GE Energy

James C. Kinsey
Project Manager, ESBWR Licensing

PO Box 780 M/C J-70
Wilmington, NC 28402-0780
USA

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

MFN 07-247

Docket No. 52-010

May 16, 2007

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

Subject: **Response to Portion of NRC Request for Additional Information Letter No. 63 Related to ESBWR Design Certification Application – Technical Specifications – RAI Number 16.2-77**

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

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

Sincerely,

/Kathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

D068

Reference:

1. MFN 06-375, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 63 Related to ESBWR Design Certification Application,* October 4, 2006

Enclosure:

1. MFN 07-247 – Response to Portion of NRC Request for Additional Information Letter No. 63 Related to ESBWR Design Certification Application – Technical Specifications – RAI Number 16.2-77

cc:

AE Cubbage	USNRC (with enclosures)
DH Hinds	GE (with enclosures)
RE Brown	GE (w/o enclosures)
eDRF	0000-0067-0078/1

Enclosure 1

MFN 07-247

Response to Portion of NRC Request for

Additional Information Letter No. 63

Related to ESBWR Design Certification Application

- Technical Specifications -

RAI Number 16.2-77

NRC RAI 16.2-77

The reactor building buffer pool is subject to rapid coolant inventory loss when fuel transfer gates are removed through failure of the non-seismic refueling seal around the reactor vessel or failure of the inclined fuel transfer system interlocks. This rapid coolant loss presents a challenge to the integrity of a fission product barrier in that water cooling is necessary to assure protection of the fuel cladding. Makeup water is part of the primary success path for prevention of fuel cladding damage for loss of coolant inventory events. Describe how a spent fuel makeup water system is included in a Limiting Condition for Operation as a system satisfying Criterion 3 of 10 CFR 50.36(c)(2)(ii).

GE Response

The refueling bellows seal and the inclined fuel transfer tube have been designed with consideration given to postulated drain down events. The refueling bellows is designed to Seismic Category I requirements therefore a rapid loss of coolant through this seal is not credible. The Inclined Fuel Transfer System (IFTS) is designed with sufficient redundancy and diversity that there are no modes of operation that will allow simultaneous opening of any set of valves that could cause draining of the water from the upper pool in an uncontrolled manner.

The Fuel and Auxiliary Pool Cooling System has the ability to deliver makeup water to the buffer pool as described in DCD Tier 2 Subsection 9.1.3. However, due to the reasons listed above, a Limiting Condition for Operation is not necessary.

DCD Impact

The following changes will be made for DCD Tier 2 Revision 4 as shown in the attached DCD markups.

Table 3.2-1

Table 3.2-1 lists the refueling bellows under system F15 (Refueling Equipment) as Seismic Category NS. The refueling bellows will be transferred from F15 to system T10 (Containment System) and will be upgraded to Seismic Category I.

Subsection 6.2.1.1.2

A statement will be added to Subsection 6.2.1.1.2 describing the refueling bellows seal as part of the Containment System, but not part of the containment boundary.

Table 9.1-4

The entry for "Refueling Bellows" will be deleted from the "Refueling Equipment" section of Table 9.1-4.

Table 3.2-1

Classification Summary

Principal Components[1]	Safety Class.[2]	Location[3]	Quality Group[4]	QA Req.[5]	Seismic Category[6]	Notes
2. Piping and valves (including supports) from the check valves upstream of the squib valves to the suppression pool and GDCS pools	2	CV	B	B	I	
3. Piping and valves (including supports) from the GDCS pools to the lower drywell	2	CV	B	B	I	
4. Safety-related electrical modules, components and cables	3	CV, RB, CB	—	B	I	
5. GDCS pool splash guard and perforated plate	3	CV	—	B	I	
6. Nonsafety-Related electrical modules, components and cable	N	CV, RB, CB	—	E	II	
F REACTOR SERVICING EQUIPMENT						
F11 Fuel Servicing Equipment						
1. Fuel Preparation Machine	N	FB	—	E	II	
2. All Other Equipment	N	FB, RB	—	E	NS	
F12 Miscellaneous Servicing Equipment	N	FB, RB	—	E	NS	
F13 Reactor Pressure Vessel Servicing Equipment						
1. RPV head holding pedestal	N	RB	—	E	I	
2. All other RPV servicing equipment	N	RB	—	E	NS	
F14 RPV Internal Servicing Equipment	N	RB	—	E	NS	
F15 Refueling Equipment						
1. Fuel Handling Machine	N	FB	—	E	II	
2. Refueling Machine	N	RB	—	E	II	

