HITACHI

**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

MFN 08-362

Docket No. 52-010

April 29, 2008

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 Related to ESBWR Design Certification Application - Containment Systems - RAI Number 6.2-20 S01**

Enclosure 1 contains the GE Hitachi Nuclear Energy (GEH) response to the subject NRC RAI originally transmitted via the Reference 1 letter and supplemented by an NRC request for clarification in Reference 2.

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

Sincerely,

James C. Kinsey

James C. Kinsey
Vice President, ESBWR Licensing

D068
NRO

References:

1. MFN 06-113, Letter from U.S. Nuclear Regulatory Commission to David H. Hinds, *Request for Additional Information Letter No. 18 Related to ESBWR Design Certification Application*, April 24, 2006
2. E-Mail from Shawn Williams, U.S. Nuclear Regulatory Commission, to George Wadkins, GE Hitachi Nuclear Energy, dated May 22, 2007 (ADAMS Accession Number ML071430342)

Enclosure:

1. MFN 08-362 - Response to Portion of NRC Request for Additional Information Letter No. 18 Related to ESBWR Design Certification Application - Containment Systems - RAI Number 6.2-20 S01

| | | |
|---|---|---|
| cc: | AE Cubbage | USNRC (with enclosures) |
| | DH Hinds | GEH/Wilmington (with enclosures) |
| | GB Stramback | GEH/San Jose (with enclosures) |
| | RE Brown | GEH/Wilmington (with enclosures) |
| | eDRF | 0000-0075-1321 |

# Enclosure 1

# MFN 08-362

# Response to Portion of NRC Request for Additional Information Letter No. 18 Related to ESBWR Design Certification Application

# Containment Systems

# RAI Number 6.2-20 S01

**NRC RAI 6.2-20 S01:**

*The GENE response to RAI 6.2-20 provided in GENE letter MFN 06-159, dated June 5, 2006, states that "the reactor is operating at full power and the containment is filled with dry air at atmospheric pressure and 100°C when the postulated pipe break occurs."*

*Confirm whether 2% measurement uncertainty for the reactor power was used and explain why the containment atmosphere was assumed to fill with air instead of nitrogen.*

**GEH Response:**

The energy of the break flow entering the annulus is the source for the annulus pressurization analysis. Break flow was determined with HEM model based on the pressure and temperature (enthalpy) at the break locations. The current analyses show that the limiting case is the reactor water cleanup (RWCU) line break. The break location is at the RWCU elevation in the downcomer.

The initial pressure and liquid temperature for the 100% power and 102% power cases are compared at the downcomer location. The result shows that the pressure is about the same, and the liquid temperature for the 100% power case is about 1°K higher than that for the 102% case. For bounding break flow and energy entering into the annulus, the current analyses used the downcomer conditions at 100% power for the RWCU break.

The annulus pressurization is a very short term transient. The time duration of interest is completed within a few seconds after the break. The current analyses assumed that the annulus is initially filled with air, instead of nitrogen. This assumption is expected to have little or no impact on the calculated peak subcompartment pressure responses. This assumption is judged to be acceptable because a multiplier of 1.2 was applied to the peak pressures calculated for annulus pressurization before being applied to the structural analyses. This 1.2 multiplier ensures at least 15% margin above the analytical determined pressures (See response to RAI 6.2-18 S01, MFN 06-159 Supplement 1, dated September 12, 2007).

**DCD Impact:**

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