

GE Hitachi Nuclear Energy

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MFN 10-064

Docket No. 52-010

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

Subject: Transmittal of ESBWR Tier 2, Chapter 7 Design Control Document
Markups Related to GEH Internal Corrective Actions

The purpose of this letter is to submit markups to ESBWR DCD, Tier 2, Chapter 7 which are a result of GEH internal review and correction process but are not related to NRC Requests for Additional Information. Chapters 1 and 17 are also affected by these reference changes, previously sent in Reference 1, so they have been included in the enclosed change lists. Other non-chapter 7 changes in those chapters are being submitted under separate cover.

Enclosure 1 contains the change lists and markups to changes to DCD Tier 2 as a result of GEH's internal review of Chapter 7. The changes not previously submitted are boxed on the change list and markups.

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

Sincerely,

Richard E. Kingston

Vice President, ESBWR Licensing

Richard E. Kingston

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Reference:

1. MFN 09-803, Letter from Richard E Kingston to the U.S. Nuclear Regulatory Commission, "Response to NRC Request for Additional Information Letter No. 403 Related to ESBWR Design Certification Application – RAI 7.1-142" dated January 12, 2010.

Enclosures:

1. DCD Tier 2, Chapter change lists and markups

cc: AE Cubbage USNRC (with enclosures)

JG Head GEH/Wilmington (with enclosures)
DH Hinds GEH/Wilmington (with enclosures)
PM Yandow GEH/Wilmington (with enclosures)

EDRF Section 0000-0114-0749

Enclosure 1

MFN 10-064

DCD Tier 2, Chapter
Change Lists and Markups

Table 1.6-1
Referenced GE / GEH Reports

Report No.	Title	Section No.	
NEDO-33219	[GE Hitachi Nuclear Energy, "ESBWR Human Factors Engineering Functional Requirements Analysis Implementation Plan," NEDO-33219, Class I (Non-proprietary), Revision 3, April 2009.]*		
NEDE-33220P NEDO-33220	[GE Hitachi Nuclear Energy, "ESBWR Human Factors Engineering Allocation of Function Implementation Plan," NEDE-33220P, Class III (Proprietary), and NEDO-33220, Class I (Non- proprietary), Revision 3, May 2009.]*	18.4	
NEDE-33221P NEDO-33221	[GE Hitachi Nuclear Energy, "ESBWR Human Factors Engineering Task Analysis Implementation Plan," NEDE-33221P, Class I (Proprietary), and NEDO-33221, Class I (Non-proprietary), Revision 3, June 2009.]*	18.5	
NEDE-33226P NEDO-33226	[GE Hitachi Nuclear Energy, "ESBWR – Software Management Program Manual," NEDE-33226P, Class III (Proprietary), Revision 4, May 2009Revision 5, February 2010, and NEDO-33226, Class I (Non-proprietary), Revision 4, May 2009Revision 5, February 2010.]*	7.1, 7.2, 7.3, 7B	
NEDC-33237P NEDO-33237	[Global Nuclear Fuel, "GE14 for ESBWR – Critical Power Correlation, Uncertainty, and OLMCPR Development," NEDC-33237P, Class III (Proprietary), and NEDO-33237, Class I (Non- proprietary), Revision 4, July 2008.]*	4.4, Chapter 16 B2.1.1, B3.2.2	
NEDC-33238P NEDO-33238	Global Nuclear Fuel, "GE14 Pressure Drop Characteristics", NEDC-33238P, Class III (Proprietary), and NEDO-33238, Class I (Non- proprietary), December 2005.	4.4	
NEDC-33239P NEDO-33239	Design Report," NEDC-33239-P, Class III		

