

September 13, 2006

Mr. David Hinds, Manager, ESBWR  
General Electric Company  
P.O. Box 780, M/C L60  
Wilmington, NC 28402-0780

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 58 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 Engineered Safety Features, Chapter 6, of Tier 2 of the ESBWR design control document (DCD), Revision 1. The RAI questions were sent to you via electronic mail on July 9, 2006, and were discussed with your staff during a telecon on August 22, 2006. You agreed to respond to this RAI by October 4, 2006.

If you have any questions or comments concerning this matter, you may contact me at (301) 415-2007 or [lnq@nrc.gov](mailto:lnq@nrc.gov), or Amy Cubbage at (301) 415-2875 or [aec@nrc.gov](mailto:aec@nrc.gov).

Sincerely,

*/RA/*

Lauren Quiñones, 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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ACCESSION NO. ML062550014

OFFICE	NRBA/PM	NRBA/BC
NAME	LQuinones	JColaccino
DATE	09/13/2006	09/13/2006

**OFFICIAL RECORD COPY**

Distribution for DCD RAI Letter No. 58 dated September 13, 2006

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**Requests for Additional Information (RAIs)**  
**ESBWR Design Control Document DCD, Chapter 6**

RAI Number	Reviewer	Summary	Full Text
6.1-1	Davis R	Provide ASME Code requirements for ESF components	Provide verification that all engineered safety feature (ESF) materials meet the requirements of Appendix I to Section III, Division 1 of the ASME Code, and parts A, B and C of Section II of the ASME Code or Regulatory Guide (RG) 1.84. Also provide a description of the design, fabrication and testing requirements of ESF components and fracture toughness requirements for all ferritic ESF materials in the ESBWR design.
6.1-2	Davis R	Provide filler metal specifications	Modify DCD Tier 2, Table 6.1-1 to include filler metal specifications that are to be used to weld ESF systems.
6.1-3	Davis R	Provide fabrication Requirements	Provide a description of the fabrication requirements for each ESF system including the applicable ASME Code or Industry Standard.
6.1-4	Davis R	Provide additional information on the welding of carbon and low alloy steel	Verify that minimum preheat requirements meet the recommendations of ASME Code, Section III, Appendix D, Article D-1000 and follow the guidelines of RG 1.50, "Control of Preheat Temperature for Welding Low-Alloy Steel." If RG 1.50 will not be followed, please provide a description of the portions of RG 1.50 that will not be followed and a description of the steps that will be taken to ensure delayed cracking of the weld metal or heat affected zone will not occur. Explain in detail, the process methods, temperature monitoring and post weld bake out to be performed.
6.1-5	Davis R	Provide discussion on dissimilar metal welds	Provide a description of all dissimilar metal welds (DMWs) in the ESF systems and discuss the selection of filler metals, welding processes and process controls for DMWs.
6.1-6	Davis R	Provide clarification on use of RG 1.71	Verify that the fabrication of ESF system materials follow the guidance provided in RG 1.71. If the guidance provided in RG 1.71 is not followed, provide a description of an alternative and provide a basis for using the proposed alternative.

<b>RAI Number</b>	<b>Reviewer</b>	<b>Summary</b>	<b>Full Text</b>
6.1-7	Davis R	Provide description of corrosion allowances	Discuss the corrosion allowances and the method used to determine corrosion allowances for ferritic material in the ESF systems
6.1-8	Davis R	Provide discussion on materials in ESF system that may come into contact with reactor water	DCD Tier 2, Section 6.1.1 discusses compatibility of materials with demineralized water, but some components not covered in Section 5.2.3, such as the isolation condenser tubing, may come into contact with reactor water. Identify any materials in the ESF system that come in contact with reactor water, but are not part of the reactor coolant pressure boundary (RCPB). Discuss the compatibility of these materials with reactor water.
6.1-9	Davis R	Provide information regarding cold working of stainless steels	Provide values of the ESBWR design special control limits on hardness, bend radius and surface finish when using austenitic stainless steel.
6.1-10	Davis R	Provide information regarding use of Alloy 600 tubing in isolation condenser	DCD Tier 2, Table 6.1-1 indicates that Alloy 600 will be used in the isolation condenser. Given that Alloy 600 has a history of stress corrosion cracking under certain conditions, provide a description of the normal environment in the isolation condenser tubing. Also include material condition (i.e. mill annealed or thermally treated) as it relates to its susceptibility to stress corrosion cracking in reactor water and demineralized water.
6.1-11	Davis R	Provide additional information on joining stainless to stainless and stainless to carbon steel	DCD Tier 2, Table 6.1-1 indicates that the containment vessel liner consist of carbon steel, stainless steel plate and stainless steel sheet. Provide a description of the construction methods/processes to join these materials.
6.1-12	Davis R	Provide information regarding A-709 Gr. HPS 70W material	Identify what, if any, portion of the stainless steel containment vessel liner is welded to A 709 Gr. HPS 70W material. Identify the welding process, filler metal, welding requirements and history of joining these two materials.

