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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 241 Related to ESBWR Design Certification Application – RAI Number 14.3-405**

Enclosure 1 contains the GE Hitachi Nuclear Energy (GEH) response to the subject NRC RAI originally transmitted via the Reference 1 letter. Enclosure 2 contains the DCD markups.

If you have any questions about the information provided here, please contact me.

Sincerely,

Richard E. Kingston

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Vice President, ESBWR Licensing

Reference:

1. MFN 08-650, Letter from the U.S. Nuclear Regulatory Commission to Robert E. Brown, Request for Additional Information Letter No. 241, Related To ESBWR Design Certification Application, dated August 15, 2008

Enclosures:

1. Response to Portion of NRC Request for Additional Information Letter No. 241, Related to ESBWR Design Certification Application – Radiation Protection – RAI Number 14.3-405
2. Response to Portion of NRC Request for Additional Information Letter No. 241, Related to ESBWR Design Certification Application – Radiation Protection – RAI Numbers 14.3-405 - DCD Markups

cc:	AE Cubbage	USNRC (with enclosures)
	RE Brown	GEH/Wilmington (with enclosures)
	DH Hinds	GEH/Wilmington (with enclosures)
	eDRF	0000-0094-5270

Enclosure 1

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Response to Portion of NRC Request for

Additional Information Letter No. 241

Related to ESBWR Design Certification Application

RAI Number 14.3-405

NRC RAI 14.3-405:

ITAAC roadmap

SRP 14.3, Section III, Review Procedures, as well as Appendix C, Detailed Review Guidance, discuss the need for the staff to review cross-references in DCD Tier 2, Section 14.3, showing where key parameters from safety analyses for the design, including, analyses of design-basis accidents, severs accidents, flooding, overpressure protection, containment, core cooling, fire protection, transients, shutdown risk, anticipated transient without scram, Three Mile Island (TMI) items, PRAs, regulatory treatment of nonsafety-related systems (RTNSS), or other analyses as specified by the staff. The applicant did not provide these roadmaps in Tier 2 of the ESBWR DCD, Rev. 5. The applicant is requested to provide these cross-references/roadmaps in Tier 2, Section 14.3 of the ESBWR DCD. Guidance on the format and content for these cross-references may be gleaned by referring to Tables 14.3-1 through 14.3-8 in the AP1000 Design Control Document.

GEH Response:

NRC guidance in NUREG-0800, Section 14.3 (March 2007), discusses including in Section 14.3 of Tier 2 information regarding the critical assumptions from transient and accident analyses and PRA and severe accident insights (see, e.g., NUREG-0800, Section 14.3, Appendix C, p. 14.3-30). It also discusses a cross-reference being useful for review of the key parameters for analyses such as those listed in the RAI (see, e.g., p. 14.3-5). The ESBWR DCD Section 14.3 (Rev. 5) contains a description of the process for determining the content of Tier 1 and the ITAAC. The selection for the material in Tier 1, as described in NRC Regulatory Guide 1.206 and Tier 2, Section 14.3, is based on addressing "the most safety-significant aspects of each of the systems of the design, and derived from the detailed design information contained in Tier 2. The applicant should put the top-level design features and performance characteristics that were the most significant to safety in the Tier 1 design descriptions." In addition, as the guidance further explains, the "design descriptions serve as binding requirements for the lifetime of a facility to assure that the plant does not deviate from the certified design." Accordingly, Tier 2, Section 14.3, explains the significance of ensuring that the right level of information is included in Tier 1. See Tier 2, Section 14.3 for the full description of all of the factors considered in selecting the material for Tier 1.

