



GE Energy

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**Subject:            Submittal of ABWR Licensing Topical Report (LTR)  
                          NEDE-33299P "Advanced Boiling Water Reactor (ABWR) with  
                          Alternative RCIC Turbine-Pump Design"**

**Reference:**      Letter MFN 017-97, J. Quirk to NRC, *ABWR Design Control Document, Revision 4*, dated March 28, 1997, Docket No. 52-001

The subject Licensing Topical Report (LTR) is submitted for NRC review and approval for a change to the current ABWR certified design (referenced), US NRC Docket No. 52-001. The regulatory basis for this submittal is discussed below. This is the first of a number of ABWR-related LTRs GE plans to submit and which have been discussed in ABWR Design Centered Working Group (DCWG) meetings with the NRC. In support of the DCWG plans, GE requests a generic review and approval of the subject LTR in advance of any future combined operating license applications (COLA) submittals. Note that the proposed change is the result of first-of-a-kind engineering by General Electric Co. in the US and Asia.

Currently, 10 CFR Part 52 does not permit generic changes in certified designs, except for limited purposes that are not applicable in this case. However, as identified in SECY-06-220, the NRC is planning to revise 10 CFR 52.63 to allow for certain types of changes to a design certification. Alternatively, as provided in Section VIII to Part 52, a combined operating license (COL) applicant is allowed to seek plant-specific departures from a design certification. Therefore, GE is providing two Appendices to address each of these regulatory paths, so that the NRC technical review can proceed in parallel while the regulatory environment matures. GE is willing to work with the NRC staff in finalizing the applicable regulatory path as that becomes clearer. The two appendices address the following:

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- Appendix A demonstrates that the proposed change is acceptable as a generic change to the design control document (DCD) under the proposed revision to 10 CFR 52.63 in SECY-06-220.
- Appendix B demonstrates that the proposed departure is acceptable as a plant-specific departure under Section VIII of the ABWR design certification rule in Appendix A to Part 52.

Enclosure 1 contains GE proprietary information as defined by 10 CFR 2.390. GE customarily maintains this information in confidence and withholds it from public disclosure. The affidavit contained in Enclosure 3 identifies that the information contained in Enclosure 1 has been handled and classified as proprietary to GE. GE hereby requests that the information of Enclosure 1 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17. A non-proprietary version is contained in Enclosure 2.

If you have any questions about the information provided here, please contact Steve Stark, project manager - ABWR licensing, at 408-925-1822, or contact me directly.

Sincerely,

Timothy O'Neil  
Manager, ABWR Projects

- Enclosures:
1. NEDE-33299P, *Advanced Boiling Water Reactor (ABWR) with Alternative RCIC Turbine-Pump Design*, December 2006 - Proprietary
  2. NEDO-33299, *Advanced Boiling Water Reactor (ABWR) with Alternative RCIC Turbine-Pump Design*, December 2006 - Non-proprietary
  3. Affidavit, Steven J. Stark, dated December 20, 2006

cc: SJ Stark      GE (San Jose w/ enclosures)  
GB Tarmac      GE (San Jose w/o enclosures)  
GF Wunder      NRC (w/ enclosures)  
ML McBurnett STP (w/enclosures)  
eDRF 0000-0062-4772



**Appendix A**

**Justification for Changes to the Generic DCD**

10 CFR 52.63(a)(1)(vi) (as proposed in SECY-06-220) allows for a change to a generic DCD if the change “Contributes to increased standardization of the certification information.” As discussed below, the proposed changes to the generic DCD satisfy this criterion.

The proposed changes involving the RCIC pump are intended to be generic and applicable to all COL applicants that reference the ABWR design certification. In particular, the proposed changes are the result of first-of-a-kind engineering efforts at GE and are intended to accommodate the use of an integrated turbine-pump design rather than separate turbine and pump arrangements. As discussed in this Licensing Topical Report, the proposed changes comply with NRC regulations and guidance, and use of the proposed integrated turbine-pump design will result in a more reliable system. At least one prospective COL applicant (i.e., the COL applicant for South Texas Project Units 3 and 4) intends to use the proposed turbine-pump design. Furthermore, it may be expected that other COL applicants will also desire to use the proposed design given its improved reliability.

Given the generic nature of this proposed change, the improvement represented by the change, and the fact that at least one COL applicant intends to make the change, it would contribute to increased standardization if the NRC were to make a generic change to the DCD to incorporate this proposed change. Therefore, the proposed change satisfies the criteria in 10 CFR 52.63(a)(1)(vi).



## Appendix B

### Justification for Departures in the Plant-Specific DCD

As discussed in this Licensing Topical Report, the proposed departures pertain to Tier 1 and Tier 2 of the ABWR DCD. Section VIII of the ABWR design certification rule establishes different criteria for departures from the DCD, depending upon whether the departure pertains to Tier 1 or Tier 2. A summary of the evaluation for each of these criteria is discussed below.

