

## ABSTRACT

Appendix A, “Design Certification Rule for the U.S. Advanced Boiling Water Reactor,” to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants,” constitutes the standard design certification (DC) for the U.S. Advanced Boiling-Water Reactor (ABWR) design. To document the U.S. Nuclear Regulatory Commission (NRC) staff’s review supporting initial certification of the ABWR, the staff issued a final safety evaluation report (FSER) in NUREG-1503, “Final Safety Evaluation Report Related to the Certification of the Advanced Boiling Water Reactor Design,” in July 1994 and NUREG-1503, Supplement 1, in May 1997.

In a letter dated December 7, 2010 (Agencywide Documents Access and Management System Accession No. ML110040176), GE-Hitachi Nuclear Energy (GEH or the applicant) submitted a Design Certification (DC) renewal application for the ABWR pursuant to the requirements of Subpart B, “Standard Design Certifications,” 10 CFR Part 52.

This supplemental FSER<sup>1</sup> (Supplement 2 to NUREG-1503) documents the NRC or the Commission staff’s technical review.

GEH’s renewal application includes the ABWR Design Control Document (DCD), Revision 7. The staff completed the review of the ABWR renewal DCD, Revision 7, and issued a supplemental FSER. The staff is planning to perform a direct final rule to renew the certification for the ABWR standard design.

The ABWR design is a single-cycle, forced-circulation, boiling-water reactor (BWR), with a rated power of 3926 megawatts thermal, originally designed by GE. The original design incorporated updated safety enhancements from previous GE BWRs including a reinforced concrete reactor containment vessel with built-in liner, reactor coolant recirculation system driven by internal pumps, advanced electric/hydraulic control rod drives using a screw mechanism, and integrated digital control system and instrumentation.

The renewed ABWR DC incorporates modifications related to aircraft impact analyses in accordance with 10 CFR 52.59(a), which requires that the renewed DC complies with the applicable requirements of 10 CFR 50.150, “Aircraft impact assessment.” In addition, GEH incorporated updated emergency core cooling suction strainers, a size correction to the containment overpressure protection system, Fukushima-related safety enhancements, including an additional ac-independent water makeup system with external connections for water addition, ac power, and safety-related wide range spent fuel pool instrumentation.

On the basis of the staff’s review of the application, as documented in this FSER, the staff recommends that the Commission approve the DC renewal of the ABWR design.

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<sup>1</sup> This FSER documents the NRC staff’s position on all safety issues associated with the ABWR DC Renewal application. The Advisory Committee on Reactor Safeguards (ACRS) independently reviewed those aspects of the application that concern safety, as well as the advanced safety evaluation report without open items (an earlier version of this document) and provided the results of its review to the Commission in a report dated October 31, 2019. This report is included as Appendix E to this SER.