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Subject: 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 3.9-201

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) response to a portion of the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) sent by NRC letter dated June 9, 2008 (Reference 1).

RAI Number 3.9-201 is addressed in Enclosure 1.

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

Sincerely,

Charles W. Bagwell
for

Richard E. Kingston
Vice President, ESBWR Licensing

D068
NRO

Reference:

1. 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 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 3.9-201

cc:	AE Cubbage	USNRC (with enclosures)
	RE Brown	GEH/Wilmington (with enclosures)
	DH Hinds	GEH/Wilmington (with enclosures)
	eDRF	0000-0089-2950 R1 (RAI 3.9-201)

ENCLOSURE 1

MFN 08-652

Response to Portion of NRC RAI Letter No. 209
Related to ESBWR Design Certification Application

DCD Tier 2 Section 3.9 – Mechanical Systems and Components

RAI Number 3.9-201

NRC RAI 3.9-201

NRC Summary:

Provisions for non-condensible gas in GDCS

NRC Full Text:

The collection of gas in the GDCS can cause binding or restriction of necessary injection flow, especially with only gravity head. In addition, gas might be released from the reactor coolant water as a result of depressurization following a LOCA and will coalesce at high points in the injection path. Discuss the provisions for high point vents in the GDCS lines, and address the need for Technical Specification surveillance requirements for monthly venting of the GDCS lines.

GEH Response

Gravity Driven Cooling System (GDCS) injection lines run from GDCS pools to Reactor Pressure Vessel (RPV) inlet nozzles, where the GDCS pool outlets are at higher elevation than the RPV inlet nozzles. DCD Tier 2, Figure 6.3-1 illustrates this relationship. There are four trains of injection lines for the GDCS. DCD Tier 2, Table 6.3-2 contains the minimum elevation change between the GDCS pool surface and the RPV nozzles that assure the pool outlet is higher than the RPV nozzles.

Each train of GDCS 8-inch injection line with an isolation valve, which begins from GDCS pool outlet, is routed down first making a 4-inch branch for deluge line and then two 6-inch branches for injection lines. Each 6-inch GDCS injection branch line pipe route makes a U-shape bottom loop at the lowest elevation before rising up to tie into the RPV nozzle. There is no elevated piping loop above GDCS outlet and RPV inlet nozzle levels.

The bottom section of each 6-inch pipe loop is at the lowest elevation with reference to GDCS pool outlet elevation and RPV nozzle inlet elevation. The bottom loop design prevents collection of non-condensable gases at the bottom of the injection line pipe.

A squib valve is located at the bottom of each U-shape pipe loop. There is an open check valve upstream of the squib valve and an open block valve downstream of squib valve. During normal operation the injection line squib valve stays closed and pipe legs on both sides of squib valve are filled with water. The water solid pipe leg from squib valve to RPV inlet nozzle prevents non-condensable gases entering into the pipe.

The GDCS injection line section from squib valve to GDCS pool is self-venting back to the pool, which is at the highest elevation of the system. Each GDCS pool is sufficiently vented to the drywell gas space.

There are two 1-inch test lines on each 6-inch injection pipe, one on each side of squib valve. Each test line has two isolation valves. It stays closed during normal operation. Test lines stay filled with liquid up to isolation valves. Test lines are for test/back flush during refueling outages.

High points between the pool outlets and the RPV inlet nozzles will not exist and ITAAC Item 24 in DCD Tier 1, Table 2.4.2-3 provides this assurance. Therefore, Technical Specification surveillance is not required for venting.

DCD Impact

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