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CHAPTER 4.0.0

DESIGN FEATURES

4.0 DESIGN FEATURES

4.1 Site Location

The Callaway Plant site consists of approximately 2,767 acres of rural land 10 miles southeast of the city of Fulton in Callaway County, Missouri, and 80 miles west of the St. Louis metropolitan area.

4.2 Reactor Core

4.2.1 Fuel Assemblies

The reactor shall contain 193 fuel assemblies. Each assembly shall consist of a matrix of Zircalloy or ZIRLO clad fuel rods with an initial composition of natural or slightly enriched uranium dioxide (UO_2) as fuel material. Limited substitution of fuel rods by zirconium alloy or stainless steel filler rods may be used in accordance with approved applications of fuel rod configurations. 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 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 53 control rod assemblies. The control rod material shall be silver indium cadmium, hafnium metal, or a mixture of both types, 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 nominal U-235 enrichment of 5.0 weight percent; For fuel with enrichments greater than 4.6 nominal weight percent of U-235, the combination of enrichment and integral fuel burnable absorbers shall be sufficient so that the requirements of 4.3.1.1.b are met.

(continued)

4.3 Fuel Storage (continued)

b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.1 of the FSAR;

c. A nominal 8.99 inch center to center distance between fuel assemblies placed in the fuel storage racks;

d. Partially spent fuel assemblies with a discharge burnup in the "Acceptable Burnup Domain for Region 2 and 3 storage" of Figure 3.7.17-1 may be allowed unrestricted storage in the fuel storage racks, except for the empty cells in the checkerboarding configuration;

e. Partially spent fuel assemblies with a discharge burnup in the "Acceptable Burnup Domain for Region 3 Storage" of Figure 3.7.17-1 may be allowed unrestricted storage, except for the empty cells in the checkerboarding configuration, and except in Region 2 locations in a Mixed Zone Three Region configuration in the fuel storage racks; and

f. New or partially spent fuel assemblies with a discharging burnup in the "Unacceptable Burnup Domain for Region 2 or 3 Storage" of Figure 3.7.17-1 will be stored in Region 1.

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

a. Fuel assemblies having a maximum nominal 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 9.1 of the FSAR;

c. $k_{eff} \leq 0.98$ if moderated by aqueous foam, which includes an allowance for uncertainties as described in Section 9.1 of the FSAR; and

d. A nominal 21 inch center to center distance between fuel assemblies placed in the storage racks.

(continued)

4.3 Fuel Storage (continued)

4.3.2 Drainage

The fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 2040 ft.

4.3.3 Capacity

The fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 2363 fuel assemblies in the spent fuel pool and no more than 279 assemblies in the cask loading pool.