Table 1.6-1
Referenced GE / GEH Reports

Report No.	ort No. Title	
NEDC-33240P NEDO-33240	[Global Nuclear Fuel, "GE14E Fuel Assembly Mechanical Design Report," NEDC-33240P, Class III (Proprietary), and NEDO-33240, Class I (Non- proprietary), Revision 1, January 2009.]*	4.2
NEDC-33242P NEDO-33242	[Global Nuclear Fuel, "GE14 for ESBWR Fuel Rod Thermal-Mechanical Design Report," NEDC-33242P, Class III (Proprietary), and NEDO-33242, Class I (Non-proprietary), Revision 2, June 2009.]*	
NEDE-33243P	[GE Hitachi Nuclear Energy, "ESBWR Control Rod Nuclear Design," NEDE-33243P, Class III Chapter 1 (Proprietary), Revision 2, July 2008.]* B3.1.3	
NEDE-33244P	[GE Hitachi Nuclear Energy, "ESBWR Marathon Control Rod Mechanical Design Report," NEDE-33244P, Class III (Proprietary), Revision 1, November 2007]*.	
NEDE-33245P NEDO-33245	[GE Hitachi Nuclear Energy, "ESBWR – Software Quality Assurance Program Manual," NEDE-33245P, Class III (Proprietary), Revision 4, July 2009Revision 5, February 2010, and NEDO-33245, Class I (Non- proprietary), Revision 4, July 2009Revision 5, February 2010.]*	
NEDO-33251	GE Hitachi Nuclear Energy, "ESBWR I&C Diversity and Defense-In-Depth Report", NEDO-33251, Class I (Non-proprietary), Revision 2, May 2009.	
NEDE-33259P NEDO-33259	GE Hitachi Nuclear Energy, "Reactor Internals Flow Induced Vibration Program," NEDE-33259P, Class III (Proprietary), Revision 2, June 2009, and NEDO-33259, Class I (Non-proprietary), Revision 2, June 2009.	
NEDO-33260	GE Hitachi Nuclear Energy, "Quality Assurance Requirements for Suppliers of Equipment and Services to the GEH ESBWR Project," NEDO-33260, Revision 5, April 2008.	

ESBWR DCD Sections 1.1-1.11 26A6642AD Revision 6 to Revision 7 Change List

Item	Location	Description of Change
1.	T1.6-1, NEDE-33226P/NEDO-33226	Changed the revision status and issue date to Revision 5, February 2010 for consistency with the latest revision that was submitted in MFN 10-043. A markup of the change to this reference was submitted in MFN 10-064.
2.	T1.6-1, NEDE-33245P/NEDO-33245	Changed the revision status and issue date to Revision 5, February 2010 for consistency with the latest revision that was submitted in MFN 10-043. A markup of the change to this reference was submitted in MFN 10-064.
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7.1.7 COL Information

None.

7.1.8 References

- 7.1-1 (Deleted)
- 7.1-2 (Deleted)
- 7.1-3 (Deleted)
- 7.1-4 GE Hitachi Nuclear Energy, "ESBWR I&C Diversity and Defense-In-Depth Report." NEDO-33251, Class I (Non-proprietary), Revision 2, May 2009.
- 7.1-5 (Deleted)
- 7.1-6 (Deleted)
- 7.1-7 (Deleted)
- 7.1-8 [GE Hitachi Nuclear Energy, "ESBWR Cyber Security Program Plan," NEDE-33295P, Class III (Proprietary), Revision 1, <u>JulyOctober</u> 20079, and NEDO-33295, Class I (Non-Proprietary), Revision 1, <u>JulyOctober</u> 20079.]*
- 7.1-9 GE Hitachi Nuclear Energy, "GEH ABWR/ESBWR Setpoint Methodology," NEDE-33304P, Class III (Proprietary), Revision 123, NovDecemberFebruary 2009108, and NEDO-33304, Class II (Non-proprietary), Revision 123, NovDecemberFebruary 2008910.
- 7.1-10 [GE Hitachi Nuclear Energy, "ESBWR Software Quality Assurance Program Manual," NEDE-33245P, Class III (Proprietary), Revision 5, February 2010Revision 4, July 2009, and NEDO-33245, Class I (Non-Proprietary), Revision 5, February 2010Revision 4, July 2009.]*
- 7.1-11 GE Nuclear Energy, "General Electric Instrument Setpoint Methodology," NEDC-31336P-A, Class III (Proprietary), September 1996, and NEDO-31336-A, Class I (Non-proprietary), September 1996. (Deleted)
- 7.1-12 [GE Hitachi Nuclear Energy, "ESBWR Software Management Program Manual," NEDE-33226P, Class III (Proprietary), Revision 4, May 2009 Revision 5, February 2010, and NEDO-33226, Class I (Non-proprietary), Revision 4, May 2009 Revision 5, February 2010.]*

7.1-13 (Deleted)

References that are bracketed and italicized with an asterisk following the brackets are designated as Tier 2. Prior NRC approval is required to change.

