LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

BASES

3/4.7.14 SPENT FUEL POOL BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.7.14 The spent fuel pool boron concentration shall be ≥ 2500 ppm.

APPLICABILITY: When fuel assemblies are stored in the spent fuel pool.

ACTION:

a. Immediately suspend movement of fuel assemblies in the spent fuel pool and initiate action to restore the spent fuel pool boron concentration to within limits.

b. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.14 The spent fuel pool boron concentration shall be determined to be ≥ 2500 ppm at least once every 7 days.

3/4.7.15 FUEL ASSEMBLY STORAGE IN THE SPENT FUEL POOL

LIMITING CONDITION FOR OPERATION

3.7.15 The combination of initial enrichment, burnup, and configuration of the fuel assemblies stored in the spent fuel pool shall be in accordance with the following:

a. New or partially spent fuel assemblies with a combination of burnup and initial nominal enrichment in the "Acceptable" burnup domain of Figure 3.7.15-1 may be stored in the spent fuel pool in a non-matrix location or a low reactivity location in the 5 x 5 matrix configuration shown in Figure 3.7.15-2. They may also be placed in a high reactivity location if stored in the 5 x 5 matrix configuration shown in Figure 3.7.15-2.

b. New or partially spent fuel assemblies with a combination of burnup and initial nominal enrichment in the "Conditionally Acceptable" domain of Figure 3.7.15-1 may be stored in the spent fuel pool in a non-matrix location, but must be placed in a high reactivity location if stored in the 5 x 5 matrix configuration shown in Figure 3.7.15-2.

c. New or partially spent fuel assemblies with a combination of burnup and initial nominal enrichment in the "Unacceptable" domain of Figure 3.7.15-1 must be stored in the spent fuel pool in a high reactivity location in the 5 x 5 matrix configuration shown in Figure 3.7.15-2. A fuel assembly transferred from Surry for storage in the North Anna spent fuel pool must be treated as a fuel assembly in the "Unacceptable" domain.

APPLICABILITY: When fuel assemblies are stored in the spent fuel pool.

ACTION:

a. Immediately initiate action to move the non-complying fuel assembly to an acceptable storage location.

b. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.15 Prior to storing the fuel assembly in the spent fuel pool location, verify by a combination of visual inspection and administrative means that the initial enrichment, burnup, and storage location of the fuel assembly are in accordance with Specification 3.7.15.

