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MFN 07-210 Supplement 1

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U.S. Nuclear Regulatory Commission
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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 155 Related to ESBWR Design Certification Application - Technical Specifications – RAI 16.2-42 S01**

Enclosures 1 and 2 contain the subject supplemental RAI response resulting from NRC RAI Letter No. 155. The GE Hitachi Nuclear Energy (GEH) response to the original RAI was provided in the Reference 1 letter.

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 5

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

Lee F. Dougherty for

James C. Kinsey
Vice President, ESBWR Licensing

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LRO

Reference:

1. MFN 07-210, Letter from James C. Kinsey to U.S. Nuclear Regulatory Commission, *Response to Portion of NRC Request for Additional Information Letter No. 63 Related to ESBWR Design Certification Application - Technical Specifications - RAI Numbers 16.2-24 and 16.2-42*, August 13, 2007

Enclosures:

1. MFN 07-210, Supplement 1 - Response to Portion of NRC Request for Additional Information Letter No. 155 Related to ESBWR Design Certification Application - Technical Specifications - RAI Number 16.2-42 S01
2. MFN 07-210, Supplement 1 – DCD Markups for RAI Number 16.2-42 S01

cc: AE Cabbage USNRC (with enclosures)
DH Hinds GEH (with enclosures)
RE Brown GEH (with enclosures)
eDRF 83-3732

Enclosure 1

MFN 07-210 Supplement 1

Response to Portion of NRC Request for

Additional Information Letter No. 155

Related to ESBWR Design Certification Application

- Technical Specifications -

RAI Numbers 16.2-42 S01

NRC RAI 16.2-42

10 CFR 50.36(c)(3) states that TS will include items surveillance requirements, which are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

Provide justification for not having Isolation Condenser System SR requiring verification every 60 months of the ICS capability to remove the design heat load.

GE Response

Revision 3 to Design Control Document (DCD) Tier 2, Chapter 16, LCO 3.5.4, "Isolation Condenser System (ICS) – Operating," added Surveillance Requirement (SR) 3.5.4.5, which requires verification of the heat removal capability of each IC train. The associated Bases specify that the purpose of this SR is to demonstrate that the heat removal capability of each IC train satisfies design requirements specified in DCD Tier 2, Chapter 5.

Revision 3 to LCO 3.5.4, SR 3.5.4.5, specifies the frequency for IC heat capacity testing as "24 months on a staggered test basis." This frequency will ensure timely identification of any degradation in ICS performance by testing one IC train every 24 months, such that each IC train is tested once every eight years. This frequency was enclosed in brackets pending changes to DCD Tier 2, Subsection 5.4.6.4, which are described in a pending supplemental response to RAI 5.4-52. Revision 4 to LCO 3.5.4, SR 3.5.4.5, will remove the brackets from the frequency for SR 3.5.4.5, coincident with the pending changes to DCD Tier 2, Subsection 5.4.6.4.

DCD Impact

DCD Tier 2, Chapter 16, LCO 3.5.4, "Isolation Condenser System (ICS) – Operating," Revision 4, will remove the brackets from the SR frequency for IC heat capacity testing. Related changes to DCD Tier 2, Subsection 5.4.6.4 are addressed in a pending supplemental response to RAI 5.4-52 and, therefore, are not addressed in this response.

NRC RAI 16.2-42 Supplement 1

1. *Explain how "required heat load" in SR 3.5.4.5 is determined from Table 5.4-1 which states: ICS Performance Requirements: Heat removal capacity of the ICS (with 3 of 4 IC trains in service) is at least 101.25 MWt when reactor is above rated operating pressure.*
2. *DCD 5.4.6.4 (Rev 4) states: During normal plant operation, a periodic surveillance test cycles the normally-closed condensate return and condensate return bypass valves (sequentially opening and closing each valve) on the condensate line to the RPV. Why does TS 3.5.4 not include a corresponding SR for this stroke test?*

GEH Response

1. GEH will revise Design Control Document (DCD) Tier 2, Table 5.4-1, Component and Subsystem Design Controls, to provide the criteria necessary to develop surveillance test procedures to verify that an isolation condenser (IC) is capable of removing the required heat load, as required by SR 3.5.4.5. Specifically, Table 5.4-1 will specify that each isolation condenser (IC) unit is designed to remove 33.75 MWt, nominal, with saturated steam at 289°C (552°F) and the IC pool at 100°C (212°F).
2. ICS valves are subject to the requirements of 10 CFR 50.55a, Codes and Standards, which must be implemented in accordance with the latest approved version of the ASME/ANSI Operations and Maintenance Standards, Part 10 (OM-10), "Inservice Testing of Valves in Light-Water Reactor Power Plants." DCD 3.9.6.1, Inservice Testing Valves, outlines the Inservice Testing Program for valves. DCD Table 3.9-8, In-Service Testing, Section B32 Isolation Condenser System Valves, provides the detailed requirements applicable to the ICS valves. DCD 5.4.6.4, Testing and Inspection Requirements, describes requirements for the ICS that includes the valve testing required by the Inservice Testing (IST) Program. Because the IST Program is established and maintained in accordance with 10 CFR 50.55a, specific IST Program requirements are not duplicated by Technical Specification Surveillance Requirements.

DCD Impact

DCD Tier 2, Table 5.4-1 will be revised in Revision 5 as shown in Enclosure 2.

Enclosure 2

MFN 07-210 Supplement 1

DCD Markups for RAI Number 16.2-42 S01

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 5.

ESBWR

Table 5.4-1
Component and Subsystem Design Controls

Component/Subsystem	Control(s)
ICS station blackout (i.e., unavailability of all AC power) capability:	≥ 72 hours
IC sizing:	Sized to remove post-reactor isolation decay heat with three out of four ICs operating and to reduce reactor pressure and temperature to safe shutdown conditions, in 36 hours, with occasional venting of radiolytically generated noncondensable gases to the suppression pool.
ICS Performance Requirements:	Heat removal capacity of the ICS (with 3 of 4 IC trains in service) is at least 101.25 MWt when reactor is above rated operating pressure. <u>Each IC unit is designed to remove 33.75 MWt, nominal, with saturated steam at 289°C (552°F) and the IC pool at 100°C (212°F).</u>
Condensate return valve stroke-open time:	≥ 7.5 seconds and ≤ 30 seconds with a logic delay time not to exceed 1 second after the opening setpoint is reached.
IC design parameters:	33.75 MWt each IC unit and is made of two identical modules. The IC has a design pressure of 10.34 MPag (1500 psig) and a design temperature of 314.5°C (598°F). The design heat transfer coefficient is 8650 W/m ² °C.
Nominal Diameter of the Steam Supply Line:	350 mm (14 inches)
Nominal Diameter of the Condensate Return Line:	200 mm (8 inches)
Outer Diameter of the Condenser Tubes:	50.8 mm (2 inches)