

September 16, 2008

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 252 RELATED TO  
ESBWR DESIGN CERTIFICATION APPLICATION

Dear Mr. Brown:

By letter dated August 24, 2005, GE Hitachi Nuclear Energy 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 301-415-2375 or [leslie.perkins@nrc.gov](mailto:leslie.perkins@nrc.gov), or you may contact Eric Oesterle at 301-415-1365 or [eric.oesterle@nrc.gov](mailto:eric.oesterle@nrc.gov).

Sincerely,

*/RA/*

Leslie Perkins, 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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Dear Mr. Brown:

By letter dated August 24, 2005, GE Hitachi Nuclear Energy 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 301-415-2375 or [leslie.perkins@nrc.gov](mailto:leslie.perkins@nrc.gov), or you may contact Eric Oesterle at 301-415-1365 or [eric.oesterle@nrc.gov](mailto:eric.oesterle@nrc.gov).

Sincerely,

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Leslie Perkins, 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  
Distribution: See next page

**ADAMS ACCESSION NO.** ML082550605

NRO-002

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SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO.252 RELATED TO  
ESBWR DESIGN CERTIFICATION APPLICATION DATED  
SEPTEMBER 16, 2008.

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

RAI Number	Reviewer	Question Summary	Full Text
14.3-421	Bongarra J	Explain relationship of minimum inventory paragraph on Page 3.3-1 to context of the information preceding and following the paragraph.	Please explain why, on Page 3.3-1, of Tier 1 of DCD Rev. 5, Sections discussing “applicable facilities, HSIs, procedures, training,” etc., were removed from the Design Description. Please also explain why the paragraph for minimum inventory was inserted as it was; is it meant to be a “Program Goal?” Is it an “HFE design goal?” The paragraph appears simply to have been inserted with an ambiguous relationship to the previous and subsequent material on Page 3.3-1 and 3.3-2.
14.3-422	Bongarra J	Explain relationship of item listing on Page 3.3-2 to context of the information preceding and following the list.	Page 3.3-2, of Tier 1 of DCD Rev. 5, lists 11 items, beginning with “operating experience review” and ending with (on Page 3.3-3), “the strategy for the Human Performance Monitoring process...” Please explain how this list relates to the previous and subsequent paragraphs.
14.3-423	Bongarra J	Clarify meaning of details of the HFE design will not be completed by design certification.	Page 3.3-3 of Tier 1 of the DCD Rev. 5: please clarify the meaning of, “... details of the HFE design will not be completed before the NRC issuance of a design certification.” Specifically, what is meant by “details of the HFE design?” Are the details those items identified in the acceptance criteria column of Table 3.3-1, e.g., “The scope of the OER” is a “detail” that will not be completed before design certification?
14-3-424	Pal A	ITAAC to address cables for onsite ac power, dc power, diesel generator power and uninterruptible ac power	SRP Section 14.3 Appendix C provides electrical systems review checklist which includes cable ampacity. The staff requests that GEH consider adding the following design commitments and ITAAC to address cables for (a) onsite ac power, (b) dc power, (c) diesel generator power and (d) uninterruptible ac power:  Design Commitment - electrical distribution system cables are rated to withstand fault current for the time required to clear the fault from its

RAI Number	Reviewer	Question Summary	Full Text
			<p>power source.</p> <p>Inspection, Tests, Analysis - Analyses for the as-built electrical distribution system to determine fault currents will be performed.</p> <p>Acceptance Criteria - Analyses for the as-built electrical distribution system exist and conclude that electrical distribution system cables will withstand the analyzed fault currents, as determined by manufacturer's ratings for the time required to clear the fault from its power source as determined by the circuit interrupting device coordination analyses.</p>
14.3-425	Pal A	ITAAC to address protective device for onsite ac power, dc power, diesel generator power and uninterruptible ac power	<p>SRP Section 14.3 Appendix C provides electrical systems review checklist which includes equipment protective device. The staff requests that GEH consider adding the following design commitments and ITAAC to address protective device for (a) onsite ac power, (b) dc power, (c) diesel generator power and (d) uninterruptible ac power:</p> <p>Design Commitment - electrical distribution system protective devices are rated to withstand fault current and sized to supply load current.</p> <p>Inspection, Tests, Analysis - Analyses for the as-built electrical distribution system to determine fault currents and the capacities of the protective device will be performed.</p> <p>Acceptance Criteria - Analyses for the as-built electrical distribution system exist and conclude that the analyzed fault currents do not exceed the interrupting capacity of protective device as determined by nameplate rating and the capacity of protective device exceed the analyzed load requirement.</p>
14.3-426	Pal A	Grounding and Lightning Protection System	Add design description for grounding and lightning protection system.

