

4.0 DESIGN FEATURES

4.1 Site Location

The site for the Calvert Cliffs Nuclear Power Plant is located on the western shore of the Chesapeake Bay in Calvert County, Maryland, about 10-1/2 miles Southeast of Prince Frederick, Maryland. The site is approximately 45 miles southeast of Washington, DC, and 60 miles south of Baltimore, Maryland. The exclusion area boundary has a minimum radius of 1,150 meters from the center of the plant.

4.2 Reactor Core

4.2.1 Fuel Assemblies

The reactor shall contain 217 fuel assemblies. Each assembly shall consist of a matrix of Zircalloy or ZIRLO fuel rods with an initial composition of natural or slightly enriched uranium dioxide (UO_2) as fuel material. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff approved codes and methods and shown by tests or analyses to comply with all fuel safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in nonlimiting core regions. For Unit 2 Cycle 14 only, advanced cladding material may be used in one lead test assembly as described in an approved temporary exemption dated March 6, 2001. For Unit 2 Cycles 15 and 16 only, advanced cladding material from Framatome-ANP may be used in up to four lead test assemblies as described in approved temporary exemption dated April 11, 2003. For Unit 2 Cycles 15 and 16 only, advanced cladding material from Westinghouse may be used in up to four lead test assemblies as described in approved temporary exemption dated April 11, 2003.

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4.2.2 Control Element Assemblies

The reactor core shall contain 77 control element assemblies.

4.3 Fuel Storage

4.3.1 Criticality

4.3.1.1 The spent fuel storage racks are designed and shall be maintained with:

- a. Fuel assemblies having a maximum U-235 enrichment of 4.52 weight percent;
- b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.7.2 of the Updated Final Safety Analysis Report (UFSAR);
- c. A nominal 10-3/32-inch center-to-center distance between fuel assemblies placed in the high density fuel storage racks;

4.3.1.2 The new fuel storage racks are designed and shall be maintained with:

- a. Fuel assemblies having a maximum U-235 enrichment of 5.0 weight percent;
- b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.7.1 of the UFSAR;
- c. $k_{eff} \leq 0.95$ if moderated by aqueous foam, which includes an allowance for uncertainties as described in Section 9.7.1. of the UFSAR; and

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- d. A nominal 18-inch center-to-center distance between fuel assemblies placed in the storage racks.

4.3.2 Drainage

The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 63 ft.

4.3.3 Capacity

The spent fuel storage pool is designed and shall be maintained with a storage capacity, for both Units 1 and 2, limited to no more than 1830 fuel assemblies.
