

June 7, 2007

Mr. Timothy O'Neil  
Manager, ABWR Projects  
General Electric Company  
1989 Little Orchard Street, M/C 780  
San Jose, CA 95125

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RELATED TO ADVANCED  
BOILING WATER REACTOR (ABWR) LICENSING TOPICAL REPORT  
(TAC NO. MD4632)

Dear Mr. O'Neil:

By letter dated February 22, 2007, General Electric Company (GE) submitted an ABWR Licensing Topical Report (LTR) for the U.S. Nuclear Regulatory Commission (NRC) review and approval for a change to the current ABWR certified design, NRC Docket No. 52-001. In order to complete its review, the NRC staff has determined that it will need responses to the enclosed request for additional information (RAI).

In order to support the review schedule, we request that you respond to this RAI within 30 days of receipt. If you are unable to respond within 30 days, please inform us in writing and propose an alternate schedule for responding. If you have any questions, I can be reached at (301) 415-1494 or by e-mail at [gfw@nrc.gov](mailto:gfw@nrc.gov).

Sincerely,

***/RA/***

George Wunder, Senior Project Manager  
ESBWR/ABWR Projects Branch 1  
Division of New Reactor Licensing  
Office of New Reactors

Docket No. 52-001

Enclosure:  
As stated

cc w/encl: See next page

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REQUEST FOR ADDITIONAL INFORMATION  
GENERAL ELECTRIC (GE) ENERGY TOPICAL REPORT  
NEDO-33305, REVISION 0,  
ADVANCED BOILING WATER REACTOR (ABWR)  
STARTUP ADMINISTRATIVE MANUAL

RAI-1

The proposed 10 CFR 52.79(a)(41) requires an applicant perform an evaluation of the facility against the standard review plan (SRP) in effect 6 months before the docketed date of the application, and that alternatives to or differences from the SRP be identified and justified in the application.

Section II.2.A of SRP Section 14.2, "Initial Plant Test Program - Design Certification and New License Applicants," Revision 3, of NUREG-0800, "Standard Review Plan," states that the applicant should commit to the revision of Regulatory Guide (RG) 1.68, "Initial Test Programs for Water-Cooled Nuclear Power Plants," and the RGs listed in the SRP. The applicant may propose exceptions or alternatives to the specific criteria, and the staff may find them acceptable if the applicant provides adequate justification.

The staff requests that GE Energy describe the revisions of RG 1.68 and SRP Section 14.2 used in the development of NEDO-33305 and any proposed exceptions, alternatives, or differences from the RG and SRP. For example, II.3.B.iv of SRP Section 14.2 states the controls that the applicant uses to ensure that test prerequisites are met should include identification of test personnel completing data forms or check sheets, and identification of dates of completion. This is not addressed in NEDO-33305. Some of the criteria in Appendix C of RG 1.68 are not consistent with the criteria in Section 6.1 of NEDO-33305. Section C.9 of RG 1.68 and Section III.3.F.v of SRP Section 14.2 describe startup test report provisions. This type of startup test report is not discussed in NEDO-33305. Additional examples where NEDO-33305 does not address criteria in RG 1.68 or SRP Section 14.2 are identified in several of the following questions.

RAI-2

Section 14.2.1.1 of NUREG-1503, "Final Safety Evaluation Report Related to the Certification of the Advanced Boiling Water Reactor Design," dated July 1994, states that construction tests will be performed to demonstrate that components and systems are correctly installed and operational. These tests include, but are not limited to, flushing and cleaning, hydrostatic testing, initial calibration of instrumentation, checks of electrical wiring and equipment, valve testing, and initial energization and operation of equipment and systems. Completion of the construction test phase ensures that systems are ready for preoperational testing.

Section 14.2.4 of NUREG-1503 states that the startup administrative manual will describe the controls in place that will ensure the as-tested status of each system is known and track modifications, including retest requirements, deemed necessary for systems undergoing or already having completed specified testing.

