



GE Energy

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Subject: **Response to Portion of NRC Request for Additional Information
Letter No. 3, Related to ESBWR Design Certification Application –
ESBWR Probabilistic Risk Assessment – RAI Numbers 19.1.0-3,
19.1.0-4, 19.3.0-2**

Enclosure 1 contains GE's response to the subject NRC RAIs transmitted via the
Reference 1 letter.

If you have any questions about the information provided here, please let me know.

Sincerely,

David H. Hinds
Manager, ESBWR

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Reference:

1. MFN 05-156, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 3 for the ESBWR Design Certification Application*, December 8, 2005

Enclosures:

1. MFN 06-442 – Response to Portion of NRC Request for Additional Information Letter No. 3 Related to ESBWR Design Certification Application – ESBWR Probabilistic Risk Assessment – RAI Numbers 19.1.0-3, 19.1.0-4, 19.3.0-2

cc: AE Cabbage USNRC (with enclosures)
GB Stramback GE/San Jose (with enclosures)
eDRF 0000-0049-3102

Enclosure 1

MFN 06-442

**Response to NRC Request for
Additional Information Letter No. 3
Related to ESBWR Design Certification Application**

ESBWR Probabilistic Risk Assessment

RAI Numbers 19.1.0-3, 19.1.0-4, 19.3.0-2

NRC RAI 19.1.0-3

The documentation of CDF quantification results (in Section 7.0) provides only the top ten cutsets contributing to the internal events CDF for review. Provide cutsets contributing to 90 percent of CDF or top 200 cutsets, whichever is smaller, as the initial information for the staff's review. In addition, provide a discussion on how the uncertainty, sensitivity and importance analyses are being used to provide insights and identify requirements for structures, systems, and components as well as for human actions.

GE Response

ESBWR Certification Probabilistic Risk Assessment has been updated to revision 1 (NEDO-33201 Rev.1). As part of the revision, the documentation of CDF quantification results in Section 7.0 has been updated. The top 200 cutsets contributing to CDF are listed in Table 7.2-6.

Revision 1 to DCD Tier 2 Chapter 19 conforms to the format and content described in Sections C.I.19 and C.II.1 of the draft Reg. Guide DG-1145. The guidance in DG-1145 was used to establish SSC functions based on the stated criteria. The uncertainty, sensitivity and importance analyses are used to enhance design and to help establish the systems that are candidates for the RTNSS program [Note: This process will be repeated after the scope of RTNSS systems is resolved with the NRC staff]. In addition, each of the external events evaluations includes a section discussing insight gained from the analyses.

Detailed information regarding the use of the PRA results can be found, as noted below, in the following sections of the documentation.

- Section 17.4 of Revision 2 to DCD Tier 2 describes the Design Reliability Assurance Programs. Reliability assurance is based upon the identification and prioritization of risk-significant SSCS.
- Section 18 of NEDO-33201 Rev 1 provides a detailed description of key operator actions, initiators, common cause failures and equipment for each type of risk analysis (internal, shutdown, fire, flood, seismic, high winds etc).
- Section 20 of NEDO-33201 Rev 1 describes the RTNSS program including actions required beyond 72 hours, as well as the systematic approach used for addressing criteria discussed in the guidance.
- The ESBWR Certification Probabilistic Risk Analysis document (NEDO-33201 Rev.1) documents some of the insights communicated to the ESBWR design team in Sections 12.7, 13.7, 14.7, 15.6, and 16.7.

DCD Impact

There are no DCD Revisions resulting from the response to this RAI.

NRC RAI 19.1.0-4

The use of PRA results and insights to identify design certification requirements for the ESBWR design is an important objective of the certification process. These requirements aim at ensuring that PRA assumptions (e.g., regarding design features and operation of a safety system, system interactions and human actions) associated with risk important features will “come true” in a future plant referencing the ESBWR design and that uncertainties have been appropriately addressed. No such information is included in the submitted ESBWR PRA.

GE Response

Revision 1 of DCD Tier 2 Chapter 19 contains a summary of PRA insights and assumptions in Table 19.2-3.

DCD Impact

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

NRC RAI 19.3.0-2

Even though release frequencies (core damage with the containment bypassed) appear to be quantified in Table 16.6-2, the shutdown PRA lacks a discussion on LRF risk. Please provide this discussion.

GE Response

Revision 1 of DCD Tier 2 Section 19.2.4.2 states the following:

“Because the majority of the shutdown CDF occurs during times when the containment is open, shutdown modes are not analyzed for large release frequency. Shutdown core damage events can be conservatively assumed to be large releases.”

DCD Impact

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