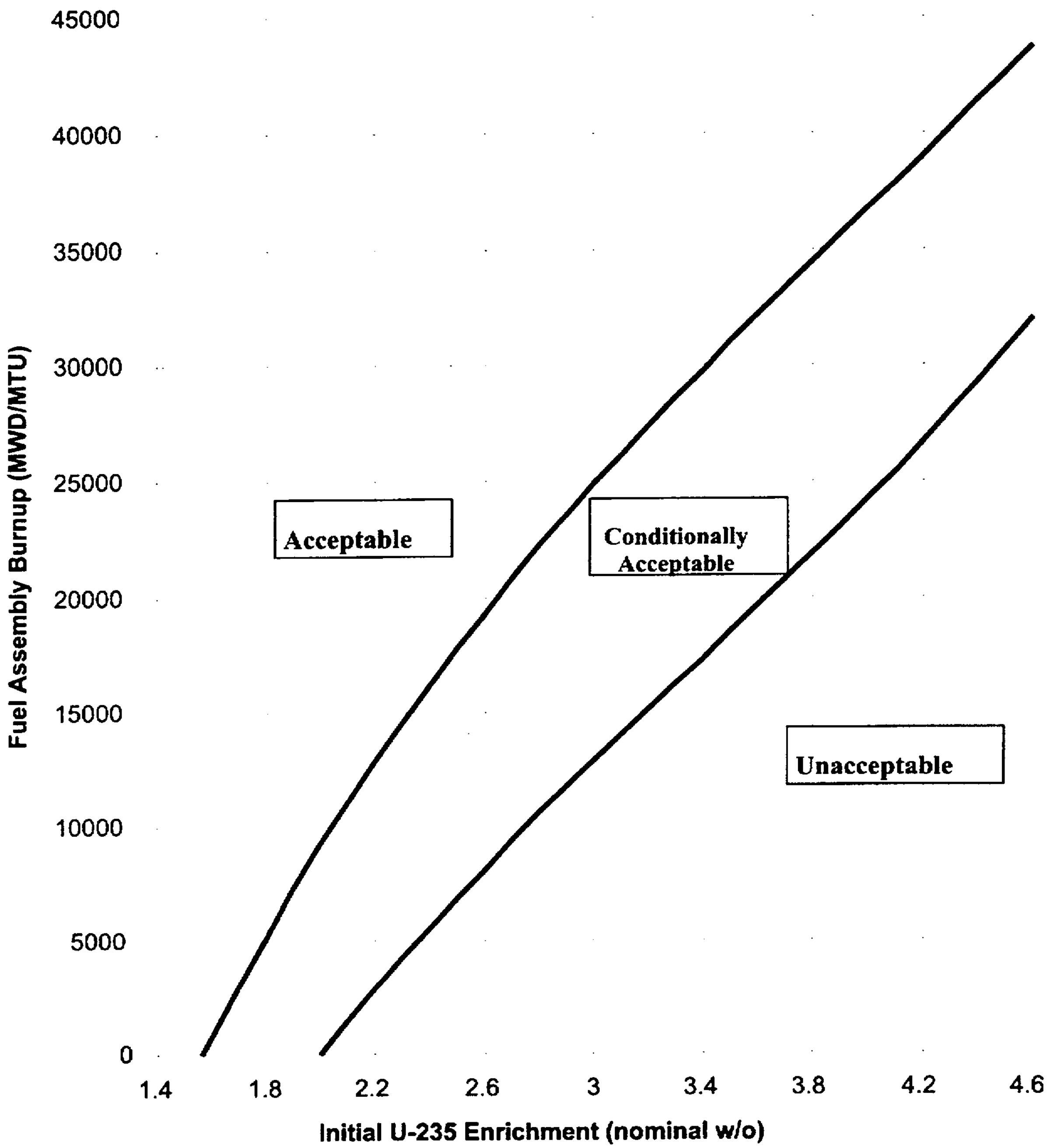
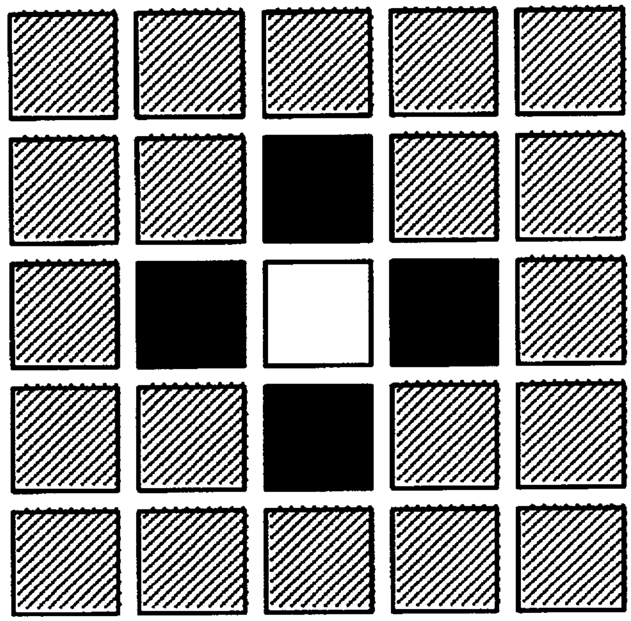


Figure 3.7.15-1 North Anna Burnup Credit Requirements for Spent Fuel Pool Storage

Acceptable: Acceptable for storage in non-matrix location or low reactivity location in matrix configuration. May also be placed in high reactivity locations in matrix configuration.

Conditionally Acceptable: Acceptable for storage in non-matrix location, but must be placed in high reactivity location if stored in matrix configuration.

Unacceptable: Must be stored in high reactivity location in matrix configuration. Surry spent fuel must be stored in high reactivity locations in a matrix.