Because the information in Tier 1 constitutes the certified material and is binding for the lifetime of a facility, future licensees of ESBWRs will use the information in Tier 1 when evaluating any temporary or permanent design changes under the change process that will be outlined in the ESBWR design certification rule. However, because of the standard design-centered approach, it is expected that most changes would be evaluated on a fleet-wide basis, unless site specific. Tier 2 is also important in evaluating changes that might affect Tier 1, as it provides further explanation for those elements of the design in Tier 1 for a better understanding of the basis for the design information contained in Tier 1. Thus, both Tier 1 and Tier 2 information will be

important when evaluating whether a change would be one which requires NRC approval or not.

The information contained in Tier 1 is based on information derived from Tier 2. While Tier 1 is not formatted in the same order as Tier 2, corresponding chapters of Tier 2 generally relate to a specific section of Tier 1. Although Tier 1 represents the certified design material for the standard ESBWR, Tier 2 provides the more detailed design bases descriptions.

In response to questions raised in meetings regarding Tier 1, GEH and the NRC discussed including a table in Tier 2, Section 14.3, that would list the key design features in the areas of design basis accident analysis and PRA/severe accident. GEH has developed two tables that address these key design features. The first, Table 14.3-1B, includes those design features that are related to specific transient and accident analyses, such as ATWS, overpressure protection, containment, and emergency core cooling. The second, Table 14.3-1C addresses the design features key to PRA and severe accident insights, including core cooling, flooding, fire, management of molten debris, and RTNSS. GEH also is including a listing of the Tier 1 contents with an indication of which systems have ITAAC, Table 14.3-1A. These tables address the key design features discussed in Tier 1 meetings, as well as the information requested in the RAI.

GEH has included a paragraph in Section 14.3.2.1 to explain the purpose of the added tables. The tables will be included in Revision 6 Section 14.3 of Tier 2 and are included in the attachment herein. The RAI suggested that the format be similar to tables in the AP1000 DCD, Section 14.3, and GEH has used those tables as a template. However, as a matter of practice in preparing the DCD, GEH did not include values in the tables in order that no discrepancies will be created between these tables and other portions of Tier 2 where the analytical values are contained.

Additionally, during the development of Table 14.3-1c, PRA and Severe Accident Insights, GEH determined that additional ITAACs are necessary or exiting ITAAC needed to be changed in Tier 1 to address the key design features. The following provides the affected Tier 1 sections:

- Section 2.1.2 Nuclear Boiler System, Table 2.1.2-3, ITAAC 23
- Section 2.2.2 Control Rod Drive System, Design Description and Table 2.2.2-7, ITAAC 16a and 16b
- Section 2.2.4 Standby Liquid Control System, Design Description and Table 2.2.4-6, ITAAC 24 and 24b
- Section 2.2.14 Diverse Instrumentation and Controls, Design Description, Table 2.2.14-1 and Table 2.2.14-4, ITAAC 8
- Section 2.4.1 Isolation Condenser System, Design Description and Table 2.4.1-3, ITAAC 29a and 29b

- Section 2.4.2 Gravity Driven Cooling System, Design Description and Table 2.4.2-3, ITAAC 28a, 28b, 29a, 29b, 29c, and 29d
- Section 2.6.1 Reactor Water Cleanup/Shutdown Cooling System, Design Description and Table 2.6.1-2, ITAAC 10a and 10b
- Section 2.11.1 Turbine Main Steam System, Design Description and Table 2.11.1 1, ITAAC 11a and 11b
- Section 2.11.2 Condensate and Feedwater System, Design Description and Table 2.11.2-1, ITAAC 9a and 9b
- Section 2.13.8 Lighting Power Supply, Design Description and Table 2.13.8-1, ITAAC 7 and 9
- Section 2.15.1 Containment System, Table 2.15.1-2, ITAAC 9
- Section 2.15.3 Containment Internal Structure, Design Description and Table 2.15.3-2, ITAAC 9
- Section 2.16.3.1, Fire Barriers, Design Description and Table 2.16.3.1-1, ITAAC 5

DCD Impact:

The changes to the DCD, Tier 2 and Tier 1, are shown in the attached marked-up pages, in Enclosure 2.

Enclosure 2

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