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
jim.kinsey@ge.com

MFN 07-587

Docket No. 52-010

November 15, 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. 101 Related to ESBWR Design Certification Application, RAI Number 22.5-7**

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) response to the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) sent by NRC letter dated June 21, 2007 (Reference 1). The GEH response to RAI Number 22.5-7 is in Enclosure 1.

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 07-357, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 101 Related to ESBWR Design Certification Application*, June 21, 2007.

Enclosure:

1. Response to Portion of NRC Request for Additional Information Letter No. 101 Related to ESBWR Design Certification Application Regulatory Treatment of Non-Safety Systems (RTNSS) RAI Number 22.5-7

cc: AE Cubbage USNRC (with enclosure)
GB Stramback GEH/San Jose (with enclosure)
RE Brown GEH/Wilmington (with enclosure)
eDRFSection 0000-0076-7811 NRC RAI 22.5-7

ENCLOSURE 1
MFN 07-587

Response to Portion of NRC Request for Additional Information Letter No. 101 Related to ESBWR Design Certification Application Regulatory Treatment of Non-Safety Systems (RTNSS)

RAI Number 22.5-7

NRC RAI 22.5-7

Section 19A.8.3 states "Systems that meet RTNSS Criterion B (i.e., for actions required beyond 72 hours) require augmented design standards to assure reliable performance in the event of hazards, such as seismic events, high winds, and flooding. These standards are applied to High and Low Regulatory Oversight systems that meet Criterion B." The ensuing text discusses systems classified as B1 and B2 and applicable seismic design - Seismic Category II and the requirements in accordance with the International Building Code (IBC) – 2003 by International Code Council, Inc. (300-214-4321).

Please respond to the following:

A. *For each of the systems that are classified as RTNSS based on Criterion B consideration (Table 19A-2), discuss the specific deterministic seismic evaluation (including the selection of the code stipulated seismic hazard inputs) implemented to demonstrate their compliance with the seismic design requirements of the IBC – 2003 proposed as design standards.*

B. *As applicable, provide also the same discussion for RTNSS structures that may be identified as within the ESBWR scope in response to RAI 22.5-6 above.*

GEH Response

A. As stated in DCD Tier 2, Rev. 4, Section 19A.8-3, Criterion B is divided into two groups:

- Criterion B1, these RTNSS systems shown in Table 19A-2 of DCD Tier 2 (Rev.4) are designed as Seismic Category II (C-II). The deterministic seismic evaluation of these systems in this group follows the same methods of analysis and acceptance criteria as Seismic Category I (C-I) applying SSE loads.
- Criterion B2, the design of these RTNSS systems shown in Table 19A-2 of DCD Tier 2 (Rev.4) follows IBC-2003 requirements delineated as follows:

  1. The maximum earthquake ground motion response spectrum, $S_{aM}(T)$, where T is the natural period of the structure, is the single envelope ESBWR SSE design response spectrum shown in DCD Tier 2, Rev.4, Figure 2.0-1 for C-I and C-II SSC's.

  2. Section 1615.2.4 of IBC-2003 defines $S_a(T)$ as two third of $S_{aM}(T)$, where $S_a(T)$ is the RTNSS design ground motion spectrum. Let S_{DS} be the design spectral response acceleration at short period, according to Section 1615.2.5, S_{DS} = $S_a(0.2sec)$ but not less than 90% of the peak spectral acceleration S_a, at any period.

     Let S_{aM} = maximum (or peak) value of earthquake ground motion response spectrum (SSE), then

     $S_{aM} = 1.35g$ [Ref: DCD Tier 2, Rev.4, Figure 2.0-1]

     Let S_a = maximum (or peak) value of design spectral acceleration, then

     $S_a = (2/3)^* S_{aM}$ [Ref: IBC-2003, Section 1615.2.4]

     $= 0.9g$

Let S_{DS} = design spectral response acceleration at short period (or, short-period design spectral response acceleration), then

$S_{DS} = 0.9^* S_a$ [Ref: IBC-2003, Section 1615.2.5]

$= 0.81g$

3. Structures, piping or components, according to Section 1616.3, shall be designed as Seismic Design Category D under Seismic use group III with Importance Factor, IP=1.5.

4. The seismic loads shall be calculated as follows according to ASCE 7-02.

   Horizontal design seismic load: Equation 9.6.1.3-1 of ASCE 7-02,
   Maximum design seismic load: Equation 9.6.1.3-2 of ASCE 7-02,
   Minimum design seismic load: Equation 9.6.1.3-3 of ASCE 7-02,
   Vertical design seismic load: Equation 9.5.2.7 of ASCE 7-02,

B. The response to RAI 22.5-6 is related to this response.

The Electrical Building (EB), as a RTNSS structure, houses two nonsafety-related standby diesels and nonsafety-related power supplies. The EB also provides space for the Technical Support Center. The EB is nonsafety-related and Seismic Category NS, but the augmented design of B2 described in A above applies.

DCD/NEDO-33201 Impact

No DCD or NEDO-33201 changes will be made in response to this RAI.