GE Hitachi Nuclear Energy

Richard E. Kingston
Vice President, ESBWR Licensing

PO Box 780 M/C A-55
Wilmington, NC 28402-0780
USA

T 910 819 6192
F 910 362 6192
rick.kingstion@ge.com

MFN 08-896

Docket No. 52-010

November 18, 2008

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Subject: **Submittal of Portion of Response to NRC Request for Additional Information Letter 241 - Related to ESBWR Design Certification Application – RAI Number 14.3-410**

The purpose of this letter is to submit the response to Nuclear Regulatory Commission (NRC) Request Additional Information (RAI) number 14.3-410.

This response to RAI 14.3-410 is provided based on the request in NRC Letter 241 (Reference 1).

If you have any questions or require additional information, please contact me.

Sincerely,

Richard E. Kingston

Richard E. Kingston
Vice President, ESBWR Licensing

D068
NRO

Reference:

1. MFN 08-650 – Letter from Nuclear Regulatory Commission to Robert E. Brown (GEH) "*Request for Additional Information Letter No. 241 Related to ESBWR Design Certification Application*", dated August 15, 2008

Enclosure:

1. MFN 08-896 – Response to Portion of NRC Request for Additional Information Letter No. 241 Related to ESBWR Design Certification Application - RAI Number 14.3-410

cc: AE Cubbage USNRC (with enclosure)
RE Brown GEH/Wilmington (with enclosure)
DH Hinds GEH/Wilmington (with enclosure)
RM Wachowiak GEH/Wilmington (with enclosure)
eDRF 0000-0093-4571

Enclosure 1

MFN 08-896

Response to Portion of NRC Request for

Additional Information Letter No. 241

Related to ESBWR Design Certification Application

RAI Number 14.3-410

* Verified DCD changes associated with this RAI response are identified in the enclosed DCD markups by enclosing the text within a black box. The marked-up pages may contain unverified changes in addition to the verified changes resulting from this RAI response. Other changes shown in the markup(s) may not be fully developed and approved for inclusion in DCD Revision 6.

NRC RAI 14.3-410

ITAAC items missing from Table 2.13.4-2

In DCD, Tier 1, Section 2.13.4, Table 2.13.4-2 is incomplete. Include ITAAC for the following items or provide justification for not including them:

a) Verification of automatic load sequencing

b) Verification that Control exist in the MCR to start and stop each SDG

c) Verification that Ancillary diesel generator and associated auxiliaries, control, electrical buses, fuel tanks, etc. are Seismic Category II.

GEH Response

After reviewing Tier 1, Section 2.13.4 and the ITAAC in Table 2.13.4-2, existing ITAAC #2a will be modified to include the requested verification of Standby Diesel Generator load sequencing. ITAAC will be added as requested to verify the existence of control in the MCR to start and stop each SDG and to verify that each ancillary diesel generator and associated auxiliaries, buses, fuel tanks, and fuel oil transfer pumps are Seismic Category II.

a) GEH has reviewed the criteria for developing ITAAC found in DCD Tier 2, Subsection 14.3.7.3. The SDG do meet criterion (1)a. of this subsection because they have been identified as a RTNSS system, and therefore have ITAAC as currently provided in Table 2.13.4-2. Criterion (2) of Subsection 14.3.7.3 specifies which aspects of Criterion (1)a. systems should be treated in ITAAC. Specifically, Criterion (2)r. requires that features or functions determined by the Tier 2 RTNSS evaluation should be included. DCD Tier 2, Appendix 19A, specifies that the SDG are included as a RTNSS system as they meet RTNSS Criterion C to support the defense-in-depth role of FAPCS. DCD Tier 1, Table 2.13.4-2 currently contains ITAAC #2a to verify that the SDG starts and achieves rated speed and voltage. To ensure that the SDG can support their required RTNSS loads, GEH will modify the existing ITAAC #2A to also verify that the PIP buses can sequence on their designed loads while maintaining voltage and frequency within design limits.

   In addition, this testing is already part of the preoperational testing defined in Subsection 14.2.8.1.37. Included in the test methods and acceptance criteria is the proper operation of the SDGs during load shedding, load sequencing, and load rejection. DCD Tier 1, Section 3.5 addresses the ESBWR Initial Test Program.

b) GEH agrees and will add an ITAAC to Section 2.13.4 to verify that each SDG can be started and stopped using manually initiated signals from the MCR.

c) GEH agrees and will add an ITAAC to Section 2.13.4 to verify that each ancillary diesel generator and associated auxiliaries, buses, fuel tanks, and fuel oil transfer pumps are Seismic Category II.

