

DUKE POWER COMPANY  
OCONEE NUCLEAR STATION

ATTACHMENT 1

PROPOSED TECHNICAL SPECIFICATION REVISION

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### 3.8 FUEL LOADING AND REFUELING

#### Applicability

Applies to fuel loading and refueling operations.

#### Objective

To assure that fuel loading and refueling operations are performed in a responsible manner.

#### Specification

- 3.8.1 Radiation levels in the reactor building refueling area shall be monitored by RIA-2 and RIA-3. Radiation levels in the spent fuel storage area shall be monitored by RIA-6. If any of these instruments becomes inoperable, portable survey instrumentation, having the appropriate ranges and sensitivity to fully protect individuals involved in refueling operation, shall be used until the permanent instrumentation is returned to service.
- 3.8.2 Core subcritical neutron flux shall be continuously monitored by at least two neutron flux monitors, each with continuous indication available, whenever core geometry is being changed. When core geometry is not being changed, at least one neutron flux monitor shall be in service.
- 3.8.3 At least one low pressure injection pump and cooler shall be operable.
- 3.8.4 During reactor vessel head removal and while loading and unloading fuel from the reactor, the boron concentration shall be maintained at not less than that required to shutdown the core to a  $k_{eff} \leq 0.99$  if all control rods were removed.
- 3.8.5 Direct communications between the control room and the refueling personnel in the reactor building shall exist whenever changes in core geometry are taking place.
- 3.8.6 During the handling of irradiated fuel in the reactor building at least one door on the personnel and emergency hatches shall be closed. The equipment hatch cover shall be in place with a minimum of four bolts securing the cover to the sealing surfaces.
- 3.8.7 Both isolation valves in lines containing automatic containment isolation valves shall be operable, or at least one shall be closed.
- 3.8.8 When two irradiated fuel assemblies are being handled simultaneously within the fuel transfer canal, a minimum of 10 feet separation shall be maintained between the assemblies at all times.

Irradiated fuel assemblies may be handled with the Auxiliary Hoist provided no other irradiated fuel assembly is being handled in the fuel transfer canal.

- 3.8.9 If any of the above specified limiting conditions for fuel loading and refueling are not met, movement of fuel into the reactor core shall cease; action shall be initiated to correct the conditions so that the specified limits are met, and no operations which may increase the reactivity of the core shall be made.
- 3.8.10 The reactor building purge system, including the radiation monitor, RIA-45, which initiates purge isolation, shall be tested and verified to be operable immediately prior to refueling operations.
- 3.8.11 Irradiated fuel shall not be moved from the reactor until the unit has been subcritical for at least 72 hours.
- 3.8.12 Two trains of spent fuel pool ventilation shall be operable with the following exceptions:
- a. With one train of spent fuel pool ventilation inoperable, fuel movement within the storage pool or crane operation with loads over the storage pool may proceed provided the operable spent fuel pool ventilation train is in operation and discharging through the Reactor Building purge filters.
  - b. With no spent fuel pool ventilation filter operable, suspend all operations involving movement of fuel within the storage pool or crane operations with loads over the storage pool until at least one train of spent fuel pool ventilation is restored to operable status.
- 3.8.13
- a. Prior to spent fuel cask movement in the Unit 1 and 2 spent fuel pool, spent fuel stored in the first 36 rows of the pool closest to the spent fuel cask handling area shall be decayed a minimum of 55 days.
  - b. Prior to spent fuel cask movement in the Unit 3 spent fuel pool, spent fuel stored in the first 20 rows of the pool closest to the spent fuel cask handling area shall be decayed a minimum of 43 days.
- 3.8.14 No suspended loads of more than 3000 lb<sub>m</sub> shall be transported over spent fuel stored in either spent fuel pool.
- 3.8.15
- a. No fuel which has an enrichment greater than 3.5 weight percent U<sup>235</sup> (46 grams of U<sup>235</sup> per axial centimeter of fuel assembly) will be stored in the spent fuel pool for Unit 3.
  - b. No fuel which has an enrichment greater than 4.3 weight percent U<sup>235</sup> (57 grams of U<sup>235</sup> per axial centimeter of fuel assembly) will be stored in the spent fuel pool for Units 1 and 2.

#### Bases

Detailed written procedures will be available for use by refueling personnel. These procedures, the above specifications, and the design of the fuel handling equipment as described in Section 9.7 of the FSAR incorporating built-in interlocks and safety features, provide assurance that no incident could occur

during the refueling operations that would result in a hazard to public health and safety. If no change is being made in core geometry, one flux monitor is sufficient. This permits maintenance on the instrumentation.