7.2.3.4 Testing and Inspection Requirements

Proper functioning of analog temperature sensors is verified by channel cross-comparison during the plant normal operation mode. The bulk pool temperatures are continuously compared between divisions and indicated by the PCF.

Each of four SPTM safety-related divisions is testable during plant normal operation to determine the operational availability of the system. Each safety-related SPTM division has the capability for testing, adjustment, and inspection during a plant outage.

7.2.3.5 Instrumentation and Controls Requirements

The I&C requirements related to SPTM are addressed in Subsections 7.2.3.1 and 7.2.3.2.

7.2.4 COL Information

None.

7.2.5 References

7.2-1 GE Hitachi Nuclear Energy, "GEH ABWR/ESBWR Setpoint Methodology," NEDE-33304P, Class III (Proprietary), Revision 123, NovDecemberFebruary 2008910, and NEDO-33304, Class II (Non-proprietary), Revision 123, NovDecemberFebruary 2008910.

7.2-2 (Deleted)

- 7.2-3 [GE Hitachi Nuclear Energy, "ESBWR Software Management Program Manual," NEDE-33226P, Class III (Proprietary), Revision 4, May 2009 Revision 5, February 2010, and NEDO-33226, Class I (Non-proprietary), Revision 4, May 2009 Revision 5, February 2010.]*
- 7.2-4 [GE Hitachi Nuclear Energy, "ESBWR Software Quality Assurance Program Manual)," NEDE-33245P, Class III (Proprietary), Revision 4, July 2009 Revision 5, February 2010, and NEDO-33245, Class I (Non-proprietary), Revision 4, July 2009 Revision 5, February 2010.]*

^{*}References that are bracketed and italicized with an asterisk following the brackets are designated as Tier 2*. Prior NRC approval is required to change.

7.3.8 References

- 7.3-1 (Deleted)
- 7.3-2 GE Hitachi Nuclear Energy, "GEH ABWR/ESBWR Setpoint Methodology," NEDE-33304P, Class III (Proprietary), Revision 123, NovDecemberFebruary 2009810, and NEDO-33304, Class II (Non-proprietary), Revision 123, NovDecemberFebruary 2008910.
- 7.3-3 [GE Hitachi Nuclear Energy, "ESBWR Software Management Program Manual," NEDE-33226P, Class III (Proprietary), Revision-45, May-February 200910, and NEDO-33226, Class I (Non-proprietary), Revision 45, MaFebruary 200910.]*
- 7.3-4 [GE Hitachi Nuclear Energy, "ESBWR Software Quality Assurance Program Manual," NEDE-33245P, Class III (Proprietary), Revision 45, JulFebruary 200910, and NEDO-33245, Class I (Non-proprietary), Revision 45, JulFebruary 20092010.]*

7.3-5 (Deleted)

References that are bracketed and italicized with an asterisk following the brackets are designated as Tier 2. Prior NRC approval is required to change.

7.8.5 Instrumentation and Control Requirements

The ATWS/SLC uses logic that is diverse from the RPS. Logic and controls for ATWS/SLC are located in divisional RTIF cabinets. Operating status is available to the operator in the MCR. Division of sensors bypass capability is provided for the ATWS/SLC logic. Communication with external interfaces is through isolation devices. Provisions are made to allow testing of the ATWS/SLC logic and maintenance of the ATWS/SLC equipment.

The DPS uses triple redundant microprocessor-based automatic actuation logic that is diverse from the RPS and SSLC/ESF automatic actuation logic.

The information available to the operator from the diverse I&C systems is described in Subsection 7.8.1.3.

7.8.6 COL Information

None.