Low reactivity fuel
(Per Figure 3.7.15-1 or cell containing no fuel assembly)

High reactivity fuel
(Per Figure 3.7.15-1, reactivity up to and including 4.6 w/o U^{235} fresh fuel or cell containing no fuel assembly)

No fuel assembly

Figure 3.7.15-2 North Anna 5 x 5 Matrix Storage Configuration

Notes to Figure:

1. A partial matrix at the boundary of the spent fuel pool storage locations is an acceptable configuration.
2. Storage of non-fueled components within the matrix or non-matrix cells that results in a reduced spent fuel pool K_{eff} is acceptable.
3. A storage cell containing no fuel assembly may be substituted for any location in either matrix or non-matrix configuration.
4. Spent fuel transferred from Surry must be stored in high reactivity locations.

3/4.7.14 SPENT FUEL POOL BORON CONCENTRATION

The specified spent fuel pool boron concentration of $\geq$ 2500 ppm preserves the assumptions used in the spent fuel pool criticality calculations. The amount of soluble boron required to offset postulated accidents was evaluated for the spent fuel pool. That evaluation established the amount of soluble boron necessary to ensure that K_{eff} will be maintained less than 0.95 should the pool temperature exceed the assumed range or a fuel assembly misload occur. The amount of soluble boron necessary to mitigate these events was determined to be 900 ppm including uncertainties. The specified minimum boron concentration of 2500 ppm assures that the concentration will remain above this value. In addition, the boron concentration of 2500 ppm is consistent with the boron dilution evaluation that demonstrates that any credible dilution event could be terminated prior to reaching the boron concentration for a $K_{eff} \geq 0.95$.

3/4.7.15 FUEL ASSEMBLY STORAGE IN THE SPENT FUEL POOL

The restrictions on the placement of fuel assemblies within the spent fuel pool ensure that the K_{eff} will always remain < 0.95, assuming the pool is flooded with borated water. The fuel that may be stored in a non-matrixed configuration is no more reactive than fresh fuel enriched to 2.0 w/o U^{235}. More reactive fuel must be stored in a matrix configuration with less reactive fuel. To ensure that K_{eff} remains < 0.95 for a matrix with the highest reactivity fuel currently allowed by T.S. 5.3.1, the low reactivity fuel in the defined matrix configuration has been defined as equivalent to the reactivity of fresh fuel enriched to $\leq$ 1.56 w/o U^{235}.

Spent fuel assemblies from Surry Power Station with an initial enrichment of $\leq$ 4.1 w/o U^{235} are less reactive than North Anna fresh fuel assemblies enriched to 4.6 w/o U^{235}. Therefore, it is acceptable to store Surry spent fuel transferred to North Anna in the high reactivity locations of the 5 x 5 matrix configuration.

Additional fueled components such as a partially or fully loaded fuel rod basket, a container of fuel pellets/pin fragments ($\leq$ 540 pellets), or fission chamber detectors (< 300 g of U^{235} total for all stored detectors) are less reactive than the low reactivity North Anna spent fuel assemblies. Therefore, these fueled components may be stored in any storage location in the North Anna spent fuel pool where fuel is permitted.

Failed fuel canister storage locations may be filled with fuel assemblies of enrichments < 2.0 w/o U^{235} equivalent and treated as a non-matrix configuration region. Due to the larger pitch of the two failed fuel canister storage locations, the K_{eff} of a non-matrix configuration in the failed fuel assembly storage region is bounded by the K_{eff} of a non-matrix configuration in the nominal spent fuel pool storage region.

DESIGN PRESSURE AND TEMPERATURE

5.2.2 The reactor containment building is designed and shall be maintained for a maximum internal pressure of 45 psig and a temperature of 280°F.

