



GE Energy

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**Subject: Response to Portion of NRC Request for Additional Information  
Letter No. 67 Related to ESBWR Design Certification Application –  
Mechanical Systems and Components – RAI Numbers 3.9-103, 3.9-  
109, 3.9-164 and 3.9-173**

Enclosure 1 contains GE's response to the subject NRC RAIs transmitted via the Reference 1 letter.

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

Sincerely,

A handwritten signature in cursive script that reads "James C. Kinsey for".

James C. Kinsey  
Project Manager, ESBWR Licensing

D068

Reference:

1. MFN 06-378, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 67 Related to ESBWR Design Certification Application*, October 10, 2006

Enclosure:

1. MFN 06-519 – Response to Portion of NRC Request for Additional Information Letter No. 67 Related to ESBWR Design Certification Application – Mechanical Systems and Components – RAI Numbers 3.9-103, 3.9-109, 3.9-164 and 3.9-173

cc: AE Cabbage USNRC (with enclosures)  
GB Stramback GE/San Jose (with enclosures)  
eDRF 0000-0062-0953

**Enclosure 1**

**MFN 06-519**

**Response to Portion of NRC Request for**

**Additional Information Letter No. 67**

**Related to ESBWR Design Certification Application**

**Mechanical Systems and Components**

**RAI Numbers 3.9-103, 3.9-109, 3.9-164 and 3.9-173**

**NRC RAI 3.9-103**

*In DCD Tier 2, Section 3.9.3, provide a table similar to Table 3.9-9 showing the load combinations and acceptance criteria for safety related active valves and pressure relief devices. Provide confirmation that safety related components and component supports required to remain operational and to perform a safety function after a specified plant condition event are designed to lower ASME Section III service level stress criteria.*

**GE Response**

Information similar to Table 3.9-9 can be found in DCD Tier 2 Table 3.9-2 for safety related active valves and pressure relief devices. Table 3.9-2, which is titled “Load Combinations and Acceptance Criteria for Safety-Related, ASME Code Class 1, 2 and 3 Components, Component Supports, and Class CS Structures”, contains the load combination and ASME Service Level information that are used in the design of the pertinent equipment. Table 3.9-2 provides a correlation of plant conditions and load combinations to service levels for the appropriate design limits defined in the ASME Code Section III. It is confirmed that safety related components and component supports required to remain operational and to perform a safety function after a specified plant condition event are designed to the appropriate ASME Code Section III service level stress criteria.

**DCD Impact**

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

**NRC RAI 3.9-109**

*In DCD Tier 2, Section 3.9.3.6, provide a detailed description of the tests that are conducted to address the testing requirements in TMI Action Item II.D.1 of NUREG-0737, or provide a reference in DCD Tier 2 where this is discussed.*

**GE Response**

In accordance with DCD Chapter 5, Rev. 2, Section 5.2.2, the design of the ESBWR reactor coolant system safety relief valves meets the recommendations of TMI Action Item II.D.1 regarding a test program and associated model development and qualification testing. This was added to the DCD in accordance with the response to RAI 5.2-7. Additional description and details of the tests that are conducted to meet the requirements of TMI Action Item II.D.1 are found in DCD Chapter 1, Rev. 2, Table 1A-1.

**DCD Impact**

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

**NRC RAI 3.9-164**

*Identify any pressure relief devices which are part of the reactor containment boundary and verify that all of them are designed and qualified to meet ASME Section III requirements for Class 2 components. Also, verify that these devices are included in the IST program.*

**GE Response**

It is assumed that the RAI is interested in all pressure relief devices that are within the reactor containment. The only pressure relief devices within the reactor containment are the Nuclear Boiler System Safety Relief Valves, which provide pressure relief protection for the Reactor Coolant Pressure Boundary. These pressure relief valves are classified as ASME Class 1 components in accordance with DCD Tables 3.2-1 and 3.2-2. Therefore, they are designed and qualified to meet ASME Section III requirements for Class 1 components. These relief valves are included in the IST program and are identified as B21 Nuclear Boiler System Valves F006 and F003 in DCD Table 3.9-8.

