

## 7 INSTRUMENTATION AND CONTROL SYSTEMS

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.

The staff is documenting its review of the GE-Hitachi Nuclear Energy (GEH or the applicant) application for renewal of the ABWR DC in Supplement 2 to NUREG-1503. Chapter 1 of this supplemental FSER describes the staff’s review process for the ABWR DC renewal. This supplemental FSER section documents the NRC staff’s review specifically related to Chapter 7, “Instrumentation and Control Systems,” Section 7.5.2.1, “Post Accident Monitoring System,” of the GEH Design Control Document (DCD), Revision 7. Except as modified by this supplement to the FSER, the findings made in NUREG-1503 and its Supplement 1 remain in full effect.

### 7.5.2.1 Post Accident Monitoring System

In a letter dated August 25, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15237A192), the applicant proposed to add spent fuel pool (SFP) level instruments that conform with the applicable guidance specified in the Japan Lesson-Learned Project Directorate-Interim Staff Guidance (JLD-ISG)-2012-03, Revision 0, “Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation,” dated August 29, 2012 (ADAMS Accession No. ML12221A339), which endorses with exceptions and clarifications the methodologies described in the Nuclear Energy Institute (NEI) industry guidance document NEI 12-02, Revision 1, “Industry Guidance for Compliance with NRC Order EA-12-051, “To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation,” issued August 2012 (ADAMS Accession No. ML122400399).

Subsequently, during the pending draft mitigation of beyond-design-basis events (MBDBE) rule (10 CFR 50.155, “Mitigation of beyond-design-basis events”), the Commission decided not to impose mitigation strategies requirements on DCs.<sup>1</sup> The final rule was published in the *Federal Register* on August 9, 2019 (84 FR 39684) and became effective September 9, 2019.

This change to the design of SFP instruments resulted in revisions to the ABWR DCD, Revision 7, specifically, DCD Tier 2, Section 7.5.2.1, “Post Accident Monitoring System,” which incorporated safety-related SFP instrumentation to permit operators to monitor the SFP water level after an accident and to take corrective action, as necessary.

The change will also result in combined license (COL) applicants being responsible for implementing the procedures and personnel training for the SFP safety-related instrumentation. These elements are specified as part of the applicants COL Information Item 7.5.3.1, “Spent Fuel Pool Level Instruments,” in the ABWR DCD, Revision 7.

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<sup>1</sup> In the MBDBE proposed rule regulatory analysis (ADAMS Accession No. ML15266A133), the Commission proposed to not make the MBDBE proposed rule applicable to existing DCs, which included the ABWR, because “[t]he issues that may be resolved in a DC and accorded issue finality may not include operational matters, such as the elements of the [MBDBE] proposed rule.”

In addition, this change resulted in revisions to the following ABWR DCD sections:

- Tier 1, Subsection 2.6.2, “Fuel Pool Cooling and Cleanup System,” including Figure 2.6.2 and Table 2.6.2; and
- Tier 2, Chapter 1, Tables 1.8-21 and 1.8-22.

These ABWR design enhancements could provide a potential COL applicant the means for meeting requirements of 10 CFR 50.155, regarding safety-related SFP instrumentation.

Section 22.2 of this FSER supplement provides the staff review of these changes and other changes associated with the new SFP instrumentation.

## References

1. 10 CFR 50.155, "Mitigation of Beyond-Design Basis Events."
2. 10 CFR Part 52, Appendix A, "Design Certification Rule for the U.S. Advanced Boiling Water Reactor."
3. NRC, NUREG-1503, "Final Safety Evaluation Report Related to the Certification of the Advanced Boiling Water Reactor Design," July 1994 (ADAMS Accession No. ML080670592).
4. NRC, NUREG-1503, "Final Safety Evaluation Report Related to the Certification of the Advanced Boiling Water Reactor Design," Supplement 1, May 1997 (ADAMS Accession No. ML080710134).
5. GEH, ABWR Standard Plant Design Certification Renewal Application Design Control Document, Revision 5, Tier 1 and Tier 2, November 2010 (ADAMS Accession No. ML110040323).
6. GEH, ABWR Standard Plant Design Certification Renewal Application Design Control Document, Revision 6, Tier 1 and Tier 2, February 2016 (ADAMS Accession No. ML16214A015).
7. GEH, ABWR Standard Plant Design Certification Renewal Application Design Control Document, Revision 7, Tier 1 and Tier 2, December 2019 (ADAMS Accession No. ML20007E371).
8. JLD-ISG-2012-03, Revision 0, "Compliance with Order EA 12-051, Reliable Spent Fuel Pool Instrumentation" August 29, 2012 (ADAMS Accession No. ML12221A339).
9. Order EA-12-051, "Order Modifying Licenses with regard to Reliable Spent Fuel Pool Instrumentation," March 12, 2012 (ADAMS Accession No. ML12056A044).
10. NEI 12-02, Revision 1, "Industry Guidance for Compliance with NRC Order EA-12-051, To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation" August 2012 (ADAMS Accession No. ML122400399).