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UPDATED FSAR

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### 1.2.2 SUMMARY PLANT DESCRIPTION

The inherent design of the pressurized water, closed-cycle reactor significantly reduces the quantities of fission products which must be released to the atmosphere. Four barriers exist between the fission products accumulated and the environment. These are the uranium dioxide fuel matrix, the fuel cladding, the reactor vessel and coolant loops, and the reactor containment. The consequences of a breach of the fuel cladding are greatly reduced by the ability of the uranium dioxide lattice to retain fission products. Fission products, which escape through a fuel cladding defect are contained within the pressure vessel, loops and auxiliary systems. Breach of these systems or equipment would release the fission products to the reactor containment where they would be retained. The reactor containment is designed to retain adequately these fission products under the most severe accident conditions, as analyzed in Chapter 15.0.

Several engineered safety features have been incorporated into the plant design to reduce the consequences of a loss-of-coolant accident (LOCA). These safety features include a Safety Injection System. This system automatically delivers borated water to the reactor vessel for cooling under high and low reactor coolant pressure conditions. The Safety Injection System also serves to insert negative reactivity into the core in the form of borated water during an uncontrolled plant cooldown following a steam line break or an accidental steam release. Other safety features which have been included in the reactor containment design are a Containment Air Recirculation Cooling System which would effect a rapid depressurization of the containment following a loss of coolant, and a Containment Spray System which would depressurize the containment and remove elemental iodine from the atmosphere by washing action. The Containment Spray System provides backup cooling for the Containment Air Recirculation Cooling System.

#### 1.2.2.1 Structures

The major structures are a Reactor Containment, Auxiliary Building, Turbine Building, and Fuel Handling Building. A general plan of the building arrangements is shown on Figure 1.2.2-1. Figures 1.2.2-2 through 1.2.2-12 show the general internal layout of the buildings.

The reactor containment is a vertical, reinforced concrete cylinder with prestressed tendons in the vertical wall, a reinforced concrete hemispherical domed roof and a substantial base slab of reinforced concrete supported by piles. The containment was designed to withstand environmental effects and the internal pressure accompanying a LOCA. It also provides adequate radiation shielding for both normal operation and accident conditions.

Particular structures and equipment are classified according to seismic design. The definition of the three seismic classifications is given in Section 3.2.

#### 1.2.2.2 Nuclear Steam Supply System (NSSS)

The NSSS consists of a pressurized water reactor, Reactor Coolant System (RCS), and associated auxiliary fluid systems. The RCS is arranged as three closed reactor coolant loops connected in parallel to the reactor vessel, each loop containing a reactor coolant pump and a steam generator. An electrically heated pressurizer is connected to one of the loops.

The reactor core is composed of uranium dioxide pellets enclosed in Zircaloy tubes with welded end plugs. The tubes are supported in assemblies by a spring clip grid structure. The mechanical control rods consist of clusters of stainless steel clad absorber rods and guide tubes located within the fuel assembly. The core fuel is loaded in three regions with new fuel being introduced into the outer region, moved inward into a checkerboard pattern at successive refuelings and discharged from the inner region to spent fuel storage.

The steam generators are vertical U-tube units containing Inconel tubes. Integral separating equipment reduces the moisture content of the steam at the turbine throttle to 1/4 percent or less.

The reactor coolant pumps are vertical, single stage, centrifugal pumps equipped with controlled leakage shaft seals.

Auxiliary systems are provided to charge the RCS and to add makeup water, purify reactor coolant water, provide chemicals for corrosion inhibition and reactor control, cool system components, remove residual heat when the reactor is shutdown, cool the spent fuel storage pool, sample reactor coolant water, provide for emergency safety injection, and vent and drain the RCS.

#### 1.2.2.3 Reactor and Plant Control

The reactor is controlled by a coordinated combination of chemical shim and mechanical control rods. The automatic rod control system is designed to restore programmed average temperature following a scheduled or transient step change in load of  $\pm 10$  percent or a ramp change of  $\pm 5$  percent per minute within the range of 15 to 100 percent power. However, under nominal operating conditions, the control system allows the plant to accept step load changes of 20 percent and ramp load changes of 15 percent per minute over the load range of 15 to 95 percent power.

Supervision of both the reactor and turbine generator is accomplished from the Control Room.

The waste disposal control board is located in the Auxiliary Building, in the vicinity of the boric acid and waste evaporators. This board permits the auxiliary operator to control and monitor the processing of wastes from a central location in the same general area where equipment is located.

#### 1.2.2.4 Waste Disposal System

The Waste Disposal System provides equipment necessary to collect, process, and prepare for disposal potentially radioactive liquid, gaseous, and solid wastes produced as a result of reactor operation.

Liquid wastes are collected and processed through a waste evaporator. The waste evaporator condensate is sampled to determine residual activity and monitored during discharge to the lake via the condenser discharge to assure concentrations below 10CFR20 limits. The evaporator residues are drummed for ultimate disposal in an authorized location.