

September 29, 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. 62 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 Fire Protection, Tier 1, and Plant Service Water System and Reactor Component Cooling Water System, Section 9.2 of Tier 2 of the ESBWR design control document (DCD), Revision 1. The RAI questions concerning Fire Protection were sent to you via electronic mail on May 12, 2006. The RAI questions concerning Plant Service Water System and Reactor Component Cooling Water were sent to you via electronic mail on August 30, 2006. You did not request a teleconference to discuss these questions. You agreed to respond to these RAI questions with the following schedule:

October 13, 2006: Questions 9.2-6 through 9.2-13.

October 20, 2006: Questions 14.3-5 through 14.3-21.

D. Hinds

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If you have any questions or comments concerning this matter, you may contact me at (301) 415-1446 or dba@nrc.gov, or Amy Cubbage at (301) 415-2875 or aec@nrc.gov.

Sincerely,

/RA/

Donald B. Allen, 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

D. Hinds

-2-

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Requests for Additional Information (RAIs)
ESBWR Design Control Document DCD, Fire Protection for DCD Tier 1, Rev 1.

| RAI Number | Reviewer | Question Summary | Full Text |
|------------|-------------|--|--|
| 14.3-5 | Radlinski R | Tier 1 should include the information on the SRP Section 14 fluid system checklist, as applicable. (DCD Tier 1, Section 2.16.3) | Section 14.3 of the standard review plan (SRP), Draft 0, April 1996, includes a checklist for information to be provided in Tier 1 for fluid systems. The list includes system function, location, operation, logic, etc. Much of this information for the fire protection fluid systems is not included in DCD Tier 1, Section 2.16.3. Provide all of the applicable information in Tier 1. |
| 14.3-6 | Radlinski R | Explain how the fire pumps meet National Fire Protection Association (NFPA) design criteria. (DCD Tier 1, Section 2.16.3) | The Design Description (DD) states that each fire pump is capable of delivering the flow and pressure required to the location that is farthest from the fire water supply. This may not be the most hydraulically demanding requirement. The pump flow rate should be in accordance with NFPA 804, 2001 Edition, Section 7.2.1. The pump should be capable of supplying fire water at the pressure required for each fixed suppression system while also providing 500 gpm for manual hose streams. The pump head should also be capable of providing hose station pressure in accordance with NFPA 14, Section 7.8 of NFPA 14, 2003 Edition (both of these NFPA standards are referenced in DCD Tier 2, Table 1.9-20). |
| 14.3-7 | Radlinski R | Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) should include inspections to verify fire barrier integrity and conformance to design. (DCD Tier 1, Table 2.16.3-1) | Section 14.3, Appendix C of the SRP, Draft 0, April 1996, provides guidance for building structure review that includes fire barriers. The ITAAC for fire barriers should include inspections to verify that all fire barriers and barrier penetration seals and other closure devices are constructed in accordance with the applicable approved designs, including verification that the design basis integrity of each barrier is provided (e.g., that all required penetration seals are in place and that the required closure of all barrier openings is complete). Update the ITAAC to include this information. |

Enclosure

| RAI Number | Reviewer | Question Summary | Full Text |
|------------|-------------|---|---|
| 14.3-8 | Radlinski R | DCD Tier 1, Table 2.16.3-1 should be consistent with the Design Description in Tier 1. | DCD Tier 1, Table 2.16.3-1 includes Design Commitments that are not included in the Design Description in Tier 1. According to the guidance in Section 14.3, Appendix C of the SRP, Draft 0, April 1996, the Certified Design Commitments should be included in the Design Description (e.g., fire water tank size and fire pump rating are listed as Design Commitments and referred to a Certified Design Commitments in the Acceptance Criteria in ITAAC but are not included in the DD). Clarify the inconsistency between DCD Tier 1, Table 2.16.3-1 and the DD in Tier 1. |
| 14.3-9 | Radlinski R | Explain the difference between the value provided in the DCD and the requirements of NFPA 14 (DCD Tier 1, Table 2.16.3-1) | DCD Tier 1, Table 2.16.3-1, ITAAC Item 4 states that the fire pumps will provide a minimum of 2,000 gpm at the most hydraulically remote hose station. NFPA 14 provides the flow requirements for hose stations (250 gpm). As noted above, the pump requirements should be described in accordance with the referenced applicable NFPA standards. The pump design should envelop the separate flow and pressure requirements of the NFPA standards. |
| 14.3-10 | Radlinski R | The ESBWR ITAAC should include NFPA tests and inspections. (DCD Tier 1, Table 2.16.3-1) | NFPA standards include specific requirements for testing and inspection of fire protection systems and equipment. Update the ESBWR ITAAC to include those tests and inspections. |
| 14.3-11 | Radlinski R | Include verification of the implementation of the seismic design for the portion of the fire protection system that must remain functional following an SSE. (DCD Tier 1, Table 2.16.3-1) | The DCD Tier 1, DD states that one source of fire water supply, one of the fire water pumps and the fire main leading to and including standpipes and subsystems for areas containing safe shutdown equipment are analyzed to withstand the effect of a Safe Shutdown Earthquake (SSE). They shall remain functional during and after an SSE. The ESBWR ITAAC should include verification that this analysis has been performed and that the system and equipment have been installed accordingly. Update the ITAAC to include this information. |