#### Departures from Tier 1

The proposed departure from Tier 1 involves deletion of the barometric condenser and other, associated equipment, which provide support for a separate turbine driver as in the DCD design but are not needed for an integrated combination turbine-pump design. Tier 1 does not mention the type of pump to be used for the RCIC system, and therefore the change from separate turbine and pump to an integrated turbine-pump design does not involve a departure from Tier 1. Furthermore, the proposed departure does not affect the performance characteristics of the RCIC pump or system, as specified in Tier 1.

Section VIII.A.4 of the ABWR design certification rule<sup>1</sup> allows for plant-specific departures from Tier 1 under the following circumstances:

Exemptions from Tier 1 information are governed by the requirements in 10 CFR 52.63(b)(1) and 52.97(b). The Commission will deny a request for an exemption from Tier 1, if it finds that the design change will result in a significant decrease in the level of safety otherwise provided by the design.

10 CFR 52.97(b) is not relevant, because it pertains to holders of a combined license (COL), which do not currently exist for the ABWR. 10 CFR 52.63(b)(1) states as follows:

An applicant or licensee who references a design certification may request an exemption from one or more elements of the design certification. The Commission may grant such a request only if it determines that the exemption will comply with the requirements of 10 CFR 50.12(a). In addition to the factors listed in § 50.12(a), the Commission shall consider whether the special circumstances which § 50.12(a) requires to be present outweigh any decrease

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<sup>1</sup> SECY-06-220 proposes changes in Section VIII.A.4 and the sections referenced therein. However, these proposed changes are not substantive.



in safety that may result from the reduction in standardization caused by the exemption. The granting of an exemption on request of an applicant must be subject to litigation in the same manner as other issues in the operating license or combined license hearing.

10 CFR 50.12(a)(1) allows exemptions that are "Authorized by law, will not present an undue risk to the public health and safety, and are consistent with the common defense and security." Additionally, Section 50.12(a)(2) provides that "special circumstances" must be present before the NRC will grant an exemption. Section 50.12 defines "special circumstances" as:

- (i) Application of the regulation in the particular circumstances conflicts with other rules or requirements of the Commission; or
- (ii) Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule; or
- (iii) Compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted, or that are significantly in excess of those incurred by others similarly situated; or
- (iv) The exemption would result in benefit to the public health and safety that compensates for any decrease in safety that may result from the grant of the exemption; or
- (v) The exemption would provide only temporary relief from the applicable regulation and the licensee or applicant has made good faith efforts to comply with the regulation; or
- (vi) There is present any other material circumstance not considered when the regulation was adopted for which it would be in the public interest to grant an exemption.

In summary, a departure from Tier 1 is acceptable if it:

1. is authorized by law;
2. will not present an undue risk to the public health and safety;
3. is consistent with the common defense and security;
4. will not result in a significant decrease in the level of safety;
5. special circumstances are present; and
6. the special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption.

As demonstrated below, the proposed departure from Tier 1 involving the RCIC satisfies each of these criteria:



- As discussed in this Licensing Topical Report, the departure from Tier 1 is an improvement in safety. (Criteria 1, 2, 3, 4, and 6, above)
- The departure is not inconsistent with the Atomic Energy Act, and therefore is authorized by law. (Criterion 1, above)
- Special circumstances are present. (Criteria 5 and 6, above). In particular, the proposed departure to the description of the RCIC in Tier 1 satisfies Criteria (ii) and (iv) in 10 CFR 50.12, in that the existing Tier 1 provision in question is not necessary for a design using an integrated turbine-pump, and the exemption will result in an increase in safety.
- Since the proposed departure represents an improvement in safety and can be (and will likely be) implemented by all COL applicants, the departure should not result in any reduction in standardization. In any event, the proposed departure does not affect the design bases or safety analyses for the RCIC turbine pump. (Criterion 6, above)

## Departures from Tier 2

The proposed departures from Tier 2 involve deletion of components that provide support for a separate turbine and pump design but are not needed for an integrated turbine-pump. Tier 2 does not mention the type of pump to be used for the RCIC system, and therefore the change from a separate turbine and pump design to an integrated turbine-pump does not involve a departure from Tier 2. Furthermore, the proposed departures do not affect the performance characteristics of the RCIC pump or system, as specified in Tier 2.

Section VIII.B.5.a of the ABWR design certification rule allows for plant-specific departures from Tier 2 under the following circumstances:

An applicant or licensee who references this appendix may depart from Tier 2 information, without prior NRC approval, unless the proposed departure involves a change to or departure from Tier 1 information, Tier 2\* information, or the technical specifications, or involves an unreviewed safety question as defined in paragraphs B.5.b or B.5.c of this section. When evaluating the proposed departure, an applicant or licensee shall consider all matters described in the plant-specific DCD.

The criteria in paragraph B.5.c pertain to resolution of severe accident issues, and are not relevant to proposed changes to the RCIC. Paragraph B.5.b defines an unreviewed safety question as:<sup>2</sup>

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<sup>2</sup> SECY-06-220 proposes a revision to this section that would make the criteria in Paragraph B.5.b less restrictive. Therefore, by demonstrating compliance with the more restrictive criteria in the original ABWR design certification rule, this Appendix also demonstrates compliance with the criteria in SECY-06-220.



