

January 30, 2007

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. 89 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. This RAI concerns Tier 1, Revision 2, Section 2.13, Electrical Systems, of the ESBWR Design Control Document.

Chapter 14: 14.3-103 through 14.3-129

To support the review schedule, you are requested to respond to these RAI questions by March 15, 2007.

If you have questions or comments concerning these RAIs please contact me at (301) 415-2875 or [aec@nrc.gov](mailto:aec@nrc.gov).

Sincerely,

*/RA/*

Amy E. Cabbage, Senior Project Manager  
ESBWR/ABWR Projects Branch 1  
Division of New Reactor Licensing  
Office of New Reactors

Docket No. 52-010

Enclosure: As stated

cc w/encl: See next page

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cc w/encl: See next page  
ACCESSION NO. ML070090432

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Distribution for DCD RAI Letter No. 89 dated January 30, 2007

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**Request for Additional Information (RAIs)**  
**ESBWR Design Control Document (DCD), Tier 1, Revision 2, Section 2.13, Electrical Systems**

<b>RAI Number</b>	<b>Reviewer</b>	<b>Question Summary</b>	<b>Full Text</b>
14.3-103	Morris G	Describe the Design Commitment and ITAAC for Racks.	In DCD Tier 1, Rev 2, Table 2.7.3-1 "ITAAC for Local Control Panels," the Design Commitment and the Inspections, Tests, Analyses columns only mentions LCP (Local Control Panels) and does not address Racks. Describe the Design Commitment and inspections, tests, analyses and acceptance criteria (ITAAC) for Racks.
14.3-104	Morris G	Provide additional acceptance criteria for the Local Control Panels.	In DCD Tier 1, Rev 2, Table 2.7.3-1 "ITAAC for Local Control Panels," the Acceptance Criteria 2b should be supplemented with the following additional acceptance criteria:  Local Control Panels should be restricted to only one Division.
14.3-105	Morris G	Provide additional acceptance criteria for transformer parameters.	In DCD Tier 1, Rev 2, Table 2.13.1-1 "ITAAC for the Electrical Power Distribution System (EPDS)," the Acceptance Criteria row numbers 2 & 3 should be supplemented with the following additional acceptance criteria:  As-built and tested Transformer parameters agree with those used in the EPDS analyses.
14.3-106	Morris G	Provide additional acceptance criteria for transformer nameplate data.	In DCD Tier 1, Rev 2, Table 2.13.1-1 "ITAAC for the Electrical Power Distribution System (EPDS)," the Acceptance Criteria row numbers 2 & 3 should be supplemented with the following additional acceptance criteria:  As-built and tested Transformer nameplate data agrees with the as-tested data.
14.3-107	Morris G	Provide justification for the	In DCD Tier 1, Rev 2, Section 2.13.2, the design description states

<b>RAI Number</b>	<b>Reviewer</b>	<b>Question Summary</b>	<b>Full Text</b>
		electrical wiring penetrations design description.	that the control circuits, control power circuits, and instrumentation circuits passing through electrical penetrations minimize the need to protect the penetration from the effects of fault or overload currents. Provide justification for the electrical wiring penetrations design description.
14.3-108	Morris G	Clearly state that all Electrical Penetration Assemblies are class IE components.	In DCD Tier 1, Rev 2, Section 2.13.2, the design description states that all class IE components are environmentally and seismically qualified to ensure the execution of their safety functions. Clearly state that all Electrical Penetration Assemblies are class IE components.
14.3-109	Morris G	Add the current carrying capability and ampacity derating requirement.	In DCD Tier 1, Rev 2, Table 2.13.2-1 "ITAAC for Electrical Wiring Penetrations," and Table 2.16.3.1-1 "ITAAC for Fire Barriers," add that the current carrying capability and ampacity derating of the containment penetration assemblies and the wall and floor penetrations can be supported by manufacturer, test, and published data.
14.3-110	Morris G	Add Battery Capacity Acceptance/Performance Test	In DCD Tier 1, Rev 2, Table 2.13.3-1, add the following direct current power supply requirement:  Battery Capacity Acceptance/Performance Test - Carry rated load for 72 hours without dropping below the minimum rated voltage. (e.g. 105 v for 60 cells.)
14.3-111	Morris G	Add Battery Charger Capacity Tests	In DCD Tier 1, Rev 2, Table 2.13.3-1, Add the following direct current power supply requirement:  Battery Charger Capacity Tests - Carry rated capacity for [24] hours.

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14.3-112	Morris G	Add requirement for charging current	<p>In DCD Tier 1, Rev 2, Table 2.13.3-1, add the following direct current power supply requirement:</p> <p>Charging current when battery charger is fully charged is equal to or less than [2] amps.</p>
14.3-113	Morris G	Provide the Direct Current Power Supply supplemental information.	<p>In DCD Tier 1, Rev 2, Table 2.13.3-1, Acceptance Criteria 3b should be supplemented with the following:</p> <p>The capacity of each as-built Class IE battery equals or exceeds the analyzed battery design service test.</p>
14.3-114	Morris G	Provide the Direct Current Power Supply supplemental information.	<p>In DCD Tier 1, Rev 2, Table 2.13.3-1, Acceptance Criteria 4 should be supplemented with the following:</p> <p>Each as-built Class IE normal battery charger can supply its respective Class IE division's normal steady state loads while charging its respective Class 1E battery within 24 hours.</p>
14.3-115	Morris G	Supplement Table 2.13.3-1, Acceptance Criteria 5a.	<p>In DCD Tier 1, Rev 2, Table 2.13.3-1, Acceptance Criteria 5a should be supplemented with the following:</p> <p>Analyses for the as-built Class IE DC electrical distribution system exist and conclude that the capacities of Class IE battery and battery charger circuit breakers, DC distribution panels, their circuit breakers and fuses exceed their analyzed load and DC interrupting current requirements as determined by their DC nameplate ratings.</p>

