10.2 NEW FUEL STORAGE

10.2.1 Power Generation Objective

The objective of the new fuel storage arrangement is to provide specially designed dry, clean storage places for the new fuel assemblies when normal storage in the spent fuel pool is not utilized.

10.2.2 Power Generation Design Basis

1. New fuel storage racks shall be supplied to accommodate 30 percent of a full core load of fuel assemblies for each reactor.

2. New fuel storage racks shall be designed and arranged so that the fuel assemblies can be handled efficiently.

10.2.3 Safety Design Basis

1. The new fuel storage racks shall be designed and maintained with sufficient spacing between the fuel assemblies to assure that when the racks are fully loaded, the array shall be subcritical by a substantial margin.

2. The new fuel storage racks loaded with fuel assemblies shall be designed to withstand earthquake loadings to prevent damage to the structure of the racks and minimize distortion of the racks' arrangement.

10.2.4 Description

Each unit is provided with a new fuel storage vault located adjacent to the spent fuel pool as shown in Figures 1.6-2 and 1.6-11. The new fuel storage racks provide a storage place in the new fuel storage vaults for new fuel. Each new fuel storage rack (shown in Figure 10.2-2) holds up to 10 new channeled or unchanneled fuel assemblies in a row spaced 6.625 inch apart center-to-center. The racks are designed so that rack arrangement in rows on an 11-inch center-to-center spacing will limit the effective multiplication factor of the array (k_{eff}) to not more than 0.90. New fuel storage racks are provided for 30 percent of the reactor core load. The fuel assemblies are loaded into the rack through the top. Each hole for a fuel assembly has adequate clearance for inserting or withdrawing the assembly while enclosed in a protective plastic wrapping. Sufficient guidance is provided to preclude damage to the fuel assemblies. Guides are provided to guide the spacers of the fuel elements for the full length of their insertion into the rack. The design of the racks prevents accidental insertion of the fuel assembly in a position not intended for the fuel. The weight of the fuel assembly is supported at the bottom and the rack provides a full horizontal support of the new fuel assembly. Removable

gratings (10-7/8 inch by 6 ft 8 inch) over each fuel rack and permanent gratings at the end spaces of the new fuel storage vault are provided to minimize the number of uncovered assemblies. These gratings can withstand loads of 100 lbs/ft^2. The vaults are provided with steel and concrete covers one foot thick. The vaults are provided with adequate drainage to prevent water collection and flooding. Each new fuel storage rack loaded with fuel is designed as a Seismic Class I structure (see Appendix C) to resist sufficiently the response motion at the installed location within the supporting structure for the design basis earthquake. Information on radiation monitoring of the new fuel storage vaults is provided in Subsection 7.13, "Area Radiation Monitoring System." Each vault is to be provided with neutron dosimeters whenever new fuel is stored there.

10.2.5 Safety Evaluation

BFN has chosen to comply with the criticality requirements specified in 10 CFR 50.68(b). New fuel is not placed in the New Fuel Storage Racks until a criticality analysis of optimum moderator configuration is performed. (Reference TVA to NRC letter dated July 21, 1997, R08970721849)

Stresses in a fully loaded rack are designed not to exceed applicable specification requirements of the American Institute of Steel Construction or the American Society of Civil Engineering when subjected to a horizontal earthquake load of 1.50g applied in any direction. A safety factor of two, based upon the material yield or local critical buckling, is used where these specifications are not applicable.

The storage rack structure is designed to absorb an impact energy of at least 7,000 ft-lbs on an impact surface no larger than 3 inches in diameter. Under this impact force, those members will remain intact whose function it is to physically maintain the abnormal design subcritical spacing to assure that k_{eff} will not exceed 0.95.

The storage racks are designed to withstand a pull-up force equal to 4,000 lbs (this is necessary in the event that the fuel assembly or grappling device accidentally becomes fouled during removal). The stress in those members required to maintain the abnormal design subcritical spacing will not exceed 75 percent of the material's yield strength or 75 percent of that stress at which local buckling occurs.

The new fuel racks are restrained by hold-down lugs to assure that rack spacing does not vary under specified earthquake loads. The hold-down bolts restrain the rack in case a stuck fuel assembly is inadvertently hoisted. Each hold-down bolt is designed to withstand 500 lb horizontal shear and uplift force of 5,000 lbs. All materials used in the construction of the new fuel storage racks are specified in accordance with the applicable ASTM specifications, and all welds are in

accordance with the AWS standards for materials used. Materials selected are corrosion resistant or treated to provide the necessary corrosion resistance.