- (1) The probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the plant-specific DCD may be increased;
- (2) A possibility for an accident or malfunction of a different type than any evaluated previously in the plant-specific DCD may be created; or
- (3) The margin of safety as defined in the basis for any technical specification is reduced.

Some of the proposed departures from Tier 2 also involve a departure from Tier 1. Those departures are evaluated in the previous section. The remaining departures from Tier 2 do not involve an unreviewed safety question. In particular:

- (1) The proposed departures are intended to facilitate the use of an integrated turbine-pump design rather than a separate turbine and pump. However, the DCD itself does not mention any particular type of pump, and the proposed Tier 2 departures only remove design features that were intended to support a separate turbine and pump and are not needed for an integrated turbine-pump design.

Furthermore, as discussed in this Licensing Topical Report, the integrated turbine-pump design has an improved reliability relative to a separate turbine and pump. Additionally, the integrated turbine-pump satisfies all of the Tier 2 performance characteristics for the RCIC pump, and none of the accident analyses is affected by the use of an integrated turbine-pump rather than a separate turbine and pump.

Therefore, the DCD departures will not increase the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety.

- (2) The proposed departures are intended to facilitate the use of an integrated turbine-pump rather than a separate turbine and pump. However, the DCD itself does not mention any particular type of pump, and the proposed Tier 2 departures only remove design features that were intended to support a separate turbine and pump and are not needed for an integrated turbine-pump.

Furthermore, the replacement of a separate turbine and pump with a an integrated turbine-pump does not create the possibility of a different type of malfunction of the RCIC pump - - the failure modes of the RCIC pump remain the same. Additionally, the replacement of a separate turbine and pump with an integrated turbine-pump does not create the possibility of a different type



of accident - - the consequences of a failure of an integrated turbine-pump are the same as for a separate turbine and pump.

Therefore, the proposed departures do not create a possibility for an accident or malfunction of a different type than evaluated previously.

- (3) The proposed departures are intended to facilitate the use of an integrated turbine-pump rather than a separate turbine and pump. However, the DCD itself does not mention any particular type of pump, and the proposed Tier 2 departures only remove design features that were intended to support a separate turbine and pump and are not needed for an integrated turbine-pump. The features that are proposed to be deleted from the DCD are not mentioned in ABWR Generic Technical Specification 3.5 or the Bases for Technical Specification 3.5 (which pertain to the RCIC system) and do not affect any of the discussions in the Bases for Technical Specification 3.5.

Furthermore, the replacement of a separate turbine and pump with an integrated turbine-pump does not adversely affect the performance of the RCIC system. The performance characteristics of the integrated turbine-pump, as provided in the DCD, are the same as for the separate turbine and pump.

Therefore, the proposed departures do not reduce the margin of safety as defined in the basis for any technical specification.

# General Electric Company

## AFFIDAVIT

I, **Steven J. Stark**, state as follows:

- (1) I am Project Manager, ABWR Licensing, General Electric Company ("GE") and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.
- (2) The information sought to be withheld is contained in the GE proprietary report NEDE-3329P, "Advanced Boiling Water Reactor with Alternate RCIC Turbine-Pump design" Revision 0, Class III (GE Proprietary Information), dated December, 2006. The two proprietary figures are identified with double square brackets before and after the object. In each case, the superscript notation<sup>(3)</sup> refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.
- (3) In making this application for withholding of proprietary information of which it is the owner, GE relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.390(a)(4) for "trade secrets" (Exemption 4). The material for which exemption from disclosure is here sought also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).
- (4) Some examples of categories of information which fit into the definition of proprietary information are:
  - a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by General Electric's competitors without license from General Electric constitutes a competitive economic advantage over other companies;
  - b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;
  - c. Information which reveals aspects of past, present, or future General Electric customer-funded development plans and programs, resulting in potential products to General Electric;

- d. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a., and (4)b, above.

- (5) To address 10 CFR 2.390 (b) (4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GE, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GE, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.
- (6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within GE is limited on a "need to know" basis.
- (7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GE are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.
- (8) The information identified in paragraph (2), above, is classified as proprietary because it contains detailed system design information developed during the "First of a Kind Engineering" (FOAKE) program and subsequent investment that resulted in GE's commercial product offered as the "Advanced Boiling Water Reactor." The two figures considered herein as proprietary were initially classified by GE in licensing submittals leading up to the ABWR certification and in the latest version of the "Design Control Document" (DCD), revision 4. Treating these two figures as proprietary in NEDE-33299P maintains GE's prior claim of proprietary information.
- (9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GE's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GE's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes

beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GE.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GE's competitive advantage will be lost if its competitors are able to use the results of the GE experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GE would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GE of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed on this 20th day of December 2006.



Steven J. Stark  
General Electric Company