7.8.7 References

- 7.8-1 GE Hitachi Nuclear Energy, "ESBWR I&C Diversity and Defense-In-Depth Report," NEDO-33251, Class I (Non-proprietary), Revision 2, May 2009.
- 7.8-2 NUREG/CR-6303, "Method for Performing Diversity and Defense-in-Depth Analyses of Reactor Protection Systems, December 1994
- 7.8-3 [GE Hitachi Nuclear Energy, "ESBWR Software Quality Assurance Program Manual," NEDE-33245P, Class III (Proprietary), Revision 4, July 2009 Revision 5, February 2010, and NEDO-33245, Class I (Non-proprietary), Revision 4, July 2009 Revision 5, February 2010.]*
- 7.8-4 GE Hitachi Nuclear Energy, "GEH ABWR/ESBWR Setpoint Methodology," NEDE-33304P, Class III (Proprietary), Revision 123, NovDecemberFebruary 2009108, and NEDO-33304, Class II (Non-proprietary), Revision 123, NovDecemberFebruary 2009108.
- *References that are bracketed and italicized with an asterisk following the brackets are designated as Tier 2*. Prior NRC approval is required to change.

7B.2 TREATMENT OF SYSTEMS DESIGNATED AS RTNSS

Table 19A-2 defines the structures, systems, and components (SSC) that perform significant safety, special event, or post-accident recovery functions that will be subject to additional regulatory oversight under the RTNSS program. The N-DCIS network segment SSC that perform these RTNSS functions are identified Table 7B-2. RTNSS SSC are subject to Maintenance Rule (10 CFR 50.65), the Availability Control Manual (ACM; Chapter 19, Appendix ACM), and verification by the inspections, tests, analyses, and acceptance criteria (ITAAC) in Tier 1. RTNSS SSC follow existing design processes. Thus, the software development process does not distinguish between RTNSS and non-RTNSS SSC. RTNSS SSC are developed using the software classification assigned to the network segment. The SQAPM (reference 7B.3-2) describes software classification.

7B.3 REFERENCES

- 7B.3-1 [GE Hitachi Nuclear Energy, "ESBWR Software Management Program Manual," NEDE-33226P, Class III (Proprietary), Revision 4, May 2009 Revision 5, February 2010, and NEDO-33226, Class I (Non-proprietary), Revision 4, May 2009 Revision 5, February 2010.]*
 - 7B.3-2 [GE Hitachi Nuclear Energy, "ESBWR Software Quality Assurance Program Manual," NEDE-33245P, Class III (Proprietary),—Revision 4, July 2009 Revision 5, February 2010, and NEDO-33245, Class I (Non-proprietary),—Revision 4, July 2009 Revision 5, February 2010.]*
 - 7B.3-3 [GE Hitachi Nuclear Energy, "ESBWR Cyber Security Program Plan," NEDE-33295P, Class III (Proprietary), Revision 1, July 2009Revision 5, February 2010, and NEDO-33295, Class I (Non-proprietary), Revision 1, July 2009Revision 5, February 2010.]*
 - 7B.3-4 [GE Hitachi Nuclear Energy, "ESBWR Man-Machine Interface System And Human Factors Engineering Implementation Plan," NEDE-33217P, Revision 5, Class III (Proprietary), Revision 6, April 2009February 2010, and NEDO-33217, Revision 5, Class I (Non-Proprietary), Revision 6, February 2010April 2009.]*

^{*}References that are bracketed and italicized with an asterisk following the brackets are designated as Tier 2*. Prior NRC approval is required to change.

