GE-Hitachi Nuclear Energy Americas LLC

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

MFN 06-188 Supplement 1

Docket No. 52-010

October 24, 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. 18 - Containment Subcompartment Analysis - RAI Numbers 6.2-14 S01 and 6.2-17 S01**

Enclosure 1 contains the GE-Hitachi Nuclear Energy Americas LLC (GEH) response to the subject NRC RAIs originally transmitted via the Reference 1 letter and supplemented by NRC requests for clarification.

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

Sincerely,

Kathy Sedney for

James C. Kinsey
Vice President, ESBWR Licensing

D068
NRO

Reference:

1. MFN 06-113, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 18 Related to ESBWR Design Certification Application*, April 24, 2006

Enclosure:

1. MFN 06-188 Supplement 1 - Response to Portion of NRC Request for Additional Information Letter No. 18 - Related to ESBWR Design Certification Application - Containment Subcompartment Analysis - RAI Numbers 6.2-14 S01 and 6.2-17 S01

cc:

AE Cubbage	USNRC (with enclosures)
GB Stramback	GEH/San Jose (with enclosures)
RE Brown	GEH/Wilmington (with enclosures)
eDRF	0000-0075-7511

Enclosure 1

MFN 06-188 Supplement 1

Response to Portion of NRC Request for

Additional Information Letter No. 18

Related to ESBWR Design Certification Application

Containment Subcompartment Analysis

RAI Numbers 6.2-14 S01 and 6.2-17 S01

NRC RAI 6.2-14:

Describe the extent to which pipe restraints are used to limit the break area of the pipe ruptures. Provide this information as part of DCD Tier 2, Section 6.2.1.2.1, "Design Bases." This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.

GEH Response:

As per note in page 7 of the enclosure to letter from U. S. Nuclear Regulatory Commission to Mr. David H. Hinds, Request for Additional Information Letter No. 18 Related to ESBWR Design Certification Application, April 24, 2006, this RAI is related to reactor shield annulus subcompartment only. For pipe break cases in this subcompartment, no credit was taken in the analysis to limit the break area due to presence of pipe restraints.

NRC RAI 6.2-14 S01:

The information provided in this response is necessary to support the basis for a reasonable assurance finding. Thus, please update DCD, Tier 2 to include information provided in response to RAI 6.2-14.

GEH Response:

DCD Tier 2, Subsection 6.2.1.2.2, Reactor Shield Analysis, will be revised to include the information requested.

DCD Impact:

DCD Tier 2, Subsection 6.2.1.2.2, Reactor Shield Analysis, will be revised as shown in the attached markup

NRC RAI 6.2-17:

For vent areas which become available only after the occurrence of a pipe break (for example blowout panels, or as a result of insulation collapsing or being blown out), identify the manner in which these are treated, and justify the vent areas used in the analyses. Provide the dynamic analyses of the available vent area as a function of time (pressure) and the supporting test data. Provide this information in DCD Tier 2, Section 6.2.1.2.2, "Design Features." This information is necessary to evaluate ESBWR subcompartment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.

GEH Response:

As per note in page 7 of the enclosure to letter from U. S. Nuclear Regulatory Commission to Mr. David H. Hinds, Request for Additional Information Letter No. 18 Related to ESBWR Design Certification Application, April 24, 2006, this RAI is related to reactor shield annulus subcompartment only. The reactor shield annulus subcompartment vent areas in ESBWR containment are always open. There are no insulation collapsing issues or blowout panels in this subcompartment.

NRC RAI 6.2-17 S01:

The information provided in this response is necessary to support the basis for a reasonable assurance finding. Thus, please update DCD, Tier 2 to include information provided in response to RAI 6.2-17.

GEH Response:

DCD Tier 2, Subsection 6.2.1.2.2, Reactor Shield Analysis, will be revised to include the information requested.

DCD Impact:

DCD Tier 2, Subsection 6.2.1.2.2, Reactor Shield Analysis, will be revised as shown in the attached markup

6.2.1.2.1 Design Bases

The design of the containment subcompartments is based upon a postulated DBA occurring in each subcompartment.

For each containment subcompartment in which high energy lines are routed, mass and energy release data corresponding to a postulated double ended line break are calculated. The mass and energy release data, subcompartment free volumes, vent path geometry and vent loss coefficients are used as input to an analysis to obtain the pressure/temperature transient response for each subcompartment. At least 15% margin above the analytically determined pressures is applied for structural analysis.

6.2.1.2.2 Design Features

The DW and WW subcompartments are described in Subsection 6.2.1.1. The remaining containment subcompartments are as follows.

Drywell Head Region

The DW head region is covered with a removable steel head, which forms part of the containment boundary. The DW bulkhead connects the containment vessel flange to the containment and represents the interface between the DW head region and the DW. There are no high energy lines in the DW head region.

Reactor Shield Annulus

The reactor shield annulus exists between the Reactor Shield Wall (RSW) and the RPV. The RSW is a steel cylinder surrounding the RPV and extending up close to the DW top slab, as shown in Figure 6.2-1. The opening between the RSW and the DW top slab provides the vent pathway necessary to limit pressurization of the annulus due to a high energy pipe rupture inside the annulus region. The shield wall is supported by the reactor support structure. The reactor shield annulus subcompartment vent areas are always open. Insulation will not cause an impediment to venting and there are no blowout panels in this subcompartment.

Several high energy lines extend from the RPV through the reactor shield wall. There are also penetrations in the RSW for other piping, vents, and instrumentation lines. The reactor shield wall is designed for transient pressure loading conditions from the worst high energy line rupture inside the annulus region. For pipe break cases in this subcompartment, no credit was taken in the analysis to limit the break area due to presence of pipe restraints.