5.3 REACTOR CORE

FUEL ASSEMBLIES

5.3.1 The reactor core shall contain 157 fuel assemblies with each fuel assembly containing 264 fuel rods clad with Zircaloy-4 or ZIRLO. Each fuel rod shall have a nominal active fuel length of 144 inches. The initial core loading shall have a maximum enrichment of 3.2 weight percent U-235. Reload fuel shall be similar in physical design to the initial core loading and shall have a maximum enrichment of 4.6 weight percent U-235. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with NRC-approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those designs that have been analyzed with applicable NRC staff-approved codes and methods, and shown by tests or analyses to comply with all fuel safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in nonlimiting core locations.

CONTROL ROD ASSEMBLIES

5.3.2 The reactor core shall contain 48 full length control rod assemblies. The full length control rod assemblies shall contain a nominal 142 inches of absorber material. The nominal values of absorber material shall be 80 percent silver, 15 percent indium and 5 percent cadmium. All control rods shall be clad with stainless steel tubing.

5.4 REACTOR COOLANT SYSTEM

DESIGN PRESSURE AND TEMPERATURE

5.4.1 The reactor coolant system is designed and shall be maintained:

a. In accordance with the code requirements specified in Section 5.2 of the FSAR, with allowance for normal degradation pursuant to the applicable Surveillance Requirements,

b. For a pressure of 2485 psig, and

c. For a temperature of 650°F, except for the pressurizer which is 680°F.

VOLUME

5.4.2 The total water and steam volume of the reactor coolant system is approximately 10,000 cubic feet at nominal operating conditions.

5.5 METEOROLOGICAL TOWER LOCATION

5.5.1 The meteorological tower shall be located as shown on Figure 5.1-1.

5.6 FUEL STORAGE

CRITICALITY

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

a. A K_{eff} equivalent to less than 1.0 when flooded with unborated water, which includes an allowance for uncertainties calculated in accordance with the methodology described in Virginia Electric and Power Company letter dated September 27, 2000 (Serial No. 00-491).

b. A nominal 10 9/16 inch center-to-center distance between fuel assemblies placed in the storage racks.

c. A K_{eff} equivalent to less than 0.95 when fully flooded with water borated to 350 ppm, which includes an allowance for uncertainties calculated in accordance with the methodology described in Virginia Electric and Power Company letter dated September 27, 2000 (Serial No. 00-491), but excludes allowances for postulated accidents.

5.6.1.2 The new fuel pit storage racks are designed and shall be maintained with a nominal 21 inch center-to-center distance between new fuel assemblies such that, on a best estimate basis, K_{eff} will not exceed .98, with fuel of the highest anticipated enrichment in place, when aqueous foam moderation is assumed.

5.6.1.3 If new fuel for the first core loading is stored dry in the spent fuel storage racks, the center-to-center distance between the new fuel assemblies will be administratively limited to 28 inches and the k_{eff} shall not exceed 0.98 when aqueous foam moderation is assumed.

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

3/4.7 PLANT SYSTEMS

3/4.7.14 SPENT FUEL POOL BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.7.14 The spent fuel pool boron concentration shall be ≥ 2500 ppm.

APPLICABILITY: When fuel assemblies are stored in the spent fuel pool

ACTION:

a. Immediately suspend movement of fuel assemblies in the spent fuel pool and initiate action to restore the spent fuel pool boron concentration to within limits.

b. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.14 The spent fuel pool boron concentration shall be determined to be ≥ 2500 ppm at least once every 7 days.

3/4.7.15 SPENT FUEL POOL BORON CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.7.15 The combination of initial enrichment, burnup, and configuration of the fuel assemblies stored in the spent fuel pool shall be in accordance with the following:

a. New or partially spent fuel assemblies with a combination of burnup and initial nominal enrichment in the "Acceptable" burnup domain of Figure 3.7.15-1 may be stored in the spent fuel pool in a non-matrix location or a low reactivity location in the 5 x 5 matrix configuration shown in Figure 3.7.15-2. They may also be placed in a high reactivity location if stored in the 5 x 5 matrix configuration shown in Figure 3.7.15-2.

b. New or partially spent fuel assemblies with a combination of burnup and initial nominal enrichment in the "Conditionally Acceptable" domain of Figure 3.7.15-1 may be stored in the spent fuel pool in a non-matrix location, but must be placed in a high reactivity location if stored in the 5 x 5 matrix configuration shown in Figure 3.7.15-2.

c. New or partially spent fuel assemblies with a combination of burnup and initial nominal enrichment in the "Unacceptable" domain of Figure 3.7.15-1 must be stored in the spent fuel pool in a high reactivity location in the 5 x 5 matrix configuration shown in Figure 3.7.15-2. A fuel assembly transferred from Surry for storage in the North Anna spent fuel pool must be treated as a fuel assembly in the "Unacceptable" domain.

