



GE Energy

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MFN 06-307
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. 46 Related to ESBWR Design Certification Application –
Seismic and Dynamic Qualification of Equipment - RAI Numbers
3.10-1 S01 through 3.10-5 S01**

Enclosure 1 contains GE's response to the subject NRC RAIs transmitted via e-mail from the NRC on 10/30/06. GE's original response to these RAIs are contained in the Reference 1 letter.

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

Sincerely,

A handwritten signature in cursive script that reads "James C. Kinsey for".

James C. Kinsey
Project Manager, ESBWR Licensing

Enclosure:

1. MFN 06-307, Supplement 1 - Response to Portion of NRC Request for Additional Information Letter No. 46 Related to ESBWR Design Certification Application – Seismic and Dynamic Qualification of Equipment - RAI Numbers 3.10-1 S01 through 3.10-5 S01

Reference:

1. MFN 06-307, Letter from David H. Hinds to U. S. Nuclear Regulatory Commission, *Response to NRC Request for Additional Information Letter No. 46 Related to ESBWR Design Certification Application – Seismic and Dynamic Qualification of Equipment - RAI Numbers 3.10-1 through 3.10-6*, September 1, 2006

cc: AE Cabbage USNRC (with enclosures)
DH Hinds GE (with enclosures)
RE Brown GE (w/o enclosures)
eDRF 0000- 0064-2486/1

Enclosure 1

MFN 06-307, Supplement 1

Response to Portion of NRC Request for

Additional Information Letter No. 46

Related to ESBWR Design Certification Application

Seismic and Dynamic Qualification of Equipment

RAI Numbers 3.10-1 S01 through 3.10-5 S01

Original Responses previously submitted under MFN 06-307 without DCD updates are included to provide historical continuity during review.

NRC RAI 3.10-1

Explain the absence of compliance to meet the requirements in Appendix S to 10 CFR Part 50 in Section 3.10, "Seismic and Dynamic Qualification of Mechanical and Electrical Equipment," of ESBWR DCD/Tier 2.

GE Response

ESBWR design will meet the 10CFR 50 Appendix S.

The DCD Subsection 3.10 (1) will be revised as noted in the attached markup.

NRC RAI 3.10-1 S01

Response added 10CFR50, App. S to the requirements in DCD Section 3.10. Did you intend to leave 10CFR100 Appendix A in Section 3.10?

GE Response

Please see response to RAI 3.9-3 (MFN 07-137)

DCD Impact

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

NRC RAI 3.10-2

For seismic and dynamic qualification of mechanical and electric equipment in ESBWR, the Design Control Document (DCD)/Tier 2 listed the following three versions of IEEE-344 Standards as the guidelines to be followed: (1) IEEE-344-2004, (2) Regulatory Guide (RG) 1.100, Revision 2, 1988, which endorses the IEEE-344-1987 with some conditions, and (3) Section 4.4 of GE Environmental Qualification Program, NEDE-24326-1-P, January 1983, which used IEEE-344-1975 as its guidelines. Specifically state which parts (chapters or sections) of each version of IEEE-344 guidelines that ESBWR DCD/Tier 2 will meet. Note that IEEE-344-2004 has not been endorsed by RG 1.100 (will be done in the near future) and the staff does not endorse Section 10 (Experience) of IEEE-344-2004 in its entirety.

GE Response

ESBWR will meet the IEEE-344-1987 Standard.

The DCD Table 1.9-22 will be revised as noted in the attached markup.

NRC RAI 3.10-2 S01

The response revises DCD Table 1.9-22 to replace the 2004 version of IEEE-344 with the 1987 version, and it added (R1993) and a note that more recent versions of IEEE-344 exist. The response also removes 2004 from IEEE-344 on DCD page 3.10-1. What is the purpose of adding (R1993) and the note to Table 1.9-22? Please address in DCD Section 3.10 if you commit to the conditions that Regulatory Guide 1.100, Rev. 2, places on IEEE-344-1987.

GE Response

(R1993) means that the committee reaffirmed the 1993 edition without any changes that year. IEEE-344-1987 (R1993) meets the Regulatory Guide 1.100 Rev. 2 (dated 6/88).

DCD Impact

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

NRC RAI 3.10-3

Subsection 4.4.3, Operating Experience, of Section 4.4 of GE report, NEDE-24326-1-P (dated January 1983), provides a definition of "operating experience" for environmental qualification of equipment. The 1987 version and 2004 version of IEEE-344 Standards also provide guidelines for "Qualification by Experience," including both earthquake experience data and test experience data. In the application, you made a commitment to meet the requirements of IEEE-344. Clarify, in sufficient detail, whether the database documents described in NEDE-24326-1-P are consistent with and satisfy the requirements in the IEEE-344 Standards. Discuss the level of documentation currently available for the cited experience database for seismic and dynamic qualification of mechanical and electrical equipment. Also, discuss whether such documentation is sufficiently complete for staff audit/review.

