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U.S. Nuclear Regulatory Commission
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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 146 Related to ESBWR Design Certification Application, RAI Number 19.1-149 S01**

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 February 20, 2008 (Reference 1). Previous RAIs and responses were transmitted in References 2 and 3. The GEH response to RAI Number 19.1-149 S01 is in Enclosure 1.

Verified DCD changes associated with this RAI response are identified in the enclosed DCD markups by enclosing the text within a black box. The marked-up pages may contain unverified changes in addition to the verified changes resulting from this RAI response. Other changes shown in the markup(s) may not be fully developed and approved for inclusion in DCD Revision 5.

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

Sincerely,


James C. Kinsey
Vice President, ESBWR Licensing

DC68
NRC

References:

1. MFN-08-157. Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request For Additional Information Letter No. 146 Related To ESBWR Design Certification Application*. February 20, 2008.
2. MFN 07-292. NRC letter to Robert E. Brown. *GEH, Request For Additional Information Letter No. 97 Related To ESBWR Design Certification Application*. May 10, 2007.
3. MFN 07-399. *Response to Portion of NRC Request for Additional Information Letter No. 97 Related to ESBWR Design Certification Application ESBWR Probabilistic Risk Assessment RAI Number 19.1-149*. August 8, 2007.

Enclosure:

1. Response to Portion of NRC Request for Additional Information Letter No. 146 Related to ESBWR Design Certification Application, ESBWR Probabilistic Risk Assessment, RAI Number 19.1-149 S01

Attachment to Enclosure 1 of MFN 07-399, Supplement 1: DCD Tier 2
Revision 5 Markup, Table 19.2-3, Risk Insights and Assumptions

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 0000-0081-7665

Enclosure 1

MFN 07-399, Supplement 1

***Response to Portion of NRC Request for**

Additional Information Letter No. 146

Related to ESBWR Design Certification Application

ESBWR Probabilistic Risk Assessment

RAI Number 19.1-149 S01

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RAI 19.1-149

Please provide additional information to address issues described in NUREG-1449, "Shutdown and Low Power Operation at Commercial Power Plants in the U.S.," which was issued in September 1993. The staff recognizes that due to ESBWR's unique design, not all of the scenarios discussed in NUREG-1449 would be directly applicable to ESBWR; however many of the issues identified in the NUREG would be applicable. The staff requests a systematic evaluation of shutdown risk for ESBWR similar to those submitted by GE and Westinghouse in support of the ABWR (ABWR DCD Tier 2, Revision 4, Appendix 19Q) and AP600 (WCAP-14837, revision 3, March 1998) design certifications, respectively.

GEH Response

A systematic evaluation of shutdown risk for the ESBWR, which addresses many of the issues identified in NUREG-1449, is provided in Revision 2 to NEDO-33201:

Section 16 for shutdown internally-initiated events;
Section 12 for shutdown fire-initiated events; and
Section 13 for shutdown flooding-initiated events.

Revision 2 of Section 16 will be issued in August 2007. Revision 2 of Sections 12 and 13 will be issued in September 2007.

DCD/NEDO-33201 Impact

There is no impact on the DCD.
Revision 2 of NEDO-33201 will address the RAI

NRC RAI 19.1.149 S01

The staff has reviewed GEH's response to RAI 19.1.149. GEH responded that a systematic evaluation of shutdown operations for the ESBWR, which addresses many of the issues identified in NUREG-1449, is provided in Revision 2 to NEDO-33201 (the ESBWR PRA). The staff reviewed the PRA to see if each relevant issue discussed in NUREG 1449 was evaluated in the PRA. NUREG-1449 discusses the set of guidelines for utility self assessment of shutdown operations (NUMARC 91-06). In addition, in SECY 97-168, the staff concluded that the current level of shutdown safety was achieved by voluntary measures (GL 88-17 and NUMARC 91-06).

Please include the following key risk assumption relating to this issue or explain why this assumption is missing from DCD Tier 2, Revision 4 Table 19.2-3, "Risk Insights and Assumptions": "Outage planning and control program is consistent with NUMARC 91-06".

GEH Response

A risk insight will be added to DCD Tier 2 Table 19.2-3 to state that the outage planning and control program is consistent with NUMARC 91-06.

DCD Impact

DCD Tier 2 Revision 5 Table 19.2-3 will be revised to include the statement in the response as shown on the attached markup.

**Attachment to Enclosure 1 of
MFN 07-399, Supplement 1:**

DCD Tier 2 Revision 5 Markup

Table 19.2-3, Risk Insights and Assumptions

**Table 19.2-3
Risk Insights and Assumptions**

| Insight or Assumption | Disposition |
|--|----------------------------|
| <u>Contingency procedures provide core and spent fuel cooling mitigative actions during FMCRD replacement with fuel in the vessel.</u> | <u>Operational Program</u> |
| <u>During shutdown conditions, both trains of RWCU/SDC are operational while the unit is in either Mode 5 or Mode 6 until the reactor cavity is flooded.</u> | <u>Operational Program</u> |
| <u>The outage planning and control program is consistent with NUMARC 91-06.</u> | <u>Operational Program</u> |