



HITACHI

GE Hitachi Nuclear Energy

Richard E. Kingston
Vice President, ESBWR Licensing

PO Box 780 M/C A-65
Wilmington, NC 28402-0780
USA

T 910 675 6192
F 910 362 6192
rick.kingston@ge.com

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Subject: **Submittal of Response to Portion of NRC Request for Additional Information Letter No. 335 Related to ESBWR Design Certification - RAI Number 14.3-436 S02.**

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) response to a portion of the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) sent by NRC letter No. 335, dated April 30, 2009 (Reference 1).

Enclosure 1 provides the GEH response to the subject RAI as requested in Reference 1. Enclosure 2 contains the DCD changes to Tier 2 as a result of GEH's response to this RAI. Verified DCD changes associated with this RAI response are identified in the enclosed DCD markups by enclosing the text within a black box.

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

Sincerely,

Richard E. Kingston
Vice President, ESBWR Licensing

References:

1. MFN 09-309 - Letter from U.S. Nuclear Regulatory Commission to Jerald G. Head, *Request For Additional Information Letter No. 335 Related To ESBWR Design Certification Application*, dated April 30, 2009

Enclosures:

1. MFN 09-366 – Response to Portion of NRC Request for Additional Information Letter No. 335 Related to ESBWR Design Certification Application - RAI Number 14.3-436 S02
2. MFN 09-366 – Response to Portion of NRC Request for Additional Information Letter No. 335 Related to ESBWR Design Certification Application - RAI Number 14.3-436 S02 – DCD Markups

cc: AE Cabbage USNRC (with enclosures)
JG Head GEH/Wilmington (with enclosures)
DH Hinds GEH/Wilmington (with enclosures)
RE Kingston GEH/Wilmington (with enclosures)

eDRF Section 0000-0102-2282 (RAI 14.3-436 S02)

Enclosure 1

MFN 09-366

Response to Portion of NRC Request for

Additional Information Letter No. 335

Related to ESBWR Design Certification Application

RAI Number 14.3-436 S02

NRC RAI 14.3-436 S02

Question Summary: Tier 1 Section 3.3

Full text:

The staff finds that the changes made to the ITAAC/DAC in Tier 1 Section 3.3 are acceptable, except for the concerns that are identified below.

- The last bullet in the acceptance criteria for ITAAC item 2 limits the RSS to safety function allocations. The scope and methodology of NEDO-33220, Rev 2 is not limited to safety functions. Human performance is impacted by the integration of all responsibilities allocated to personnel. Thus, the RSS should identify the full scope of allocations as the plan does. Bullets should also be added for “A summary of AOF results” and “the process for refining and updating function allocations.”*
- The bullets in the acceptance criteria column for ITAAC item 5 do not agree with what was found to be acceptable in the IP NEDO-33267, Rev. 3, Section 5.1. The new bullets are not fully clear or complete. Thus, the bullets should be revised to match the IP.*
- The bullet that deals with laydown area in the acceptance criteria column for ITAAC item 7, should mention the MCR, RSSs and risk significant LCSs, as does the IP section for the results summary report.*

GEH Response

GEH will revise Tier 1, Section 3.3 to address the staff's concerns. The changes are shown in the attached markup and are discussed by ITAAC Design Commitment item number below.

ITAAC Item 2

The results summary elements were revised to include “A summary of AOF results” and “A description of the process for refining and updating functional allocations” to improve alignment with the key aspects of the corresponding implementation plan's results section. The addition of “A summary of AOF results” to the Acceptance Criteria addresses the staff's concern regarding the limitation of the results summary report to safety function allocations.

ITAAC Item 5

The results summary elements were revised to improve alignment with the key aspects of the corresponding implementation plan's results section.

ITAAC Item 7

The results summary element that deals with laydown areas was revised to explicitly include the MCR, RSS, and risk significant local control stations. This change improves alignment with the key aspects of the corresponding implementation plan's results section.

DCD Impact

DCD Tier 1, Section 3.3, Revision 5 will be revised as shown in the attached markup.

