GE Hitachi Nuclear Energy

James C. Kinsey
Vice President, ESBWR Licensing

PO Box 780 M/C A-55
Wilmington, NC 28402-0780
USA

T 910 675 5057
F 910 362 5057
jim.kinsey@ge.com

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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 124 Related to ESBWR Design Certification Application – Steam and Power Conversion Systems - RAI Number 10.4-16.**

Enclosure 1 contains GEH's response to the subject RAI transmitted via Reference 1.

Should you have any questions about the information provided here, please contact me.

Sincerely,

James C. Kinsey

James C. Kinsey
Vice President, ESBWR Licensing

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NRO

References:

1. MFN 08-029, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 124 Related to the ESBWR Design Certification Application,* January 14, 2008

Enclosure:

1. Response to Portion of NRC Request for Additional Information Letter No. 124 Related to ESBWR Design Certification Application – Steam and Power Conversion Systems - RAI Number 10.4-16.

cc:	AE Cubbage	USNRC (with enclosure)
	RE Brown	GEH/Wilmington (with enclosure)
	DH Hinds	GEH/Wilmington (with enclosure)
	GB Stramback	GEH/San Jose (with enclosure)
	eDRF	0000-0080-6796

Enclosure 1

MFN 08-136

Response to Portion of NRC Request for

Additional Information Letter No. 124

Related to ESBWR Design Certification Application

Steam and Power Conversion Systems

RAI Number 10.4-16

NRC RAI 10.4-16

DCD Tier 2, Section 10.4.7.3, Revision 4, states that the ESBWR design utilizes design features such as keep-full system water lines that minimize the occurrence of water hammer incidents. Describe how keep-full system water lines are used in the condensate and feedwater system, given that the system is normally operating.

GEH Response

The DCD Chapter 10 statement regarding ESBWR design utilizing design features such as keep-full water lines is a broad statement applying to the overall ESBWR plant design and is not contextually appropriate in DCD Section 10.4.7.3. Keep-full water systems act to prevent void formation in normally idle systems. As noted above the condensate and feedwater system (C&FS) is a normally operating system. Prior to C&FS startup, vents located in high points and pump casings are utilized to eliminate pockets of air and non-condensables in the system. Vents are also provided for portions of piping or components, which may become voided during maintenance operations. This will minimize air intrusion and water hammer.

DCD Impact

DCD Tier 2, Section 10.4.7.3 will be revised in Revision 5 as noted in the attached markup.

The majority of the condensate and FW piping considered in this section is located within the nonsafety-related Turbine Building. The portion that connects to the seismic interface restraint outside the containment is located in the steam tunnel between the Turbine and Reactor Buildings. This portion of the piping is analyzed for dynamic effects from postulated seismic events.

The FW control system is designed to ensure that there could not be large sudden changes in FW flow that could induce water hammer. The design of the ESBWR C&FS complies with NUREG–0927~~, Rev. 1~~, "Evaluation of Water Hammer Occurrence in Nuclear Power Plants." In addition, operating and maintenance procedures include adequate precautions to minimize the potential for water hammer occurrences. ~~The ESBWR design utilizes design features, such as keep-full system water lines, that minimize the occurrence of water hammer incidents.~~

The C&FS trip logic and control schemes respectively use coincident logic and redundant controllers and input signals to support plant availability goals and avoid spurious trips. This specifically includes all FW heater level controllers, all C&FS flow and minimum flow controllers, and pump suction pressure trips, FW heater string isolation/high level trips and C&FS bypass system(s) operation.

10.4.7.4 Tests and Inspections

10.4.7.4.1 Preservice Testing

Each FW heater and condensate pump receives a shop hydrostatic test, which is performed in accordance with applicable codes. All tube joints of FW heaters are shop leak tested. Prior to initial operation, the completed C&FS receives a field hydrostatic test and inspection in accordance with the applicable code.

10.4.7.4.2 Inservice Inspections

The performance, leak-tightness, and structural integrity of system components are demonstrated by continuous operation.

Periodic tests and inspections of the system are performed in conjunction with scheduled maintenance outages. Accessibility for inservice inspections is provided by appropriate arrangement of piping and major equipment and accessible arrangement of vents and drains in the system to comply with ASME Code Section XI requirements for the performance of ISI and testing for assessing operational readiness. Areas that require inspection are provided with access space and removable insulation.

10.4.7.5 Instrumentation Applications

FW flow-control instrumentation measures the FW flow rates from each reactor FW pump and the low flow control valve. These FW system flow measurements combined with steam flow, reactor level, and setpoint level are used by the Feedwater Control System (see Section 7.7) to regulate the reactor level.

Pump flow is measured on the pump discharge line and flow controls provide automatic pump recirculation flow for each reactor FW pump. Automatic controls also regulate the condensate flow through the auxiliary condensers (i.e., offgas recombiner condenser/coolers, gland steam condenser, and SJAE condensers) and maintain condensate pump minimum flow during normal