



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001**

October 31, 2019

The Honorable Kristine L. Svinicki  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**SUBJECT:    ADVANCED BOILING WATER REACTOR DESIGN CERTIFICATION  
              RENEWAL**

Dear Chairman Svinicki:

During the 667<sup>th</sup> meeting of the Advisory Committee on Reactor Safeguards (ACRS), October 2-4, 2019, we completed our review of the design certification renewal application for the advanced boiling water reactor (ABWR) and the associated final safety evaluation report. Our review considered actions by GE-Hitachi (GEH), the first vendor in the U.S. to apply for a design certification renewal. Our ABWR Subcommittee reviewed this matter during a meeting on August 23, 2019. During our review, we had the benefit of discussions with representatives of the staff and GEH. We also had the benefit of the referenced documents.

This report fulfills the requirement of Title 10 of the *Code of Federal Regulations* (10 CFR) 52.57(c) that the ACRS report on those portions of the application which concern safety.

## **CONCLUSION AND RECOMMENDATION**

Staff supplemental safety evaluations (SEs) approved GEH proposed design changes to update and amend specific design attributes that meet the criteria for a Design Certification Renewal in accordance with 10 CFR 52.59, extending it for an additional 15 years, following implementation of the design certification final rule.

1. There is reasonable assurance that the ABWR, under the renewed design certification, can be constructed and operated without undue risk to the health and safety of the public.
2. We concur with the conclusions of the staffs' supplemental renewal SEs to NUREG-1503, "Final Safety Evaluation Report Related to the Certification of the Advanced Boiling Water Reactor Design," with no open items. The SEs should be issued, and the GEH application for the Design Certification Renewal of the ABWR should be approved.

## **BACKGROUND**

Previously, on July 13, 1994, the U.S. Nuclear Regulatory Commission (NRC) issued the final design approval, along with NUREG-1503, "Final Safety Evaluation Report Related to the

Certification of the Advanced Boiling Water Reactor Design.” On May 12, 1997, the NRC issued the final design certification rule for the ABWR design.

On December 7, 2010, GEH requested the NRC to renew the ABWR design certification. The ABWR design certification rule, effective June 11, 1997, would otherwise expire at the end of a period of 15 years, or June 11, 2012. GEH applied for a design certification renewal on December 7, 2010. On July 20, 2012, staff identified proposed changes including Fukushima Near Term Task Force Recommendations. GEH provided the ABWR design control document (DCD), Revision 6, in response to staff requested changes. On June 28, 2019, the staff completed the SEs with no open items.

## DISCUSSION

The regulatory basis for renewal of a design certification includes three change categories: modifications, renewal backfits, and amendments. Modifications to the certified design are those changes in accordance with 10 CFR 52.57(a) (e.g., clarifications, changes to correct known errors, typographical errors, or defects that are necessary to meet 10 CFR 52.59(a)). Modifications must comply with the regulations applicable and in effect at the time the certification was originally issued. Renewal backfits are those changes that are necessary to comply with additional requirements imposed by the NRC through application of the criteria in 10 CFR 52.59(b). Amendments are those changes proposed by the design certification renewal applicant in accordance with 10 CFR 52.59(c). Amendments must comply with regulations applicable and in effect at the time of renewal. The GEH Design Certification renewal application contains modifications and amendments but no backfits.

The key significant renewal design changes involved the following areas: amendment to the emergency core cooling system (ECCS) suction strainers; peak cladding temperature (PCT) modification; Fukushima design enhancements; aircraft impact assessment; and containment overpressure protection system (COPS) modification.

- In accordance with guidance of Regulatory Guide 1.82, Revision 4, “Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident,” the staff confirmed that the ECCS suction strainer design complied with 10 CFR 50.46(b)(5), providing adequate Net Positive Suction Head margins. The staff also confirmed that GEH addressed the chemical, in-vessel, and ex-vessel downstream effects.
- Following incorporation of the effects of the ECCS evaluation model changes, and correction of errors since the original ABWR design certification, the estimated PCT increased by a small amount (42°C or 75°F). PCT is now 663 °C (1225 °F), which remains in compliance with criteria in 10 CFR 50.46(3)(i).
- To allow combined license applicants to meet anticipated requirements of the Mitigation of Beyond-Design-Basis Events Rule, GEH made design amendments, such as additional non-safety-related water and electrical connections.
- GEH performed a detailed aircraft impact assessment. The staff found that GEH adequately described the key design features and functional capabilities identified and credited to meet 10 CFR 50.150(b), including how the key design features meet the acceptance criteria in 10 CFR 50.150(a)(1).
- GEH modified the COPS design to include a dedicated containment vent path to prevent containment over pressure. The staff concluded that this modification did not alter the safety findings made in NUREG-1503.

In total, 39 design items were reviewed and approved by the staff in supplemental SEs to NUREG-1503 or closed by letter. In addition to reviewing DCD, Revision 6, and responses to requests for additional information, the staff performed audits to resolve outstanding technical issues.

## SUMMARY

The staff made safety determinations on the specific modifications and amendments proposed by GEH as part of its design certification renewal application; they were found to meet applicable regulatory requirements. We agree with the staff's determinations. There is reasonable assurance that the ABWR, under the renewed design certification, can be constructed and operated without undue risk to the health and safety of the public.

We are not requesting a formal response from the staff to this letter report.

Sincerely,

/RA/

Peter C. Riccardella  
Chairman

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4. U.S. Nuclear Regulatory Commission, "Safety Evaluation Report with No Open Items Related to the ABWR DC Renewal Issue 02 SER Section 2.3 Meteorology," June 20, 2018 (ML18026A750).
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14. U.S. Nuclear Regulatory Commission, "Safety Evaluation Report with No Open Items Related to the ABWR DC Renewal Issue 26 Fukushima Related Design Enhancements SER Section 5.4.7 Residual Heat Removal System," June 19, 2019 (ML19148A516).
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17. U.S. Nuclear Regulatory Commission, "Safety Evaluation Report with No Open Items Related to the ABWR DC Renewal Issue 30 SER Section 6.2.1.3 Short-Term Pressure Response," February 8, 2019 (ML18052A925).
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October 31, 2019

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RENEWAL

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