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MFN 07-014

Docket No. 52-010

January 31, 2007

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

Subject: **Response to Portion of NRC Request for Additional Information Letter No. 86 Related to ESBWR Design Certification Application – ESBWR Human Factors Engineering - RAI Numbers 18.0-1 through 18.0-4**

Enclosure 1 contains GE's response to the subject NRC RAIs transmitted via the Reference 1 letter.

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

Sincerely,

Kathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

D068

Reference:

1. MFN 06-518, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 86 Related to ESBWR Design Certification Application*, December 11, 2006

Enclosures:

1. MFN 07-014 – Response to Portion of NRC Request for Additional Information Letter No. 74 Related to ESBWR Design Certification Application –ESBWR Human Factors Engineering– RAI Numbers 18.0-1 through 18.0-4

cc: AE Cubbage USNRC (with enclosures)
David Hinds GE/Wilmington (with enclosures)
eDRF 0000-0063-0516

Enclosure 1

MFN 07-014

Response to Portion of NRC Request for

Additional Information Letter No. 86

Related to ESBWR Design Certification Application

ESBWR Human Factors Engineering

RAI Numbers 18.0-1 through 18.0-4

NRC RAI 18.0-1

Page 18.1-4 - Please explain why there is only one document (NEDO-33217) referenced given that there are numerous other "Plans" that pertain to the ESBWR HFE program.

GE Response

NEDO-33217, ESBWR Man Machine Interface System and Human Factors Engineering (HFE) Implementation Plan is the top-level guidance document for performing HFE duties. This document lists all the subset implementation plans including the hardware and software interfaces. These we consider to be lower level GE internal work plans that have been submitted under separate cover.

DCD Impact

No DCD changes will be made in response to this RAI.

NRC RAI 18.0-2

Page 18.1-5, Section 18.1.1.1 - Re: "...validation testing of dynamic control room prototypes." Provide the description of this validation activity including which testings were performed, when was the activity completed, and what were the results.

GE Response

The DCD statement is referring to future validation and verification testing that will be performed on the ESBWR simulators and Main Control Room prototype per NEDO-33276, HFE Validation and Verification (V&V) Implementation Plan. Additional dynamic simulation techniques will also be utilized as a human engineering design tool as stated in NEDO-33268 HSI Implementation Plan. As a prelude to these activities, other V&V testing for other Main Control Rooms such as Lungmen will be reviewed and appropriate results applied to the ESBWR activities.

The V&V plan provides for a continuous revolving reiteration of HSI/HFE checks and balances throughout the HFE design process.

DCD Impact

No DCD changes will be made in response to this RAI.

NRC RAI 18.0-3

Page 18.3-1. This section seems to discuss a review versus a plan that outlines a process. Please clarify if this guidance is for GE, the COL applicant, or both.

GE Response

We believe that your question refers to Section 18.3 Operating Experience Review and some of the phrasing that is used within.

NEDO-33262 ESBWR Operating Experience Review (OER) Implementation Plan (Human Factors) applies to the HFE design team with members comprised of both GE and the COL applicants. The OER obtains and analyzes information on the past performance of predecessor designs and in the case of a new plant such as the ESBWR, the evolution of the design comes from years of BWR experience and improvements. The ESBWR design builds upon the ABWR design and the SBWR design features. The engineered design features, experimental tests, new technology for operator monitoring & control, and lessons learned from previous operating experience provide the bases for improving the plant design and the Human System Interface (HSI) system.

In some instances, the phrasing appears to describe the plan content verses outlining a plan process. However, in these instances, the methodology discussed is appropriate for a plan document. Detailed content is provided in the OER implementation plan.

DCD Impact

No DCD changes will be made in response to this RAI.

NRC RAI 18.0-4

Page 18.13-1, Section 18.13.2 - Explain the role of RG 1.174, which is cited in the last paragraph of this section, in forming a "basis of the documentation strategy "

GE Response

Regulatory Guide 1.174 endorses the use of Probabilistic Reliability Assessment (PRA) for risk management, Defense-in-Depth and the use of the NRC Standard Review Plans (SRP) and related regulatory guides (RG) for determining safety impacts of proposed changes. To ensure that the new ESBWR design meets the regulatory requirements, the screening and processing endorsed in this RG will be used during the HFE design process. The existing HFE licensing topical reports address specific processes for implementing the regulatory guidance in RG 1.174. The overall methodology of our approach will be clarified, in our next revision to NEDO-33217, MMIS and HFE Implementation Plan.

The following HFE tasks reference RG 1.174:

- DCD Chapter 18.1 [pg. 18-3] discusses the ESBWR Defense-in-Depth and Diversity (D-D&D) methodology. NEDO-33251, July 2006, D-D&D report contains the details for the ESBWR design.
- DCD Chapter 18.3 discusses the ESBWR OER process for addressing risk important human actions (HA) from predecessor plants. [NEDO-33262}
- DCD Chapter 18.7 discusses the ESBWR approach for Human Reliability Analysis (HRA) and PRA. [NEDO-33267]

The following HFE tasks use the risk-based approach that is outlined in RG 1.174:

- DCD Chapter 18.8, Human System Interface Design [NEDO-33268]
- DCD Chapter 18.11, Human Factors Verification & Validation [NEDO-33276]
- DCD Chapter 18.13, Human Performance Monitoring [NEDO-33277]

DCD Impact

No DCD changes will be made in response to this RAI.

LTR NEDO-33217 Rev 1 will be revised as described above.