March 28, 2008

Mr. Robert E. Brown
Senior Vice President, Regulatory Affairs
GE-Hitachi Nuclear Energy Americas, LLC
3901 Castle Hayne Road MC A-45
Wilmington, NC 28401

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 173 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION

Dear Mr. Brown:

By letter dated August 24, 2005, GE-Hitachi Nuclear Energy Americas, LLC (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 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 301-415-3179 or ixb3@nrc.gov or you may contact Amy Cubbage at (301) 415-2875 or aec@nrc.gov.

Sincerely,

/RA/

Ilka Berrios, 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 w/encl: See next page

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Dear Mr. Brown:

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SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 173 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION DATED MARCH 28, 2008

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Request for Additional Information (RAI)
ESBWR Design Control Document (DCD), Revision 4

RAI Number	Reviewer	Question Summary	Full Text
12.2-9 S04	Dehmel J	An evaluation of responses to NRC RAI 12.2-9S02 and S03, contained in MFN 08-019 and MFN 08-222, indicates that offsite dose calculation results need to be revised given the updated gaseous effluent source terms presented in MFN 08-222.	An evaluation of responses to NRC RAI 12.2-9S02 and S03, contained in MFN 08-019 and MFN 08-222, indicates that offsite dose calculation results need to be revised given the updated gaseous effluent source terms presented in MFN 08-222. Specifically: 1. Item n. to RAI 12.2-9S02 is <u>not</u> closed, pending GEH's response to update dose calculation results and supporting data presented in DCD Tables 12.2-18a and 12.2-18b. During the NRC/GEH telecon of March 26, 2008, GEH committed to revise the dose calculations confirming compliance with App. I to Part 50, given that the gaseous effluent source terms were revised in light of updated information presented in GEH responses to NRC RAI 12.2-9S02 and 12.2-9S03. 2. The closure of RAI 12.2-9S02 (item n) is also tied to RAI 12.2-25 addressing the inclusion of a qualifier about the basis of long-term atmospheric dispersion and deposition parameters. The parameters are used to calculate doses for Part 50, App. I compliance. Based on a prior NRC/GEH telecon about met data and how this info would be presented in DCD Chapters 2.3.5 and 12.2.2, GEH staff had suggested a statement to the effect that the atmospheric dispersion and deposition parameters noted in Table 12.2-15 reflect typical conditions at existing sites with operating BWR plants. Accordingly, update DCD Tier 2, Tables 12.2-15, 12.2-18a, and 12.2-18b with revised dose calculations and appropriate qualifiers for met data used in calculating doses for Part 50, Appendix I dose objective compliance.
9.1-33 S01	Hernandez J	Include a reference to RG. 1.29 to meet GDC 2	The staff finds acceptable that the dynamic analyses are performed during equipment selection and procurement. However, there is currently no reference to RG 1.29 in Tier 1 nor Tier 2 sections related to the fuel handling components. Revise the DCD to include a reference to RG. 1.29 for meeting GDC 2 as related to fuel handling components. In addition, please confirm that ITAACs 5 and 6 described in DCD Tier 1, Rev. 4, Table 2.16.1-1 will demonstrate conformance to RG 1.29.

RAI Number	Reviewer	Question Summary	Full Text
9.2-11 S04	Li C	Include reference to ANSI/ANS standard for development of procedures related to water hammer in TRNSS systems	The proposed revision of DCD Tier 2 Section 13.5.2 is not acceptable because it refers the procedures for RTNSS to a procedure development and implementation plan (NEDO-33274), which does not have procedure contents dealing with water hammer. Please clarify this revision by referring directly to the second bullet (ANSI/ANS -3.2) of the next paragraph by expanding the applicability of the industry standard to the RTNSS systems of PSWS, RCCWS, and CWS because ANSI/ANS 3.2 includes procedures explicitly dealing with water hammer. The following would be acceptable to the staff to address this issue. 1. Delete the second sentence from the following paragraph: The development of Operating and Maintenance Procedures is the responsibility of the COL Applicant (COL 13.5-2-A). Development of Operating and Maintenance Procedures for RTNSS systems, as described in Subsection 19A, are included within the scope of ESBWR HFE Procedure Development and Implementation Plan, NEDO-33274 (Reference 13.5-8). 2. Revise the following bullet adding the second sentence: Requirements that the procedures developed shall include, as necessary, the elements described in American National Standards Institute (ANSI)/American Nuclear Society (ANS)-3.2-1994: R1999, (Reference 13.5-2), as endorsed by Regulatory Guide 1.33 Rev. 2 (Reference 13.5-5). Elements of ANSI/ANS-3.2-1994: R1999 addressing water hammer shall be applied in the development of procedures for RTNSS systems.
9.4-33 S01	Forrest E	CR Passive Heat Sink	Although the response to 9.4-33 provides a general overview of the CRHA passive cooling evaluation, it fails to provide sufficient information needed to evaluate the passive cooling features for acceptability. The DCD should include at least in summary form the important assumptions and parameters used to evaluate the passive cooling capability. Listed below are specific concerns of the staff that are needed to support a finding in the SER and support further discussions with the ACRS committee. Please respond to the following: A. Please submit or make available for audit a copy of the CONTAIN 2.0 analysis that was used to evaluate the CRHA temperature. Please submit or make