Table 3.2-1

Classification Summary

Principal Components[1]	Safety Class.[2]	Location[3]	Quality Group[4]	QA Req.[5]	Seismic Category[6]	Notes
3. (Deleted)						
F16 Fuel Storage Facility						
1. Fuel storage racks - new and spent	N	RB, FB	—	E	I	
F17 Under-RPV Servicing Equipment	N	CV	—	E	NS	
F21 CRD Maintenance Facility	N	RB	—	E	NS	
F32 Fuel Cask Cleaning Facility	N	FB	—	E	NS	
F41 Plant Startup and Test Equipment	N	CV	—	E	NS	
F42 Fuel Transfer System (FTS)						
1. Transfer tube assembly from interface with upper fuel pool, through building to lower spent fuel pool terminus equipment, including drain connection	N	RB, FB	D	E	I	
2. Remaining equipment	N	RB, FB	—	E	NS	
G DECAY HEAT REMOVAL NETWORK						
G21 Fuel and Auxiliary Pools Cooling System (FAPCS)						
1. Piping and valves including supports between containment isolation valves (including valves) for – Suppression pool return line – GDCS pool suction line – GDCS pool return line – Drywell spray discharge line	2	CV, RB	B	B	I	

Table 3.2-1

Classification Summary

Principal Components[1]	Safety Class.[2]	Location[3]	Quality Group[4]	QA Req.[5]	Seismic Category[6]	Notes
3. Vacuum Breaker "Closed" Proximity Instrumentation	3	CV	—	B	I	
4. Vacuum Breaker "Open" Proximity Instrumentation.	N	CV	—	E	II	
5. Vacuum Breaker Isolation Valves	2	CV	B	B	I	
6. Refueling bellows	N	CV	—	E	I	
T11 Containment Vessel						
1. Drywell head	2	CV	B	B	I	
2. Reinforced Concrete Containment Vessel (RCCV)	2	CV	B	B	I	
3. Reactor pedestal (Part of RCCV)	2	CV	B	B	I	
4. Portion of basemat under pedestal	2	CV	B	B	I	
T12 Containment Internal Structures						
1. Reactor vessel support brackets and stabilizer support	3	CV	—	B	I	
2. Support structures for safety-related piping, including supports and equipment	3	CV	—	B	I	
3. Reactor shield wall	3	CV	—	B	I	
4. Diaphragm floor	3	CV	—	B	I	
5. GDCS pools	3	CV	—	B	I	
6. Vent Wall	3	CV	—	B	I	

6.2.1.1.2 Design Features

The containment structure is a reinforced concrete cylindrical structure, which encloses the reactor pressure vessel (RPV) and its related systems and components. Key containment components and design features are exhibited in Figures 6.2-1 through 6.2-5. The containment structure has an internal steel liner providing the leak-tight containment boundary. The containment is divided into a DW region and a WW region with interconnecting vent system. The functions of these regions are as follows:

- The DW region is a leak-tight gas space, surrounding the reactor pressure vessel and reactor coolant pressure boundary, which provides containment of radioactive fission products, steam, and water released by a LOCA, prior to directing them to the suppression pool via the DW/WW Vent System. A relatively small quantity of DW steam is also directed to the PCCS during the LOCA blowdown.
- The WW region consists of the suppression pool and the gas space above it. The suppression pool is a large body of water to absorb energy by condensing steam from SRV discharges and pipe break accidents. The pool is an additional source of reactor water makeup and serves as a reactor heat sink. The flow path to the WW is designed to entrain radioactive materials by routing fluids through the suppression pool during and following a LOCA. The gas space above the suppression pool is leak-tight and sized to collect and retain the DW gases following a pipe break in the DW, without exceeding the containment design pressure.

The DW/WW Vent System directs LOCA blowdown flow from the DW into the suppression pool.

The containment structure consists of the following major structural components: RPV support structure (pedestal), diaphragm floor separating DW and WW, suppression pool floor slab, containment cylindrical outer wall, cylindrical vent wall, containment top slab, and DW head. The containment cylindrical outer wall extends below the suppression pool floor slab to the common basemat. This extension is not part of containment boundary, however, it supports the upper containment cylinder. The reinforced concrete basemat foundation supports the entire containment system and extends to support the reactor building surrounding the containment. The refueling bellows seal extends from the lower flange of the reactor vessel to the interior of the reactor cavity. This extension is also not part of the containment boundary, however, it provides a Seismic Category I seal between the upper drywell and reactor well during a refueling outage.

The design parameters of the containment and the major components of the containment system are given in Tables 6.2-1 through 6.2-4. A detailed discussion of their structural design bases is given in Section 3.8.

Table 9.1-4

Classification of Equipment

Principal Component	Safety Class	Location	QA Requirement	Seismic Category	Notes
Fuel Servicing Equipment					
1. Fuel Preparation machine	N	FB/RB	E	II	
2. All Other Equipment	N	FB/RB	E	NS	
Miscellaneous Servicing Equipment	N	FB/RB	E	NS	
RPV Servicing Equipment	N	RB	E	NS/I	
RPV Internal Servicing Equipment	N	RB	E	NS	
Refueling Equipment					
1. Fuel Handling machine	N	FB	E	II	
2. Refueling Machine	N	RB	E	II	
3. Deleted ~~Refueling Bellows~~	~~N~~	~~CV~~	~~E~~	~~NS~~	