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MFN 08-635
Supplement 1

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

Subject: **Response to Portion of NRC RAI Letter No. 278 Related to ESBWR Design Certification Application - DCD Tier 2 Section 3.9 – Mechanical Systems and Components; RAI Number 3.9-202, Supplement 1**

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) letter number 278 sent by NRC letter dated July 29, 2008 (Reference 1). The original RAI and the GEH response are listed in references 3 and 2, respectively. RAI Number 3.9-202, Supplement 1 is addressed in Enclosure 1.

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

Sincerely,

Richard E. Kingston

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Vice President, ESBWR Licensing

References:

1. MFN 08-956 Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GEH, *Request For Additional Information Letter No. 278 Related to ESBWR Certification*, dated December 4, 2008

2. MFN 08-635 from Richard E. Kingston to the U.S. Nuclear Regulatory Commission, *Response to Portion of NRC Request for Additional Information Letter No. 209 Related to ESBWR Design Certification Application – DCD Tier 2 Section 3.9 – Mechanical Systems and Components – RAI Number 3.9-202*, dated August 14, 2008

3. MFN 08-517, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 209 Related to ESBWR Design Certification Application*, June 9, 2008

Enclosure:

1. Response to Portion of NRC RAI Letter No. 278 Related to ESBWR Design Certification Application - DCD Tier 2 Section 3.9 – Mechanical Systems and Components; RAI Number 3.9-202, Supplement 1

cc:	AE Cubbage	USNRC (with enclosures)
	RE Brown	GEH/Wilmington (with enclosures)
	DH Hinds	GEH/Wilmington (with enclosures)
	eDRF	0000-0096-5096 (RAI 3.9-202 S01)

Enclosure 1

MFN 08-635, Supplement 1

Response to Portion of NRC Request for

Additional Information Letter No. 278

Related to ESBWR Design Certification Application

DCD Tier 2, Section 3.9

Mechanical Systems and Components

RAI Numbers 3.9-202 S01

For historical purposes, the original text of RAI 3.9-202 and the GEH response are included. The attachments (if any) are not included from the original response to avoid confusion.

NRC RAI 3.9-202

NRC Summary:

GDCS isolation of reactor coolant pressure boundary

NRC Full Text:

Describe how the GDCS configuration with a squib valve and a normally-open check valve meets regulatory requirements for isolation of the reactor coolant pressure boundary. The NRC regulations in 10 CFR 50.55a(c)(2) require that non-ASME Class 1 components be isolated from the reactor coolant pressure boundary with two closed valves or, if one or both valves are open, each valve must be capable of automatic isolation.

GEH Response

The existing configuration for the GDCS meets 10 CFR 50.55a(c)(2). The reactor coolant pressure boundary ends at the GDCS squib valve, which is an ASME Class 1 component. The squib valve is a pipe closure that is sealed and will only be opened to initiate GDCS coolant injection during a LOCA. This sealed boundary is similar to that provided by the Depressurization Valve (DPV) that is attached to the reactor pressure vessel (RPV) and remains sealed until opened to depressurize the RPV during a LOCA. The check valve is normally open; however, consistent with General Design Criteria 55, a check valve is considered an automatic isolation valve. Therefore, the GDCS line has one normally open valve and one normally closed valve, and the normally open valve is capable of automatic closure, which meets the requirements of 10 CFR 50.55a(c)(2). The check valve is an ASME Class 1 component.

DCD Impact

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

NRC RAI 3.9-202 S01

Summary: GDCS isolation from reactor coolant system

RAI Text:

In RAI 3.9-202, the NRC staff requested that GEH describe how the GDCS configuration with a squib valve in series with a normally-open check valve meets the regulatory requirements for isolation of the reactor coolant pressure boundary. In its response to this RAI (MFN 08-635, dated August 14, 2008), GEH stated that the reactor coolant boundary ends with the squib valve (not including the check valve) and is similar to the sealed boundary Depressurization Valves. GEH further stated that the open check valve is considered an automatic isolation valve consistent with 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 55. The NRC staff does not agree with GEH that the ESBWR GDCS configuration with a squib valve in series with one open check valve is similar to the configuration addressed by GDC 55. However, the staff agrees that the squib valve is much more likely to remain sealed and not leak compared to a conventionally seated valve (e.g., a gate or globe valve). Further, the spurious failure of the disk pressure retaining integrity (e.g., by spurious valve actuation) would not result in a loss of GDCS pressure integrity or loss of the GDCS safety function, provided the GDCS components are designed to accommodate the resulting loads. Therefore, the staff requests that GEH verify that the design process will address GDCS fluid dynamic loading as discussed in other supplemental RAIs to support the determination that the GDCS configuration with a squib valve in series with a check valve satisfies the NRC regulations for isolation of the reactor coolant system at the GDCS interface.

GEH Response

As discussed in the response to RAI 3.9-202, the GDCS configuration with a squib valve in series with a normally open check valve meets 10 CFR 50.55a(c)(2) - the line has one normally open valve (the check valve) and one normally closed valve (the squib valve), and the normally open valve is capable of automatic closure. The reference to General Design Criteria (GDC) 55 was not intended to suggest that GDC 55 is applicable for this configuration - GEH agrees it is not - but rather to support the position that a check valve is an “automatic” valve since 10 CFR 50.55a does not specifically address this issue. Note that this response incorrectly stated that the reactor coolant pressure boundary (RCPB) ends at the squib valves. In fact, the RCPB ends at the GDCS check valves; the break between Class A and Class B is just outboard of the check valves.

As discussed in the response to RAI 3.9-200, Supplement 1 (MFN 08-648 S01), the DCD will be revised to state that the design process will include consideration of the expected reverse check valve closure loads in the qualification of the GDCS check valves, piping and other components.

DCD Impact

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