DCD Impact

DCD Tier 1, Subsection 2.13.4 will be revised in Revision 6 as noted in the attached markup.

DCD Revision 6 Markup for

RAI 14.3-410

2.13.4 Onsite Diesel Generator Power Supply Systems

Design Description

There are two systems capable of supplying onsite AC power. They are the standby diesel generators (SDG) and the ancillary diesel generators (ADG).

Two independent nonsafety-related SDG, including their support systems, provide separate sources of onsite power for the nonsafety-related Plant Investment Protection (PIP) load groups when the normal and alternate preferred 6.9kV power supplies are not available. The nonsafety-related standby diesel generators have a Regulatory Treatment of Non-Safety Systems (RTNSS) function to provide power to the PIP buses that supply RTNSS loads.

Two nonsafety-related, seismic category II ADG, including their support systems, provide 480 VAC power for post accident support loads when the normal and alternate preferred 6.9 kV power supplies and the SDG are not available. The nonsafety-related ancillary diesel generators have a RTNSS function to provide power to the ancillary diesel buses that supply RTNSS loads.

(1) The functional arrangement of Standby Onsite Power System is as described in the Design Description of this Section 2.13.4 and as shown in Table 2.13.4-1.

(2) The Standby Onsite Power Supply System provides the following nonsafety-related functions:

a. Upon receipt of an undervoltage signal from the Onsite AC Power System, the standby diesel generator starts and achieves rated speed and voltage and sequences its designed loads while maintaining voltage and frequency within design limits.

b. Each standby diesel generator is sized to accommodate its expected loads.

c. Each standby diesel generator fuel oil storage tank contains adequate fuel oil capacity for 7 days of standby diesel generator operation.

d. Each of the standby diesel generator fuel oil transfer pumps (two pumps per engine) starts automatically and transfer fuel oil from the standby fuel oil storage tank to the standby diesel generator day tank at a rate greater than or equal to the usage rate of the standby diesel generator.

e. Each of the standby diesel generator starting air receivers (two receivers per engine) is capable of three engine start attempts.

f. Each of the standby diesel generator jacket cooling water systems controls the flow of water to maintain required water temperature.

g. Each standby diesel generator has instrumentation provided to monitor lube oil temperature, pressure and sump level, ensuring proper operation of the system.

h. Each standby diesel generator is provided with a separate intake and exhaust system.

i. Each standby diesel generator can be remotely operated from the MCR.

(3) The Standby Onsite Power Supply System minimum inventory of alarms, displays, controls, and status indications in the main control room are addressed in Section 3.3.

(4) The functional arrangement of the Ancillary Diesel Onsite Power Supply System is as described in the Design Description of this Section 2.13.4 and the component locations are shown in Table 2.13.4-1.

(5) The Ancillary Diesel Onsite Power Supply System provides the following nonsafety-related functions:

a. Upon receipt of an undervoltage signal from the Onsite AC Power System, the standby diesel generator starts, achieves rated speed and voltage, and produces a ready to load signal.

b. Upon receipt of a low ancillary diesel room temperature signal, the ancillary diesel generator starts, achieves rated speed and voltage, and produces a ready to load signal.

c. Each ancillary diesel generator is sized to accommodate its expected loads.

d. Each ancillary diesel generator fuel oil storage tank contains adequate fuel oil capacity for 7 days of ancillary diesel generator operation.

e. Each of the ancillary diesel generator fuel oil transfer pumps start automatically and transfer fuel oil from the ancillary fuel oil storage tank to the ancillary diesel generator day tank at a rate greater than or equal to the usage rate of the ancillary diesel generator.

(6) The Ancillary Diesel Onsite Power Supply System minimum inventory of alarms, displays, controls, and status indications are addressed in Section 3.3.

(7) Each ancillary diesel generator and its associated auxiliaries, buses, fuel tanks, and fuel oil transfer pumps conform to Seismic Category II requirements.

Inspections, Tests, Analyses and Acceptance Criteria

Table 2.13.4-2 provides a definition of the inspections, tests, and/or analyses, together with associated acceptance criteria for the Standby Onsite Power Supply System and the Ancillary Diesel Onsite Power Supply System.