Enclosure 2

MFN 09-366

**Response to Portion of NRC Request for
Additional Information Letter No. 335
Related to ESBWR Design Certification Application
DCD Markups for RAI Number 14.3-436 S02**

Table 3.3-1~~2~~
ITAAC For Human Factors Engineering

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>2. Functional Requirements Analysis (FRA) is performed in accordance with the ESBWR HFE Functional Requirements Analysis Implementation Plan and Allocation of Functions (AOF) is performed in accordance with the ESBWR HFE Allocation of Functions Implementation Plan.</p>	<p>An inspection is performed on the FRA and AOF results summary report(s). {{Design Acceptance Criteria}}</p> <p align="center">3.3-8</p>	<p>A results summary report(s) exists that concludes that the FRA and AOF activities were conducted in accordance with the implementation plans and contains:</p> <ul style="list-style-type: none"> • Scope of the FRA. • Functional hierarchy for plant safety functions including the identification of Critical Safety Functions. • Plant systems and configurations that support safety functions. • Definition of high-level plant functions, their support needs, and monitoring parameters. • Scope of AOF. • Safety function allocations. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <ul style="list-style-type: none"> • A summary of AOF results. • A description of the process for refining and updating functional allocations. </div> <p>{{Design Acceptance Criteria}}</p> <p>The inspections, tests, analyses, and acceptance criteria for the Human Factors Engineering process address the ESBWR safety-related systems as defined in Table 2.2.10-1 and their associated safety-related functions.</p>

Table 3.3-12
ITAAC For Human Factors Engineering

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>5. Human Reliability Analysis (HRA) is performed in accordance with the ESBWR HFE Human Reliability Analysis Implementation Plan.</p>	<p>i. An inspection is performed on the HRA results summary report(s). {{Design Acceptance Criteria}}</p>	<p>i. A results summary report(s) exists that concludes that the HRA design was conducted in accordance with the implementation plan and contains:</p> <ul style="list-style-type: none"> • The scope of the HRA. • A list of risk-important human actions input to Human Factors activities. <p>{{Design Acceptance Criteria}} The inspections, tests, analyses, and acceptance criteria for the Human Factors Engineering process address the ESBWR safety-related systems as defined in Table 2.2.10-1 and their associated safety-related functions.</p>
	<p>ii. An inspection is performed on the final HRA results summary report(s).</p>	<p>ii. A final results summary report(s) exists that concludes that the HRA process was conducted in accordance with the implementation plan and contains:</p> <div style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> ☐ A reconciled list of risk important human actions input to Human Factors activities. ☐ A summary of how risk important human actions are addressed in the </div>

Table 3.3-1-2
ITAAC For Human Factors Engineering

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
		<p>Human Factors activities.</p> <ul style="list-style-type: none"> • <u>A list of potentially risk-important human actions, human interactions, and operational failure events and a summary of how these basic events and their associated tasks, and scenarios are addressed during the various phases of the design process.</u> • A summary <u>that demonstrates</u> of <u>how measures taken in the design keep risk-important actions below the risk important threshold</u> <u>risk management actions taken in the design keep the potentially risk-important human interactions as low as practical.</u> • Results <u>A discussion</u> of the validation of the HRA assumptions concluding that HRA assumptions are valid. <p>The inspections, tests, analyses, and acceptance criteria for the Human Factors Engineering process address the ESBWR safety-related systems as defined in Table 2.2.10-1 and their associated safety-related functions.</p>

Table 3.3-12
ITAAC For Human Factors Engineering

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
	summary report(s).	<p>Development process was conducted in accordance with the implementation plan and contains:</p> <ul style="list-style-type: none"> • A description of the plant procedures derived from ESBWR EPGs. • A list of procedures and procedure support equipment developed. • A description of how procedures are utilized, including operator access and use of hard copy and computer based procedures. • Technical basis for severe accident management. • A description of procedure storage and laydown areas for hardcopy procedure use in the MCR, RSS, and risk significant local control stations. • A description of the framework utilized for procedure maintenance and control of updates. <p>The inspections, tests, analyses, and acceptance criteria for the Human Factors Engineering process address the ESBWR safety related systems as defined in Table</p>