March 30, 2006

Mr. David H. Hinds, Manager, ESBWR
General Electric Company
P.O. Box 780, M/C L60
Wilmington, NC 28402-0780

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 15 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION

Dear Mr. Hinds:

By letter dated August 24, 2005, General Electric Company (GE) submitted an application for final design approval and standard design certification of the economic simplified boiling water reactor (ESBWR) standard plant design pursuant to 10 CFR Part 52. The Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed design.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the attachment to this letter. This RAI concerns reactor coolant system leakage and reactor water cleanup/shutdown cooling system pipe failures, missile generation, and flooding protection as discussed in Sections 5.2 and 5.4 of the ESBWR design control document. These questions were sent to you via electronic mail on February 2, 2006, and were discussed with your staff during a telecon on February 17, 2006. An additional telecon on Questions 5.4-8, 9, and 10 was held with your staff on March 9, 2006. You agreed to respond to Questions 5.2-1 through 5 by April 10, 2006, and Questions 5.4-8, 9, and 10 by April 28, 2006.

If you have any questions or comments concerning this matter, you may contact me at (301) 415-2863 or lwr@nrc.gov or you may contact Amy Cubbage at (301) 415-2875 or aec@nrc.gov.

Sincerely,

/RA/

Lawrence Rossbach, Project Manager
New Reactor Licensing Branch
Division of New Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 52-010

Attachment: As stated

cc w/att: See next page

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cc w/att: See next page
ACCESSION NO. ML060880217

OFFICE	NRBA/PM	NRBA/BC
NAME	LRossbach	LDudes
DATE	03/30/2006	03/30/2006

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Request for Additional Information
ESBWR Section 5.2.5, “Reactor Coolant Pressure Boundary (RCPB) Leakage Detection”

RAI Number	Reviewer	Summary	Full Text
5.2 -1	Chang Li	How does ESBWR meet quantitative Regulatory Guide (RG) 1.45 Positions C.2 and C.5 of 1 gpm limit, if the alarm and Technical Specification (TS) limit is specified as 5 gpm?	DCD Section 5.2.5 Item (3) indicates that the system is equipped with indicators and alarms for each leakage detection system in the control room, and permits “qualitative” interpretations of such indicators. However, DCD Section 5.2.5.8 indicates that the monitoring instrumentation is designed to detect leakage rates of 1 gpm within one hour, satisfying Regulatory Guide (RG) 1.45, Position C.5. Leakage from unidentified sources inside drywell is collected in the floor drain sump to detect leakage of 1 gpm, thus satisfying RG 1.45, Position C.2. Furthermore, DCD Section 5.2.5.8 indicates that the limit established for alarming unidentified leakage is 5 gpm, and the Technical Specification (TS) limit specified in Limiting Conditions for Operation (LCO) 3.4.2 for unidentified RCPB leakage is 5 gpm. The above DCD statements appear to be inconsistent in meeting 1 gpm guidance in RG 1.45. The following are the specific questions. (a) Why does the system permit only “qualitative” rather than “quantitative” interpretations of such control room indicators? Qualitative control room indicators are not adequate in meeting RG 1.45. (b) Explain how the proposed TS limit and the alarm limit for the unidentified leakage of 5 gpm, which is consistent with neither the design capability of 1 gpm nor Positions C.2 and C.5 of RG 1.45, is justified?

5.2 -2	Chang Li	Discuss the adverse effects that are caused by using 5 gpm limit in stead of 1 gpm.	All certified advanced reactor designs (CE System 80+, AP600, AP1000, ABWR) have the Technical Specification (TS) limit of 1 gpm or less for unidentified reactor coolant system (RCS) operational leakage to satisfy RG 1.45. Standard Technical Specifications for current operating GE BWRs have the limit of 5 gpm for unidentified RCS operational leakage. ESBWR TS LCO 3.4.2 specifies a limit of 5 gpm (the criterion used by the last generation BWR technology) for unidentified RCS operational leakage, even though it has the design capability of 1 gpm for unidentified leakage. Why would ESBWR TS LCO 3.4.2 need a more relaxed limit (5 gpm) for RCPB leakage detection than for ABWR (1 gpm)? The more relaxed limit indicates higher operating RCPB leakage rates, less RCPB leakage control, potentially more humid environment inside containment, increased probability of abnormal leakage. (a) Evaluate the adverse effects to instrument and degradation effects (such as corrosion) to components caused by the additional humidity. (b) Specifying a leakage limit of 5 gpm instead of 1 gpm would allow a plant to operate in a potentially degraded condition longer. Provide compensatory measures to correct the degraded condition in accordance with the requirements of Criterion XVI of 10CFR 50, Appendix B, as discussed in NRC Generic Letter 91-18, Revision 1.

5.2 -3	Chang Li	Revise references to incorrect regulation in the TS Bases, TS B.3.4.2.	In ESBWR TS B.3.4.2, RCS Operational Leakage, it refers to GDC 55 in the bases of the TS. GDC 55 discusses the requirements of containment isolation valves only, and has nothing to do with RCS leakage. On the other hand, DCD Section 5.2.5 indicates the design of the RCPB leakage detection systems conforms with GDC 30, but TS B.3.4.2 does not mention GDC 30. Revise TS B.3.4.2 to reflect applicable regulatory requirements.
5.2 -4	Chang Li	Clarify whether the procedures are the responsibility of COL applicants.	In DCD Section 5.2.5.8, it states that procedures are provided to the operator to convert the identified and unidentified leakage into a common leakage rate equivalent. Are the procedures to be generic for the ESBWR design and currently available for audit? Or are the plant-specific procedures to be developed by COL applicants, which should be a COL action item?
5.2 -5	Chang Li	Which are the leak detection instruments meeting RG 1.29, Positions C-1 and C-2 regarding seismic capability? Which are not?	In DCD Section 5.2.5.8, it states that the leak detection system required to perform isolation function are classified as Class 1E, Seismic Category I. The airborne particulate radioactivity monitor is designed to operate during an SSE event. All the leak detection instrumentation and monitoring for RCPB are discussed in DCD Section 5.2.5.2; identify those leak detection instrumentation that are required to perform isolation function versus that are not required for isolation. Among these leak detection instrumentation that are not required for isolation function, their capability to maintain and perform their safety functions following an earthquake is not clear. Discuss their capability to maintain and perform their safety functions following an earthquake in meeting the guidelines of RG 1.29, Positions C-1 and C-2.

Request for Additional Information
ESBWR Section 5.4.8 Reactor Water Cleanup System/Shutdown Cooling System (RWCU/SDC)

RAI Number	Reviewer	Summary	Full Text
5.4 -8	Chang Li	Discus the effects of RWCU/SDC pipe failures outside containment.	Describe how the effects of high and moderate energy piping failures outside the primary containment were evaluated in the RWCU/SDC design to ensure that the other safety-related systems and equipment will not be made inoperable.
5.4 -9	Chang Li	Discuss the effects of missiles resulting from RWCU/SDC system.	Demonstrate the capability of safety-related systems to withstand the effects of internally-generated missiles resulting from RWCU/SDC system, both inside and outside the primary containment.
5.4 -10	Chang Li	Demonstrate the flooding effects associated with RWCU/SDC SSC.	Demonstrate the capability of structures housing the RWCU/SDC including safety-related components and instrument inside these structures to withstand external and internal flood conditions.

cc:

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