4.0 DESIGN FEATURES

4.1 Site

4.1.1 Site and Exclusion Area Boundaries

The site and exclusion area boundaries are described as follows:

The STP site is located approximately 89 miles southwest of Houston, Texas, and 200 miles southeast of Austin, Texas. The site area is approximately 12,200 acres located in a rural area of south-central Matagorda County. STP 3 & 4 are located within the Exclusion Area Boundary (EAB) already designated for STP 1 & 2. The site boundary entirely encompasses the designated EAB for STP 3 & 4. The EAB is an oval having a minimum distance of approximately 4692 feet from the center of each of the STP 1 & 2 Reactor Containment Buildings. The center of the exclusion area "oval" is a point approximately 305 feet directly west of the center of the Unit 2 Reactor Containment Building.

4.1.2 Low Population Zone (LPZ)

The LPZ is defined by the 3-mile radius circle from a point approximately 305 feet directly west of the center of the Unit 2 Reactor Containment Building. This point is also the center of the existing STP 1 & 2 LPZ.

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 water rods. Limited substitutions of zirconium alloy 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 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.

4.3 Fuel Storage

4.3.1 Criticality

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

4.0 DESIGN FEATURES

4.3 Fuel Storage (continued)

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 FSAR.

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 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, 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).