Class 2, which is referenced in the RAI, applies to pressure-retaining portions of primary containment that are not included in Class 1 and that accomplish safety-related functions as defined in DCD Tier 2, Section 3.2.3.2. Those pressure relief devices, which are classified as Safety Class 2, are designed and qualified to meet ASME Section III requirements for Class 2 components. These devices are the Standby Liquid Control System Accumulator Tank Relief Valve (F030A/B) and the Containment Drywell Wetwell Vacuum Breaker Valve (F002) and are included in the IST program as identified in DCD Table 3.9-8.

**DCD Impact**

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

**NRC RAI 3.9-173**

*Verify that the Safety/Relief Valve (S/RV) rupture disks meet ASME Section III requirements and are included in the IST program.*

**GE Response**

It is confirmed that the rupture disks meet ASME Code Section III requirements and are included in the IST program. DCD Table 3.9-8 will be revised to show the applicable information for the rupture disks.

**DCD Impact**

DCD Tier #2, Table 3.9-8 will be revised as noted in the attached markup.

**Table 3.9-8  
In-Service Testing**

<b>No.</b>	<b>Qty</b>	<b>Description (g)</b>	<b>Code Class (a)</b>	<b>Code Cat. (c)</b>	<b>Valve Func. (d)</b>	<b>Test Para (e)</b>	<b>Test Freq. (f)</b>
<b>B21 Nuclear Boiler System Valves</b>							
F709	1	Manual valve – RPV shutdown range water level instrument reference leg line	2	B	P		E1
F710	1	Excess flow check valve – RPV shutdown range water level instrument reference leg line (g3)	2	A, C	I, A	L, S	R0
F700	4	Manual valve – RPV water level instrument reference leg line	2	B	P		E1
F701	4	Excess flow check valve – RPV water level instrument reference leg line (g3),	2	A, C	I, A	L, S	R0
F702	4	Manual valve – RPV narrow range water level instrument sensing line	2	B	P		E1
F703	4	Excess flow check valve – RPV narrow range water level instrument sensing line (g3),	2	A, C	I, A	L, S	R0
F704	4	Manual valve – RPV wide range water level instrument sensing line	2	B	P		E1
F705	4	Excess flow check valve – RPV wide range water level instrument sensing line (g3),	2	A, C	I, A	L, S	R0
F706	4	Manual valve – RPV fuel zone range water level instrument sensing line	2	B	P		E1

**Table 3.9-8  
In-Service Testing**

<b>No.</b>	<b>Qty</b>	<b>Description</b> <sup>(g)</sup>	<b>Code Class</b> <sup>(a)</sup>	<b>Code Cat.</b> <sup>(c)</sup>	<b>Valve Func.</b> <sup>(d)</sup>	<b>Test Para</b> <sup>(e)</sup>	<b>Test Freq.</b> <sup>(f)</sup>
F707	4	Excess flow check valve – RPV fuel zone range water level instrument sensing line	2	A, C	I, A	L, S	R0
F100	2	Feedwater (FW) discharge line upstream maintenance valve	2	B	P	P	RO
F101	2	FW discharge line upstream (first) check valve (g3)	2	A, C	A	L, S	R0
F102	2	FW discharge line outboard air-operated (AO) check valve (g1)	1	A, C	I, A	L, S, P	R0
F103	2	FW discharge line inboard check valve (g1)	1	A, C	I, A	L, S	R0
F104	2	FW discharge line downstream maintenance valve	1	B	P		E1
F001	4	Inboard main steam isolation valve (MSIV)(g1)	1	A	I, A	L, P S	R0 3 mo
F002	4	Outboard main steam isolation valve (MSIV) (g1)	1	A	I, A	L, P S	R0 3 mo
F006	10	Safety-relief valve (SRV) (g1) (g2)	1	A, C	A	R P,S	5YR R0
F003	8	Safety Valve (SV)	1	A, C	A	R P,S	5YR R0
F004	4	Depressurization valve (DPV) on the stub tube connected to the RPV	1	D	A	X	E2
F005	4	Depressurization valve (DPV) on the line branching from each main steamline	1	D	A	X	E2

