



GE Energy

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**Subject: Response to Portion of NRC Request for Additional Information
Letter No. 69 – Safety Analysis – RAI Numbers 15.3-14, and 15.3-16**

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

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

Lathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

Reference:

1. MFN 06-212, Supplement 2, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 69 Related to the ESBWR Design Certification Application*, October 11, 2006

Enclosures:

1. MFN 07-264– Response to Portion of NRC Request for Additional Information Letter No. 69 – Safety Analysis – RAI Numbers 15.3-14 and 15.3-16

cc: AE Cabbage USNRC (with enclosures)
GB Stramback GE/San Jose (with enclosures)
RE Brown GE/Wilmington (with enclosures)
eDRF 0064-5084

Enclosure 1

MFN 07-264

**Response to Portion of NRC Request for
Additional Information Letter No. 69
Related to ESBWR Design Certification Application**

Safety Analysis

RAI Numbers 15.3-14, 15.3-16

NRC RAI 15.3-14:

State failures considered in Sections 15.3.2/3/4.

For the events in DCD Tier 2, Rev. 1, Sections 15.3.2/3/4, the probability of failure seems to be based on the improved triplicate logic of the SB&PC system. However, operating experience shows that most of the high pressure valve failures do not originate with the electronic logic, but the mechanical functions of the valve, i.e., failure to close/open or sticking half open. Have such failures been accounted for in the calculation of the probabilities of these events for their categorization?

GE Response:

DCD Subsection 15.3.2: Feedwater Controller Failure – Maximum Demand

This event refers strictly to the failure of the Feedwater Controller. No valve failures are involved. The frequency evaluation of this event is documented in Subsection 15A.3.5 of the DCD.

DCD Subsection 15.3.3: Pressure Regulator Failure – Opening of All Turbine Control and Bypass Valves; and DCD Subsection 15.3.4: Pressure Regulator Failure – Closure of All Turbine Control and Bypass Valves.

The frequency evaluation of these events is documented in DCD Tier 2, Revision 3, Subsections 15A.3.1 and 15A.3.2. A discussion regarding the mechanical failures of the Turbine Control Valves was included in the response to RAI 15.0-25, Part A submitted via GE letter 07-221 dated May 5, 2007.

Affected Documents:

DCD, Tier 2, Revision 3, Subsections 15.3.2.1, 15.3.3.1, and 15.3.4.1 included references to the appropriate sections of Appendix 15A, regarding the frequency evaluation of the discussed events.

NRC RAI 15.3-16:

Provide basis for determination of probability of bypass failure.

DCD Tier 2, Rev. 1, Section 15.3.5, at the end of paragraph 15.3.5.1, you divide the actuarial probability for bypass failure with load rejection by 100 to calculate the failure probability. This factor is attributed to the triplicate electronic control system. In Sections 15.3.1, 15.3.3 and elsewhere, valve failure probability was based on the electronic portion of the control and ignored the mechanical aspects of valve failure. Explain the omission of the mechanical aspects and the difference that justifies your choice.

GE Response:

DCD Subsection 15.3.5: Generator Load Rejection With Total Turbine Bypass Failure.

The discussion of the event provided in DCD Tier 2, Revision 1, Subsection 15.3.5.1 was removed in Revision 3 to the DCD, and replaced with a reference to Subsection 15A.3.4. Subsection 15A.3.4 evaluates the frequency of the event, and includes the mechanical failure of the Turbine Bypass Valves in the evaluation.

DCD Subsections 15.3.1, 15.3.3 and Other Subsections:

A detailed evaluation of event frequencies is provided in Appendix 15A. A discussion of mechanical failure contributions is included in the evaluation of many events. In some cases, this contribution is insignificant. The response to RAI 15.0-25 submitted via GE letter 07-221 dated May 5, 2007 discusses the mechanical failures for Subsections 15A.3.1, 15A.3.2, 15A.3.6, 15A.3.11, 15A.3.12, and 15A.3.13 for event frequencies for Subsections 15.3.3, 15.3.4, 15.3.1, 15.3.7, 15.3.8, and 15.3.9, respectively.

Affected Documents:

DCD Tier 2, Revision 3, Subsection 15.3.5.1 replaced the last paragraph with a reference to Subsection 15A.3.4 for the event frequency evaluation. All subsections of type 15.3.x.1, with x from 1 to 16, have been revised to include appropriate references to Appendix 15A regarding the event frequency evaluations.