3-388

NRC Summary:
Safety-related piping

NRC Full Text:
For ITAAC Table 3.1-1 Item 1, the staff requests that the applicant provide a reference table that lists all of the safety related piping for which this ITAAC is applicable (i.e., it was not evident that ITAAC for the systems containing safety related piping refer to this ITAAC). Alternatively, the applicant could include reference to Table 3.1-1 in the ITAAC for each safety-related system, as applicable.

In addition, the staff requests that the applicant clarify or provide a distinction between design commitment verification and as-built verification. The ASME Code Certified Stress Report is understood to provide verification for the design of the system only, so it is not clear if this is DAC. The applicant also needs to include an ITAAC for verification that the asbuilt system is in compliance with the ASME Code.

GEH Response

As discussed in an October 18, 2007, NRC meeting regarding Tier 1, GEH revised the ITAAC in Tier 1, Section 3.1. These changes were provided to the NRC in GEH Letter MFN 07-266, Supplement 1, dated November 29, 2007. We understand that this letter was not available for review prior to issuance of RAI 14.3-388.

In MFN 07-266, Supplement 1, GEH intended to address similar NRC comments made during the October 18, 2007, meeting in revising the ITAAC in Section 3.1 to include piping, structures, systems, and components subject to ASME Code, Section III, requirements and specify that the ASME Code Design Reports be available for the closure of the design acceptance criteria (DAC) ITAAC 1, 2, and 3. ITAAC 4, 5, and 6 are intended to verify that the as-built piping, components structures, systems, and components subject to ASME Code, Section III, requirements meet the design elements that result from the completion of DAC ITAAC 1, 2, and 3.

Specifically, reference to the ASME Code Certified Stress Report has been removed and the ITAAC reference the ASME Code Design Report, as suggested by the NRC during the October 18, 2007, meeting.

In MFN 07-266, Supplement 1, GEH did not include a table of the systems to which Tier 1, Section 3.1 applies. Therefore, Section 3.1 is changed to add the suggested listing to clarify which systems are subject to the ITAAC in section 3.1. The changes are described in the DCD markup..

DCD Impact

DCD Tier 1, Section 3.1 will be revised as noted in the attached markup.

3. NON-SYSTEM BASED MATERIAL

3.1 DESIGN OF PIPING SYSTEMS AND COMPONENTS

Design Description

Piping systems and their components are designed and constructed in accordance with their applicable design code requirements identified in the individual system design specifications. The piping systems have a design life of 60 years. Systems subject to the ITAAC in Section 3.1, ITAAC 1, 2, 4, and 5, are those Tier 1 systems which are ASME Code Class 1, 2, or 3, and subject to ASME Code, Section III, pressure boundary requirement. The specific Tier 1 sections that contain these systems are as follows:

- 2.1.1 Reactor Pressure Vessel
- 2.1.2 Nuclear Boiler System
- 2.2.2 Control Rod Drive System
- 2.2.4 Standby Liquid Control System
- 2.4.1 Isolation Condenser System
- 2.4.2 Gravity-Driven Cooling System
- 2.6.1 Reactor Water Cleanup/Shutdown Cooling System
- 2.6.2 Fuel and Auxiliary Pools Cooling System
- 2.11.1 Turbine Main Steam System
- 2.15.1 Containment System
- 2.15.4 Passive Containment Cooling System

The scope of Section 3.1 ITAAC 3 and 6 is as stated in the ITAAC.

(1) Safety-related piping systems are designed to ASME Code Section III requirements and Seismic Category I requirements. The ASME Code Class 1, 2, and 3 piping systems shall be designed to retain their pressure integrity and functional capability under internal design and operating pressures and design basis loads. Piping and piping components shall be designed to show compliance with the requirements of ASME Code, Section III.~~Safety-related piping systems are designed to ASME Code Section III requirements.~~

(2) Safety-related components which are subject to the ASME Code are designed to ASME Code Section III requirements and Seismic Category I requirements. The ASME Code Class 1, 2, and 3 components shall be designed to retain their pressure integrity and functional capability under internal design and operating pressures and design basis loads. ASME Code Class 1, 2, and 3 components shall be designed to show compliance with the requirements of ASME Code, Section III.~~Safety related piping systems are designed to Seismic Category I requirements.~~

(3) Systems, structures, and components, that are required to be functional during and following an SSE, shall be protected against or qualified to withstand the dynamic and environmental effects associated with analyses of postulated failures in Seismic Category I and nonsafety-related piping systems.~~Systems, structures, and components, that are~~