RAI Number	Reviewer	Summary	Full Text
6.1-13	Davis R	Provide materials Specification for ADS piping	DCD Tier 2, Table 6.6-1 does not list material specification for automatic depressurization system (ADS) piping such as the piping from the relief valve to the suppression pool. Provide the appropriate specification and verify Table 6.6-1 is complete and includes the materials specifications for passive containment cooling system (PCCS), gravity driven cooling system (GDCCS), ADS, isolation condenser system (ICS), standby liquid control (SLC), sealed emergency operating area (SEOA), and emergency breathing air system (EBAS) piping and components that are part of ESF systems but are not included in Section 5.2.3.
6.1-14	Davis R	Provide stainless steel cladding specification	DCD Tier 2, Table 6.6-1 indicates the SLC system accumulator is fabricated from low alloy steel with stainless steel cladding. Provide stainless steel cladding specification.
6.1-15	Davis R	Provide information regarding cast stainless components	DCD Tier 2, Table 6.6-1 indicates that some components are fabricated from cast austenitic stainless steel (CASS). Given that CASS components can be susceptible to thermal aging embrittlement, please discuss the following for any CASS component in a ESF system: (1) the impact of this aging effect on the integrity of the components, (2) the consideration of the thermal embrittlement mechanism in the design and material selection for ESF components, (3) the need for inspections to detect this aging effect, and (4) verify that $\delta$ -ferrite content is calculated using Hull's equivalent factors or a method producing an equivalent level of accuracy.
6.6-1	Davis R	Provide clarification on access for examinations	DCD Tier 2, Section 6.6.2 states that all items within the Class 2 and 3 boundary are designed to provide access for examinations required by ASME Code Section XI, IWC-2500 and IWD-2500. However, the following sentence indicates that accessibility for preservice inspection (PSI) and inservice inspection (ISI) is the responsibility of the COL holder. Please address this potential conflict and provide verification that the ESBWR design provides accessibility for complete inspection in accordance with ASME Code, Section XI, Subarticle IWA-1500, and the requirements of 10 CFR 50.55a(g)(3)(ii). Verify that these requirements are incorporated in the design process for Class 2 and 3 piping and components.

<b>RAI Number</b>	<b>Reviewer</b>	<b>Summary</b>	<b>Full Text</b>
6.6-2	Davis R	Provide information regarding accessibility welds	Clarify whether all austenitic to austenitic welds that require an ultrasonic examination provide access for full ISI coverage from both the near and far side of the weld side. If not, discuss how a qualified UT examination will be performed.
6.6-3	Davis R	Provide description of dissimilar metal welds that requires PSI and ISI inspections	Describe all dissimilar metal welds within the Class 2 system that require volumetric examination as part of the PSI and/or ISI program. Confirm that all configurations will provide access from both the near and far sides of the weld.
6.6-4	Davis R	Provide information regarding PSI & ISI of cast components	Clarify whether there are any cast components within the Class 2 system that will require a PSI and/or ISI volumetric inspection. If so, clarify if these components will have a specification that requires a casting process that strictly controls grain size to make ultrasonic examination less difficult and more reliable than castings with a large grain structure.
6.6-5	Davis R	Verify that limitations and modifications listed in 10 CFR 50.55a have been considered.	The DCD indicates that the design to perform preservice inspection is based on the requirements of the ASME Code, Section XI, 2001 Edition with the 2003 Addenda. Clarify whether the ESBWR design is such that the COL applicant will be able to meet all of the ASME Section XI requirements including any limitations and modifications currently listed in 10CFR50.55a.
6.6-6	Davis R	Provide Code Edition and Addenda used as basis for information provided in DCD Tier 2, Section 6.6	DCD Tier 2, Section 6.6, page 6.6-1, indicates that the requirements presented in this section are based on the 2001 Edition of ASME Section XI with the 2003 Addenda. However, page 6.6-7 indicates that information presented in Section 6.6 is based on the 1989 Edition of ASME Section XI. Provide clarification.
6.6-7	Davis R	Provide additional information on flow-assisted corrosion	DCD Tier 2, Section 6.6.7 discusses single-phase erosion-corrosion inspections. Please identify any systems in the ESBWR design that may be susceptible to two-phase erosion-corrosion. Also, Section 6.6.7 references the NUMARC Program. Please change the reference to be consistent with staff's current recommendation to implement a flow-assisted corrosion (FAC) program, described by the EPRI guidelines in NSAC-202L-R2.

ESBWR

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