ESBWR DCD Tier 2 Chapter 7

26A6642AW Revision 6 to Revision 7 Change List

Item	Location	Description of Change
1.	Entire Chapter	Global chapter editorial changes to correct misspelling and grammar, spell out or integrate acronyms where appropriate, and update references as needed and where required.
2.	Entire Chapter	Changed the sequence of the 10 CFR references in all "Safety Evaluation / Code of Federal Regulations" paragraphs.
3.	S7.1.8, Reference 7.1-9	Deleted "ABWR/" from report title.—Changed "Revision 1, November 2008" to "Revision 3, February 2010" in two locations per_Reference for NEDO-33304 and NEDE-33304P were updated to indicate latest revision submitted in MFN-09-775 Rev 1 in response to RAI 7.1-141 Rev 1.
4	S7.1.8, Reference 7.1-10	Reference for NEDO-33245 and NEDE-33245P were updated to indicate latest revision submitted in MFN-10-043. DCD changes reflecting this reference update were submitted in MFN-10-064.
5	S7.1.8, Reference 7.1-12	Reference for NEDO-33226 and NEDE-33226P were updated to indicate latest revision submitted in MFN-10-043. DCD changes reflecting this reference update were submitted in MFN-10-064.
<u>4.6.</u>	S7.2.5, Reference 7.2-1	Deleted "ABWR/" from report title. Reference for NEDO-33304 and NEDE-33304P were updated to indicate latest revision submitted in MFN-09-775 Rev 1 in response to RAI 7.1-141 Rev 1. Deleted "ABWR/" from report title. Changed "Revision 1, November 2008" to "Revision 3, February 2010" in two locations per response to RAI 7.1-141 Rev 1.
7.	S7.2.5, Reference 7.2-3	Reference for NEDO-33226 and NEDE-33226P were updated to indicate latest revision submitted in MFN-10-043. DCD changes reflecting this reference update were submitted in MFN-10-064.
8	S7.2.5, Reference 7.2-4	Reference for NEDO-33245 and NEDE-33245P were updated to indicate latest revision submitted in MFN-10-043. DCD changes reflecting this reference update were submitted in MFN-10-064.

Item	Location	Description of Change
<u>5.9.</u>	S7.3.8, Reference 7.3-2	Deleted "ABWR/" from report title. Reference for NEDO-33304 and NEDE-33304P were updated to indicate latest revision submitted in MFN-09-775 Rev 1 in response to RAI 7.1-141 Rev 1.Deleted "ABWR/" from report title. Changed "Revision 1, November 2008" to "Revision 3, February 2010" in two locations per response to RAI 7.1-141 Rev 1.
10.	S7.3.8, Reference 7.3-3	Reference for NEDO-33226 and NEDE-33226P were updated to indicate latest revision submitted in MFN-10-043. DCD changes reflecting this reference update were submitted in MFN-10-064.
11.	S7.3.8, Reference 7.3-4	Reference for NEDO-33245 and NEDE-33245P were updated to indicate latest revision submitted in MFN-10-043. DCD changes reflecting this reference update were submitted in MFN-10-064.
6. 12.	T7.3-4, 3 rd row	Revised in response to RAI 7.3-18 (MFN#09-708); included RPV water level 0.5 parameter to be consistent with S7.3.1.2.2.
7. 13.	S7.4.4.3, 6 th paragraph	Revised in response to RAI 16.2-189 (MFN#09-672); for the IC/PCCS cross-connect valves, clarified that the number of load drivers referenced is "per initiator" and also clarified the number of initiators for each valve.
<u>8.</u> 14.	S7.4.4.3, 6 th paragraph, 5 th sentence	Changed "in either of the IC/PCCS inner expansion pools to provide" to "in the IC/PCCS inner expansion pool to which they are connected to provide" in response to RAI 19.5-16 (MFN#09-783).
<u>9.15.</u>	S7.4.7, Reference 7.4-2	Deleted "ABWR/" from report title. Reference for NEDO-33304 and NEDE-33304P were updated to indicate latest revision submitted in MFN-09-775 Rev 1 in response to RAI 7.1-141 Rev 1.Deleted "ABWR/" from report title. Changed "Revision 1, November 2008" to "Revision 3, February 2010" in two locations per response to RAI 7.1-141 Rev 1.
10. 16.	S7.5.5, IC/PCCS Expansion Pools, 2 nd paragraph, 2 nd sentence	Changed "is detected in either of the IC/PCCS inner expansion pools to provide" to "is detected in the IC/PCCS inner expansion pool to which the valves are connected to provide" in response to RAI 19.5-16 (MFN#09-783).

