9.0 Auxiliary Systems

9.1.4 Light Load Handling System (Related to Refueling)

9.1.4.1 Regulatory Criteria

In this section the staff reviews and evaluates the applicant's proposed changes to the light load-handling system (LLHS) for the General Electric-Hitachi (GEH) Advanced Boiling-Water Reactor (ABWR) design. The LLHS provides the means of transporting, handling and storing fuel (both new and spent fuel) in the reactor building.

A combined license (COL) applicant that references the GEH ABWR DC will incorporate the ABWR LLHS as specified by the ABWR Design Certification (DC) for the safe handling of new and spent fuel from the time it reaches the plant until it leaves the plant after post-irradiation cooling.

In Revision 6 of the ABWR design control document (DCD), GEH proposed to revise the DCD to eliminate the use of the new fuel storage vault (NFSV) and its new fuel storage racks. This proposed change will result in the GEH ABWR utilizing the spent fuel pool (SFP) for storage of new fuel prior to loading into the reactor. The ABWR LLHS related to SFP was already evaluated and found acceptable for handling of new and spent fuel assemblies as part of the initially certified ABWR DCD and therefore is not evaluated as part of the ABWR renewal review.

The proposed change to the GEH DCD LLHS to remove the NFSV does not fall within the definition of a "modification." Therefore, in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 52.59(c), this design change is an "amendment," as this term is defined in Chapter 1 of this safety evaluation report (SER) supplement, and will correspondingly be evaluated using the regulations in effect at renewal.

The relevant requirements for this area of review and the associated acceptance criteria are given in Revision 4 of NUREG-0800, Section 9.1.4, "Light Load Handling System and Refueling Cavity Design," and are summarized below.

- 10 CFR Part 50, Appendix A, General Design Criteria (GDC) 2 as it relates to structures housing the system, and the system itself, being capable of withstanding the effects of earthquakes;

- GDC 61 as it relates to radioactivity release as a result of fuel damage, and the avoidance of excessive personnel radiation exposure;

- GDC 62 as it relates to prevention of inadvertent criticality; and

- 10 CFR 52.47(b)(1), which requires that a DC application contain the proposed inspections, tests, analyses, and acceptance criteria (ITAAC) that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a facility that incorporates the design certification has been constructed and will be operated in accordance with the design

certification, the provisions of the Atomic Energy Act of 1954, as amended, and the NRC's rules and regulations.

9.1.4.2 Summary of Technical Information

Revision 5 of the ABWR DCD was submitted as part of the GEH design certification renewal application (DCRA) in 2010. There was no difference between Revision 5 and Revision 4 of DCD Tier 2 Section 9.1.4, approved as part of the ABWR DC rule in 1997 (10 CFR Part 52, Appendix A). Revision 6 of the ABWR DCD was submitted in 2016.

In Revision 6 of the ABWR DCD, the applicant proposed to eliminate the NFSV. The racks in the SPF will be utilized for storage of new fuel prior to loading into the reactor. This change generated conforming changes in the following DCD Sections:

- **Tier 1**

  Section 2.15.3 "Cranes and Hoists", is revised to eliminate references to the new fuel storage vault and references to dry storage of new fuel, which was to be done in the new fuel storage vault.

- **Tier 2**

  In Section 9.1.4 "Light Load Handling System (Related to Refueling)," the applicant revised the process of receiving and handling of new fuel assemblies to eliminate any step that stores new fuel into the new fuel vault or make reference to the new fuel racks or new fuel storage vault.

9.1.4.3 Technical Evaluation

The proposed changes includes the revision of Tier 1, Section 2.15.3 and Tier 2, Section 9.1.4, in order to remove references to the NFSV and its associated storage racks, and to clearly indicate that the SFP is the only storage location for new fuel assemblies. The staff's review of the removal of the new fuel storage vault is discussed in Section 9.1.1 of this SER supplement.

By eliminating the NFSV, the applicant has not altered the new fuel transportation path, previously reviewed as part of the initial design certification, from receiving to loading new fuel in the SFP. The original design included the option to put new fuel in the NFSV prior to moving it to the SFP, but the applicant proposes to eliminate this option. The staff finds that this change does not introduce a new accident scenario to those previously evaluated, and it does not impact the safety conclusion that the staff has previously reached in the final safety evaluation report (FSER) for the initially certified design as documented in NUREG-1503.

9.1.1.4 Conclusion

Based on the evaluation provided in this ABWR DC Renewal SER section supplement, the staff concludes that the proposed design change to remove the NFSV and the change to the LLHS related to new and spent fuel handling as documented in ABWR DCD, Revision 6 to address the elimination of the option to use the NFSV does not alter the staff's safety findings in the FSER for the initially certified design. Therefore, this ABWR design change meets all applicable regulatory requirements in GDC 2, GDC 61, GDC 62, and 10 CFR 52.47(b)(1), as reviewed by the staff in accordance with the associated SRP acceptance criteria in Section 9.1.4, Revision 4, "Light Load Handling System and Refueling Cavity Design," of NUREG-0800.