**Table 3.9-8  
In-Service Testing**

<b>No.</b>	<b>Qty</b>	<b>Description</b> <sup>(g)</sup>	<b>Code Class</b> <sup>(a)</sup>	<b>Code Cat.</b> <sup>(c)</sup>	<b>Valve Func.</b> <sup>(d)</sup>	<b>Test Para</b> <sup>(e)</sup>	<b>Test Freq.</b> <sup>(f)</sup>
F010	1	Main steamline (MSL) upstream drain line inboard isolation valve	1	A	I, A	L, P S	R0 3 mo
F011	1	MSL upstream drain line outboard isolation valve	1	A	I, A	L, P S	R0 3 mo
F012	1	MSL warmup valve	2	B	P		E1
F016	4	MSL downstream drain line isolation valve	1	A	I, A	L, P S	R0 3 mo
F714	4	Manual isolation valve – MSL flow restrictor instrument line	2	B	P		E1
F715	4	Excess flow check valve – MSL flow restrictor instrument line (g3), (g4)	2	A, C	I, A	L, S	R0
F712	4	Manual valve – MSL flow restrictor instrument line	2	B	P		E1
F713	4	Excess flow check valve – MSL flow restrictor instrument line (g3), (g4)	2	A, C	I, A	L, S	R0
F025	1	RPV non-condensable gas removal line valve	1	B	P		E1
F026	1	RPV top head vent inboard shutoff valve (g1)	1	B	A	P,S	R0
F027	1	RPV top head vent outboard shutoff valve (g1)	1	B	A	P,S	R0
F007	12	SRV discharge line inboard vacuum breaker (g1)	3	C	A	R,S	10YR R0
F008	12	SRV discharge line outboard vacuum breaker (g1)	3	C	A	R,S	10YR R0

**Table 3.9-8  
In-Service Testing**

<b>No.</b>	<b>Qty</b>	<b>Description</b> <sup>(g)</sup>	<b>Code Class</b> <sup>(a)</sup>	<b>Code Cat.</b> <sup>(c)</sup>	<b>Valve Func.</b> <sup>(d)</sup>	<b>Test Para</b> <sup>(e)</sup>	<b>Test Freq.</b> <sup>(f)</sup>
F035	10	SRV pneumatic supply line check valve (g1)	3	C	A	R,S	10YR R0
F031	4	Inboard MSIV air supply line check valve (g1)	3	C	A	S	R0
F033	4	Outboard MSIV air supply line check valve (g1)	3	C	A	S	R0
F608	2	Inboard valve on the FW discharge line outboard check valve downstream test line	2	B	P		E1
F611	2	Inboard valve on the FW discharge line inboard check valve test line	2	B	P		E1
F605	2	Inboard valve on the FW discharge line upstream (first) check valve F101 test line	2	B	P		E1
F750	4	Inboard test line valve at the downstream of outboard MSIV	2	B	P		E1
F525	4	Inboard MSIV accumulator A001 drain line valve	3	B	P		E1
F526	4	Outboard MSIV accumulator A002 drain line valve	3	B	P		E1
F528	10	SRV accumulator A003 drain line valve	3	B	P		E1
F510	4	Inboard test line valve upstream of MSL downstream drain valve F016	2	B	P		E1
F512	1	Inboard test line valve upstream of MSL downstream drain line header valve F017	2	B	P		E1

**Table 3.9-8  
In-Service Testing**

<b>No.</b>	<b>Qty</b>	<b>Description <sup>(g)</sup></b>	<b>Code Class <sub>(a)</sub></b>	<b>Code Cat. <sub>(c)</sub></b>	<b>Valve Func. <sub>(d)</sub></b>	<b>Test Para <sub>(e)</sub></b>	<b>Test Freq. <sub>(f)</sub></b>
F502	1	Inboard test line valve upstream of MSL upstream drain outboard isolation valve F011	2	B	P		E1
F504	1	Inboard test line valve upstream of MSL upstream drain line header valve F013	2	B	P		E1
<u>F028</u>	<u>1</u>	<u>Rupture Disk</u>	<u>3</u>	<u>D</u>	<u>A</u>	<u>Visual</u>	<u>5 YR</u> <u>R0</u>
<u>F029</u>	<u>1</u>	<u>Rupture Disk</u>	<u>3</u>	<u>D</u>	<u>A</u>	<u>Visual</u>	<u>5 YR</u> <u>R0</u>
<u>F030</u>	<u>1</u>	<u>Rupture Disk</u>	<u>3</u>	<u>D</u>	<u>A</u>	<u>Visual</u>	<u>5 YR</u> <u>R0</u>
<u>F031</u>	<u>1</u>	<u>Rupture Disk</u>	<u>3</u>	<u>D</u>	<u>A</u>	<u>Visual</u>	<u>5 YR</u> <u>R0</u>