



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 08-245

Docket No. 52-010

March 24, 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. 132 Related to ESBWR Design
Certification Application, RAI Number 19.1-161**

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 January 15, 2008 (Reference 1). The GEH response to RAI Number 19.1-161 is in Enclosure 1.

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

Sincerely,

James C. Kinsey
Vice President, ESBWR Licensing

DO68
NRO

Reference:

1. MFN-08-040. Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request For Additional Information Letter No. 132 Related To ESBWR Design Certification Application*. January 15, 2008.

Enclosure:

1. Response to NRC Request for Additional Information Letter No. 132 Related to ESBWR Design Certification Application, ESBWR Probabilistic Risk Assessment, RAI Number 19.1-161

Attachment to Enclosure 1: NEDO-33201 Revision 3 Markup,
Section 11.3.4.3, Focus Level 2 Flood

cc: AE Cubbage USNRC (with enclosure)
GB Stramback GEH/San Jose (with enclosure)
RE Brown GEH/Wilmington (with enclosure)
DH Hinds GEH/Wilmington (with enclosure)
eDRFSection 0000-0080-4240

Enclosure 1

MFN 08-245

**Response to NRC Request for
Additional Information Letter No. 132
Related to ESBWR Design Certification Application
ESBWR Probabilistic Risk Assessment
RAI Number 19.1-161**

RAI Response 19.1-161

Question Summary: ESBWR PRA (NEDO-33201) Revision 2, Section 11.3.4.3 Focus Level 2 Flood - Inconsistent results reported in this section. Please verify and correct the inconsistency.

Full Text: In Section 11.3.4.3, it is stated that: "The focus Level 2 flood generated a nTSL release frequency of 4.49E-4/yr.....". However, 4.49E-06 is shown in Table 11.3-30. Please resolve this inconsistency.

In the same section, it is stated that "...NRC goal of 1E-06/y4 LRF is met for both focus and RTNSS...." The figure 1E-6/y4 appears to be a typographical error. The NRC goal for LRF is 1.E-6/yr. The focus Level 2 flood frequency is either 4.49E-4/yr or 4.49E-6/yr. In either case, the NRC goal is not met for the Level 2 focus flood. Please correct the typographical error and revise the quoted sentence to reflect that the goal has not been met.

GEH Response

A review of Level 2 focus flood data identified a typographical error in Section 11.3.4.3. The Level 2 flood focus value was mis-identified as 4.49E-04/yr, whereas the actual value is 4.49E-06/yr. This value will be amended as shown in the markup below. The nTSL value for the Level 2 flood focus was presented correctly in Table 11.3-30.

Discussions within Section 11.3.4.3 will be amended to reflect that the focus Level 2 flood frequency exceeds the NRC goal of 1E-06/yr LRF and are shown in the markup below. Additionally, discussions in Section 11.3.4.5 pertaining to the Level 2 flood focus were consistent with actual results and no changes to this section will be required.

DCD/NEDO-33201 Impact

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

NEDO-33201, Rev. 3 will be revised as noted in the attached markup.

MFN 08-245

Attachment to Enclosure 1:

**NEDO-33201 Revision 3 Markup
Section 11.3.4.3, Focus Level 2 Flood**

available for ICS/PCCS pool makeup. Some other release categories such as OPW1 and OPVB are relatively unaffected because passive safety-related systems, which exhibit excellent reliability, are available. The RTNSS Level 2 fire results are dominated by OPW2, BYP and CCID release categories, yet the NRC goal is met with an order of magnitude margin. Additional details of the release categories for the Level 2 focus are provided in Table 11.29.

11.3.4.3 Focus Level 2 Flood

In order to perform the Level 2 flood focus and RTNSS sensitivities, two flag files were generated (1) to fail all non-safety system and (2) to fail all non-safety systems except those systems designated as RTNSS. The Level 2 focus flood sensitivity was run using the base model at a truncation of $1\text{E-}15$ with the additional flag files. The focus Level 2 flood generated a nTSL release frequency of $4.49\text{E-}0406/\text{yr}$ and a CDF of $1.15\text{E-}05$. The RTNSS Level 2 flood generated a nTSL release frequency of $1.23\text{E-}09/\text{yr}$ and a CDF of $9.06\text{E-}09$. The results for the focus sensitivity showed significant impact to both nTSL and CDF with the failure of non-safety systems both with and without RTNSS. The results show that crediting RTNSS systems reduces the nTSL release frequency by over two orders of magnitude. Results for the focus Level 2 flood sensitivity are shown in Table 11.3-30.

The Level 2 flood PRA model is significantly impacted by the failure of the non-safety and RTNSS systems. The availability of the RTNSS systems significantly minimizes nTSL frequency. Based on the Level 2 flood focus sensitivities nTSL results, the NRC goal of $1\text{E-}06/\text{yr}$ LRF is ~~met-exceeded, for both focus and RTNSS~~. Additional details of the release categories for the Level 2 focus flood are provided in Table 11.3-31.

11.3.4.4 Focus Level 2 High Winds

In order to perform the Level 2 high winds focus and RTNSS sensitivities, two flag files were generated (1) to fail all non-safety system and (2) to fail all non-safety systems except those systems designated as RTNSS. The Level 2 focus high winds sensitivity was run using the base model at a truncation of $1\text{E-}15$ with the additional flag files. The focus Level 2 generated a nTSL release frequency of $3.26\text{E-}07/\text{yr}$. The RTNSS generated a nTSL release frequency of $7.75\text{E-}11/\text{yr}$. The results for the focus high winds sensitivities showed significant impact to nTSL with the failure of non-safety systems both with and without RTNSS. The results show that crediting the RTNSS systems reduces the nTSL release frequency by more than three orders of magnitude. Results for the focus Level 2 high winds sensitivity are shown in Table 11.3-32.

The Level 2 high winds PRA model is significantly impacted by the failure of the non-safety and RTNSS systems. The availability of the RTNSS systems significantly minimizes nTSL release frequency. Based on the Level 2 high winds focus sensitivities nTSL results, the NRC goal of $1\text{E-}06/\text{yr}$ LRF is met for both the focus and RTNSS Level 2 high winds sensitivities. Additional details of the release categories for the Level 2 high winds focus sensitivities are provided in Table 11.3-33.

11.3.4.5 DPS and ARI Sensitivity

The focus Level 2 models for the internal events, fire and flood did not meet the NRC goal $1\text{E-}06/\text{yr}$ for LRF. The focus Level 1 internal events and fire model did not satisfy the NRC goal of $1\text{E-}04/\text{yr}$ for CDF. Further results showed that the addition of DPS alone was not sufficient to