

June 1, 2006

Mr. David Hinds, Manager, ESBWR
General Electric Company
P.O. Box 780, M/C L60
Wilmington, NC 28402-0780

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 30 RELATED TO
ESBWR DESIGN CERTIFICATION APPLICATION

Dear Mr. Hinds:

By letter dated August 24, 2005, General Electric Company (GE) submitted an application for final design approval and standard design certification of the economic simplified boiling water reactor (ESBWR) standard plant design pursuant to 10 CFR Part 52. The Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed design.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter. This RAI concerns "Human Factors Engineering," Chapter 18 of Tier 2 of the ESBWR design control document. This RAI was sent to you via electronic mail on April 4, 2006. The RAIs were discussed with you during a telecon on May 15, 2006. You agreed to respond to these RAIs by June 15, 2006.

If you have any questions or comments concerning this matter, you may contact me at (301) 415-207 or lnq@nrc.gov, Amy Cabbage at (301) 415-42875 or aec@nrc.gov, Lawrence Rossbach at (301) 415-2863 or lwr@nrc.gov, or Martha Barillas at (301) 415-4115 or mcb@nrc.gov.

Sincerely,

/RA/

Lauren Quiñones, Project Manager
ESBWR/ABWR Projects Branch
Division of New Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 52-0010

Enclosure: As stated

cc: See next page

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ACCESSION NO. ML061520022

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DATE	06/01/2006	06/01/2006

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Distribution for DCD RAI Letter No. 30 dated June 1, 2006

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Request for Additional Information - ESBWR DCD Chapter 18

RAI Number	Reviewer	Question Summary	Full Text
18.3-1	Bongarra J	Clarify if operational experience (OE) from isolation condensers in current BWR fleet will be included in the ESBWR operational experience review (OER).	Section 1.2, Scope, notes that an OER was performed as part of the first-of-a-kind engineering (FOAKE) effort for the ABWR and that results are documented in the ABWR system functional requirements analysis (SFRA) reports for each system. Older BWRs use Isolation (or Emergency) Condensers. Current BWR fleet experience with isolation condenser systems would not have been applicable to the ABWR, but their experience will be pertinent to ESBWR. Please clarify whether this area will be included in the ESBWR OER and that the ABWR SFRA reports will be provided as part of the OER results.
18.3-2	Bongarra J	Clarify definition of terms.	Section 1.3, Definition of Terms, There are two different definitions for the term "diagnosis." Please clarify.
18.3-3	Bongarra J	Explain why OE from existing ABWR plants was not addressed in NEDO-33262.	For the ESBWR there are three predecessor ABWR plants that have been operating for several years and three additional ABWRs are in design and construction stages. NEDO-33262 does not specifically address the important area operating experience for ABWRs. Please address.
18.3-4	Bongarra J	Include missing citations in reference documents.	Section 2.1, does not identify supporting documents for previously cited ABWR lessons-learned material. Please explain/include.
18.3-5	Bongarra J	Revise outdated standard cited.	Section 2.2, references IEEE- STD 1023 which was revised in 2004. Please cite most recent version.

RAI Number	Reviewer	Question Summary	Full Text
18.3-6	Bongarra J	Explain terminology in Section 4.2.	Section 4.2, p.21. Please explain what is meant by the sentence, “The functional and physical designs of these systems will be segmented to inhibit the propagation of failures across major functions.”
18.3-7	Bongarra J	Explain derivation of “mean time between MMIS [man-machine interface system] equipment failures...”	Section 4.1. Please explain the derivation and definition of “mean time between MMIS equipment failures...” Explain if there is a design standard or precedent for the five year value.
18.3-8	Bongarra J	Explain application of App. A to ESBWR.	Appendix A of NEDO-33262, Example Identification of Human Interactions from Event Experience Related to BWRs, provides a detailed example of an OER of current BWR plants related to shutdown operations. Please explain how this has been or will be applied to the ESBWR.
18.3-9	Bongarra J	Clarify incomplete sentence in Appendix A-1.	Appendix A-1, page 26. The sentence that begins, “These events are directly related to losses...” appears incomplete. Please clarify.
18.3-10	Bongarra J	Update Appendix A references.	Appendix A.3.2, page 31. Please explain references to INPO O&MR-272, 365, etc. Reference to these citations do not appear in the references section of the Appendix.

