

9.0 Auxiliary Systems

9.1.1 New Fuel Storage

9.1.1.1 Regulatory Criteria

In this section the staff reviews and evaluates the applicant's proposed changes regarding new fuel storage and handling for the General Electric-Hitachi (GEH) Advanced Boiling-Water Reactor (ABWR) design. The ABWR Design Certification (DC) renewal review in this area is based on the GEH proposed design changes for the ABWR.

A combined license (COL) applicant that references the GEH ABWR DC will incorporate the new fuel handling storage requirements specified for the ABWR design and the COL applicant will implement the applicable ABWR design and procedures to address regulatory requirements for new fuel storage and handling.

In Revision 4 of design control document (DCD) Tier 2, Section 9.1, "Fuel Storage and Handling," approved as part of the ABWR DC rule in 1997 (10 CFR Part 52, Appendix A), onsite underwater storage of spent fuel assemblies and new fuel assemblies is provided by the Spent Fuel Pool (SFP). The SFP fuel racks ensure that stored fuel is maintained in a suitable geometry to prevent criticality and provide cooling for all evaluated design conditions. In order to facilitate handling during fuel inspection and preparation, new fuel assemblies could also be safely stored in the new fuel storage vault (NFSV), which is located in the Reactor Building, as close as practicable to the spent-fuel storage pool work area.

In Revision 6 of the ABWR DCD, GEH proposed to revise the DCD to eliminate the use of the NFSV for the storage of new fuel assemblies. This proposed change will result in the GEH ABWR utilizing the SFP for storage of new fuel prior to loading into the reactor. The SFP racks were already evaluated and found acceptable for storage of new fuel assemblies as part of the initially certified ABWR DCD and therefore is not evaluated as part of the ABWR renewal review.

The applicant's proposal 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 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 NUREG-0800, Section 9.1.2, Revision 4, "New and Spent Fuel Storage," and are summarized below.

- 10 CFR Part 50, Appendix A, General Design Criteria (GDC) 2 as it relates to the ability of structures housing the facility and the facility itself to withstand the effects of natural phenomena such as earthquakes
- GDC 4 as it relates to the structures housing the facility and the facility itself withstanding the effects of environmental conditions, externally-generated missiles, internally-generated missiles, pipe whip, and jet impingement forces of pipe breaks so safety functions are not precluded;

- GDC 61 as it relates to the facility design for fuel storage and handling of radioactive materials;
- GDC 63 as it relates to monitoring systems for detecting conditions that could cause the loss of decay heat removal capabilities for spent fuel assemblies, detecting excessive radiation levels, and initiating appropriate safety actions;
- 10 CFR 20.1101(b) as it relates to keeping radiation doses as low as reasonably achievable (ALARA);
- 10 CFR 50.68 as it relates to criticality monitoring or design to preclude criticality accidents; 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.

Review interfaces with other standard review plan (SRP) sections also can be found in NUREG-0800, Section 9.1.2.I.

9.1.1.2 Summary of Technical Information

Revision 5 of the ABWR DCD was submitted as part of the GEH DC renewal application (DCRA) in 2010. There was no difference between Revision 5 and Revision 4 of DCD Tier 2, Section 9.1, "Fuel Storage and Handling," approved as part of the ABWR DC rule.

In Revision 6 of the ABWR DCD, the applicant proposed to eliminate the NFSV. The SFP will be utilized for storage of new fuel prior to loading into the reactor. This change generated a large number of conforming changes in DCD Tier 2 Section 9.1, "Fuel Storage and Handling."

9.1.1.3 Technical Evaluation

The proposed ABWR design change includes the revision of Tier 2, Section 9.1, in order to remove references to the NFSV and the associated new fuel storage racks from the ABWR design.

The staff reviewed all the changes related to the removal of the NFSV and racks. The certified design already allowed for new fuel to be moved directly from receipt inspection to the SFP for storage before use in the reactor vessel. Therefore, the staff did not review the capability of the ABWR SFP to store new fuel assemblies in this safety evaluation report (SER) supplement.

By eliminating NFSV the applicant has not altered the new fuel handling path from receiving to loading in the vessel. In addition, the staff finds that this design change does not introduce a new potential accident to those previously evaluated, and therefore does not impact the safety

conclusion that the staff had previously reached in its final safety evaluation report (FSER) for the initially certified ABWR design as documented in NUREG-1503.

9.1.1.4 Conclusion

Based on the evaluation provided in this ABWR DC Renewal FSER section supplement, the staff concludes that the proposed design change to remove the NFSV does not alter the staff safety findings in the FSER for the initially certified design. Therefore the ABWR design, as modified, continues to meet all applicable regulatory requirements including GDC 2, GDC 4, GDC 61, GDC 63, 10 CFR 20.1101(b), 10 CFR 50.68, and 10 CFR 52.47(b)(1) as reviewed by the staff in accordance with the associated SRP acceptance criteria in Section 9.1.2, Revision 4, "New and Spent Fuel Storage," of NUREG-0800.