

January 27, 2009

Mr. Robert E. Brown
Senior Vice President, Regulatory Affairs
GE Hitachi Nuclear Energy
3901 Castle Hayne Road MC A-50
Wilmington, NC 28401

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 299 RELATED TO
ESBWR DESIGN CERTIFICATION APPLICATION

Dear Mr. Brown:

By letter dated August 24, 2005, GE Hitachi Nuclear Energy (GEH) 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 U.S. 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.

If you have any questions or comments concerning this matter, you may contact me at 301-415-3025 or Chandu.Patel@nrc.gov or you may contact Amy Cubbage at 301-415-2875 or Amy.Cubbage@nrc.gov.

Sincerely,

/RA/

Chandu Patel, Senior Project Manager
ESBWR/ABWR Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket No. 52-010

Enclosure:
Request for Additional Information

cc: See next page

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Distribution: See next page
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SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 299 RELATED TO
ESBWR DESIGN CERTIFICATION APPLICATION DATED JANUARY 27, 2009

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**Requests for Additional Information (RAIs)
ESBWR Design Control Document (DCD), Revision 5**

RAI Number	Reviewer	Question Summary	Full Text
RAI 3.8-107 S03	Chakrabarti S	Verify the validity of the equations used in the SSDP computer code for design of reinforced concrete members.	<p>As a result of the staff's review of the GEH response transmitted in GEH letter MFN 08-432, Supplement 2, dated September 30, 2008, GEH is requested to address the following two remaining items:</p> <p>Part (b)(3):</p> <p>The information provided in the RAI response does not demonstrate that the approach in AIJ Article 15 (provided as Attachment 3.8-107(3) to the RAI response) is the same as the analytical approach in Section 4.2 of the Shimizu SSDP validation report (Enclosure 2 to GEH letter MFN 06-416 dated 11/6/06). While the equations for most of the concrete section properties (e.g., A_e, g, I_g) match, the equations for solving the compressive stress in the concrete, and rebar stresses in tension and compression could not be matched. Furthermore, the equations in the additional Reference 3 (Reinforced Concrete Analysis and Design textbook excerpt provided as Attachment 3.8-107(4)) also do not match the equations in the AIJ Article 15. Therefore, GEH is requested to verify the equations used in the SSDP computer code by comparing the quantitative results for the sample problems performed in Sections 4.2.1 through 4.2.3 of the validation report with the use of the equations presented in the Reference 2 concrete textbook or other conventional concrete textbook. This approach would validate the use of the SSDP computer code for design of reinforced concrete members for the ESBWR.</p> <p>Part (c):</p> <p>The study performed demonstrates that the use of uncracked properties for mechanical loads is acceptable for determining the concrete stresses; however, the approach did not adequately demonstrate the approach for stresses in the rebars. This was evident by the fact that so many rebar stress ratios for Case 1/Case 2, in RAI Table 3.8-107(18), were less than 1.0 and in some cases substantially less than 1.0. The RAI response indicates that these locations are "typically" at locations of "relatively" low stress that are "not controlling." This statement alone is not considered sufficient to address the numerous tabulated</p>

RAI Number	Reviewer	Question Summary	Full Text
			<p>ratios less than 1.0. Therefore, unless the effects of concrete cracking is considered in the mechanical load analyses, GEH is requested to confirm that in the regions where the rebar stress ratios are less than 1.0, these rebar stresses indeed do not control the design. This could be achieved by confirming that at locations where the stress ratios are less than 1.0 one or more of the following occurs: (1) the section design at the location is based on other sections adjacent to or at a different azimuth where the ratios are equal to or greater than 1.0, (2) the rebar stresses are sufficiently small to compensate for the ratio being less than 1.0, and/or (3) there is sufficient margin between the rebar stress/section design and code limits to accommodate the lower stress ratios.</p>

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(Revised 01/06/2009)

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