April 25, 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. 22 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 enclosure to this letter. Question 3.5-15 concerns concrete code requirements that are discussed in Section 3.5 of the ESBWR design control document. Questions 5.4-11 through 18 concern component and subsystem design as discussed in Section 5.4 of the ESBWR design control document. Question 3.5-15 was sent to you via electronic mail on April 6, 2006. You did not request a telecon on this question. Questions 5.4-11 through 18 were sent to you via electronic mail on March 21, 2006, and were discussed with your staff during a telecon on April 17, 2006. You agreed to respond to question 3.5-15 by May 1, 2006, and to questions 5.4-11 through 18 by May 17, 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
ESBWR/ABWR Projects Branch
Division of New Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 52-010

Enclosure: As stated

cc: See next page

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cc: See next page
ACCESSION NO. ML061150302

OFFICE	NRBA/PM	NRBA/BC
NAME	LRossbach	LDudes
DATE	04/25/2006	04/25/2006

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REQUEST FOR ADDITIONAL INFORMATION (RAI) RELATED TO
ESBWR DESIGN CONTROL DOCUMENT (DCD), SECTION 3.5.3, BARRIER DESIGN PROCEDURES

RAI Number	Reviewer	Question Summary	Full Text
3.5-15	Jeng D Cruz Perez Z	Confirm that all applicable provisions of Regulatory Guide (RG) 1.142, including the permissible ductility ratio, are complied with in the ESBWR Design. Otherwise, discuss the bases for exceptions taken with respect to RG 1.142.	DCD Tier2, Section 3.5.3.1.1, states that ACI-349, Appendix C, Section C.7, "Code Requirements for Nuclear Safety Related Concrete Structures," was used to prevent perforation in the event of missile impact. RG 1.142 provides guidance to licensees and applicants on methods acceptable to the NRC staff for complying with the NRC's regulations in the design, evaluation, and quality assurance of safety-related nuclear concrete structures, excluding concrete reactor vessel and concrete containments. This regulatory guide contains some exceptions to ACI-349 to reflect the existing review practices of the NRC staff. For example, part C.3.7.a of ACI-349 states that a ductility ratio of 1.3 is acceptable for shear carried by concrete alone. In contrast, RG 1.142 part C 10.4.1 states that a ductility ratio of 1.0 is acceptable for the same case. Confirm that all applicable provisions of RG 1.142, including the permissible ductility ratio, are complied with in the ESBWR Design. Otherwise, discuss the bases for exceptions taken with respect to RG 1.142.

REQUESTS FOR ADDITIONAL INFORMATION (RAIs)
ESBWR DESIGN CONTROL DOCUMENT (DCD) SECTIONS 5.4.7, 5.4.8.2, 5.4.12
RESIDUAL HEAT REMOVAL, REACTOR WATER CLEANUP AND SHUTDOWN COOLING SYSTEM

RAI Number	Reviewer	Question Summary	Full Text
5.4-11	Thomas G	General Design Criteria (GDC) Applicability	In DCD Tier 2, Section 5.4.7, add GDC 1 and 3 as being applicable to systems that deal with accomplishing the residual heat removal (RHR) function.
5.4-12	Thomas G	Definition of Safe Shutdown	Because of the functional limitations of the passive plant designs, the Commission, in a staff requirements memorandum (SRM) issued June 30, 1994, approved the position in SECY-94-084, "Policy and Technical Issues Associated with the Regulatory Treatment of Non-safety systems in Passive Plant Designs." This position accepts 420 EF or lower, rather than the cold shutdown specified in Regulatory Guide (RG) 1.139, as the safe stable condition that the passive systems must be capable of achieving and maintaining following non-loss of coolant accident (LOCA) events. DCD Tier 2, Section 5.4.7 does not address this issue. Explain in detail how the ESBWR design complies with the Commission position on safe shutdown.
5.4-13	Thomas G	RPV interface with RWCU/SDC system	In the RWCU/SDC Piping and Instrumentation Diagram (P& I.D) 105E3981, Sheet No.2, the inlet to the system from the RPV is shown as coming from the bottom of the bottom head of the RPV. In DCD Tier 1, Figure 2.6.1-1, the connections are shown as coming from the side near the bottom of the RPV. Which is correct?

RAI Number	Reviewer	Question Summary	Full Text
5.4-14	Thomas G	Thermal Stratification in the RPV bottom head	One function of the RWCU system is to prevent thermal stratification in the reactor vessel lower head. If the system stops functioning, and "overboarding" cannot be done, a stratified layer of cold water may begin to build up in the vessel lower head. This condition could have the effect of lowering the overall driving head for natural circulation in the vessel. (a) How will stratification affect normal natural circulation flow in the reactor vessel? (b) What impact would the stratification have on the operation of the safety systems, including the gravity-driven cooling system (GDCS) and Isolation Condensers, in the event of a transient or an accident?
5.4-15	Thomas G	Vent Acceptance Criteria	Add 10 CFR 50.34(f)(2)(vi) related to TMI action plan item II.B.1 to DCD Tier 2, Section 5.4.12. Provide a discussion regarding how this requirement will be met.
5.4-16	Thomas G	Vent Acceptance Criteria	Add 10 CFR 50.49 as it relates to environmental qualification of electrical equipment necessary to operate the reactor coolant vent to DCD Tier 2, Section 5.4.12. Provide discussion as to how these requirements will be met.
5.4-17	Thomas G	Applicable GDC	Add GDC 17 ,19 and 36 to DCD Tier 2, Section 5.4.12. Provide discussion as to how these criteria will be met.

RAI Number	Reviewer	Question Summary	Full Text
5.4-18	Thomas G	Standard Review Plan (SRP) Vessel Vent Items	The following features specified by in standard review plan (SRP) Section 5.4.12, Revision 0, July 1981, are not addressed in DCD Tier 2, Section 5.4.12. Please address these criteria and identify any deviations: (a) The SRP states that "[T]he vent system shall be designed with sufficient redundancy to assure a low probability of inadvertent or irreversible actuation." The SRP also states: "A single failure of a vent valve, power supply, or control system shall not prevent isolation of the vent path." In the ESBWR design, there is only one RPV vent line. Justify why redundancy is not required for the ESBWR. Describe how the vent system satisfies the single failure criterion. Describe the failure modes of the valve train. (b) Specify the location, size, discharge capacity, functions, and discharge areas of the vent system. ©) Perform supporting LOCA analyses for breaks in the vent line (Refer to DCD Tier2 Section 6.3) to demonstrate compliance with 10 CFR 50.46. (d) Describe the procedure(s) for using (or not using) the vent system, and the bases for these procedures. (This may be a combined operating license (COL) action item). (e) Describe the information available to the operator (i.e. instrument indications) related to vent system operation, the procedures for initiating and terminating vent system operation, and the bases for these procedures.

cc:

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