| RAI Number | Reviewer | Question Summary | Full Text |
|------------|-------------|---|---|
| 14.3-12 | Radlinski R | ITAAC Item No. 6 should include inspection of the location of safe shutdown equipment. (DCD Tier 1, Table 2.16.3-1) | DCD Tier 1, Table 2.16.3-1, ITAAC Item No. 6 verifies the Design Commitment that no safe shutdown equipment is more than 100 ft from two hose stations on separate standpipes. The Inspection only mentions verification of the location of the hose rack locations. To verify the Design Commitment, both the hose station and the safe shutdown equipment locations must be verified. Update the ITAAC to include this information. |
| 14.3-13 | Radlinski R | Clarify Design Commitment No. 7 which states that automatic fire suppression is provided for all electrical areas. (DCD Tier 1, Table 2.16.3-1) | The Tier 2 description of areas protected by automatic suppression systems does not include automatic suppression systems in all electrical areas, e.g., the electrical building corridor (with installed cables) and the battery rooms are not protected by automatic suppression systems. The Design Commitment in DCD Tier 1, Table 2.16.3-1 should be more specific. In addition, the reference to the applicable NFPA codes should state, as the Design Commitment, that the automatic suppression systems meet or exceed the requirements of NFPA 13 or NFPA 15, as applicable. |
| 14.3-14 | Radlinski R | Clarify Design Commitment No. 8 which states that automatic fire suppression is provided for all non-electrical areas. (DCD Tier 1, Table 2.16.3-1) | The Tier 2 description of areas protected by automatic suppression systems does not include automatic suppression systems in all non-electrical areas. The Design Commitment in DCD Tier 1, Table 2.16.3-1 should be more specific. In addition, the reference to the applicable NFPA codes should state, as the Design Commitment, that the automatic suppression systems meet or exceed the requirements of NFPA 13 and NFPA 15, as applicable. |

| RAI Number | Reviewer | Question Summary | Full Text |
|------------|-------------|---|--|
| 14.3-15 | Radlinski R | ITAAC Items 7 and 8 for automatic suppression systems should include inspections and tests indicated for Item 9 and as required by the applicable NFPA standard. (DCD Tier 1, Table 2.16.3-1) | DCD Tier 1, Table 2.16.3-1, ITAAC Items 7 and 8 for automatic suppression systems should include inspections and tests indicated for Item 9 - inspection of as-built systems and testing of automatic logic under simulated fire conditions. As noted above, tests and inspection should also include those required by the applicable NFPA standards. Update the ITAAC to include this information. |
| 14.3-16 | Radlinski R | ITAAC Item 10 should include the same method of verification of tank volume as Item 3. (DCD Tier 1, Table 2.16.3-1) | ITAAC Item 10 only includes an inspection to verify the volume of the fuel oil tanks. The ITAAC should be similar to the ITAAC for the fire water storage tank (Item 3) - verify volumetric calculations using as-built dimensions. The fuel oil tank ITAAC should also verify the fuel consumption calculation that dictated the volume using the as-built diesel engine fuel consumption rate. Update the ITAAC to include this information. |
| 14.3-17 | Radlinski R | ITAAC Item 11 should include a test of control room displays and controls for the fire protection system. (DCD Tier 1, Table 2.16.3-1) | ITAAC Item 11 only includes an inspection to verify the Design Commitment. This ITAAC should also include appropriate tests that verify the displays and controls function properly. Update the ITAAC to include this information. |
| 14.3-18 | Radlinski R | The fire protection system (FPS) interfaces for emergency makeup should identify the system to which emergency makeup is being provided. (DCD Tier 1, Figure 2.16.3-1) | DCD Tier 1, Figure 2.16.3-1 indicates two FPS interfaces as "Emergency Makeup". The figure should indicate the specific system to which each interface is providing emergency makeup. Update Figure 2.16.3-1. |