Continuous monitoring of radiation levels and neutron flux provides immediate indication of an unsafe condition. The low pressure injection pump is used to maintain a uniform boron concentration. (1) The shutdown margin indicated in Specification 3.8.4 will keep the core subcritical, even with all control rods withdrawn from the core. (2) The boron concentration will be maintained above 1.800 ppm. Although this concentration is sufficient to maintain the core  $k_{eff} \leq 0.99$  if all the control rods were removed from the core, only a few control rods will be removed at any one time during fuel shuffling and replacement. The  $k_{eff}$  with all rods in the core and with refueling boron concentration is approximately 0.9. Specification 3.8.5 allows the control room operator to inform the reactor building personnel of any impending unsafe condition detected from the main control board indicators during fuel movement.

The specification requiring testing of the Reactor Building purge isolation is to verify that these components will function as required should a fuel handling accident occur which resulted in the release of significant fission products.

Specification 3.8.11 is required, as the safety analysis for the fuel handling accident was based on the assumption that the reactor had been shutdown for 72 hours.(3)

The off-site doses for the fuel handling accident are within the guidelines of 10CFR100; however, to further reduce the doses resulting from this accident, it is required that the spent fuel pool ventilation system be operable whenever the possibility of a fuel handling accident could exist.

Specification 3.8.13 is required as the safety analysis for a postulated cask handling accident was based on the assumptions that spent fuel stored as indicated has decayed for the amount of time specified for each spent fuel pool.

Specification 3.8.14 is required to prohibit transport of loads greater than a fuel assembly with a control rod and the associated fuel handling tool(s).

#### REFERENCES

- (1) FSAR, Section 9.7
- (2) FSAR, Section 14.2.2.1
- (3) FSAR, Section 14.2.2.1.2

## 5.4 NEW AND SPENT FUEL STORAGE FACILITIES

### Specification

#### 5.4.1 New Fuel Storage

- 5.4.1.1 New fuel will normally be stored in the spent fuel pool serving the respective unit.

In the spent fuel pool serving Units 1 and 2, the fuel assemblies are stored in racks in parallel rows, having a nominal center-to-center distance of 13.75 inches in both directions. This spacing is sufficient to maintain a  $K_{eff} \leq 0.95$  when flooded with unborated water, based on fuel with an enrichment of 3.5 weight percent  $U^{235}$ .

In the spent fuel pool serving Unit 3, the fuel assemblies are stored in racks consisting of stainless steel cavities which maintain a minimum edge-to-edge spacing of 3.95 inches between adjacent fuel assemblies. The neutron poisoning effect of the storage cavity material combined with the minimum 3.95 inches edge-to-edge spacing between adjacent fuel assemblies is sufficient to maintain a  $K_{eff} \leq 0.95$  when flooded with unborated water based on fuel with an enrichment of 3.5 weight percent  $U^{235}$  or the equivalent.

- 5.4.1.2 New fuel may also be stored in the fuel transfer canal. The fuel assemblies are stored in five racks in a row having a nominal center-to-center distance of 2' 1-3/4". One rack is oversized to receive a failed fuel assembly container. The other four racks are normal size and are capable of receiving new fuel assemblies.

- 5.4.1.3 New fuel may also be stored in shipping containers.

- 5.4.1.4 New fuel of enrichment not exceeding 2.9 weight percent  $U^{235}$  or the equivalent may be placed in dry storage in Unit 3 fuel storage racks in a checkerboard pattern, with fuel assemblies occupying only diagonally adjacent storage locations. Unused storage locations in a fuel storage module shall be covered by inserting a metal plate in the lead-in to prevent incorrect placement of fuel assemblies. This configuration is sufficient to assure a  $K_{eff} \leq 0.9$  at all times.

#### 5.4.2 Spent Fuel Storage

- 5.4.2.1 Irradiated fuel assemblies will be stored, prior to offsite shipment, in a stainless steel lined spent fuel pool.

The spent fuel pool serving Units 1 and 2 is sized to accommodate a full core of irradiated fuel assemblies in addition to the concurrent storage of the largest quantity of new and spent fuel assemblies predicted by the fuel management program.

Provisions are made in the Unit 1, 2 spent fuel pool to accommodate up to 1312 fuel assemblies and in the Unit 3 spent fuel pool up to 474 fuel assemblies.

- 5.4.2.2 Spent fuel may also be stored in storage racks in the fuel transfer canal when the canal is at refueling level.
- 5.4.3 Except as provided in Specification 5.4.1.4, whenever there is fuel in the pool, the spent fuel pool is filled with water borated to the concentration that is used in the reactor cavity and fuel transfer canal during refueling operations.
- 5.4.4 The spent fuel pool and fuel transfer canal racks are designed for an earthquake force of 0.1g ground motion.

#### REFERENCES

FSAR, Section 9.7