APPLICABILITY: When fuel assemblies are stored in the spent fuel pool.

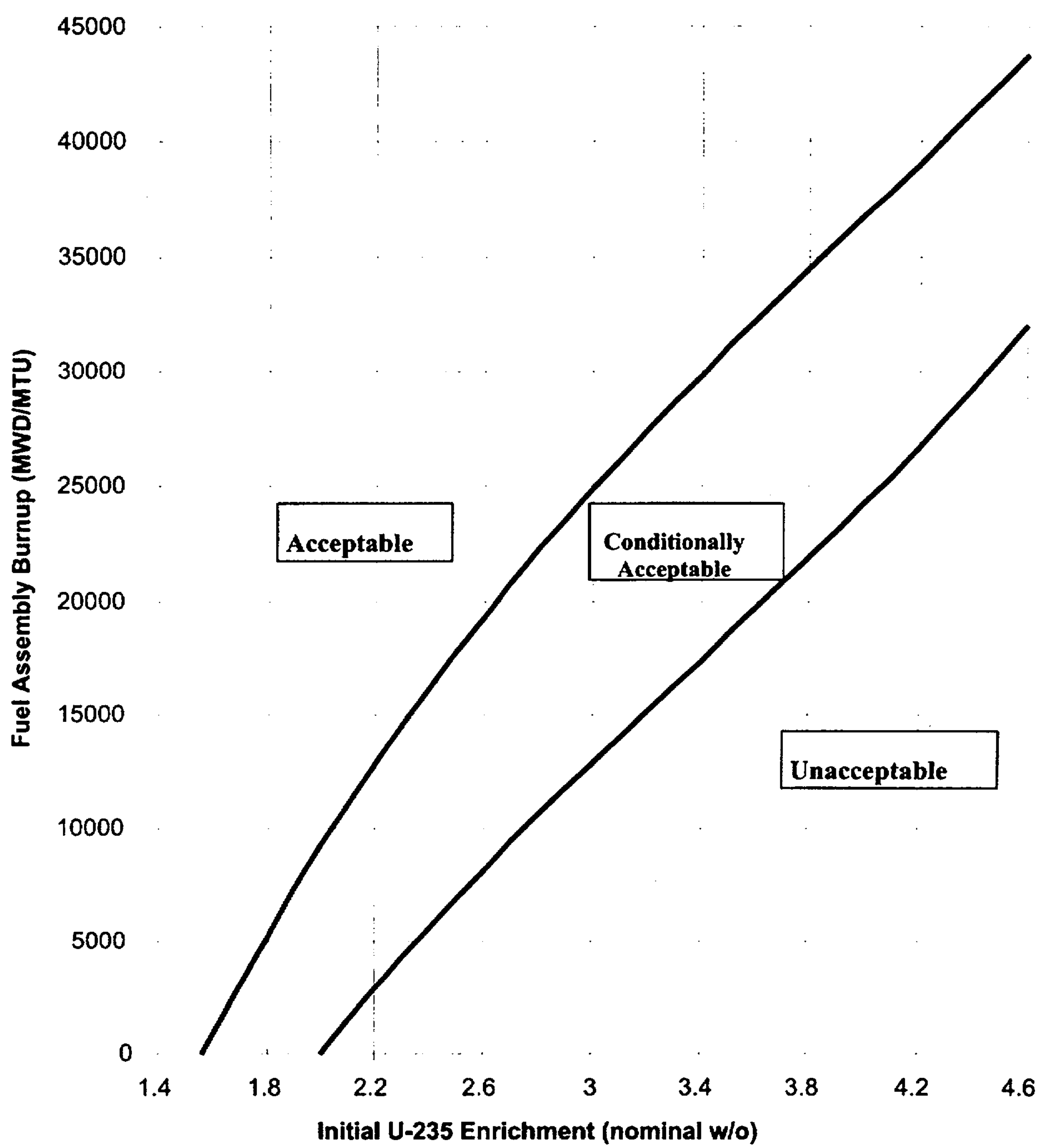
ACTION:

a. Immediately initiate action to move the non-complying fuel assembly to an acceptable storage location.

b. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.15 Prior to storing the fuel assembly in the spent fuel pool location, verify by a combination of visual inspection and administrative means that the initial enrichment, burnup, and storage location of the fuel assembly are in accordance with Specification 3.7.15.



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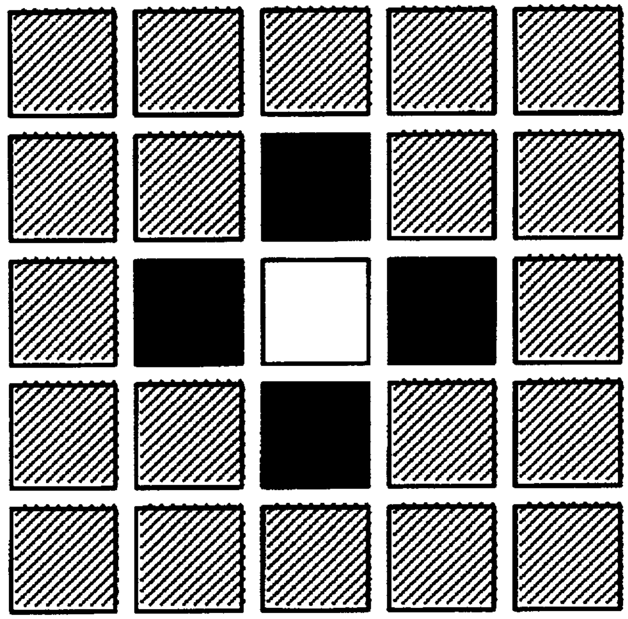

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3/4.7.15 FUEL ASSEMBLY STORAGE IN THE SPENT FUEL POOL

The restrictions on the placement of fuel assemblies within the spent fuel pool ensure that the K_{eff} will always remain < 0.95, assuming the pool is flooded with borated water. The fuel that may be stored in a non-matrixed configuration is no more reactive than fresh fuel enriched to 2.0 w/o U^{235}. More reactive fuel must be stored in a matrix configuration with less reactive fuel. To ensure that K_{eff} remains < 0.95 for a matrix with the highest reactivity fuel currently allowed by T.S. 5.3.1, the low reactivity fuel in the defined matrix configuration has been defined as equivalent to the reactivity of fresh fuel enriched to ≤ 1.56 w/o U^{235}.

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5.6 FUEL STORAGE

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b. A nominal 10 9/16 inch center-to-center distance between fuel assemblies placed in the storage racks.

c. A K_{eff} equivalent to less than 0.95 when fully flooded with water borated to 350 ppm, which includes an allowance for uncertainties calculated in accordance with the methodology described in Virginia Electric and Power Company letter dated September 27, 2000 (Serial No. 00-491), but excludes allowances for postulated accidents.

5.6.1.2 The new fuel pit storage racks are designed and shall be maintained with a nominal 21 inch center-to-center distance between new fuel assemblies such that, on a best estimate basis, k_{eff} will not exceed .98, with fuel of the highest anticipated enrichment in place, when aqueous foam moderation is assumed.

5.6.1.3 If new fuel for the first core loading is stored dry in the spent fuel storage racks, the center-to-center distance between the new fuel assemblies will be administratively limited to 28 inches and the k_{eff} shall not exceed 0.98 when aqueous foam moderation is assumed.

DRAINAGE

5.6.2 The spent fuel pit is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 288.83 feet Mean Sea Level, USGS datum.

CAPACITY

5.6.3 The fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 1737 fuel assemblies.