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14.3-116	Morris G	Revise Table 2.13.3-1, Acceptance Criteria 5b.	<p>Regarding DCD Tier 1, Rev 2, Table 2.13.3-1, Acceptance Criteria 5b, testing half way between minimum and maximum satisfies the acceptance criteria as presently written but does not test circuit breakers at the minimum or the maximum load current. Acceptance Criteria 5b should be supplemented with the following:</p> <p>Connected as-built Class IE loads operate throughout the entire range of allowable battery voltage.</p>
14.3-117	Morris G	Supplement Table 2.13.3-1, Acceptance Criteria Section 6	<p>In DCD Tier 1, Rev 2, Table 2.13.3-1, Acceptance Criteria 6 should be supplemented with the following:</p> <p>6c. All circuit breakers are tested to confirm that they operate within the tolerance of their time-current characteristic curve in the overload and short circuit regions.</p>
14.3-118	Morris G	Supplement Table 2.13.3-1, Design Commitment Section 7	<p>In DCD Tier 1, Rev 2, Table 2.13.3-1, Design Commitment 7 should be supplemented with the following:</p> <p>Each Class 1E battery is located in a Seismic Category I structure and in its respective vented divisional battery room.</p>
14.3-119	Morris G	Revise Table 2.13.3-1, Acceptance Criteria Section 7	<p>In DCD Tier 1, Rev 2, Table 2.13.3-1, Acceptance Criteria 7 should be revised as follows:</p> <p>Verify that each as-built Class IE battery is located in a Seismic Category I structure and in its respective <i>vented</i> divisional battery room.</p>

<b>RAI Number</b>	<b>Reviewer</b>	<b>Question Summary</b>	<b>Full Text</b>
14.3-120	Morris G	Clarify Table 2.13.3-1, Acceptance Criteria 11.	In DCD Tier 1, Rev 2, Table 2.13.3-1, Acceptance Criteria 11, the vague description in 2.13.3 does not clearly identify if there are 8 alarms or one common alarm. No description of displays is provided in 2.13.3. Clarify Table 2.13.3-1, Acceptance Criteria 11.
14.3-121	Morris G	Add testing requirements to the standby on site power supply ITTAC	In DCD Tier 1, Section 2.13.4, add ITAAC for the standby on-site power supply per Reg Guide 1.9 & IEEE 387.
14.3-122	Morris G	Provide specifics on the acceptance criteria for the Uninterruptible AC Power Supply independence.	In DCD Tier 1, Rev 2, Table 2.13.5-1, simple reference to the Certified Design Commitment in the Acceptance Criteria column for 1b and 1c is too vague. Provide specifics on the acceptance criteria for the Uninterruptible AC Power Supply independence.
14.3-123	Morris G	Provide ITAAC for the Instrument and Control Power Supply Inspections, Test, Analyses and Acceptance Criteria	In DCD Tier 1, Rev 2, Section 2.13.6, Even though the Instrument and Control Power Supply may be non-safety, if its failure could cause a plant transient, ITAACs should be provided.
14.3-124	Morris G	Demonstrate that the Communication System Design Description conforms to the Regulations.	In DCD Tier 1, Rev 2, Section 2.13.7, the Communications System includes a dial telephone system, a power-actuated paging facility, a sound-powered telephone system, and an in-plant radio system. Some elements of the system (such as the off-site security radio system, crisis management radio system, and fire brigade system) are COL applicant scope and should have ITAAC to demonstrate conformance to the regulations.
14.3-125	Morris G	Provide detailed description for the Lighting Power Supply.	In DCD Tier 1, Rev 2, Table 2.13.8-1, simple reference to the Certified Design Commitment in the Acceptance Criteria column for 1b and 1c is too vague. Provide details such as "test will demonstrate minimum lighting levels and provide acceptance criteria in foot candles."
14.3-126	Morris G	Provide supplemental information for the Lighting	In DCD Tier 1, Rev 2, Table 2.13.8-1, Acceptance Criteria 2 should be supplemented by adding "as demonstrated by each division



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		Power Supply required levels.	separately providing the required levels.”
14.3-127	Morris G	Clarify the inspections that will be performed on the Lighting Power Supply.	In DCD Tier 1, Rev 2, Table 2.13.8-1, Inspections, Tests, Analyses Number 2 should be supplemented by adding “by operating one division at a time.”
14.3-128	Morris G	Clarify the Lighting Power Supply Certified Design Commitment.	In DCD Tier 1, Rev 2, Table 2.13.8-1, Simple reference to the Certified Design Commitment in the Acceptance Criteria column for 3 is too vague. Provide detail such as (1) inspection will confirm correct placement of lighting units and (2) test will demonstrate adequate light levels can be provided for no less than 8 hours.
14.3-129	Morris G	Add design commitments and ITAAC to address seismic design of the mounting of the components of the four safety-related divisions of the DC system	<p>Add design commitments and ITAAC to address seismic design of the mounting of the components of the four safety-related divisions of the DC system as follows:</p> <p>Design Commitment - The mounting of the components of the four safety-related divisions of the DC system (batteries, battery chargers, inverters, buses, etc.) conform to Seismic Category 1 requirements.</p> <p>Inspection, Tests and Analysis - An inspection will be performed of the mounting of the components of the four safety-related divisions of the DC system (batteries, battery chargers, inverters, buses, etc.) to verify that the installed equipment including anchorage is seismically bounded by the tested and/or analyzed condition.</p> <p>Acceptance Criteria - A report exists and concludes that the as-installed equipment including anchorage is seismically bounded by the tested and/or analyzed conditions.</p>

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