Enclosure

Section B of RG 1.68 states that administrative controls to govern the development and conduct of the initial test program should (a) provide for orderly turnover of plant systems and components from construction forces or other preliminary checkout groups to the preoperational testing group, and (b) ensure that general prerequisites (such as completion of construction, construction or preliminary tests, and inspections) are satisfied prior to preoperational and/or startup tests of individual systems or components. In addition, administrative controls should be established to ensure adequate retesting of systems or design features that are returned to construction custody, maintained, or modified during or following preoperational testing.

Section II.3.B.ii of SRP Section 14.2 states that applicants should establish administrative controls to ensure that the designated construction-related inspections and tests are completed before preoperational testing begins.

Section II.3.E.v of SRP Section 14.2 states that the applicant should include provisions to ensure that retesting required for modifications or maintenance remains in compliance with inspections, tests, analyses, and acceptance criteria requirements.

Section 14.2.3 of the ABWR Standard Safety Analysis Report (SSAR), Revision 9, states that the startup administrative manual will delineate how determinations of operability and availability will be authorized.

The staff requests that GE Energy describe the administrative controls that will ensure that: (1) the designated construction-related inspections and tests are completed before preoperational testing begins, (2) adequate retesting of systems, structures, and components (SSCs) that are returned to construction custody, maintained, or modified during the preoperational and initial startup test programs, and (3) determinations of operability and availability are properly tracked and authorized.

### RAI-3

Section 14.2.3 of the ABWR SSAR states that test procedures will be reviewed by the startup coordinating group.

Section 14.2.2.3(1) of the ABWR SSAR states that the GE site manager reviews and approves all test procedures and changes.

Section 14.2.4 of NUREG-1503 states that the startup administrative manual will define the review and approval process for both initial procedures and subsequent changes.

Section 5.3.3.4 of NEDO-33305 states that the Test Director prepares and processes a Test Procedure Change Notice (TPCN) as discussed in Section 6.3.1 of this document. Section 6.3.1 states that the Test Director will process the TPCN for review and approval.

Section 6.2 of NEDO-33305 states that the original draft of each test procedure is prepared by the designated organizations and is subject to a formal review and approval process and that following the initial preparations, test procedure drafts are processed through a formal review and approval cycle.

The staff requests that GE Energy describe the formal review and approval process/cycle to be used for preoperational and initial startup test procedures and subsequent changes that are made after final approval. This description should address whether or not the formal review and approval process for TPCNs (Section 6.3.1 of NEDO-33305) is different than the review and approval process for procedure changes (Section 6.3.2 of NEDO-33305). The staff requests that GE Energy explain why it is acceptable to specify different review and approval processes for TPCNs and procedure changes if separate review processes are specified. This explanation should focus on technical content versus the size (small or large) of the TPCN or change.

RAI-4

Section 14.2.4 of NUREG-1503 states that the startup administrative manual will contain the administrative procedures that govern the activities of the startup group. The staff requests that GE Energy provide the administrative procedures that govern the activities of the startup group.

RAI-5

Section 14.2.4 of NUREG-1503 states that the startup administrative manual will receive the same level of review and approval as other plant administrative procedures. The staff requests that GE Energy describe the review and approval process for the startup administrative manual.

RAI-6

Section 14.2.3 of NUREG-1503 states that procedures will be developed, reviewed, and controlled by personnel with appropriate technical backgrounds and experience in accordance with the startup administrative manual.

Section 14.2.4 of NUREG-1503 states that the startup administrative manual will delineate the qualifications and responsibilities of the different positions within the startup group.

Section III.3.D.i of SRP Section 14.2 states that the applicant should describe the education, training, and experience requirements established for each management and operating staff member including the nuclear steam supply systems vendor, architect-engineer, and other major contractors, subcontractors, and vendors, as appropriate who will conduct the preoperational and initial tests and who will develop testing, operating, and emergency procedures.