| RAI Number | Reviewer | Question Summary | Full Text |
|------------|-------------|--|---|
| 14.3-19 | Radlinski R | Clarify emergency backup function for Isolation Condenser / Passive Containment Cooling System (IC/PCCS). (DCD Tier 1, Section 2.16.3) | The DCD Tier 1, DD states that the FPS provides an emergency backup source of makeup water 72 hours after a loss of coolant accident (LOCA) for IC/PCCS pools. This IC/PCCS makeup function is not mentioned in DCD Tier 2, Section 9.5.1.1 that describes the other emergency backup functions of the FPS. Revise Section DCD Tier 1, Section 2.16.3 and/or DCD Tier 2, Section 9.5.1 to consistently describe the backup functions in accordance with the ESBWR proposed design. Also verify that this FPS function and the other FPS emergency backup functions are not required safety-related functions. |
| 14.3-20 | Iqbal N | State the ESBWR commitment to the enhanced fire protection criteria for advanced light-water reactor designs. (DCD Tier 1, Table 2.16.3-1) | Commission Papers SECY 90-016, SECY 93-087 and SECY 94-084 describe enhanced fire protection criteria for new reactor designs. The ESBWR commitment to these criteria should be included in DCD Tier 1, Section 2.16.3. |
| 14.3-21 | Iqbal N | Identify FPS controls and displays in the main control room. | Section 14.3, Appendix C of the SRP, Draft 0, April 1996, provides guidance for DCD Tier 1, DDs. The information to be included in the DD includes controls and displays. Describe the FPS controls and displays that will be provided in the main control room. |

Requests for Additional Information (RAIs)
ESBWR Design Control Document (DCD) Tier 2, Revision 1, Section 9.2

| RAI Number | Reviewer | Question Summary | Full Text |
|-------------------|-----------------|---|---|
| 9.2-6 | Li C | Provide PSWS and RCCWS drawings in the DCD. | Include a non-proprietary version of the Plant Service Water System (PSWS) and Reactor Component Cooling Water System (RCCWS) drawings, with legends, in the Design Control Document (DCD) with sufficient detail to permit the preparation of acceptance and inspection requirements by the NRC and showing system function, major equipment, components, piping classes, instrumentation, and interface systems. |
| 9.2-7 | Li C | Address applicability of GDC 44, GDC 45, and GDC 46 to PSWS and RCCWS. | Table 1.9-9 of the DCD, Tier 2, Rev 1, indicates that General Design Criteria (GDC) 44 is not applicable to PSWS and RCCWS because they are non-safety-related. GDC 44 applies to cooling water systems that transfer heat to an ultimate heat sink under normal operating conditions as well as during cooldown, shutdown, and accident conditions. These two systems are important to safety even though they are not safety-related; therefore GDC 44 applies to them. And if GDC 44 applies, so do GDCs 45 and 46. Demonstrate how these systems satisfy GDCs 44, 45, and 46. |
| 9.2-8 | Li C | Demonstrate capability to detect PSWS Leakage. | Demonstrate the capability for detection, control, and isolation of PSWS leakage, including radioactive leakage into and out of the system and prevention of accidental releases to the environment. Describe allowable operational degradation (e.g., pump leakage) and the procedures to detect and correct |
| 9.2-9 | Li C | Describe measures to preclude PSWS long-term corrosion and organic fouling. | Describe the measures provided for precluding long-term corrosion and organic fouling that would degrade PSWS performance. |

| RAI Number | Reviewer | Question Summary | Full Text |
|-------------------|-----------------|---|---|
| 9.2-10 | Li C | Identify PSWS instrumentation. | Identify all alarms, instruments, and controls for PSWS, such as valve position, pressure and temperature indications, radiation monitors, cooling tower basin level indications, etc. |
| 9.2-11 | Li C | Discuss potential for water hammer in PSWS and RCCWS. | Discuss the potential for water hammer as well as operating and maintenance procedures for avoidance of water hammer in the PSWS and RCCWS. |
| 9.2-12 | Li C | Clarify how non-safety-related systems satisfy GDC 2. | How do the PSWS, RCCWS, Makeup Water System (MWS), Condensate Storage and Transfer System (CS&TS), Chilled Water System (CWS), and Turbine Component Cooling Water System (TCCWS) satisfy GDC 2? Acceptance is based on meeting the guidance of Regulatory Position C.2 of Regulatory Guide 1.29 for non-safety-related portions. |
| 9.2-13 | Li C | Describe detection of RCCWS Leakage of radioactive or chemical contamination. | Describe design provisions to detect RCCWS leakage of radioactive or chemical contamination and the locations of radioactivity and conductivity monitors. |

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