Item	Location	Description of Change
11. 17.	S7.5.8, Reference 7.5-2	Deleted "ABWR/" from report title. Reference for NEDO-33304 and NEDE-33304P were updated to indicate latest revision submitted in MFN-09-775 Rev 1 in response to RAI 7.1-141 Rev 1.Deleted "ABWR/" from report title. Changed "Revision 1, November 2008" to "Revision 3, February 2010" in two locations per response to RAI 7.1-141 Rev 1.
<u>12.</u> 18.	S7.8.1.2.5, 1 st paragraph, third bullet	Changed "detected in either of the IC/PCCS inner expansion pools" to "is detected in the IC/PCCS inner expansion pool to which the valves are connected." in response to RAI 19.5-16 (MFN#09-783).
<u>19.</u>	S7.8.7, Reference 7.8-3	Reference for NEDO-33245 and NEDE-33245P were updated to indicate latest revision submitted in MFN-10-043. DCD changes reflecting this reference update were submitted in MFN-10-064.
13. 20.	S7.8.7, Reference 7.8-4	Deleted "ABWR/" from report title. Reference for NEDO-33304 and NEDE-33304P were updated to indicate latest revision submitted in MFN-09-775 Rev 1 in response to RAI 7.1-141 Rev 1.Deleted "ABWR/" from report title. Changed "Revision 1, November 2008" to "Revision 3, February 2010" in two locations per response to RAI 7.1-141 Rev 1.
14. 21.	S7B.1, new 8 th , 9 th and 10 th paragraphs	Added 3 new paragraph at the end of this Section to; 1) define "digital computer-based plant process control and monitoring devices, equipment and systems", 2) identify what types of digital computer based systems are not within the scope of the project software plans, and 3) identify what types of digital computer based systems are within the scope of the project software plans (specifically safety related and RTNSS systems) in response to RAI 7.1-142 (MFN#09-803).
22.	S7B.3, Reference 7B.3-1	Reference for NEDO-33226 and NEDE-33226P were updated to indicate latest revision submitted in MFN-10-043. DCD changes reflecting this reference update were submitted in MFN-10-064.
23.	S7B.3, Reference 7B.3-2	Reference for NEDO-33245 and NEDE-33245P were updated to indicate latest revision submitted in MFN-10-043. DCD changes reflecting this reference update were submitted in MFN-10-064.

Item	Location	Description of Change
<u>15.</u> 24.	S7B.3, new 4 th reference (7B.3-4).	Add 7B.3-4, "ESBWR Man-Machine Interface System And Human Factors Engineering Implementation Plan," NEDE-33217P, Revision 5, Class III, April 2009, and NEDO-33217, Revision 5, Class I, April 2009 in response to RAI 7.1-142 (MFN#09-803).
25.	S7B.3, Reference 7B.3-4	Reference for NEDO-33217 and NEDE-33217P were updated to indicate latest revision submitted in MFN-10-029. DCD changes reflecting this reference update were submitted in MFN-10-062.

17.1.25 References

- 17.1-1 GE Nuclear Energy, "GE Nuclear Energy Quality Assurance Program Description," NEDO-11209-04A, Revision 8, March 1989.
- 17.1-2 [GE Hitachi Nuclear Energy, "ESBWR Software Quality Assurance Program Manual," NEDE-33245P, Class III (Proprietary), Revision 5, February 2010Revision 4, July 2009, and NEDO-33245, Class I (Non-proprietary), Revision 5, February 2010Revision 4, July 2009.]*
- 17.1-3 GE Hitachi Nuclear Energy, "NP-2010 COL Demonstration Project Quality Assurance Program," NEDO-33181, Revision 6, August 2009.
- *References that are bracketed and italicized with an asterisk following the brackets are designated as Tier 2*. Prior NRC approval is required to change.

ESBWR DCD Tier 2 Chapter 17 26A6642BW Revision 6 to Revision 7 Change List

Item	Location	Description of Change
1.	Entire Chapter	Global chapter editorial changes to correct misspelling and grammar, spell out or integrate acronyms where appropriate, and update references as needed and where required.
2.	S17.1.25	Reference for NEDE-33245P and NEDO-33245 was updated to indicate latest revision (submitted in MFN-10-043 with DCD pages submitted in MFN 10-064). No further DCD changes to Chapter 17 were required as a result of this reference update.