Table 2.13.4-2

ITAAC For The Onsite Diesel Generator Power Supply Systems

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the Standby Onsite Power Supply is as described in the Design Description of Subsection 2.13.4	Inspections of the as-built system will be conducted.	Inspection report(s) ~~document~~ exist and conclude that the as-built Standby Onsite Power Supply system conform with the functional arrangement as described in the Design Description of Subsection 2.13.4 and Table 2.13.4-1.
2. The Standby Onsite Power Supply System provides the following nonsafety-related functions: a. Upon receipt of an undervoltage signal from the Onsite AC Power System, the standby diesel generator starts and achieves rated speed and voltage and sequences its designed loads while maintaining voltage and frequency within design limits.	Tests of the as-built Standby Onsite Power Supply system will be conducted by providing a real or simulated undervoltage signal to start the standby diesel generators.	Test report(s) ~~demonstrate~~ exist and conclude that the as-built standby diesel generator starts upon receipt of a real or simulated undervoltage signal on its associated PIP bus, ~~and~~ achieves rated speed and voltage, and sequences its designed loads while maintaining voltage and frequency within design limits.
b. Each standby diesel generator is sized to accommodate its expected loads.	Testing will be performed to demonstrate that each as-built standby diesel generator will operate between rated and maximum nameplate load, and nameplate power factor for a time period required to reach engine temperature equilibrium.	Test report(s) ~~demonstrate~~ exist and conclude that each as-built standby diesel generator provides power at generator terminal rated voltage and frequency when fully loaded.
c. Each standby diesel generator fuel oil storage tank contains adequate fuel oil capacity for 7 days of standby diesel generator operation.	The as-built standby fuel oil storage tank capacity will be calculated.	Calculations show that the as-built standby fuel oil storage tank capacity is adequate to supply 7 days of fuel oil to the standby diesel generator under continuous operation

Table 2.13.4-2

ITAAC For The Onsite Diesel Generator Power Supply Systems

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
i. Each standby diesel generator can be remotely operated from the MCR.	Each standby diesel generator will be started and stopped using manually initiated signals from the MCR.	Test report(s) exist and conclude that each standby diesel generator starts and stops when manually initiated signals are sent from the MCR.
3. The Standby Onsite Power Supply minimum inventory of alarms, displays, controls, and status indications in the main control room are addressed in Section 3.3.	See Section 3.3.	See Section 3.3.
4. The functional arrangement of the Ancillary Diesel Onsite Power Supply System is as described in Section 2.13.4	Inspections of the as-built system will be conducted.	Inspection report(s) ~~document~~ exist and conclude that the as-built Ancillary Diesel Onsite Power Supply System conforms with the functional arrangement as described in section 2.13.4.
5a. Upon receipt of an undervoltage signal from the Onsite AC Power System, the ancillary diesel generator starts, achieves rated speed and voltage, and produces a ready to load signal.	Tests of the as-built Ancillary Diesel Onsite Power Supply System will be conducted by providing a real or simulated undervoltage signal to start the ancillary diesel generators.	Test report(s) ~~demonstrate~~ exist and conclude that the as-built ancillary diesel generator starts upon receipt of a real or simulated undervoltage signal on its associated bus, achieves rated speed and voltage, and produces a ready to load signal.

Table 2.13.4-2

ITAAC For The Onsite Diesel Generator Power Supply Systems

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
6. The Ancillary Diesel Onsite Power Supply System minimum inventory of alarms, displays, controls, and status indications are addressed in Section 3.3.	See Section 3.3.	See Section 3.3.
7. Each ancillary diesel generator and its associated auxiliaries, buses, fuel tanks, and fuel oil transfer pumps conform to Seismic Category II requirements.	i. Type tests and analyses of the ancillary diesel generators, their associated auxiliaries, buses, fuel tanks, and fuel oil transfer pumps will be performed.	i. Report(s) exist and conclude that each as-built ancillary diesel generator and its associated auxiliaries, buses, fuel tanks, and fuel oil transfer pumps conform to Seismic Category II requirements.
	ii. Inspections of the as-built ancillary diesel generators, their associated auxiliaries, buses, fuel tanks, and fuel oil transfer pumps will be performed to verify that the equipment is installed in accordance with the configurations specified in the type tests and analyses.	ii. Inspection report(s) exist and conclude that each ancillary diesel generator and its associated auxiliaries, buses, fuel tanks, and fuel oil transfer pumps are installed in accordance with the configurations specified by the type tests and analyses.