RAI Number	Reviewer	Question Summary	Full Text
14.3-427	Pal A	ITAAC to address grounding and lightning protection system	<p>SRP Section 14.3 Appendix C provides electrical systems review checklist which includes grounding and lightning protection systems. Add design commitments and ITAAC to address grounding and lightning protection system. The staff request that GEH consider adding the following:</p> <p>Design Commitment - The grounding and lightning protection system provides electrical grounding system for:</p> <ol style="list-style-type: none"> <li>(1) instrument/computer grounding;</li> <li>(2) electrical system grounding of neutral points of the main generator, main step-up transformers, auxiliary transformers, load center transformers, onsite standby and ancillary diesel generators; and</li> <li>(3) equipment grounding of equipment enclosures, metal structures, metallic tanks, ground bus of switchgear assemblies, load centers, motor control centers, and control cabinets. Lightning protection is provided for exposed structures and building housing safety-related and fire protection equipment. Each grounding system and lightning protection system is grounded to the station ground grid.</li> </ol> <p>Inspection, Tests, Analyses-</p> <ol style="list-style-type: none"> <li>i) An inspection for the instrument/computer grounding system connection to the station grounding grid will be performed.</li> <li>ii) An inspection for the electrical system grounding connection to the station ground grid will be performed.</li> <li>iii) An inspection for the equipment grounding system</li> </ol>

RAI Number	Reviewer	Question Summary	Full Text
			<p>connection to the station grounding grid will be performed.</p> <p>iv) An inspection for the lightning protection system connection to the station grounding grid will be performed.</p> <p>Acceptance Criteria -</p> <p>i) A connection exists between the instrument/computer grounding system and station grounding grid</p> <p>ii) A connection exists between the electrical system grounding and the station grounding grid.</p> <p>iii) A connection exists between the equipment grounding system and the station ground grid.</p> <p>iv) A connection exists between the lightning protection system and the station ground grid.</p>
14.3-428	Pal A	ITAAC to address transfer device.	SRP Section 14.3 appendix C provides electrical systems review checklist which includes Class 1E vital ac inverters, regulating transformers and transfer devices. Add an ITAAC to address transfer device in Section 2.13.5.
14.3-429	Pal A	ITAAC to address cable tray loading	SRP Section 14.3 appendix C provides electrical systems review checklist which includes cable tray loading. Add an ITAAC to address cable tray loading.
14.3-430	Taneja D	Add VBIF to Tier 1 Section 2.2	In Rev. 5, a number of ITAAC for DW to WW vacuum breaker isolation valve function (VBIF) were identified in Tier 1 Section 2.15. However no discussion/ITAAC is provided in Tier 1 Section 2.2 on the instrumentation and control systems associated with VBIF. A section similar to 2.2.14, DICS should also be added addressing VBIF.

RAI Number	Reviewer	Question Summary	Full Text
14.3-431	Pal A	ITAAC to address utilization voltage adequacy	<p>SRP Section 14.3 appendix C provides electrical systems review checklist which includes utilization voltage adequacy. The staff requests that GEH consider adding the following in Table 2.13.5-2 design commitment and ITAAC to address utilization voltage adequacy.:</p> <p>Design commitment - Safety-related UPS system supplies an operating voltage at the terminals of the safety-related utilization equipment that is within the utilization equipment's voltage tolerance limits.</p> <p>Inspection, test, analyses – (a) Analyses for the as built safety-related UPS system to determine voltage drops will be performed. (b) Tests of the as-built safety-related UPS system will be conducted by operating connected Safety-related loads at their analyzed minimum voltage.</p> <p>Acceptance Criteria - (a) Analyses for the as-built safety-related UPS system exist and conclude that the analyzed operating voltage supplied at the terminals of the safety-related utilization equipment is within the utilization equipment's voltage tolerance limits, as determined by their nameplate ratings. (b) Connected safety-related loads at their analyzed minimum voltage, as determined by the voltage drop analyses.</p>



RAI Number	Reviewer	Question Summary	Full Text
14.3-432	Beacom R	Per RG 1.206, Section C.II, ITAAC and "acceptance criteria should be objective and unambiguous in order to prevent misinterpretation." Provide all necessary definitions in the DCD Tier 1 which are used in ITAAC.	Provide definitions of the following terms used throughout Tier 1: a) Initiators b) Interfacing System c) Implementing System
14.3-433	Beacom R	Repetitive functional arrangement entry for DICS	In Table 2.2.14-1 the DPS scram initiation logic is "energize-to-actuate" applied at the power return side of the control circuit going to the scram pilot valve solenoids." and; "DPS logic is "energize-to-actuate". These functional arrangements should be reduced to one or explain the need for both.
14.3-262 S01	Beacom R	NUREG/CR 6303 should be included in the Acceptance Criteria	The staff determined that GEH response to RAI 14.3-262 in MFN 08-086, Supplement 13 was acceptable. However, the staff request that GEH include reference to NUREG/CR 6303 in the acceptance criteria for Item 9 in Table 2.2.14-4 so that the acceptance criteria is consistent with the design commitment and ITA.
14.3-434	Beacom R	Request to make Tier 1 changes in footnote of Table 2.2.14-2, would require rule making change	Table 2.2.14-2 and Table 2.2.14-3 have the following footnote "Function, initiator or Interface change allowed if justified by confirmatory analysis and or protection systems FMEA in support of DPS scope validation (see Table 2.2.14-4, Items 8 and 9)" was added for Revisions 5. Note that departures from Tier 1 information must be approved by the Commission governed by the requirements in 10 CFR 52.63(a)(1). Please explain intent of this footnote and provide additional discussion as necessary in DCD Tier 2 to discuss acceptable design options. The staff recommends that GEH consider moving these tables into Tier 2 and add DAC/ ITAAC to Tier 1 to finalize this same information.

RAI Number	Reviewer	Question Summary	Full Text
14.3-435	Beacom R	Verification of bypasses should be included in Design Commitment # 3	Design Commitment No. 3 states that "DICS interlocks and controls are described in Table 2.2.14-3." Table 2.2.14-3 also lists bypasses. The staff requests that GEH include bypasses in this design commitment.

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(Revised 09/16/2008)

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