The staff requests that GE Energy describe qualification requirements for the different positions in the startup group; and the education, training, technical background, and experience requirements for each management and operating staff member including the nuclear steam supply systems vendor, architect-engineer, and other major contractors, subcontractors, and vendors, as appropriate who will conduct the preoperational and initial startup tests and who will develop testing, operating, and emergency procedures.

RAI-8

Section 14.2.2.5 of NUREG-1503 states that duties of startup coordinating group are to review and approve project test schedules and to effect timely changes to construction or testing in order to facilitate execution of the preoperational and initial startup test programs.

Section B of RG 1.68 states that to provide for the development and safe execution of the initial test program, the applicant should formulate advance plans for the entire testing program before the NRC staff completes its review of the construction permit or combined license application.

Section II.3.D.ii of SRP Section 14.2 states that the applicant should develop a training program for each functional group of employees in the organization relative to the schedule for preoperational and initial startup testing to ensure that the necessary plant staff are ready to begin the test program.

ABWR SSAR Section 14.2.11 states that the detailed testing schedule will be made available to the NRC prior to actual implementation. The schedule will be maintained on the job site so that it may be updated and continually optimized to reflect actual progress and subsequent revised projections.

ABWR SSAR Section 14.2.11 states that the schedule, relative to initial fuel load date, for conducting each major phase of the initial test program will be provided by the applicant. This includes the time table for generation, review, and approval of procedures as well as the actual testing and analysis of results. To allow for NRC review, test procedure preparation for power ascension will be scheduled so that approved procedures are available approximately 60 days prior to fuel load.

The staff requests that GE Energy describe the review and approval process for the test schedule and changes to the test schedule, when the test schedule will be provided to the NRC, and the relationship between the schedule for preoperational and initial startup testing and the training program.

RAI-8

Section 14.2.6 of NUREG-1503 states that test records that demonstrate the adequacy of safety-related SSCs will be retained for the life of the plant.

Section C.9 of RG 1.68 states that preoperational test procedures and results should be retained as part of the plant's historical record.

The staff requests that GE Energy describe the record requirements for preoperational and initial startup test procedures and test results.

RAI-9

Section 14.2.13.1 of NUREG-1503 states that the ABWR design control document addresses SSCs within the scope of the ABWR standard plant design and that it is the responsibility of the applicant to address site-specific SSCs that are not in the scope of the ABWR standard plant design.

Section A of RG 1.68 states that the scope of the initial test program is not limited solely to safety-related SSCs. Consequently, this guide specifies the scope of plant SSCs to be tested to satisfy the requirements of General Design Criteria 1, "Quality Standards and Records" (as specified in Appendix A to 10 CFR Part 50), as well as the quality assurance criteria set forth in Appendix B to 10 CFR Part 50.

The staff requests that GE Energy describe the preoperational and initial startup test requirements for (1) SSCs that are not within the scope of the ABWR standard plant design, and (2) any nonsafety-related SSCs to be included in the preoperational and initial startup test programs (for example, the scope of the reliability assurance program could include nonsafety-related SSCs).

#### RAI-10

Section 14.2.3 of NUREG-1503 states that available information on operating and testing experience of operating power reactors will be factored into test procedures as appropriate. Section 14.2.8 of NUREG-1503 states that reactor operating and testing experience of similar nuclear power plants obtained from NRC licensee event reports and through other industry sources will be used to the extent practicable in developing and carrying out the initial test program.

The staff requests that GE Energy describe the process for incorporating testing and operating experience into preoperational and initial startup procedures.

#### RAI-11

Sections 3.2.4 and 7.2.3 of NEDO-33305 state that the Plant Operations Review Committee performs an independent review function. The staff requests that GE Energy explain why this review is considered independent.

#### RAI-12

The staff requests that GE Energy describe the audits that will be performed that verify that the requirements in the startup administrative manual are being properly implemented.

#### RAI-13

Section B of RG 1.68 states that each new applicant for an advanced plant should identify all new first-of-a-kind tests in the given plant. The staff requests that GE Energy identify any new first-of-a-kind tests.



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