

4.0 DESIGN FEATURES

4.1 Site Location

The site for the Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 3 is located on the western shore of the Chesapeake Bay in Calvert County, Maryland, about 10.5 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 for CCNPP Unit 3 is a circle with a radius of 3324 feet. The exclusion area boundary establishes a radius of at least 2640 feet from potential CCNPP Unit 3 release points.

4.2 Reactor Core

4.2.1 Fuel Assemblies

The reactor shall contain 241 fuel assemblies. Each assembly shall consist of a matrix of fuel rods clad with a zirconium based alloy with an initial composition of natural or slightly enriched uranium dioxide (UO₂) 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 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.

4.2.2 Control Rod Assemblies

The reactor core shall contain 89 control rod assemblies. The control material shall be silver indium cadmium as approved by the NRC.

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 5.0 weight percent;
- b. $k_{\text{eff}} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in FSAR Section 9.1;
- c. A nominal 10.9 inch center to center distance between fuel assemblies placed in Region 1 and a nominal 9.028 inch center to center distance between fuel assemblies placed in Region 2 of the spent fuel storage racks;

4.0 DESIGN FEATURES

4.3 Fuel Storage (continued)

- d. New or partially spent fuel assemblies with any discharge burnup may be allowed unrestricted storage in Region 1 of Figure 4.3-1;
- e. Partially spent fuel assemblies meeting the initial enrichment and burnup requirements of LCO 3.7.16, "Spent Fuel Storage," may be stored in Region 2 of Figure 4.3-1.

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

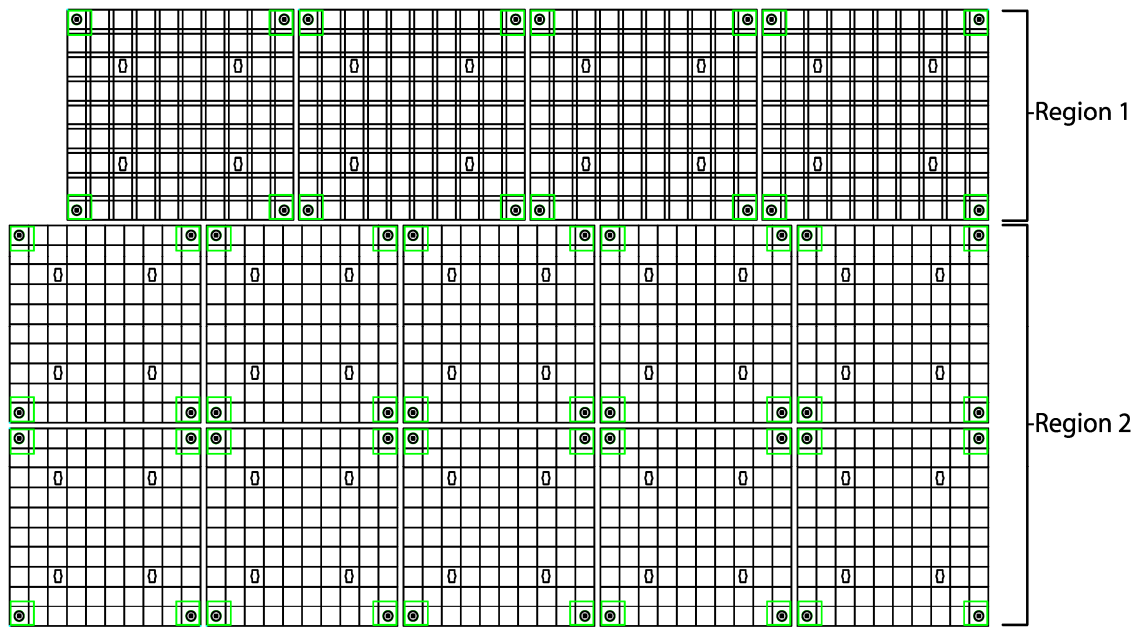
- a. Fuel assemblies having a maximum U-235 enrichment of 5.0 weight percent;
- b. $k_{\text{eff}} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in FSAR Section 9.1;
- c. $k_{\text{eff}} \leq 0.98$ if moderated by aqueous foam, which includes an allowance for uncertainties as described in FSAR Section 9.1; and
- d. A nominal 10.9 inch center to center distance between fuel assemblies placed in the new fuel 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 23 ft.

4.3.3 Capacity

The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 1360 fuel assemblies.



Region 1 (Racks 1 through 4) – 360 locations
 Region 2 (Racks 5 through 14) – 1000 locations
 Total Storage Locations – 1360

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Figure 4.3-1 (page 1 of 1)
 Discrete Two Region Spent Fuel Pool Rack Layout