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			available a copy of any other analysis that was used to evaluate other conditions such as winter conditions or limiting relative humidity conditions. The basic assumptions for the analysis should be documented in the DCD in a table showing the conditions on which the analysis depends and the analysis conclusions. The results of the analyses should also be documented in the DCD. B. The analysis uses 117 def F dry bulb temperature. What relative humidity was considered? How does this compare to summer design temperatures documented in the weather conditions section of ASHRAE fundamentals for a representative plant location (i.e. Grand Gulf)? Were winter design conditions also evaluated and what was the effect on results? Please document in the DCD. C. What is the source of the daily temperature cycle used in the analysis? Please include the temperature cycle in the DCD table. D. Please provide dimensions and volume of concrete walls and ceilings used as heat sink in the analysis. Please create an ITAAC in Tier 1 that would confirm the dimensions post construction. Please identify rooms, offices and storage closets which would hamper air from reaching concrete walls where it could be cooled by the heat sink concrete. Discuss the impact of these internal room partitions on the overall heat sink performance. E. Please provide the details of the concrete floor and its means of thermal isolation from the CRHA. Heat transfer from the SR DCIS below should still be considered even though the amount of heat transfer may be minimal. The heat potentially affects the temperature of the air on the external surfaces of the CRHA concrete during isolation and could impede passive cooling. F. Please determine both the initial and external wall and ceiling temperatures for heat sink structures. Please include these temperatures in the DCD initial conditions table. The outside wall and ceiling temperatures are subject to rapid increase once the CRGAHVS has been isolated. How is this increase in temperature included in the analysis? Please describe the surveillance program and frequency that will confirm the plant is operating in conditions consistent with

RAI Number	Reviewer	Question Summary	Full Text
			the analysis. Please include the surveillance in the Tech Spec portion of the DCD. G. The analysis assumes that there is no heat difference in the CRHA. The 424 cfm EFU may not have the capacity to uniformly distribute the heating loads, particularly to areas such as offices on the heat sink walls. Because the 424 cfm EFU flow enters through the ceiling plenum, significant stratification of temperature can occur. Please consider the impact of a non uniform heating load peaking in the area of operator actions and the electrical equipment panels on CR temperature. Specifically consider the fact that the outside air at summer design conditions would be blowing into the supply plenum and potentially directly down upon operators with out distribution or dispersion or cooling by the heat sink. Although the bulk well mixed temperature might be less than 93 degrees, the temperature that an operator feels could be much higher and could also impact equipment operation. H. Please list the coefficients of heat transfer for barriers such as carpet, vinyl layers, et al in the DCD table of initial conditions. Please discuss how the analysis addresses condensate on walls from high relative humidity. What administrative program will be established to assure changes that might be made are consistent with the assumptions in the analysis? Discuss the requirements for an administrative program in the DCD. I. Please address temperatures inside electrical cabinets as temperature in the CRHA increases to assure that electrical component design limits are not exceeded. Please consider the fact that equipment in the direct path of the EFU supply air may see temperatures higher than the calculated bulk air temperature. J. Please list in the DCD initial conditions and assumptions table all the heat loads that were considered in the analysis including EFU fan, electrical cabinets, 21 people, lighting, EFU air supply heat load, et. al.

cc:

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