RAI Number	Reviewer	Question Summary	Full Text
18.3-11	Bongarra J	Clarify if NEDO-33217 includes Attachment 1 to DCD Chapter 18 Table 18E-1.	In discussing lessons learned from a review of previous nuclear power plant MMIS designs, both Section 1.2, Scope, and Section 3, Methods for Review of Operating Experience, refer to Attachment 1 to DCD Chapter 18 Table 18E-1. However, the referenced attachment is not included in revision 1 of DCD Chapter 18. Appendix 18E has the following statement: This appendix is now replaced with the GEEN Report NEDO-33217 provided under separate cover. Please clarify if NEDO-33217 includes Attachment 1 to DCD Chapter 18 Table 18E-1. If yes, please provide correct reference and update the OER plan.
18.3-12	Bongarra J	Explain parenthetical references	In several places, NEDO-33262 contains parenthetical references, such as: [TJ9] and [GWH10], that are not discussed or defined. Please clarify the purpose of these references.
18.3-13	Bongarra J	Clarify commitment to perform personnel interviews for OE.	There is not a clear commitment in NEDO-33262 to perform personnel interviews to obtain operating experience information nor is it clear who will actually be interviewed. NEDO-33262 also does not address personnel interviews to specifically determine the operating experience related to the ABWR plants or systems. Please provide this information.
18.3-14	Bongarra J	Elaborate on treatment of risk-important human actions in OER.	NEDO-33262 discusses risk-important human actions briefly in Sections 4.3 and 5.1. Section 4.3 notes that the human factors engineering (HFE) issue tracking system (ITS) will capture support data for the risk-important human actions, but it is not clear how this will be done. Please elaborate. Section 5.1 discusses events in the HFE tracking system, how they will be evaluated during the design process, and the development of a human action evaluation report. However, please clarify how and what information related to the risk-important actions will be gathered during the OER.

RAI Number	Reviewer	Question Summary	Full Text
18.3-15	Bongarra J	Clarify statement on tracking system.	Section 5.1, "Events Tracking System," of NEDO-33262 states that, "Events in the tracking system will be compared with the probabilistic risk assessment (PRA)/human reliability analysis (HRA) for Risk-Important Human Actions that have been identified as different from the PRA analysis or where interpretation errors have occurred." Please clarify or explain this statement.
18.3-16	Bongarra J	Explain classification scheme.	Section 3.3.2 of NEDO 33262 is titled "Classification." Please clarify what is being classified, the purpose of the classification, and the levels to be used in the classification scheme.
18.3-17	Bongarra J	Clarify application of OER to all aspects of human performance.	Section 3.3.3 should clarify whether the OER analysis will identify enhancements for all aspects of human performance and not just the human-system interaction (HSI), such as plant design, procedures, and training.
18.3-18	Bongarra J	Clarify summary report statement.	Section 5.3, "Summary of Results," of NEDO-33262 states the following: "Reports that summarize the various report documenting the analysis of operating experience in the tracking system, which identifies the human performance issues, problems and sources of human error, will describe the design elements that support and enhance human performance." The meaning of this sentence is not clear. Please clarify.

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18.3-19	Bongarra J	Provide a commitment to a complete summary report.	<p>Section 5.3, "Summary of Results," seems to limit the OER Summary Report to describing what is in the HFE Issue Tracking System. The report should be broader in that it describes the OER that was performed and the results of this review. For example, a few items noted in the text of the NEDO that would be appropriate to include are:</p> <ol style="list-style-type: none"> 1. "A Review this FOAKE OER will be used to identify those OER issues already incorporated through the experience of previous BWR and ABWR designs, and those issues, which need additional attention." 2. "... OER information to help allocate human factor issues to manual, shared or automated for those cases that have been illuminated by past events." 3. "... recognized industry HFE issues such as those documented in NRC documents such as NUREG-0933 and NUREG/CR-4600 will be addressed." 4. Bulleted items in Section 1.2, Scope. <p>Provide a commitment to a complete summary report.</p>
18.3-20	Bongarra J	Identify criteria for inputting issues into tracking system.	<p>Throughout NEDO-33262, various issues that will be input into the HFE ITS are mentioned. However, there does not appear to be any one place that specifically defines what the criteria will be used to decide what will go into the ITS. This should be clearly stated, for example in Section 3.3.3. Please provide this information.</p>

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18.3-21	Bongarra J	Update scope of OER in DCD Chapter 18.	DCD Chapter 18 currently does not address the full scope of an OER as explained in NEDO-33262 and in NUREG-0711. Chapter 18 should be modified to agree with NEDO-33262 and to address changes that may be made in response to the other OER RAIs.

ESBWR

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