4.0 Design Features

4.1 Site

4.1.1 Site and Exclusion Area Boundaries

The site and exclusion area boundaries [shall be as described or as shown in Figure 4.1-1].

4.1.2 Low Population Zone (LPZ)

The LPZ [shall be as described or as shown in Figure 4.1-2].

4.2 Reactor Core

4.2.1 Fuel Assemblies

The reactor shall contain 872 fuel assemblies. Each assembly shall consist of a matrix of zirconium alloy fuel rods with an initial composition of natural or slightly enriched uranium dioxide (UO_2) as fuel material, and an internal cruciform structure designed to allow the passage of non-boiling water during operation. 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 205 cruciform shaped control rod assemblies. The control material shall be boron carbide and/or hafnium metal as approved by the NRC.

4.0 DESIGN FEATURES

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 k-infinity of 1.35 in the normal reactor core configuration at cold conditions;

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 DCD Tier 2.

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

a. Fuel assemblies having a maximum k-infinity of 1.35 in the normal reactor core configuration at 20ºC;

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 DCD Tier 2;

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 DCD Tier 2; and

d. A nominal [approximately 16] cm center to center distance between fuel assemblies placed in 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 3.1 m above the top of the active fuel.

4.3.3 Capacity

4.3.3.1 The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no less than 2354 fuel assemblies (270% of full core discharge).

(This figure shall be supplied by the COL applicant.)

This figure shall consist of [a map of] the site area and provide, as a minimum, the information described in Section [2.1.2] of the FSAR relating to [the map].

Figure 4.1-1 (page 1 of 1)

Site and Exclusion Area Boundaries

(This figure shall be supplied by the COL applicant.)

This figure shall consist of [a map of] the site area showing the LPZ boundary. Features such as towns, roads, and recreational areas shall be indicated in sufficient detail to allow identification of significant shifts in population distribution within the LPZ.

Figure 4.1-2 (page 1 of 1)

Low Population Zone