GE Response

GE does not utilize "operating experience" for equipment qualification. Furthermore, GE does not maintain any database for operating experience.

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

NRC RAI 3.10-3 S01

The response states that GE does not use 'operating experience' for equipment qualifications. What does GE mean by 'operating experience'; does it include both earthquake and test experience? If you don't maintain any operating experience database, why was 'operating experience' left in DCD Section 3.10.2.4? If operating experience isn't used, why isn't DCD Section 3.10.2.4 deleted? If using test experience as a method for qualification, please respond to RAI's 3.10-3, -4 and -5 from that perspective including the last three items in RAI 3.10-4.

E-mail from Larry Rossbach: NRC can not approve the design certification with open-ended answers. If "Qualification by Experience" is an option in the DCD, provide responses to RAIs 3.10-3, 4, and 5 in detail so that the staff can make a determination whether GE's approach is acceptable or not.

GE Response

GE does not use, "Operating experience" as a basis for equipment qualifications. GE shall use test, analysis, or test and analysis as explained in NRC RAI 3.11-1 response (MFN 07-174).

DCD Impact

DCD Tier #2, Section 3.10.2.4 has been deleted.

NRC RAI 3.10-4

In Section 3.10.2.4 (Qualification by Experience) of the ESBWR DCD/Tier 2, the application states that the methods outlined in IEEE-344 are followed. Clarify which version of IEEE-344 you commit to follow. As indicated in RAI 3.10-2 above, some aspects of the criteria provided in Section 10 (Experience) of IEEE-344-2004 are not acceptable to the NRC staff. For examples, the staff does not agree with: (1) the use of median centered spectra to define the required response spectra for a candidate equipment, (ii) inadequate provisions for meeting the operating basis earthquake (OBE) requirements, (iii) the use of "mean" of test response spectra to define the test experience spectra (TES), (iv) inadequate provisions for meeting OBE TES requirements, and (v) inadequate provisions for the demonstration of operability during and after the safe shutdown earthquake loads and Service Level D reactor building vibration dynamic loads. Having noted some unacceptable criteria provided in IEEE-344-2004 as described above, (1) discuss, in detail, the criteria and procedures for seismic and dynamic qualification of electric equipment by experience for ESBWR, including the experience database and all pertinent references for the experience database; (2) state whether you intend to commit to particular industry Standard guidelines for seismic qualification of ESBWR mechanical equipment by experience, and discuss the experience database and all pertinent references for the experience database; and (3) state at what stage the specific detailed experience database documents will be available for staff audit/review.

GE Response

GE does not utilize operating experience for equipment qualification. Furthermore, GE does not maintain a database for operating experience.

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

NRC RAI 3.10-4 S01

The response states that GE does not use 'operating experience' for equipment qualifications. What does GE mean by 'operating experience'; does it include both earthquake and test experience? If you don't maintain any operating experience database, why was 'operating experience' left in DCD Section 3.10.2.4? If operating experience isn't used, why isn't DCD Section 3.10.2.4 deleted? If using test experience as a method for qualification, please respond to RAI's 3.10-3, -4 and -5 from that perspective including the last three items in RAI 3.10-4.

E-mail from Larry Rossbach: NRC can not approve the design certification with open-ended answers. If "Qualification by Experience" is an option in the DCD, provide responses to RAIs 3.10-3, 4, and 5 in detail so that the staff can make a determination whether GE's approach is acceptable or not.

GE Response

Please see response to RAI 3.10-3 S01.

DCD Impact

As described in response to RAI 3.10-3 S01.

NRC RAI 3.10-5

In Section 3.10.4 (Combined Operation License Information) of the ESBWR DCD/Tier 2, the application states that the qualification records including reports for equipment included in Subsection 3.10.2.1 and 3.10. 2.2 shall be maintained in a permanent file and shall be readily available for audit. However, the application did not address the qualification records for equipment included in Subsections 3.10.2.3 and 3.10.2.4, or their availability for audit. Please discuss the availability of qualification records and reports for equipment included in Subsections 3.10.2.3 and 3.10.2.4, for the purpose of staff review/audit.

GE Response

The DCD Subsections 3.10.2.3 and 3.10.2.4 will be revised to include “Qualification Documentation” and “Documentation of Qualification” as noted in the attached markup.

The DCD Subsection 3.10.4 will also be revised to include sections 3.10.2.3 and 3.10.2.4 as noted in the attached markup.

NRC RAI 3.10-5 S01

The response states that GE does not use 'operating experience' for equipment qualifications. What does GE mean by 'operating experience'; does it include both earthquake and test experience? If you don't maintain any operating experience database, why was 'operating experience' left in DCD Section 3.10.2.4? If operating experience isn't used, why isn't DCD Section 3.10.2.4 deleted? If using test experience as a method for qualification, please respond to RAI's 3.10-3, -4 and -5 from that perspective including the last three items in RAI 3.10-4.

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GE Response

Please see response to RAI 3.10-3 S01.

DCD Impact

As described in response to RAI 3.10-3 S01.